

Wednesday, May 29, 2024**6:00 PM****McFarland Municipal Center**
5915 Milwaukee St, McFarland
Community Room

AGENDA

The public may attend in-person or remotely through the Zoom webinar or telephone options listed below.

PLEASE CLICK THE LINK BELOW TO JOIN THE ZOOM WEBINAR:

<https://us02web.zoom.us/j/87543994777>

Or by Telephone: +1 (312) 626-6799

Webinar ID: 875 4399 4777

Press *9 to raise/lower hand. Press *6 to mute/unmute.

1. CALL TO ORDER, ROLL CALL.**2. PUBLIC APPEARANCES.**

- a. This is an opportunity for members of the public to address the Public Works and Utilities Committee for items that are not on the agenda. Please remember this is a hybrid meeting conducted in person and through the Zoom online meeting platform. Meeting attendees wishing to address the Committee about items not on the agenda may do so at this time. Zoom attendees should type their name and address in the Question and Answer feature within the Zoom online meeting platform at this time. Members of the public who are present in person and wish to address the Committee should fill out a public comment form and turn into the meeting chairperson. When you are called upon to speak, state your name, address, and provide your comments to the Committee for their consideration. Please adhere to the 3-minute time limit. Additionally, you may send your public comments to public.works@mcfarland.wi.us to be included as part of the meeting.

Members of the public may also speak during their selected agenda item as they designate on the public comment form or in the Question and Answer feature on Zoom.

3. APPROVAL OF MINUTES.

- a. Motion to approve the minutes of the May 2, 2024, Public Works & Utilities Committee meeting.

4. BUSINESS.

- a. Presentation and discussion regarding the 2023 Audit and Financial Statements to review rate and budgetary impacts for McFarland Utilities.
- b. Discussion and action to make a recommendation to the Village Board regarding the award of contract for the bulk fill station at the Public Works building.
- c. Discussion and action to make a recommendation to the Village Board regarding the annual CMAR submittal for 2023
- d. Discussion regarding Paulson Road traffic study.
- e. Discussion and action to approve the installation of an additional stop sign at Ridge Road and Paulson Road at the Larson Beach Road intersection.

f. Discussion and action to approve the addition of stop signs on Broadhead Street at Holscher Road.

g. Public Works Week Presentation

5. SCHEDULE NEXT MEETING DATE.

a. Monday, June 24, 2024 at 6:00 p.m.

6. ADJOURNMENT.

Any person who has a qualifying disability as defined by the Americans with Disabilities Act that requires the meeting or materials at the meeting to be in an accessible location or format should contact the McFarland Municipal Center at (608)838-3153, 5915 Milwaukee Street, McFarland, Wisconsin, or village.clerk@mcfarland.wi.us by 2:00 p.m. at least 5 business days prior to the meeting so that any necessary arrangements can be made to accommodate each request. If the meeting or request is less than 5 business days from the meeting, requests for accommodations may still be made and reasonable efforts will be made to accommodate each request.

VILLAGE OF MCFARLAND
Public Works & Utilities Committee Minutes

Thursday, May 2, 2024 - 6:00 PM

1. CALL TO ORDER, ROLL CALL.

President Clow called the regular meeting of the Public Works & Utilities Committee to order at 6:00 PM in the Community Room of the Municipal Center. This meeting was also held via Zoom webinar.

Members present: Carolyn Clow, Pauline Boness, Chris Fredrick, Zach Freeman, Eric Kindschi, Marc Nielsen

Members not present: Lowell J. Prill

Staff Present: Public Works Director Lee Igl, Assistant to the Public Works Director Aimee Irwin, Town and Country staff Tim Stieve

2. PUBLIC APPEARANCES.

- a. *This is an opportunity for members of the public to address the Public Works and Utilities Committee for items that are not on the agenda. Please remember this is a hybrid meeting conducted in person and through the Zoom online meeting platform. Meeting attendees wishing to address the Committee about items not on the agenda may do so at this time. Zoom attendees should type their name and address in the Question and Answer feature within the Zoom online meeting platform at this time. Members of the public who are present in person and wish to address the Committee should fill out a public comment form and turn into the meeting chairperson. When you are called upon to speak, state your name, address, and provide your comments to the Committee for their consideration. Please adhere to the 3-minute time limit. Additionally, you may send your public comments to public.works@mcfarland.wi.us to be included as part of the meeting.*

Members of the public may also speak during their selected agenda item as they designate on the public comment form or in the Question and Answer feature on Zoom.

None.

3. APPROVAL OF MINUTES.

- a. *Motion to approve the minutes of the March 25, 2024, Public Works & Utilities Committee meeting.*

Motion by President Clow, seconded by Fredrick, to approve the minutes of the March 25, 2024, Public Works & Utilities Committee meeting. Motion carries 6 - 0 - 0.

4. BUSINESS.

- a. *Discussion and action to make a recommendation to the Village Board regarding the award of contract for the 2024 Street & Utility Improvements project.*

Igl provided an overview of the scope of work included within the 2024 Street & Utility Improvement project. Igl explained that funds from the stormwater utility and pedestrian trails will only include the required funds to match the expenses of the project. Stieve reviewed the supplemental bid items that were included in the bid package.

- Fredrick asked if Speedway Sand & Gravel had completed other projects for the village. Stieve responded that Speedway recently completed the Paulson Road project. Igl added that Speedway will be completing the restroom installation at Highland Oaks Park and are working on sidewalk replacements for this year.
- Freeman asked if supplemental bid items were included with Paulson Road last year and if they were accepted. Stieve explained that supplemental bid items were included and accepted. However, those bid tabulations were more favorable than this year's.

Motion by Fredrick, seconded by Boness, to recommend to the Village Board the award of contract to Speedway Sand & Gravel Inc. of Middleton for an amount of \$319,394.00 including the base bid and supplemental bid items S1, S2, and S3, omitting S4, with additional expenses for engineering, construction administration, and contingency for a total project cost in the amount of \$385,000. Motion carries 6 - 0 - 0.

5. SCHEDULE NEXT MEETING DATE.

a. Wednesday, May 29, 2024, at 6:00 p.m.

6. ADJOURNMENT.

Motion by Fredrick, seconded by Boness, to adjourn. By unanimous consent, meeting was adjourned at 6:20 p.m.

Pursuant to law, written notice of this meeting was given to the public and posted on the public bulletin board in accordance with Open Meetings Law.

Respectfully submitted,
Aimee Irwin
Assistant to the Public Works Director

McFarland
SUMMARY SHEET

MEETING DATE: Wednesday, May 29, 2024

SECTION: Business

DEPARTMENT: Public Works

CONTACT: Matt Schuenke, Village Administrator, Lee Igl, Public Works Director

AGENDA ITEM: Presentation and discussion regarding the 2023 Audit and Financial Statements to review rate and budgetary impacts for McFarland Utilities.

PREVIOUS ACTION:

None.

ISSUE SUMMARY:

Enclosed is the annual audit and financial statements for fiscal year 2023. The Auditor will be present to provide a brief overview of the year's performance and its background to understand the finances related to the Committee's responsibilities within the code (related to revenues, expenditures, rates, CIP items, etc.) This will be a general overview of the audit. Committee members are welcome to ask questions of staff and the auditor. No action is required on this item.

FINANCIAL/BUDGET IMPACT:

Financial information is included within the enclosed 2023 Audit and Financial Statements.

VILLAGE PLAN REFERENCE:

None.

ORDINANCE REFERENCE:

None.

BOARD, COMMISSION OR COMMITTEE RECOMMENDATION:

No action is required on this item.

ATTACHMENTS:

1. 2023 McFarland Utility Meeting Handout
2. McFarland Water & Sewer Utilities AUD 12-31-2023 FS FINAL

VILLAGE OF McFARLAND

WATER, SEWER AND STORM UTILITY AUDIT REPORT

Presented on: May 29, 2024

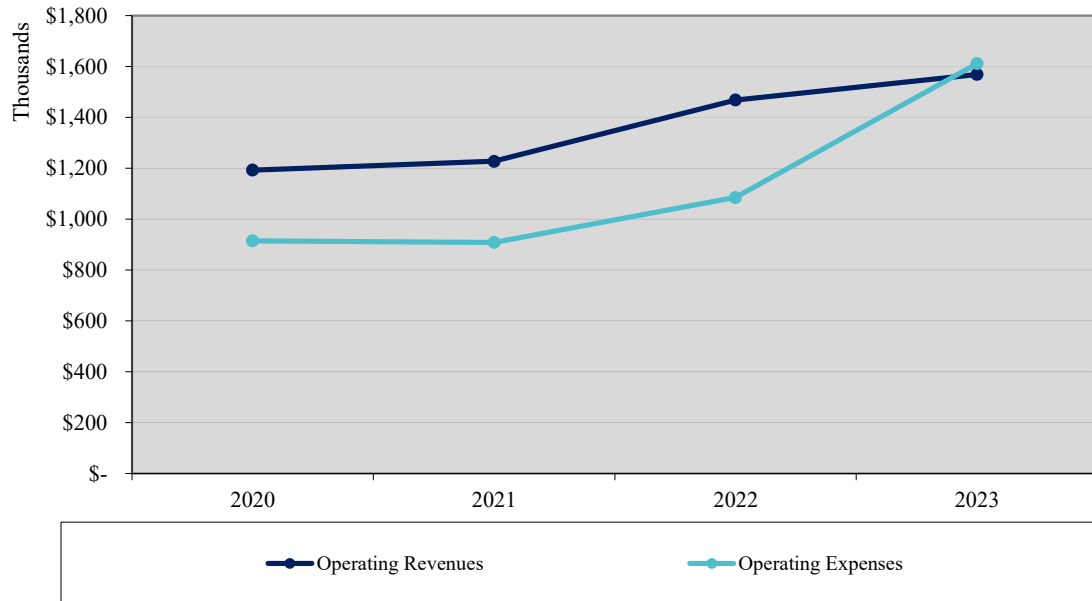
Presented by: Baker Tilly
Jodi Dobson, CPA, Partner

- >> Financial statements will receive unmodified opinion
- >> Overall audit went well
- >> Internal control items noted relate to incomplete segregation due to size
- >> Financial highlights

VILLAGE OF McFARLAND

WATER UTILITY FINANCIAL STATEMENT HIGHLIGHTS

	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Operating Revenues	\$ 1,192,684	\$ 1,227,009	\$ 1,467,683	\$ 1,569,043
Operating Expenses	914,413	907,816	1,085,027	1,611,433

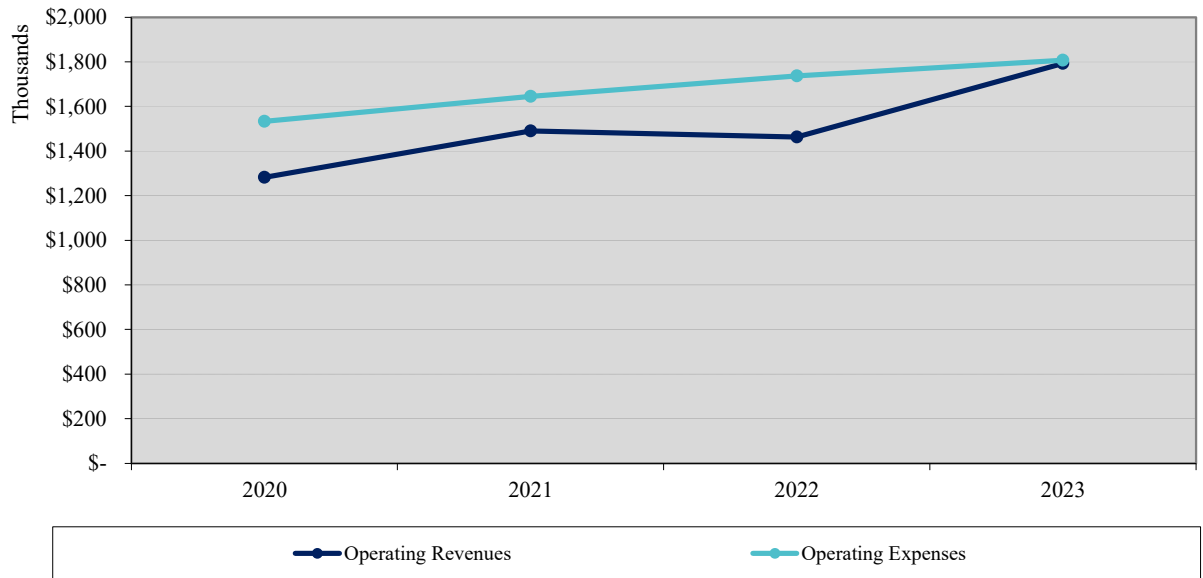


<u>Rate of Return</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Actual rate	1.80%	2.94%	3.45%	-1.10%
Authorized rate	7.25%	4.90%	4.90%	4.90%

VILLAGE OF McFARLAND

SEWER UTILITY FINANCIAL STATEMENT HIGHLIGHTS

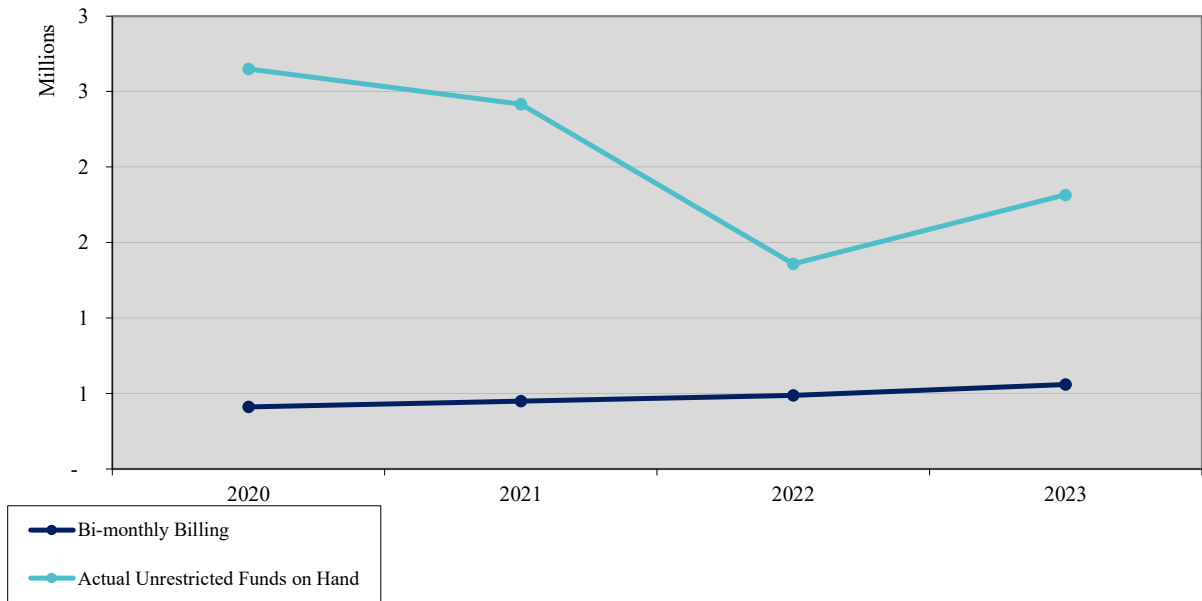
	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Operating Revenues	\$ 1,282,517	\$ 1,490,378	\$ 1,462,816	\$ 1,793,659
Operating Expenses	1,533,595	1,645,340	1,736,571	1,808,192



VILLAGE OF McFARLAND

WATER & SEWER UTILITY FINANCIAL STATEMENT HIGHLIGHTS

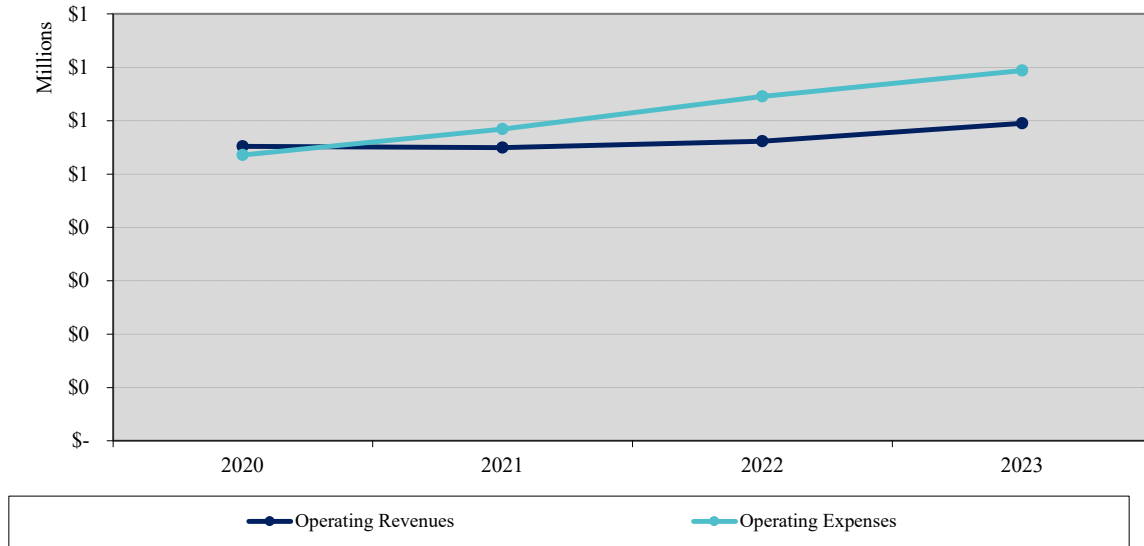
<u>Unrestricted Cash</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Minimum Funding Benchmark				
Bi-monthly Billing	412,500	450,000	488,333	560,000
Actual Unrestricted Funds on Hand	\$ 2,650,474	\$ 2,416,424	\$ 1,360,207	\$ 1,815,964
Bi-monthly Billings on Hand	6.43	5.37	2.79	3.24



VILLAGE OF McFARLAND

STORM WATER UTILITY FINANCIAL STATEMENT HIGHLIGHTS

	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Operating Revenues	\$ 552,182	\$ 549,586	\$ 561,817	\$ 595,187
Operating Expenses	535,493	584,374	645,654	694,247



<u>Unrestricted Cash</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Minimum Funding Benchmark				
Bi-monthly Billing	\$ 92,000	\$ 91,667	\$ 93,667	\$ 99,167
Actual Unrestricted Funds on Hand	\$ 892,824	\$ 588,676	\$ 70,825	\$ 1,092
Bi-monthly Billings on Hand	9.70	6.42	0.76	0.01

McFarland Utilities

Enterprise Funds of the Village of McFarland, Wisconsin

Financial Statements and
Supplementary Information

December 31, 2023 and 2022

McFarland Utilities

Enterprise Funds of the Village of McFarland, Wisconsin

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December 31, 2023 and 2022

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Independent Auditors' Report

To the Village Board of
Village of McFarland

Opinions

We have audited the financial statements of the McFarland Water and Sewer Utility and the McFarland Storm Water Utility (enterprise funds) of the Village of McFarland (the Village), as of and for the years ended December 31, 2023 and 2022, and the related notes to the financial statements, as listed in the table of contents.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the financial position of the enterprise funds of the Village as of December 31, 2023 and 2022, and the changes in financial position and cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America

Basis for Opinions

We conducted our audits in accordance with auditing standards generally accepted in the United States of America (GAAS). Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of the enterprise funds and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Emphasis of Matters

As discussed in Note 1, the financial statements present only the enterprise funds and do not purport to, and do not, present fairly the financial position of the Village as of December 31, 2023, and 2022, and the changes in financial position, or cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America. Our opinions are not modified with respect to this matter.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America; and for the design, implementation and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinions. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the enterprise funds' internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings and certain internal control-related matters that we identified during the audit.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the required supplementary information, as listed in the table of contents be presented to supplement the financial statements. Such information is the responsibility of management and, although not a part of the financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary Information

Our audit was conducted for the purpose of forming opinions on the financial statements as a whole. The accompanying supplementary information as listed in the table of contents is presented for purposes of additional analysis and is not a required part of the financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the financial statements. The information has been subjected to the auditing procedures applied in the audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the supplementary information is fairly stated in all material respects, in relation to the financial statements as a whole.

Baker Tilly US, LLP

Madison, Wisconsin
May 15, 2024

MANAGEMENT'S DISCUSSION AND ANALYSIS

McFarland Water and Sewer Utility

Management's Discussion and Analysis December 31, 2023 and 2022

The management of the McFarland Water and Sewer Utility (Utility) offers this narrative discussion and analysis of the financial performance of the Utility for the year ended December 31, 2023. The easy to read narrative overview information presented here should be considered in conjunction with the more detailed information available in the financial statements of the Utility. These financial statements report information about the Utility using accounting methods similar to those used by private sector companies and offer short-term and long-term information about Utility activities.

Financial Highlight

- The net position of the Utility decreased \$49,000 from \$18,286,000 in 2022 to \$18,237,000 in 2023.
- The operating revenues of the Utility increased \$432,000 from \$2,930,000 in 2022 to \$3,363,000 in 2023.
- The operating expenses of the Utility, excluding depreciation, increased \$572,000 from \$2,244,000 in 2022 to \$2,816,000 in 2023.
- The Water Utility recognized an operating loss \$42,000 in 2023 compared to a profit of from \$382,000 in 2022.
- The Sewer Utility recognized an operating loss of \$15,000 in 2023 compared to an operating loss \$274,000 in 2022.
- The authorized rate of return for the Public Service Commission of Wisconsin (PSCW) regulated water utility operations is 4.90%. The actual rate of return for 2023 was -1.10%, down from 3.45% in 2022.

Overview of the Financial Statements

The Water and Sewer Utility is a self-supporting entity and separate enterprise fund of the Village of McFarland. The Utility accounts for the cost of water utility and sewer utility operations on a continuing basis. The statements of net position of water utility operations and sewer utility operations is combined for accounting purposes although the capital assets and operating revenues/expenses are maintained separately for each type of utility.

Water and sewer service is provided to properties within the Village of McFarland and to several properties outside McFarland. The Utility is managed by the Village Board and the Public Utilities Committee (PSCW), which is advisory to the Village Board.

The Water Utility operations are subject to service rules and rates established by the PSCW. The accounting records of the Utility are maintained in accordance with the Uniform System of Accounts prescribed by the PSCW and in accordance with the Governmental Accounting Standards Board.

In 1994, the PSCW authorized deregulation of the Sewer Utility operations. Sewer rates and rules are now determined by the Village Board, based upon the recommendations of the Public Utilities Committee. Wastewater is treated under an agreement with the Madison Metropolitan Sewerage District.

The annual report consists of Management's Discussion and Analysis, the basic financial statements, the report of the independent auditor, and supplemental information.

McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

An analysis of the financial position of the Water and Sewer Utility begins with a review of the Statements of Net Position and the Statements of Revenues, Expenses and Changes in Net Position. These two statements report the Utility's net position and changes therein. The net position – the difference between assets and deferred outflows and liabilities and deferred inflows – is key to measuring the financial health of the Utility. Over time, increases or decreases in net position are an indicator of whether the financial position of the Utility is improving or deteriorating. It should be noted, however, that the financial position may also be affected by other nonfinancial factors, including economic conditions, customer growth, climate conditions and new regulations.

Utility Financial Analysis

Net Position

The Statements of Net Position includes all of the assets, deferred outflows, liabilities, and deferred inflows of the Utility and provides information about the nature and amount of investments in resources (assets) and the obligations to utility creditors (liabilities). This statement provides the basis for evaluating the capital structure and assessing the liquidity and financial flexibility of the Utility. A summary of the Statements of Net Position is presented below in Table 1.

TABLE 1
CONDENSED STATEMENTS OF NET POSITION

	2023	2022	2021	2022-2023 Change
Current and other assets	\$ 5,536,156	\$ 8,031,971	\$ 6,039,107	\$ (2,495,815)
Capital assets	<u>20,674,138</u>	<u>19,238,288</u>	<u>18,440,555</u>	<u>1,435,850</u>
Total assets	<u>26,210,294</u>	<u>27,270,259</u>	<u>24,479,662</u>	<u>(1,059,965)</u>
Deferred outflows of resources	<u>534,217</u>	<u>316,564</u>	<u>194,502</u>	<u>217,653</u>
Long-term debt outstanding	5,605,000	6,400,000	3,400,000	(795,000)
Other liabilities	<u>1,012,231</u>	<u>893,640</u>	<u>911,433</u>	<u>118,591</u>
Total liabilities	<u>6,617,231</u>	<u>7,293,640</u>	<u>4,311,433</u>	<u>(676,409)</u>
Deferred inflows of resources	<u>1,890,462</u>	<u>2,007,276</u>	<u>1,924,936</u>	<u>(116,814)</u>
Investment in capital assets	15,108,777	15,359,009	14,907,129	(250,232)
Restricted	633,599	875,709	668,392	(242,110)
Unrestricted	<u>2,494,442</u>	<u>2,051,189</u>	<u>2,862,274</u>	<u>443,253</u>
Total net position	<u>\$ 18,236,818</u>	<u>\$ 18,285,907</u>	<u>\$ 18,437,795</u>	<u>\$ (49,089)</u>

As shown the table above, the net position of the Water and Sewer Utility declined by \$49,000 or, 0.3%, in 2023. Current and other assets decreased by \$2,496,000 or 31.1%, due to decline in the construction account used for capital projects and the net pension asset becoming a liability in 2023. Capital assets, which increased \$1,436,000, or 7.5%, now comprise 79% of total assets, up from 70.5% in 2022.

Restricted net position includes \$86,667 for debt service related to the 2022 revenue bonds that were issued, \$477,407 for a replacement fund used for sewer lift station replacements and \$69,525 for funds related to impact fees collected.

See Independent Auditors' Report

McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

The Utility reported deferred outflows related to pension of \$534,000 in 2023, an increase of \$218,000 from 2022. The Utility reported deferred inflows related to pension of \$279,000 in 2023, a decrease of \$71,000 from 2022. The Utility reported deferred inflows related to leases of \$1,611,000, a decrease of \$46,000 from 2022. See accompanying notes to the financial statements for more information on deferred outflows and inflows of resources.

The specific nature or source of these changes becomes more evident in the Statements of Revenues, Expenses and Changes in Net Position that follows.

McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

Revenues, Expenses, and Change in Net Position

All of the Utility's revenues and expenses are accounted for in Table 2, the Statements of Revenues, Expenses, and Change in Net Position. This statement measures the success of the Utility's operations over the year and can be used to determine whether the Utility has successfully recovered all its costs through user fees and other charges, profitability, and credit worthiness.

TABLE 2
CONDENSED STATEMENTS OF REVENUES, EXPENSES, AND CHANGE IN NET POSITION

	2023	2022	2021	2021-2023 Change
Operating revenues	\$ 3,362,702	\$ 2,930,499	\$ 2,717,387	\$ 432,203
Nonoperating revenues	<u>387,129</u>	<u>175,344</u>	<u>78,192</u>	<u>211,785</u>
Total revenues	<u>3,749,831</u>	<u>3,105,843</u>	<u>2,795,579</u>	<u>643,988</u>
Depreciation expense	604,028	578,362	545,611	25,666
Other operating expense	2,815,597	2,243,236	2,007,545	572,361
Nonoperating expense	<u>158,351</u>	<u>243,881</u>	<u>69,229</u>	<u>(85,530)</u>
Total expenses	<u>3,577,976</u>	<u>3,065,479</u>	<u>2,622,385</u>	<u>512,497</u>
Income before capital contributions and trans	171,855	40,364	173,194	131,491
Transfers	(257,048)	(258,404)	(341,057)	1,356
Capital contributions	<u>36,104</u>	<u>66,152</u>	<u>1,069,978</u>	<u>(30,048)</u>
Change in net position	(49,089)	(151,888)	902,115	102,799
Net Position, Beginning	<u>18,285,907</u>	<u>18,437,795</u>	<u>17,535,680</u>	<u>(151,888)</u>
Net Position, Ending	<u>\$ 18,236,818</u>	<u>\$ 18,285,907</u>	<u>\$ 18,437,795</u>	<u>\$ (49,089)</u>

Operating revenues for the Utility in 2023 increased \$432,000, or 14.7%, from \$2,930,000 to \$3,363,000. This is primarily attributable to increase in consumption from both water and sewer services as well as an increase in sewer rates.

Total expenses for 2023 increased \$512,000, or 16.7%, from the previous year. Depreciation increased by \$26,000, while other operating expenses increased by \$572,000. Water Utility operation and maintenance expenses increased \$497,000 from 2022, mainly due to water tower painting and increased maintenance costs occurring 2023. The Sewer Utility operation and maintenance expenses increased \$76,000 from 2022 mainly due to increased treatment costs. Nonoperating revenues increased by \$387,000 due to an increase in investment income. Non-operating expenses decreased \$86,000 from the previous year.

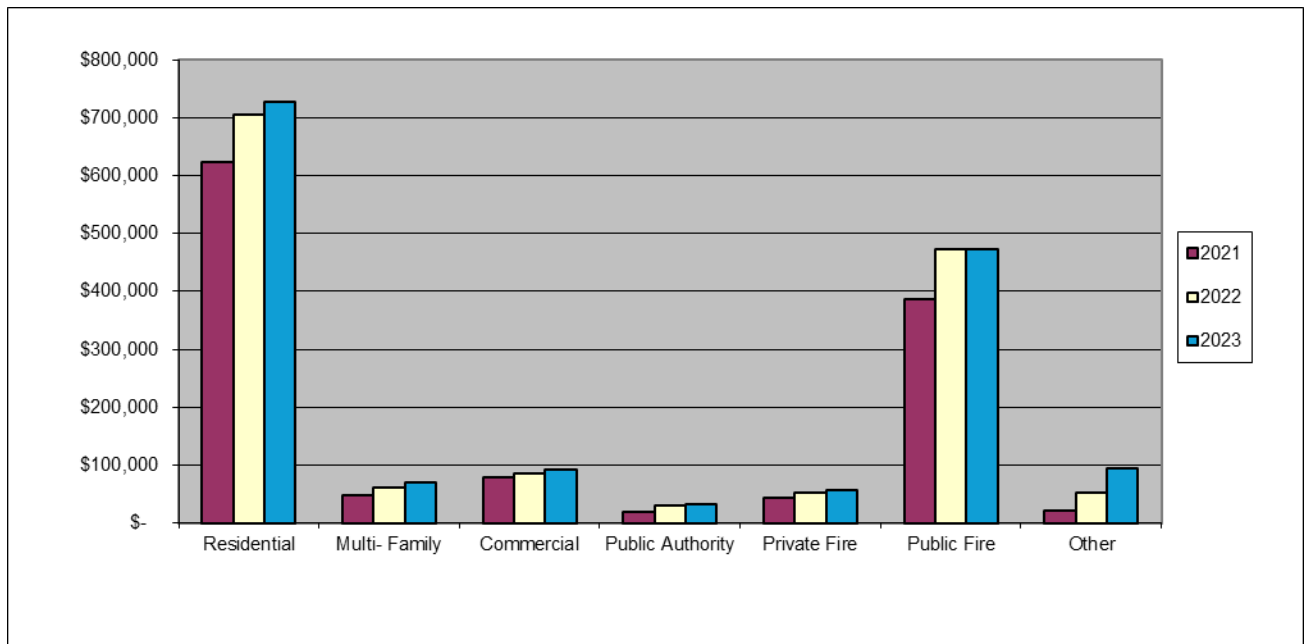
McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

Comparison of Operating Revenues

Tables 3 and 4 compare revenues received in 2023 from Water Utility and Sewer Utility operations with those revenues generated in 2022 and 2021. Revenues can be affected by a variety of factors including rate increases, customer growth, climate conditions, and local economic conditions.

TABLE 3
COMPARISON OF WATER OPERATING REVENUES

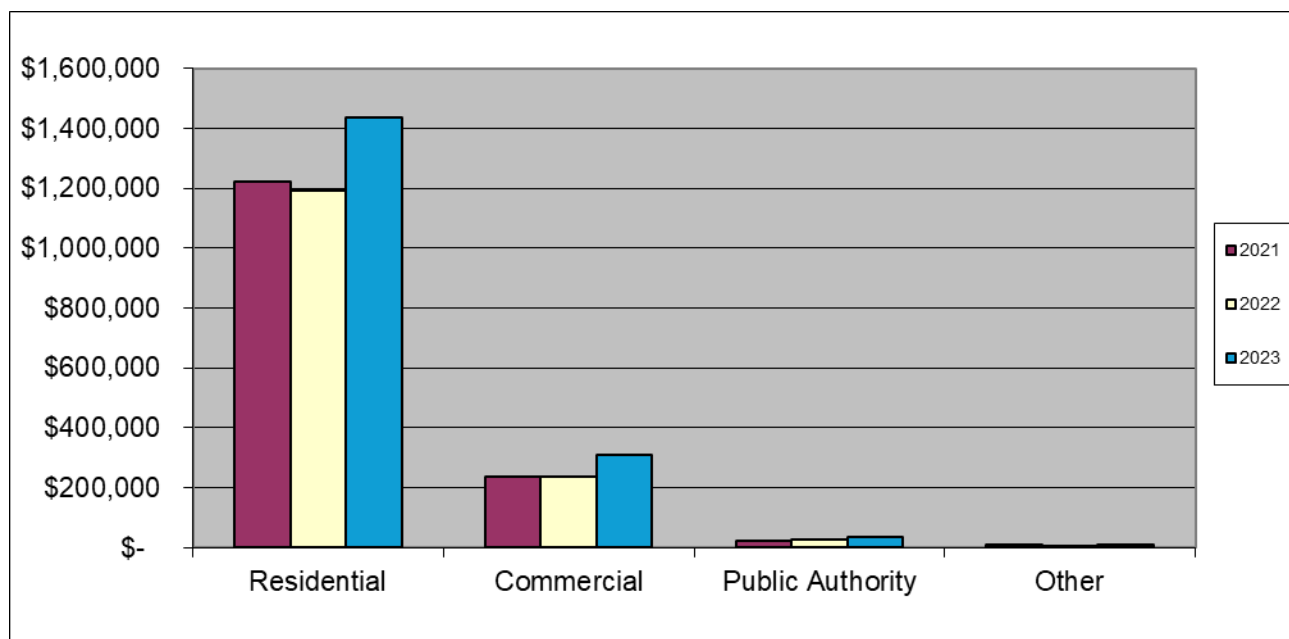


McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

Operating revenues from sales of water and other sources increased in 2023 by \$83,000, or 7.03%.
Mainly due to increase in consumption in FY23.

TABLE 4
COMPARISON OF SEWER OPERATING REVENUES



Sewer Utility revenues from user charges increased by \$331,000 or 28.8%, in 2023, due to an average increase in sewer rates of 25.71%.

McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

Statements of Cash Flows

The Statements of Cash Flows in Table 5 below reports cash receipts, cash payments, and net changes in cash resulting from operations, investment income, and financing activities such as repayment of debt and capital additions. This information provides answers to such questions as where did cash come from, what was cash used for, and what was the change in the cash balance during the reporting period.

TABLE 5
CONDENSED STATEMENTS OF CASH FLOWS

	<u>2023</u>	<u>2022</u>	<u>2021</u>	<u>2022-2023</u> <u>Change</u>
Cash Flows From:				
Operating activities	\$ 605,617	\$ 473,973	\$ 896,327	\$ 131,644
Noncapital financing activities	(257,048)	(279,069)	(332,333)	22,021
Capital and related financing activities	(3,072,542)	1,589,685	(798,177)	(4,662,227)
Investing activities	<u>377,075</u>	<u>174,385</u>	<u>75,992</u>	<u>202,690</u>
Net change in cash and cash equivalents	(2,346,898)	1,958,974	(158,191)	(4,305,872)
Cash and Cash Equivalents, Beginning	<u>5,574,414</u>	<u>3,615,440</u>	<u>3,773,631</u>	<u>1,958,974</u>
Cash and Cash Equivalents, Ending	<u>\$ 3,227,516</u>	<u>\$ 5,574,414</u>	<u>\$ 3,615,440</u>	<u>\$ (2,346,898)</u>

Cash flows from operating activities of \$606,000 increased by \$132,000 or 27.8%, from 2022. This is due to an increase in cash received from customers from increase in revenues. Cash used for noncapital financing activities was for the tax equivalent paid to the Municipality. Cash flows used in capital and related financing activities decreased by \$4,306,000, or 219.8%, from 2022. The decrease is the result of new debt issued in 2022 and increase in acquisition and construction of capital assets spending of \$706,000 in 2023. The overall net change in cash and cash equivalents was a decrease of \$2,347,000 compared to an increase of \$1,959,000 in 2022, due to no debt issued in 2023. At year-end, total cash and cash equivalents balance is \$3,228,000, compared to \$5,574,000 in 2022, due to continued use of construction funds for capital improvements and use of tower reserve funds for painting. Of the \$3,228,000 ending cash balance, \$87,000 is restricted for debt service, \$477,000 is restricted for equipment replacement and \$69,000 is restricted for impact fees collected.

McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

Capital Assets

Tables 6 and 7 below summarize the capital assets currently held for water utility and sewer utility purposes, respectively. Please refer to the notes to the financial statements for further detail about these capital assets.

TABLE 6
CAPITAL ASSETS – WATER UTILITY OPERATIONS

	2023	2022	2021	2022-2023 Change
Capital assets:				
Source of supply	\$ 243,539	\$ 243,539	\$ 243,539	\$ -
Pumping	388,148	357,710	357,710	30,438
Water treatment	4,498	4,498	4,498	-
Transmission and distribution	19,585,027	18,087,560	16,923,230	1,497,467
General	<u>644,066</u>	<u>653,106</u>	<u>655,675</u>	<u>(9,040)</u>
Total capital assets	20,865,278	19,346,413	18,184,652	1,518,865
Less accumulated depreciation	<u>(6,008,815)</u>	<u>(5,753,904)</u>	<u>(5,432,429)</u>	<u>(254,911)</u>
Net capital assets	<u>\$ 14,856,463</u>	<u>\$ 13,592,509</u>	<u>\$ 12,752,223</u>	<u>\$ 1,263,954</u>

During 2023, the capital assets for water utility operations increased \$1,519,000, or 7.9%. After depreciation was factored in, however, the net capital assets for the water utility were \$14,856,000, increasing by \$1,264,000, or 9.3%, from the previous year. This compares to an increase of 6.6% in net capital assets in 2022.

TABLE 7
CAPITAL ASSETS – SEWER UTILITY OPERATIONS

	2023	2022	2021	2022-2023 Change
Capital assets:				
Collection system	\$ 7,018,843	\$ 6,948,642	\$ 6,887,528	\$ 70,201
Collection system pumping	1,043,088	1,043,088	1,043,088	-
General	<u>422,904</u>	<u>431,944</u>	<u>487,704</u>	<u>(9,040)</u>
Total capital assets	8,484,835	8,423,674	8,418,320	61,161
Less accumulated depreciation	<u>(3,003,944)</u>	<u>(2,842,797)</u>	<u>(2,752,724)</u>	<u>(161,147)</u>
Net capital assets	<u>\$ 5,480,891</u>	<u>\$ 5,580,877</u>	<u>\$ 5,665,596</u>	<u>\$ (99,986)</u>

See Independent Auditors' Report

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McFarland Water and Sewer Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

During 2023, the capital assets for sewer utility operations increased by \$61,000, or 0.7%. After depreciation was factored in, the net capital assets for the sewer utility were \$5,481,000, a decrease of \$100,000 or 1.8%, from 2022. This compares to a decrease of 1.5% in net capital assets in 2022.

Please refer to the notes to the financial statements for further detail about the capital assets of the Water and Sewer Utility.

Debt Administration

As of December 31, 2023, the Water and Sewer Utility have \$2,080,000 in outstanding general obligation debt. This debt was issued in 2015, 2017, 2019, 2020, and 2021 for the purpose of funding 2015, 2016, 2017, 2019, 2020 and 2021 capital improvement projects and equipment purchases. New Revenue debt was issued in 2022 for \$3,650,000 for 2022 and 2023 capital improvement projects. No new debt was issued in 2023. Please refer to the notes to the financial statements for further detail about the debt obligations of the Water and Sewer Utility.

Currently Known Facts / Economic Conditions

The Village of McFarland is located adjacent to the southeast edge of the City of Madison. This proximity to a major regional commercial center, which is the capital of state government and home to the flagship campus of the University of Wisconsin has produced a favorable economic climate. With the exception of the economic downturn and stagnation in housing construction that began in 2008, these economic drivers have resulted in steady growth in the service area of the Utility over the last two decades. The market for existing homes strengthened significantly in 2013, and there are promising signs of increased growth in new residential construction. The Village has seen positive growth since 2013, given the performance of the market and the expansion surrounding the Madison area.

The customer base of the Utility consists primarily of residential and small commercial users that, for the most part, do not utilize large quantities of water. This characteristic of the customer base results in a very stable revenue base since the loss of any single user would not have a significant impact on the Utility's operating revenues. The creation of TID #3 in 2004 and TID #4 in 2008, both of which will promote more commercial / industrial development, combined with the availability of land that exists for residential development, should yield long-term growth in the customer base and greater economies of scale in future Utility operations once the pace of development returns to more normal levels.

The Utility has created long-range project and financial plans to keep pace with projected Village growth. Rate structures are reviewed annually to maintain a strong cash flow sufficient to cover operating and debt service needs and to fund smaller capital projects.

Contacting Utility Management

This discussion and analysis is intended to provide information for our customers, investors, and creditors concerning the financial performance of the Water and Sewer Utility and to demonstrate the Utility's accountability for the money it receives. If you have questions about this report, or would like additional financial information, contact the Village of McFarland at PO Box 110, McFarland, WI 53558-0110 or at (608)838-3153.

General information relating to the McFarland Water and Sewer Utility can also be found at the Village website www.mcfarland.wi.us.

McFarland Storm Water Utility

Management's Discussion and Analysis
December 31, 2023 and 2022

The management of the McFarland Storm Water Utility (STW Utility) offers this narrative discussion and analysis of the financial performance of the STW Utility for the year ended December 31, 2023. The easy to read narrative overview information presented here should be considered in conjunction with the more detailed information available in the financial statements of the STW Utility. These financial statements report information about the STW Utility using accounting methods similar to those used by private sector companies and offer short-term and long-term information about STW Utility activities.

Financial Highlights

- The net position of the STW Utility was \$4,589,000 at the end of 2023, a \$79,000 decline over 2022.
- The operating revenues of the STW Utility for 2023 were \$595,000 up \$33,000 compared to 2022.
- The operating expenses of the STW Utility for 2023, excluding depreciation, were \$532,000, an increase of \$46,000 from 2022.
- The STW Utility had \$70,000 in outstanding general obligation debt at the end of 2023.

Overview of the Financial Statements

The STW Utility is a self-supporting entity and separate enterprise fund of the Village of McFarland. The STW Utility accounts for the cost of storm water management operations on a continuing basis. The STW Utility was legally established and began charging fees on July 1, 2008. Storm water management expenses and revenues have, however, been segregated into a separate fund since 2007.

Storm water management services are provided to properties within the Village of McFarland. The STW Utility is managed by the Village Board and the Public Utilities Committee, which is advisory to the Village Board, in compliance with standards established by the Federal Environmental Protection Agency and the Wisconsin Department of Natural Resources. The Village of McFarland is also a joint holder with other Madison-area communities of a Storm Water Discharge Permit issued under Chapter NR216 of the Wisconsin Administration Code.

The accounting records of the STW Utility are maintained in accordance with the requirements set forth by the Governmental Accounting Standards Board.

The STW Utility is not regulated by the Public Service Commission of Wisconsin (PSCW). Its rates, credits and rules are determined by the Village Board. The user charge structure is based on Equivalent Runoff Units (ERUs) as measured by the impervious surface area of the property, with one ERU equal to 3,456 square feet of impervious area.

The annual report consists of Management's Discussion and Analysis, the basic financial statements, the report of the independent auditor, and supplemental information.

An analysis of the financial position of the STW Utility begins with a review of the Statements of Net Position and the Statements of Revenues, Expenses and Changes in Net Position. These two statements report the STW Utility's net position and changes therein. The net position – the difference between assets and deferred outflows and liabilities and deferred inflows – is key to measuring the financial health of the STW Utility. Over time, increases or decreases in the net position value are an indicator of whether the financial position of the STW Utility is improving or deteriorating. It should be noted, however, that the financial position may also be affected by other nonfinancial factors, including economic conditions, customer growth, climate conditions and new regulations.

See Independent Auditors' Report

McFarland Storm Water Utility

Management's Discussion and Analysis
December 31, 2022 and 2021

Utility Financial Analysis

Net Position

The Statements of Net Position includes all of the assets, deferred outflows, liabilities, and deferred inflows of the STW Utility and provides information about the nature and amount of investments in resources (assets) and the obligations to utility creditors (liabilities). This statement provides the basis for evaluating the capital structure and assessing the liquidity and financial flexibility of the STW Utility. A summary of the Statements of Net Position is presented below in Table 1.

TABLE 1
CONDENSED STATEMENTS OF NET POSITION

	2023	2022	2021	2022-2023 Change
Current and other assets	87,326	\$ 228,522	\$ 705,868	\$ (141,196)
Capital assets	<u>4,927,506</u>	<u>4,637,295</u>	<u>4,322,922</u>	<u>290,211</u>
Total assets	<u>5,014,832</u>	<u>4,865,817</u>	<u>5,028,790</u>	<u>149,015</u>
Deferred outflows of resources	<u>187,659</u>	<u>124,037</u>	<u>76,627</u>	<u>63,622</u>
Long-term debt outstanding	70,000	135,000	200,000	(65,000)
Other liabilities	<u>441,365</u>	<u>46,680</u>	<u>67,429</u>	<u>394,685</u>
Total liabilities	<u>511,365</u>	<u>181,680</u>	<u>267,429</u>	<u>329,685</u>
Deferred inflows of resources	<u>101,861</u>	<u>140,325</u>	<u>91,806</u>	<u>(38,464)</u>
Investment in capital assets	4,857,365	4,482,038	4,099,858	375,327
Restricted	-	66,385	39,658	(66,385)
Unrestricted	<u>(268,100)</u>	<u>119,426</u>	<u>606,666</u>	<u>(387,526)</u>
Total net position	<u>\$ 4,589,265</u>	<u>\$ 4,667,849</u>	<u>\$ 4,746,182</u>	<u>\$ (78,584)</u>

See Independent Auditors' Report

McFarland Storm Water Utility

Management's Discussion and Analysis
December 31, 2022 and 2021

As can be seen from the table above, the net position of the STW Utility declined in 2023 to \$4,589,000 a decrease of \$79,000, or 1.7% over 2022. The decline in net position is attributable to continued operating loss. Current assets decreased \$141,000, or 61.8%. Capital and other noncurrent assets comprise 98.3% of total assets at this time, which increased from 95.3% in 2022.

The STW Utility reported deferred outflows related to pension of \$188,000 in 2023, an increase of \$64,000 from 2022. The Utility reported deferred inflows related to pension of \$102,000 in 2023, a decrease of \$38,000 from 2022. See accompanying notes to the financial statements for more information on deferred outflows and inflows of resources.

The specific nature or source of these changes becomes more evident in the Statements of Revenues, Expenses and Changes in Net Position that follows.

Revenues, Expenses, and Changes in Net Position

All STW Utility revenues and expenses are accounted for in Table 2, the Statements of Revenues, Expenses, and Changes in Net Position. This statement measures the success of the STW Utility operations over the year and can be used to determine whether the STW Utility has successfully recovered all its costs through user fees and other charges, profitability, and credit worthiness.

TABLE 2
CONDENSED STATEMENTS OF REVENUES, EXPENSES, AND CHANGES IN NET POSITION

	2023	2022	2021	2022-2023 Change
Operating revenues	\$ 595,187	\$ 561,817	\$ 549,586	\$ 33,370
Nonoperating revenues	<u>23,491</u>	<u>9,510</u>	<u>499</u>	<u>13,981</u>
Total revenues	<u>618,678</u>	<u>571,327</u>	<u>550,085</u>	<u>47,351</u>
Depreciation expense	161,839	160,151	153,106	1,688
Other operating expense	532,408	485,503	431,268	46,905
Nonoperating expense	<u>3,015</u>	<u>4,006</u>	<u>5,936</u>	<u>(991)</u>
Total expenses	<u>697,262</u>	<u>649,660</u>	<u>590,310</u>	<u>47,602</u>
Income (loss) before capital contributions and transfers	(78,584)	(78,333)	(40,225)	(251)
Capital contributions	<u>-</u>	<u>-</u>	<u>406,187</u>	<u>-</u>
Change in net position	(78,584)	(78,333)	365,962	(251)
Net Position, Beginning	<u>4,667,849</u>	<u>4,746,182</u>	<u>4,380,220</u>	<u>(78,333)</u>
Net Position, Ending	<u>\$ 4,589,265</u>	<u>\$ 4,667,849</u>	<u>\$ 4,746,182</u>	<u>\$ (78,584)</u>

See Independent Auditors' Report

McFarland Storm Water Utility

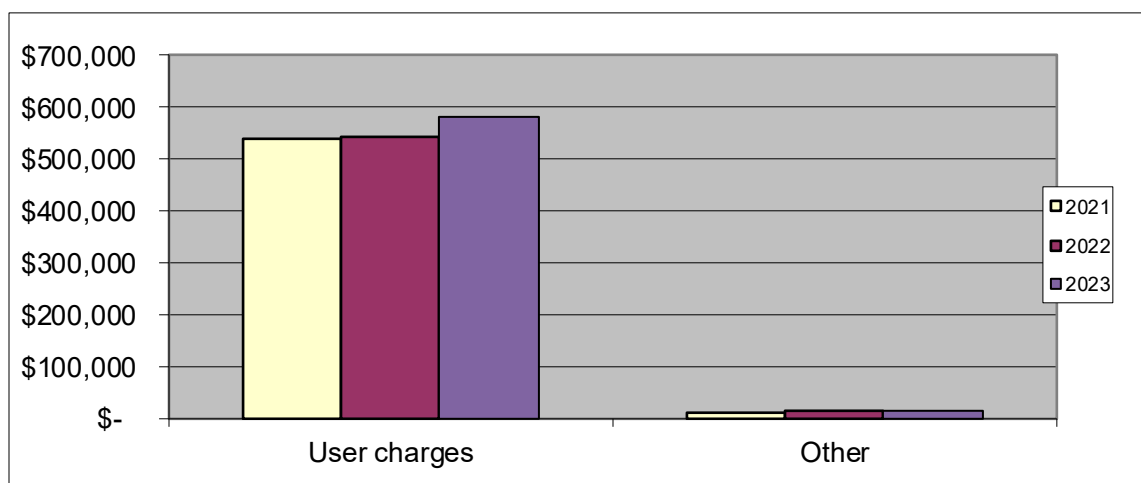
Management's Discussion and Analysis
December 31, 2022 and 2021

Operating revenues for the STW Utility in 2023 increased \$33,000, or 5.9%, from 2022. The customer base increased 1.3% from the prior year. Table 3 below summarizes the operating revenues of the STW Utility.

Total expenses for 2023 of \$697,000 were \$48,000, or 7.3%, higher than the previous year primarily due to an increase in the operation supplies expense. Depreciation expense for the year was up 1.1%.

Net position was decreased by \$79,000 in 2023 primarily as a result of the loss in operations.

TABLE 3
COMPARISON OF STORM WATER OPERATING REVENUES



McFarland Storm Water Utility

Management's Discussion and Analysis
December 31, 2022 and 2021

Statements of Cash Flows

The statements of cash flows in Table 4 below reports cash receipts, cash payments, and net changes in cash resulting from operations, investment income, and financing activities such as repayment of debt and capital additions. This information provides answers to such questions as where did cash come from, what was cash used for, and what was the change in the cash balance during the reporting period.

TABLE 4
CONDENSED STATEMENTS OF CASH FLOWS

	2023	2022	2021	2022-2023 Change
Cash Flows From:				
Operating activities	\$ 101,627	\$ 19,428	\$ 95,288	\$ 82,199
Noncapital Financing Activities	354,668	-	-	354,668
Capital and related financing activities	(529,005)	(546,337)	(400,135)	17,332
Investing activities	<u>2,977</u>	<u>9,058</u>	<u>699</u>	<u>(6,081)</u>
Net change in cash and cash equivalents	(69,733)	(517,851)	(304,148)	448,118
Cash and Cash Equivalents, Beginning	<u>70,825</u>	<u>588,676</u>	<u>892,824</u>	<u>(517,851)</u>
Cash and Cash Equivalents, Ending	<u>\$ 1,092</u>	<u>\$ 70,825</u>	<u>\$ 588,676</u>	<u>\$ (69,733)</u>

The STW Utility experienced a net cash flow of \$102,000 from operating activities in 2023, an increase of \$82,000, or 474%, from 2022 due to increase in receipts from customers and decrease in cash paid to suppliers. Cash received from noncapital financing activities increased \$355,000 in 2023 due to the Village providing cash for operations. Cash used in capital and related financing activities decreased \$17,000 and cash equivalents at year-end decreased \$70,000, or 98.5%, from 2022 to 2023.

McFarland Storm Water Utility

Management's Discussion and Analysis
December 31, 2022 and 2021

Capital Assets

Table 5 below summarizes the capital assets currently held for STW Utility purposes.

TABLE 5
CAPITAL ASSETS – STORM WATER UTILITY OPERATIONS

	2023	2022	2021	2021-2022 Change
Capital assets:				
Land and improvements	\$ 313,596	\$ 313,596	\$ 313,596	\$ -
Pipes	4,328,708	3,998,698	3,784,771	330,010
Manholes	620,876	580,052	462,858	40,824
Inlets	855,510	848,870	746,692	6,640
Basins	719,431	719,431	719,431	-
Miscellaneous and general	<u>392,089</u>	<u>401,128</u>	<u>520,084</u>	<u>(9,039)</u>
Total capital assets	7,230,210	6,861,775	6,547,432	368,435
Less accumulated depreciation	<u>(2,389,563)</u>	<u>(2,236,372)</u>	<u>(2,227,402)</u>	<u>(153,191)</u>
Net capital assets	<u>\$ 4,840,647</u>	<u>\$ 4,625,403</u>	<u>\$ 4,320,030</u>	<u>\$ 215,244</u>

During 2023, the capital assets of the STW Utility increased by \$368,000, or 5.4%, from 2022. The increase came primarily from additions to pipes, manholes, and inlets. After depreciation was factored in, the net capital assets for the STW Utility were \$4,841,000, an increase of \$215,000, or 4.7%, from 2022.

Please refer to the notes to the financial statements for further detail about the capital assets of the Storm Water Utility.

Debt Administration

As of December 31, 2023 the STW Utility had \$70,000 in general obligation debt outstanding compared to \$135,000 in 2022. The STW Utility issued \$500,000 in new general obligation debt in 2015 for the purpose of funding 2015 and 2016 capital improvement projects and equipment purchases. Please refer to the notes to the financial statements for further detail about the debt obligations of the Storm Water Utility.

McFarland Storm Water Utility

Management's Discussion and Analysis
December 31, 2022 and 2021

Currently Known Facts / Economic Conditions

The Village of McFarland is located adjacent to the southeast edge of the City of Madison. This proximity to a major regional commercial center, which is the capital of state government and home to the flagship campus of the University of Wisconsin has produced a favorable economic climate. With the exception of the economic downturn and stagnation in housing construction that began in 2008, these economic drivers have resulted in steady growth in the service area of the STW Utility over the last two decades. The market for existing homes strengthened significantly in 2013, and there are promising signs of increased growth in new residential construction. The Village has seen positive growth since 2013, given the performance of the market and the expansion surrounding the Madison area.

The customer base of the STW Utility consists of all residential commercial, industrial and institutional properties in McFarland. Local streets, cemeteries, and the railroad land areas are not assessed user charges. The creation of TID #3 in 2004 and TID #4 in 2008, both of which will promote more commercial / industrial development, combined with the availability of land that exists for residential development, should yield long-term growth in the customer base and greater economies of scale in future STW Utility operations once the pace of development returns to more normal levels.

Although just established in 2008, the STW Utility has created long-range project and financial plans to keep pace with projected Village growth. Rate structures are reviewed annually to maintain a strong cash flow sufficient to cover operating and debt service needs and to fund smaller capital projects.

Contacting Utility Management

This discussion and analysis is intended to provide information for our customers, investors, and creditors concerning the financial performance of the STW Utility and to demonstrate the STW Utility's accountability for the money it receives. If you have questions about this report, or would like additional financial information, contact the Village of McFarland, PO Box 110, McFarland, WI 53558-0110 or at (608)838-3153.

General information relating to the McFarland STW Utility can also be found at the Village website www.mcfarland.wi.us.

WATER AND SEWER UTILITY

McFarland Water and Sewer Utility

Statements of Net Position
December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Assets and Deferred Outflows of Resources		
Current Assets		
Cash and investments	\$ 2,133,510	\$ 1,360,207
Restricted assets:		
Redemption account	97,942	95,025
Customer accounts receivable	349,091	354,920
Due from municipality	68,754	-
Materials and supplies	19,450	19,450
Current portion of lease receivable	<u>52,799</u>	<u>45,765</u>
Total current assets	<u>2,721,546</u>	<u>1,875,367</u>
Noncurrent Assets		
Restricted assets:		
Reserve account	267,200	267,200
Replacement account	477,407	564,847
Impact fee account	69,525	61,452
Construction account	-	2,555,938
Net pension asset	-	166,077
Other assets:		
Water tower reserve	97,297	589,249
Depreciation reserve	84,635	80,496
Special assessments receivable	36,109	36,109
Lease receivable	1,558,325	1,611,124
Property held for future use	<u>224,112</u>	<u>224,112</u>
Capital assets:		
Plant in service:		
Water	20,865,278	19,346,413
Sewer	<u>8,484,835</u>	<u>8,423,674</u>
Total plant in service	<u>29,350,113</u>	<u>27,770,087</u>
Accumulated depreciation/amortization:		
Water	(6,008,815)	(5,753,904)
Sewer	<u>(3,003,944)</u>	<u>(2,842,797)</u>
Total accumulated depreciation/amortization	<u>(9,012,759)</u>	<u>(8,596,701)</u>
Construction work in progress:		
Water and sewer	<u>336,784</u>	<u>64,902</u>
Total construction work in progress	<u>336,784</u>	<u>64,902</u>
Total noncurrent assets	<u>23,488,748</u>	<u>25,394,892</u>
Total assets	<u>26,210,294</u>	<u>27,270,259</u>
Deferred Outflows of Resources		
Deferred outflows related to pension	<u>534,217</u>	<u>316,564</u>

See notes to the financial statements

McFarland Water and Sewer Utility

Statements of Net Position
December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Liabilities, Deferred Inflows of Resources and Net Position		
Current Liabilities		
Accounts payable	\$ 249,648	\$ 246,469
Due to Municipality	258,404	258,404
Customer deposits	15,000	5,000
Accrued interest	4,464	5,676
Accrued vacation leave	13,022	10,995
Accrued liabilities	33,536	-
Current portion of financed purchase	-	39,950
Current portion of general obligation debt	700,000	670,000
Current liabilities payable from restricted assets:		
Current portion of revenue bonds	130,000	125,000
Accrued interest	11,275	11,692
Total current liabilities	<u>1,415,349</u>	<u>1,373,186</u>
Noncurrent Liabilities		
General obligation debt	1,380,000	2,080,000
Revenue bonds	3,395,000	3,525,000
Unamortized debt premium	227,561	262,467
Accrued sick leave	71,988	52,987
Net pension liability	127,333	-
Total noncurrent liabilities	<u>5,201,882</u>	<u>5,920,454</u>
Total liabilities	<u>6,617,231</u>	<u>7,293,640</u>
Deferred Inflows of Resources		
Deferred inflows related to pension	279,338	350,387
Deferred inflows related to leases	1,611,124	1,656,889
Total deferred inflows of resources	<u>1,890,462</u>	<u>2,007,276</u>
Net Position		
Net investment in capital assets	15,108,777	15,359,009
Restricted for:		
Debt service	86,667	83,333
Equipment replacement	477,407	564,847
Impact fee	69,525	61,452
Net pension asset	-	166,077
Unrestricted	2,494,442	2,051,189
Total net position	<u>\$ 18,236,818</u>	<u>\$ 18,285,907</u>

See notes to the financial statements

McFarland Water and Sewer Utility

Statements of Revenues, Expenses and Changes in Net Position
Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Operating Revenues		
Water:		
Sales of water	\$ 1,453,557	\$ 1,412,209
Other	<u>115,486</u>	<u>55,474</u>
Total water	<u>1,569,043</u>	<u>1,467,683</u>
Sewer:		
Treatment charges	1,781,500	1,457,178
Other	<u>12,159</u>	<u>5,638</u>
Total sewer	<u>1,793,659</u>	<u>1,462,816</u>
Total operating revenues	<u>3,362,702</u>	<u>2,930,499</u>
Operating Expenses		
Water:		
Operation and maintenance	1,181,524	684,723
Depreciation	<u>429,909</u>	<u>400,304</u>
Total water	<u>1,611,433</u>	<u>1,085,027</u>
Sewer:		
Operation and maintenance	1,634,073	1,558,513
Depreciation	<u>174,119</u>	<u>178,058</u>
Total sewer	<u>1,808,192</u>	<u>1,736,571</u>
Total operating expenses	<u>3,419,625</u>	<u>2,821,598</u>
Operating Income (Loss)		
Water	(42,390)	382,656
Sewer	<u>(14,533)</u>	<u>(273,755)</u>
Total operating income (loss)	<u>(56,923)</u>	<u>108,901</u>
Nonoperating Expenses		
Investment income	377,075	174,384
Gain on equipment disposal	10,054	-
Miscellaneous income	-	960
Interest expense	(193,257)	(153,986)
Debt issuance costs	-	(124,119)
Amortization of premium	<u>34,906</u>	<u>34,224</u>
Total nonoperating expenses	<u>228,778</u>	<u>(68,537)</u>
Income before contributions and transfers	171,855	40,364
Capital Contributions	36,104	66,152
Transfers, Tax Equivalent	<u>(257,048)</u>	<u>(258,404)</u>
Change in net position	(49,089)	(151,888)
Net Position, Beginning	<u>18,285,907</u>	<u>18,437,795</u>
Net Position, Ending	<u><u>\$ 18,236,818</u></u>	<u><u>\$ 18,285,907</u></u>

See notes to the financial statements

McFarland Water and Sewer Utility

Statements of Cash Flows

Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Cash Flows From Operating Activities		
Received from customers	\$ 2,886,463	\$ 2,483,162
Received from Municipality for services	472,300	472,300
Paid to suppliers for goods and services	(2,151,028)	(2,025,340)
Paid to employees for operating payroll	<u>(602,118)</u>	<u>(456,149)</u>
Net cash flows from operating activities	<u>605,617</u>	<u>473,973</u>
Cash Flows From Noncapital Financing Activities		
Paid to Municipality for tax equivalent	<u>(257,048)</u>	<u>(279,069)</u>
Cash Flows From Capital and Related Financing Activities		
Acquisition and construction of capital assets	(2,113,808)	(1,408,110)
Capital contributions received	36,104	66,152
Financed purchase payments	(4,952)	(4,805)
Debt retired	(795,000)	(650,000)
Interest paid	(194,886)	(147,453)
Proceeds from debt issue	-	3,650,000
Debt issuance costs	<u>-</u>	<u>83,901</u>
Net cash flows from capital and related financing activities	<u>(3,072,542)</u>	<u>1,589,685</u>
Cash Flows From Investing Activities		
Investment income	<u>377,075</u>	<u>174,385</u>
Net change in cash and cash equivalents	(2,346,898)	1,958,974
Cash and Cash Equivalents, Beginning	<u>5,574,414</u>	<u>3,615,440</u>
Cash and Cash Equivalents, Ending	<u>\$ 3,227,516</u>	<u>\$ 5,574,414</u>
Noncash Capital and Related Financing Activities		
Amortization of debt premium	<u>\$ 34,906</u>	<u>\$ 34,224</u>
Write-off financed purchase	<u>\$ 34,998</u>	<u>\$ -</u>

See notes to the financial statements

McFarland Water and Sewer Utility

Statements of Cash Flows

Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Reconciliation of Operating Income (Loss) to Net Cash Flows		
From Operating Activities		
Operating income (loss)	\$ (56,923)	\$ 108,901
Nonoperating revenue (expense)	-	960
Noncash items in operating income (loss):		
Depreciation	604,028	578,362
Depreciation charged to clearing and other utilities	48,986	32,014
Changes in assets and liabilities:		
Customer accounts receivable	5,829	(47,747)
Other accounts receivable	45,765	39,043
Due from municipality	(68,754)	39,736
Accounts payable	3,179	(157,323)
Accrued vacation and sick leave	21,028	(15,999)
Other current liabilities	33,536	670
Deferred inflow of resources	(45,765)	(39,043)
Pension related deferrals and liabilities	4,708	(65,601)
Customer deposits	<u>10,000</u>	<u>-</u>
Net cash flows from operating activities	<u>\$ 605,617</u>	<u>\$ 473,973</u>
Reconciliation of Cash and Cash Equivalents to Statements of		
Net Position Accounts		
Cash and investments	\$ 2,133,510	\$ 1,360,207
Redemption account	97,942	95,025
Reserve account	267,200	267,200
Replacement account	477,407	564,847
Impact fee account	69,525	61,452
Construction account	-	2,555,938
Water tower reserve	97,297	589,249
Depreciation reserve	<u>84,635</u>	<u>80,496</u>
Cash and cash equivalents	<u>\$ 3,227,516</u>	<u>\$ 5,574,414</u>

See notes to the financial statements

STORM WATER UTILITY

McFarland Storm Water Utility

Statements of Net Position
December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Assets and Deferred Outflows of Resources		
Current Assets		
Cash and investments	\$ 1,092	\$ 70,825
Customer accounts receivable	86,234	83,750
Other accounts receivable	<u>-</u>	<u>7,562</u>
Total current assets	<u>87,326</u>	<u>162,137</u>
Noncurrent Assets		
Restricted assets:		
Net pension asset	-	66,385
Capital assets:		
Plant in service	7,230,120	6,861,775
Accumulated depreciation/amortization	(2,389,563)	(2,236,372)
Construction work in progress	<u>86,949</u>	<u>11,892</u>
Total noncurrent assets	<u>4,927,506</u>	<u>4,703,680</u>
Total assets	<u>5,014,832</u>	<u>4,865,817</u>
Deferred Outflows of Resources		
Deferred outflows related to pension	<u>187,659</u>	<u>124,037</u>
Liabilities, Deferred Inflows of Resources and Net Position		
Current Liabilities		
Accounts payable	1,053	2,201
Due to municipality	354,668	-
Accrued interest	125	337
Accrued vacation leave	4,761	4,425
Accrued liabilities	9,950	-
Current portion of notes payable	-	19,975
Current portion of general obligation debt	<u>70,000</u>	<u>65,000</u>
Total current liabilities	<u>440,557</u>	<u>91,938</u>
Noncurrent Liabilities		
General obligation debt	-	70,000
Unamortized debt premium	141	282
Accrued sick leave	25,752	19,460
Net pension liability	<u>44,915</u>	<u>-</u>
Total noncurrent liabilities	<u>70,808</u>	<u>89,742</u>
Total liabilities	<u>511,365</u>	<u>181,680</u>
Deferred Inflows of Resources		
Deferred inflows related to pension	<u>101,861</u>	<u>140,325</u>
Net Position		
Net investment in capital assets	4,857,365	4,482,038
Net pension asset	-	66,385
Unrestricted	<u>(268,100)</u>	<u>119,426</u>
Total net position	<u>\$ 4,589,265</u>	<u>\$ 4,667,849</u>

See notes to the financial statements

McFarland Storm Water Utility

Statements of Revenues, Expenses and Changes in Net Position
Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Operating Revenues		
Charges for services	\$ 582,442	\$ 544,101
Other	<u>12,745</u>	<u>17,716</u>
Total operating revenues	<u>595,187</u>	<u>561,817</u>
Operating Expenses		
Operation and maintenance	532,408	485,503
Depreciation	<u>161,839</u>	<u>160,151</u>
Total operating expenses	<u>694,247</u>	<u>645,654</u>
Operating loss	<u>(99,060)</u>	<u>(83,837)</u>
Nonoperating Expenses		
Investment income	2,977	9,058
Miscellaneous revenues (expenses)	19,076	452
Gain on disposal of equipment	1,438	-
Interest expense	(3,156)	(4,411)
Amortization of debt premium	<u>141</u>	<u>405</u>
Total nonoperating expenses	<u>20,476</u>	<u>5,504</u>
Change in net position	(78,584)	(78,333)
Net Position, Beginning	<u>4,667,849</u>	<u>4,746,182</u>
Net Position, Ending	<u><u>\$ 4,589,265</u></u>	<u><u>\$ 4,667,849</u></u>

See notes to the financial statements

McFarland Storm Water Utility

Statements of Cash Flows

Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Cash Flows From Operating Activities		
Received from customers	\$ 619,341	\$ 548,491
Paid to suppliers for goods and services	(340,960)	(357,085)
Paid to employees for operating payroll	(176,754)	(171,978)
Net cash flows from operating activities	<u>101,627</u>	<u>19,428</u>
Cash Flows From Noncapital Financing Activities		
Operating advances from other funds	<u>354,668</u>	<u>-</u>
Cash Flows From Capital and Related Financing Activities		
Acquisition and construction of capital assets	(458,161)	(474,524)
Financed purchase payments	(2,476)	(2,402)
Debt retired	(65,000)	(65,000)
Interest paid	(3,368)	(4,411)
Net cash flows from capital and related financing activities	<u>(529,005)</u>	<u>(546,337)</u>
Cash Flows From Investing Activities		
Investment income	<u>2,977</u>	<u>9,058</u>
Net change in cash and cash equivalents	(69,733)	(517,851)
Cash and Cash Equivalents, Beginning	<u>70,825</u>	<u>588,676</u>
Cash and Cash Equivalents, Ending	<u>\$ 1,092</u>	<u>\$ 70,825</u>
Noncash Capital and Related Financing Activities		
Write-off financed purchase	<u>\$ 17,499</u>	<u>\$ -</u>
Amortization of debt premium	<u>\$ 141</u>	<u>\$ 405</u>
Reconciliation of Operating Loss to Net Cash Flows From Operating Activities		
Operating loss	\$ (99,060)	\$ (83,837)
Nonoperating revenue (expense)	19,076	452
Noncash items in operating loss:		
Depreciation	161,839	160,151
Changes in assets and liabilities:		
Customer accounts receivable	(2,484)	(9,561)
Other accounts receivable	7,562	(4,217)
Pension related deferrals and liabilities	9,214	(25,618)
Accounts payable	(1,148)	(11,836)
Accrued vacation	6,292	(6,255)
Accrued sick leave	336	149
Net cash flows from operating activities	<u>\$ 101,627</u>	<u>\$ 19,428</u>

See notes to the financial statements

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

1. Summary of Significant Accounting Policies

The financial statements of McFarland Utilities (the Utilities) have been prepared in conformity with accounting principles generally accepted in the United States of America as applied to enterprise funds of governmental units. The Governmental Accounting Standards Board (GASB) is the accepted standard-setting body for establishing governmental accounting and financial reporting principles.

The significant accounting principles and policies utilized by the Utilities are described below.

Reporting Entity

The Utilities are separate enterprise funds of the Village of McFarland (Municipality). The Utilities are managed by the village board. The Utilities provide water, sewer, and storm water service to properties within the Municipality.

The water utility operates under service rules and rates established by the Public Service Commission of Wisconsin (PSCW). The sewer and storm water utilities operate under rules and rates established by the village board. Wastewater is treated under an agreement with Madison Metropolitan Sewerage District.

Measurement Focus, Basis of Accounting and Financial Statement Presentation

The Utilities are presented as enterprise funds of the Municipality. Enterprise funds are used to account for operations that are financed and operated in a manner similar to private business or where the governing body has decided that the determination of revenues earned, costs incurred and net income is necessary for management accountability.

The financial statements are reported using the economic resources measurement focus and the accrual basis of accounting. Under the accrual basis of accounting, revenues are recognized when earned and expenses are recorded when the liability is incurred or economic asset used. Revenues, expenses, gains, losses, assets and liabilities resulting from exchange and exchange-like transactions are recognized when the exchange takes place.

Preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Assets, Deferred Outflows of Resources, Liabilities, Deferred Inflows of Resources and Net Position

Deposits and Investments

For purposes of the statement of cash flows, cash and cash equivalents have original maturities of three months or less from the date of acquisition.

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Investment of the Utilities' funds are restricted by state statutes. Investments are limited to:

- Time deposits in any credit union, bank, savings bank or trust company.
- Bonds or securities of any county, city, drainage district, technical college district, village, town or school district of the state. Also, bonds issued by a local exposition district, local professional baseball park district, local professional football stadium district, local cultural arts district, the University of Wisconsin Hospitals and Clinics Authority or the Wisconsin Aerospace Authority.
- Bonds or securities issued or guaranteed by the federal government.
- The local government investment pool.
- Any security maturing in seven years or less and having the highest or second highest rating category of a nationally recognized rating agency.
- Securities of an open end management investment company or investment trust, subject to various conditions and investment options.
- Repurchase agreements with public depositories, with certain conditions.

The Utilities have adopted an investment policy. That policy has been adopted by the Village of McFarland. Please refer to the financial statements of the Municipality for details on this policy.

Investments are stated at fair value, which is the amount at which an investment could be exchanged in a current transaction between willing parties. No investments are reported at amortized cost. Adjustments necessary to record investments at fair value are recorded in the operating statement as increases or decreases in investment income. Fair values may have changed significantly after year end.

Receivables/Payables

Transactions between the Utilities and other funds of the Municipality that are representative of lending/borrowing arrangements outstanding at year end are referred to as advances to/from other funds. All other outstanding balances between the Utilities and other funds of the Municipality are reported as due to/from other funds.

The Utilities have the right under Wisconsin statutes to place delinquent water, sewer and storm water bills on the tax roll for collection. As such, no allowance for uncollectible customer accounts is considered necessary.

Materials and Supplies

Materials and supplies are generally used for construction, operation and maintenance work, not for resale. They are valued at the lower of cost or market utilizing the average cost method and charged to construction or expense when used.

Restricted Assets

Mandatory segregations of assets are presented as restricted assets. Such segregations are required by bond agreements and other external parties. Current liabilities payable from these restricted assets are so classified.

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Water Tower Reserve

Current water rates are designed to provide funds for future water tower painting. The utility transfers the budgeted amount each year from unrestricted cash to the internally designated account.

Depreciation Reserve

These are funds the utility has elected to set aside for future capital purchases and projects.

Special Assessments Receivable

This account represents the balances of special assessments levied against property owners for infrastructure improvements. The balances are receivable over various time periods with interest accrued annually. Some of the properties assessed are currently not developed; i.e., not attached to the water and sewer system. Payment of the assessment balance is deferred until these properties are attached to the water and sewer system.

Property Held for Future Use

This land is owned by the utility and is currently not in use.

Capital Assets

Capital assets (including right-to-use lease assets) are generally defined by the Utilities as assets with an initial, individual cost of more than \$10,000 and an estimated useful life in excess of one year.

Capital assets of the Utilities are recorded at cost or the estimated acquisition value at the time of contribution to the Utilities. Major outlays for Utility plant are capitalized as projects are constructed. Capital assets in service are depreciated or amortized using the straight-line method over the following useful lives:

	<u>Years</u>
Water Plant:	
Source of supply	34
Pumping	22-31
Water treatment	17
Transmission and distribution	18-77
General	4-17
Sewer Plant:	
Collecting system	50-100
Collecting system pumping	20-40
General	7-20
Storm Water Plant:	
Storm water infrastructure	50
General	10-50

Lease assets are typically amortized over the lease term.

Pensions

The fiduciary net position of the Wisconsin Retirement System (WRS) has been determined using the flow of economic resources measurement focus and accrual basis of accounting. This includes for purposes of measuring the following:

- Net Pension Liability (Asset);
- Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions; and
- Pension Expense (Revenue).

Information about the fiduciary net position of the WRS and additions to/deductions from WRS' fiduciary net position have been determined on the same basis as they are reported by the WRS. For this purpose, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

Deferred Outflows of Resources

A deferred outflow of resources represents a consumption of net position that applies to a future period and will not be recognized as an outflow of resources (expense) until that future time.

Accrued Vacation and Sick Leave

Under terms of employment, employees are granted sick leave and vacations in varying amounts. Only benefits considered to be vested are disclosed in these statements. Vested vacation and sick leave pay is accrued when earned in the financial statements. The liability is liquidated from general operating revenues of the Utilities.

Long-Term Obligations

Long-term debt and other obligations are reported as Utility liabilities. Bond premiums and discounts, are amortized over the life of the bonds using the straight-line or effective interest method. Gains or losses on prior refundings are amortized over the remaining life of the old debt or the life of the new debt, whichever is shorter. The balance at year end for premiums and discounts is shown as an increase or decrease in the liability section of the statement of net position. The balance at year end for the loss on refunding is shown as a deferred outflow in the statement of net position.

Leases

The Utilities is a lessor because it leases capital assets to other entities. As a lessor, the Utilities reports a lease receivable and corresponding deferred inflow of resources in the financial statements. The Utilities continues to report and depreciate the capital assets being leased as capital assets. The Utilities have a policy to recognize leases over \$75,000 as a lease receivable.

Deferred Inflows of Resources

A deferred inflow of resources represents an acquisition of net position that applies to a future period and therefore will not be recognized as an inflow of resources (revenue) until that future time.

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Revenues and Expenses

The Utilities distinguish operating revenues and expenses from nonoperating items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with the Utilities' principal ongoing operations. The principal operating revenues of the Utilities are charges to customers for sales and services. Operating expenses for enterprise funds include the cost of sales and services, administrative expenses and depreciation on capital assets. All revenues and expenses not meeting this definition are reported as nonoperating revenues and expenses.

Charges for Services

Billings are rendered and recorded bi-monthly based on metered usage. The Utilities do not accrue revenues beyond billing dates.

Current water rates were approved by the PSCW effective August 13, 2021.

Current storm total net investment in capital assets rates were approved by the village board on February 19, 2020 and implemented on August 5, 2020.

Current storm water utility rates were approved by the village board on August 22, 2022 and implemented on January 1, 2023.

Capital Contributions

Cash and capital assets are contributed to the Utilities from customers, the Municipality or external parties. The value of property contributed to the Utilities are reported as revenue on the statements of revenues, expenses and changes in net position.

Connection or Impact Fee

The Water Utility charges new customers an impact fee to connect to the system. Fees collected are recorded as capital contributions on the statements of revenues, expenses and changes in net position.

Transfers

Transfers include the payment in lieu of taxes to the Municipality.

Miscellaneous Operating Revenues

Miscellaneous revenues include forfeited discounts and water tower lease income for the Water and Sewer Utilities, as well as erosion control permits, yard waste permits and forfeited discounts for the Storm Water Utility.

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Effect of New Accounting Standards on Current Period Financial Statements

The Governmental Accounting Standards Board (GASB) has approved the following:

- Statement No. 100, *Accounting Changes and Error Corrections - an Amendment of GASB Statement No. 62*
- Statement No. 101, *Compensated Absences*
- Statement No. 102, *Certain Risk Disclosures*

When they become effective, application of these standards may restate portions of these financial statements.

Comparative Data

Certain amounts presented in the prior year data may have been reclassified in order to be consistent with the current year's presentation.

2. Deposits and Investments

	Carrying Value as of December		Risks
	2023	2022	
LGIP	\$ 1,129,492	\$ 5,412,891	Credit
Checking and savings	2,099,116	232,348	Custodial credit
Total	<u>\$ 3,228,608</u>	<u>\$ 5,645,239</u>	

Deposits in each local and area bank are insured by the FDIC in the amount of \$250,000 for time and savings accounts (including NOW accounts) and \$250,000 for demand deposit accounts (interest bearing and noninterest bearing). In addition, if deposits are held in an institution outside of the state in which the government is located, insured amounts are further limited to a total of \$250,000 for the combined amount of all deposit accounts.

Bank accounts are also insured by the State Deposit Guarantee Fund (SDGF) in the amount of \$400,000.

The Utilities may also maintain separate cash and investment accounts at the same financial institutions utilized by the Municipality. Federal depository insurance and the SDGF apply to all municipal accounts, and accordingly, the amount of insured funds is not determinable for the Utilities alone. Therefore, coverage for the Utilities may be reduced. Investment income on commingled investments of the entire Municipality is allocated based on average investment balances.

The Wisconsin Local Government Investment Pool (LGIP) is part of the State Investment Fund (SIF) and is managed by the State of Wisconsin Investment Board. The SIF is not registered with the Securities and Exchange Commission, but operates under the statutory authority of Wisconsin Chapter 25. The SIF reports the fair value of its underlying assets annually. Participants in the LGIP have the right to withdraw their funds in total on one day's notice. At December 31, 2023 and 2022, the fair value of the LGIP's assets were substantially equal to the Utilities' share.

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Custodial Credit Risk

Deposits

Custodial credit risk is the risk that in the event of a financial institution failure, the Utilities' deposits may not be returned to the Utilities.

The Utilities maintain certain deposits commingled with the Municipality. The following is a summary of the Utilities' total deposit balances at these institutions.

	2023		2022	
	Bank Balance	Carrying Value	Bank Balance	Carrying Value
McFarland State Bank	(A)	\$ 2,099,116	(A)	\$ 232,348

(A) - The Utilities maintain certain investments commingled with the Municipality. The custodial credit risk pertaining specifically to the Utilities' resources cannot be determined for those accounts. Please refer to the Municipality's financial statements for information on this risk.

Credit Risk

Credit risk is the risk an issuer or other counterparty to an investment will not fulfill its obligations.

The Utilities maintain certain investments commingled with the Municipality. The credit risk pertaining specifically to the Utilities' resources cannot be determined for those accounts. Please refer to the Municipality's financial statements for information on this risk.

The Utilities held investments in the Local Government Investment Pool which is an external pool that is not rated.

Investment Policy

Credit Risk

The Utilities adopted the Village of McFarland's investment policy, which addresses both credit and custodial credit risk. Refer to the Village-wide statements for this policy.

3. Interfund Receivables/Payables and Transfers

The following is a schedule of interfund balances for the years ending December 31, 2023 and 2022:

Due To	Due From	2023		2022	
		Amount	Principal Purpose	Amount	Principal Purpose
Municipality	Water and Sewer Utility	\$ 258,404	Tax equivalent	\$ 258,404	Tax equivalent
Municipality	Stormwater	354,668	Operating	-	

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

The following is a schedule of transfer balances for the years ending December 31, 2023 and 2022:

<u>To</u>	<u>From</u>	<u>2023</u>		<u>2022</u>	
		<u>Amount</u>	<u>Principal Purpose</u>	<u>Amount</u>	<u>Principal Purpose</u>
Municipality	Water and Sewer Utility	\$ 257,048	Tax equivalent	\$ 258,404	Tax equivalent

4. Restricted Assets

Restricted Accounts

Certain proceeds of the Utilities' debt, as well as certain resources set aside for their repayment, are classified as restricted assets on the statement of net position because their use is limited. The following accounts are reported as restricted assets:

Redemption - Used to segregate resources accumulated for debt service payments over the next twelve months.

Reserve - Used to report resources set aside to make up potential future deficiencies in the redemption account.

Construction - Used to report debt proceeds restricted for use in construction.

Replacement Account

As a condition of receiving state and federal funds for wastewater plant construction, the Utilities have established an account for replacement of certain mechanical equipment.

Impact Fee Account

The Utilities have received impact fees which must be spent in accordance with local ordinances and state statutes. Those funds not spent within the ordinance guidelines and time frames must be refunded to the current property owner.

Net Pension Asset

Restricted assets have been reported in connection with the net pension asset balance since this balance must be used to fund employee benefits.

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Restricted Net Position

The following calculation supports the amount of water and sewer utility restricted net position:

	<u>2023</u>	<u>2022</u>
Restricted assets:		
Redemption account	\$ 97,942	\$ 95,025
Reserve account	267,200	267,200
Replacement account	477,407	564,847
Impact fee account	69,525	61,452
Construction account	-	2,555,938
Net pension asset	-	166,077
Total restricted assets	<u>912,074</u>	<u>3,710,539</u>
Less restricted assets not funded by revenues:		
Reserve from borrowing	(267,200)	(267,200)
Construction account	-	(2,555,938)
Total restricted assets not funded by revenues	<u>(267,200)</u>	<u>(2,823,138)</u>
Current liabilities payable from restricted assets	<u>(11,275)</u>	<u>(11,692)</u>
Total restricted net position as calculated	<u>\$ 633,599</u>	<u>\$ 875,709</u>

The purpose of the restricted net position is as follows:

	<u>2023</u>	<u>2022</u>
Debt service	\$ 86,667	\$ 83,333
Equipment replacement	477,407	564,847
Impact fee	69,525	61,452
Net pension asset	-	166,077
Total restricted net position	<u>\$ 633,599</u>	<u>\$ 875,709</u>

The following calculation supports the amount of storm total net investment in capital assets restricted net position:

	<u>2023</u>	<u>2022</u>
Restricted assets:		
Net pension asset	\$ -	\$ 66,385
Total restricted net position as calculated	<u>\$ -</u>	<u>\$ 66,385</u>

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

5. Changes in Capital Assets

Water Utility

A summary of changes in water capital assets for 2023 follows:

	Balance 1/1/23	Increases	Decreases	Balance 12/31/23
Capital assets, not being depreciated:				
Land and land rights	\$ 87,550	\$ -	\$ -	\$ 87,550
Capital assets being depreciated:				
Source of supply	211,239	-	-	211,239
Pumping	357,710	30,438	-	388,148
Water treatment	4,498	-	-	4,498
Transmission and distribution	18,032,310	1,709,949	212,482	19,529,777
General	653,106	15,669	24,709	644,066
Total capital assets being depreciated	19,258,863	1,756,056	237,191	20,777,728
Total capital assets	19,346,413	1,756,056	237,191	20,865,278
Less accumulated depreciation	(5,753,904)	(492,102)	237,191	(6,008,815)
Construction in progress	64,902	1,719,699	1,447,817	336,784
Net capital assets	<u>\$ 13,657,411</u>			<u>\$ 15,193,247</u>

A summary of changes in water capital assets for 2022 follows:

	Balance 1/1/22	Increases	Decreases	Balance 12/31/22
Capital assets, not being depreciated:				
Land and land rights	\$ 87,550	\$ -	\$ -	\$ 87,550
Capital assets being depreciated:				
Source of supply	211,239	-	-	211,239
Pumping	357,710	-	-	357,710
Water treatment	4,498	-	-	4,498
Transmission and distribution	16,867,980	1,240,380	76,050	18,032,310
General	655,675	32,225	34,794	653,106
Total capital assets being depreciated	18,097,102	1,272,605	110,844	19,258,863
Total capital assets	18,184,652	1,272,605	110,844	19,346,413
Less accumulated depreciation	(5,432,429)	(432,319)	110,844	(5,753,904)
Construction in progress	22,736	956,549	914,383	64,902
Net capital assets	<u>\$ 12,774,959</u>			<u>\$ 13,657,411</u>

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Sewer Utility

A summary of changes in sewer capital assets for 2023 follows:

	Balance 1/1/23	Increases	Decreases	Balance 12/31/23
Capital assets, not being depreciated:				
Land and land rights	\$ 78,020	\$ -	\$ -	\$ 78,020
Capital assets being depreciated:				
Collecting system	6,870,622	70,201	-	6,940,823
Collecting system pumping	1,043,088	-	-	1,043,088
General	431,944	15,669	24,709	422,904
Total capital assets being depreciated	8,345,654	85,870	24,709	8,406,815
Total capital assets	8,423,674	85,870	24,709	8,484,835
Less accumulated depreciation	(2,842,797)	(185,856)	24,709	(3,003,944)
Net capital assets	<u>\$ 5,580,877</u>			<u>\$ 5,480,891</u>

A summary of changes in sewer capital assets for 2022 follows:

	Balance 1/1/22	Increases	Decreases	Balance 12/31/22
Capital assets, not being depreciated:				
Land and land rights	\$ 78,020	\$ -	\$ -	\$ 78,020
Capital assets being depreciated:				
Collecting system	6,809,508	61,114	-	6,870,622
Collecting system pumping	1,043,088	-	-	1,043,088
General	487,704	32,225	87,985	431,944
Total capital assets being depreciated	8,340,300	93,339	87,985	8,345,654
Total capital assets	8,418,320	93,339	87,985	8,423,674
Less accumulated depreciation	(2,752,724)	(178,058)	87,985	(2,842,797)
Net capital assets	<u>\$ 5,665,596</u>			<u>\$ 5,580,877</u>

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

Storm Water Utility

A summary of changes in storm water capital assets for 2023 follows:

	Balance 1/1/23	Increases	Decreases	Balance 12/31/23
Capital assets, not being depreciated:				
Land and land rights	\$ 160,275	\$ -	\$ -	\$ 160,275
Capital assets being depreciated:				
Storm water plant	6,412,742	377,384	-	6,790,126
General	288,758	15,670	24,709	279,719
Total capital assets being depreciated	6,701,500	393,054	24,709	7,069,845
Total capital assets	6,861,775	393,054	24,709	7,230,120
Less accumulated depreciation	(2,236,372)	(177,900)	24,709	(2,389,563)
Construction in progress	11,892	472,215	397,158	86,949
Net capital assets	<u>\$ 4,637,295</u>			<u>\$ 4,927,506</u>

A summary of changes in storm water capital assets for 2022 follows:

	Balance 1/1/22	Increases	Decreases	Balance 12/31/22
Capital assets, not being depreciated:				
Land and land rights	\$ 160,275	\$ -	\$ -	\$ 160,275
Capital assets being depreciated:				
Storm water plant	5,979,443	433,299	-	6,412,742
General	407,714	32,225	151,181	288,758
Total capital assets being depreciated	6,387,157	465,524	151,181	6,701,500
Total capital assets	6,547,432	465,524	151,181	6,861,775
Less accumulated depreciation	(2,227,402)	(160,151)	151,181	(2,236,372)
Construction in progress	2,892	523,767	514,767	11,892
Net capital assets	<u>\$ 4,322,922</u>			<u>\$ 4,637,295</u>

McFarland Utilities

Notes to Financial Statements
December 31, 2023 and 2022

6. Lease Disclosures

Lessor - Lease Receivables

<u>Water Utility</u>					
<u>Lease Receivables Description</u>	<u>Date of Inception</u>	<u>Final Maturity</u>	<u>Interest Rates</u>	<u>Receivable Balance 12/31/23</u>	<u>Receivable Balance 12/31/22</u>
Tower Space (US Cellular)	04/01/2020	12/01/2033	4.00 %	\$ 444,988	\$ 467,230
Tower Space (AT&T)	08/01/2005	07/31/2035	2.50	314,233	331,820
Tower Space (T-mobile)	11/11/2009	12/31/2044	4.00	851,903	857,839
Total water utility activities				<u>\$ 1,611,124</u>	<u>\$ 1,656,889</u>

The water utility recognized \$45,765 and \$39,043 of lease revenue during 2023 and 2022, respectively.

The water utility recognized \$69,295 and \$71,986 of interest revenue during 2023 and 2022, respectively.

7. Long-Term Obligations

Revenue Debt - Water and Sewer Utility

The following bonds have been issued:

<u>Date</u>	<u>Purpose</u>	<u>Final Maturity</u>	<u>Interest Rate</u>	<u>Original Amount</u>	<u>Outstanding Amount 12/31/23</u>
04/27/2022	Water & Sewer System Revenue Bonds 2022	05/01/2042	4.00 %	\$ 3,650,000	\$ 3,525,000

Revenue bonds debt service requirements to maturity follows:

<u>Years Ending December 31:</u>	<u>Principal</u>	<u>Interest</u>	<u>Total</u>
2024	\$ 130,000	\$ 132,700	\$ 262,700
2025	135,000	127,400	262,400
2026	140,000	121,900	261,900
2027	145,000	116,200	261,200
2028	150,000	110,300	260,300
2029-2033	850,000	455,225	1,305,225
2034-2038	1,015,000	292,625	1,307,625
2039-2042	960,000	78,800	1,038,800
Total	<u>\$ 3,525,000</u>	<u>\$ 1,435,150</u>	<u>\$ 4,960,150</u>

All water and sewer revenues net of specified operating expenses are pledged as security of the above revenue bonds until the bonds are defeased. Principal and interest paid for 2023 and 2022 were \$262,800 and \$71,709, respectively. Total customer gross revenues as defined for the same periods were \$3,775,881 and \$3,171,035. Annual principal and interest payments are expected to require 7% of gross revenues on average.

McFarland Utilities

Notes to Financial Statements
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General Obligation Debt - Water and Sewer Utility

The following general obligation notes have been issued:

<u>Date</u>	<u>Purpose</u>	<u>Final Maturity</u>	<u>Interest Rate</u>	<u>Original Amount</u>	<u>Outstanding Amount 12/31/23</u>
06/23/2015	2015 and 2016 improvement projects	12/01/2024	2.00 %	\$ 2,495,000	\$ 340,000
07/20/2017	2017 improvement projects	12/01/2025	1.20	845,000	250,000
08/01/2019	2019 improvement projects	12/01/2028	2.00	720,000	470,000
06/22/2020	2020 Improvement projects	12/01/2029	1.50	645,000	440,000
03/01/2021	2021 Improvement projects	12/01/2030	1.00	725,000	580,000

General obligation notes debt service requirements to maturity follows:

<u>Years Ending December 31:</u>	<u>Principal</u>	<u>Interest</u>	<u>Total</u>
2024	\$ 700,000	\$ 38,710	\$ 738,710
2025	370,000	24,450	394,450
2026	250,000	17,300	267,300
2027	255,000	12,150	267,150
2028	260,000	6,950	266,950
2029-2030	245,000	2,400	247,400
Total	<u>\$ 2,080,000</u>	<u>\$ 101,960</u>	<u>\$ 2,181,960</u>

General Obligation Debt - Storm Water Utility

The following general obligation notes have been issued:

<u>Date</u>	<u>Purpose</u>	<u>Final Maturity</u>	<u>Interest Rate</u>	<u>Original Amount</u>	<u>Outstanding Amount 12/31/23</u>
06/23/2015	2015 and 2016 improvement projects	12/01/2024	2.00 %	\$ 500,000	\$ 70,000

General obligation notes debt service requirements to maturity follows:

<u>Years Ending December 31:</u>	<u>Principal</u>	<u>Interest</u>	<u>Total</u>
2024	\$ 70,000	\$ 1,505	\$ 71,505

McFarland Utilities

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Long-Term Obligations Summary - Water and Sewer Utility

Long-term obligation activity for the year ended December 31, 2023 is as follows:

	1/1/23 Balance	Additions	Reductions	12/31/23 Balance	Due Within One Year
Revenue bonds	\$ 3,650,000	\$ -	\$ 125,000	\$ 3,525,000	\$ 130,000
General obligation debt	2,750,000	-	670,000	2,080,000	700,000
Accrued sick leave	52,987	23,468	4,467	71,988	-
Financed purchase	39,950	-	39,950	-	-
Unamortized debt premium	262,467	-	34,906	227,561	-
Total	\$ 6,755,404	\$ 23,468	\$ 874,323	\$ 5,904,549	\$ 830,000

Long-term obligation activity for the year ended December 31, 2022 is as follows:

	1/1/22 Balance	Additions	Reductions	12/31/22 Balance	Due Within One Year
Revenue bonds	\$ -	\$ 3,650,000	\$ -	\$ 3,650,000	\$ 125,000
General obligation debt	3,400,000	-	650,000	2,750,000	670,000
Accrued sick leave	68,986	18,906	34,905	52,987	-
Financed purchase	44,755	-	4,805	39,950	39,950
Unamortized debt premium	88,671	208,020	34,224	262,467	-
Total	\$ 3,602,412	\$ 3,876,926	\$ 723,934	\$ 6,755,404	\$ 834,950

Long-Term Obligations Summary - Storm Water Utility

Long-term obligation activity for the year ended December 31, 2023 is as follows:

	1/1/23 Balance	Additions	Reductions	12/31/23 Balance	Due Within One Year
General obligation debt	\$ 135,000	\$ -	\$ 65,000	\$ 70,000	\$ 70,000
Accrued sick leave	19,460	8,767	3,475	24,752	-
Financed purchase	19,975	-	19,975	-	-
Unamortized debt premium	282	-	141	141	-
Total	\$ 174,717	\$ 8,767	\$ 88,591	\$ 94,893	\$ 70,000

Long-term obligation activity for the year ended December 31, 2022 is as follows:

	1/1/22 Balance	Additions	Reductions	12/31/22 Balance	Due Within One Year
General obligation debt	\$ 200,000	\$ -	\$ 65,000	\$ 135,000	\$ 65,000
Accrued sick leave	25,716	7,239	13,495	19,460	-
Financed purchase	22,377	-	2,402	19,975	19,975
Unamortized debt premium	687	-	405	282	-
Total	\$ 248,780	\$ 7,239	\$ 81,302	\$ 174,717	\$ 84,975

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8. Net Position

GASB No. 34 requires the classification of net position into three components - net investment in capital assets, restricted and unrestricted. These classifications are defined as follows:

Net Investment in Capital Assets - This component of net position consists of capital assets, including restricted capital assets, net of accumulated depreciation and reduced by the outstanding balances of any bonds, mortgages, notes or other borrowings that are attributable to the acquisition, construction or improvement of those assets. If there are significant unspent related debt proceeds at year-end, the portion of the debt attributable to the unspent proceeds are not included in the calculation of net investment in capital assets. Rather, that portion of the debt is included in the same net position component as the unspent proceeds.

Restricted - This component of net position consists of constraints placed on net position use through external constraints imposed by creditors (such as through debt covenants), grantors, contributors or laws or regulations of other governments or constraints imposed by law through constitutional provisions or enabling legislation.

Unrestricted Net Position - This component of net position consists of net positions that do not meet the definition of "restricted" or "net investment in capital assets."

When both restricted and unrestricted resources are available for use, it is the Utilities' policy to use restricted resources first, then unrestricted resources as they are needed.

The following calculation supports the water and sewer utility net investment in capital assets:

	<u>2023</u>	<u>2022</u>
Plant in service	\$ 29,350,113	\$ 27,770,087
Accumulated depreciation	(9,012,759)	(8,596,701)
Construction work in progress	336,784	64,902
Subtotal	<u>20,674,138</u>	<u>19,238,288</u>
Less capital related debt:		
Current portion of capital related long-term debt	830,000	834,950
Long-term portion of capital related long-term debt	4,775,000	5,605,000
Unamortized debt premium	227,561	262,467
	<u>5,832,561</u>	<u>6,702,417</u>
Add unspent debt proceeds:		
Reserve from borrowing	267,200	267,200
Construction funds	-	2,555,938
Subtotal	<u>267,200</u>	<u>2,823,138</u>
Total net investment in capital assets	<u>\$ 15,108,777</u>	<u>\$ 15,359,009</u>

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The following calculation supports the storm total net investment in capital assets :

	2023	2022
Plant in service	\$ 7,230,120	\$ 6,861,775
Accumulated depreciation/amortization	(2,389,563)	(2,236,372)
Construction work in progress	86,949	11,892
Subtotal	<u>4,927,506</u>	<u>4,637,295</u>
Less capital related debt:		
Current portion of capital related long-term debt	70,000	84,975
Long-term portion of capital related long-term debt	-	70,000
Unamortized debt premium	141	282
	<u>70,141</u>	<u>155,257</u>
Total net investment in capital assets	<u><u>\$ 4,857,365</u></u>	<u><u>\$ 4,482,038</u></u>

9. Employees Retirement System

General Information About the Pension Plan

Plan Description

The WRS is a cost-sharing multiple-employer defined benefit pension plan. WRS benefits and other plan provisions are established by Chapter 40 of the Wisconsin Statutes. Benefit terms may only be modified by the legislature. The retirement system is administered by the Wisconsin Department of Employee Trust Funds (ETF). The system provides coverage to all eligible State of Wisconsin, local government and other public employees. All employees, initially employed by a participating WRS employer on or after July 1, 2011 expected to work at least 1,200 hours a year (880 hours for teachers and school district educational support employees) and expected to be employed for at least one year from employee's date of hire are eligible to participate in the WRS.

ETF issues a standalone Annual Comprehensive Financial Report (ACFR), which can be found at <http://etf.wi.gov/about-etf/reports-and-studies/financial-reports-and-statements>.

Additionally, ETF issued a standalone Wisconsin Retirement System Financial Report, which can be found using the link above.

Vesting

For employees beginning participation on or after January 1, 1990, and no longer actively employed on or after April 24, 1998, creditable service in each of five years is required for eligibility for a retirement annuity. Participants employed prior to 1990 and on or after April 24, 1998, and prior to July 1, 2011, are immediately vested. Participants who initially became WRS eligible on or after July 1, 2011, must have five years of creditable service to be vested.

Benefits Provided

Employees who retire at or after age 65 (54 for protective occupation employees, 62 for elected officials and State executive participants, if hired on or before 12/31/2016) are entitled to retirement benefit based on a formula factor, their average earnings and creditable service.

McFarland Utilities

Notes to Financial Statements
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Final average earnings is the average of the participant's three highest earnings period. Creditable service includes current service and prior service for which a participant received earnings and made contributions as required. Creditable service also includes creditable military service. The retirement benefit will be calculated as a money purchase benefit based on the employee's contributions plus matching employer's contributions, with interest, if that benefit is higher than the formula benefit.

Vested participants may retire at age 55 (50 for protective occupation employees) and receive an actuarially reduced benefit. Participants terminating covered employment prior to eligibility for an annuity may either receive employee-required contributions plus interest as a separation benefit or leave contributions on deposit and defer application until eligible to receive a retirement benefit.

The WRS also provides death and disability benefits for employees.

Postretirement Adjustments

The Employee Trust Funds Board may periodically adjust annuity payments from the retirement system based on annual investment performance in accordance with s. 40.27, Wis. Stat. An increase (or decrease) in annuity payments may result when investment gains (losses), together with other actuarial experience factors, create a surplus (shortfall) in the reserves, as determined by the system's consulting actuary. Annuity increases are not based on cost of living or other similar factors. For Core annuities, decreases may be applied only to previously granted increases. By law, Core annuities cannot be reduced to an amount below the original, guaranteed amount (the floor) set at retirement. The Core and Variable annuity adjustments granted during recent years are as follows:

<u>Year</u>	<u>Core Fund Adjustment</u>	<u>Variable Fund Adjustment</u>
2013	(9.6)	9.0
2014	4.7	25.0
2015	2.9	2.0
2016	0.5	(5.0)
2017	2.0	4.0
2018	2.4	17.0
2019	0.0	(10.0)
2020	1.7	21.0
2021	5.1	13.0
2022	7.4	15.0

Contributions

Required contributions are determined by an annual actuarial valuation in accordance with Chapter 40 of the Wisconsin Statutes. The employee required contribution is one-half of the actuarially determined contribution rate for general category employees, including teachers and Executives and Elected Officials. Starting January 1, 2016, the Executives and Elected Officials category was merged into the General Employee category. Required contributions for protective employees are the same rate as general employees. Employers are required to contribute the remainder of the actuarially determined contribution rate. The employer may not pay the employee required contribution unless provided for by an existing collective bargaining agreement.

The WRS recognized \$56,198 and \$39,757 in contributions from the Utilities during the current and prior reporting periods, respectively.

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Contribution rates for the plan year reported as of December 31, 2023 and December 31, 2022 are:

	2023		2022	
	Employee	Employer	Employee	Employer
General (including Executives and Elected Officials)	6.50 %	6.50 %	6.75 %	6.75 %
Protective with Social Security	6.50	12.00	6.75	11.75
Protective without Social Security	6.50	16.40	6.75	16.35

Pension Liabilities, Pension Expense (Revenue), Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

At December 31, 2023, the Utilities reported a liability (asset) of \$172,248 for its proportionate share of the net pension liability (asset). The net pension liability (asset) was measured as of December 31, 2022, and the total pension liability used to calculate the net pension liability (asset) was determined by an actuarial valuation as of December 31, 2021 rolled forward to December 31, 2022. No material changes in assumptions or benefit terms occurred between the actuarial valuation date and the measurement date. The Utilities' proportion of the net pension liability (asset) was based on the Utilities' share of contributions to the pension plan relative to the contributions of all participating employers. At December 31, 2022, the Village of McFarland's proportion was 0.03264827%, which was an increase of 0.00156747% from its proportion measured as of December 31, 2021.

At December 31, 2022, the Utilities reported a liability (asset) of \$232,462 for its proportionate share of the net pension liability (asset). The net pension liability (asset) was measured as of December 31, 2021, and the total pension liability used to calculate the net pension liability (asset) was determined by an actuarial valuation as of December 31, 2020 rolled forward to December 31, 2021. No material changes in assumptions or benefit terms occurred between the actuarial valuation date and the measurement date. The Utilities' proportion of the net pension liability (asset) was based on the Utilities' share of contributions to the pension plan relative to the contributions of all participating employers. At December 31, 2021, the Village of McFarland's proportion was 0.03108080%, which was an increase of .00128896% from its proportion measured as of December 31, 2020.

For the years ended December 31, 2023 and 2022, the Utilities recognized pension expense (revenue) of \$71,314 and \$(21,922), respectively.

McFarland Utilities

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At December 31, 2023, the Utilities reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Water and Sewer Utility		Storm Water Utility	
	Deferred Outflows of Resources	Deferred Inflows of Resources	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between projected and actual experience	\$ 155,130	\$ 276,559	\$ 66,061	\$ 100,840
Changes in assumption	25,993	-	10,357	-
Net differences between project and actual earnings on pension plan	310,711	-	96,198	-
Changes in proportion and differences between employer contributions and proportionate share of contributions	1,018	2,779	202	1,021
Employer contributions subsequent to the measurement date	41,365	-	14,841	-
Total	\$ 534,217	\$ 279,338	\$ 187,659	\$ 101,861

At December 31, 2022, the Utilities reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Water and Sewer Utility		Storm Water Utility	
	Deferred Outflows of Resources	Deferred Inflows of Resources	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	\$ 250,264	\$ 31,607	\$ 99,619	\$ 14,436
Changes in assumption	35,362	-	13,662	-
Net differences between project and actual earnings on pension plan	-	318,182	-	125,637
Changes in proportion and differences between employer contributions and proportionate share of contributions	1,548	598	389	252
Employer contributions subsequent to the measurement date	29,390	-	10,367	-
Total	\$ 316,564	\$ 350,387	\$ 124,037	\$ 140,325

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Deferred outflows related to pension resulting from the WRS Employer's contributions subsequent to the measurement date reported in the tables above will be recognized as a reduction of the net pension liability (asset) in the subsequent year. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to pension will be recognized in pension expense as follows:

Years Ending December 31:	Water and Sewer Utility	Storm Water Utility
2024	\$ 8,509	\$ 2,828
2025	44,011	14,626
2026	44,922	14,929
2027	116,072	38,574
2028	-	-
Thereafter	-	-
Total	<u>\$ 213,514</u>	<u>\$ 70,957</u>

Actuarial Assumptions

The total pension liability in the actuarial valuation used in the current and prior year was determined using the following actuarial assumptions, applied to all periods included in the measurement:

	2023	2022
Actuarial Valuation Date:	December 31, 2021	December 31, 2020
Measurement Date of Net Pension Liability (Asset):	December 31, 2022	December 31, 2021
Experience Study:	January 1, 2018- December 31, 2020, Published November 19, 2021	January 1, 2018- December 31, 2020, Published November 19, 2021
Actuarial Cost Method:	Entry Age Normal	Entry Age Normal
Asset Valuation Method:	Fair Value	Fair Value
Long-Term Expected Rate of Return:	6.8%	6.8%
Discount Rate:	6.8%	6.8%
Salary Increases:		
Wage Inflation	3.0%	3.0%
Seniority/Merit	0.1%-5.6%	0.1%-5.6%
Mortality:	2020 WRS Experience Mortality Table	2020 WRS Experience Mortality Table
Postretirement Adjustments: *	1.7%	1.7%

* No postretirement adjustment is guaranteed. Actual adjustments are based on recognized investment return, actuarial experience and other factors. The percentages listed above are the assumed annual adjustment based on the investment return assumption and the postretirement discount rate.

Actuarial assumptions are based upon an experience study conducted in 2021 that covered a three-year period from January 1, 2018 to December 31, 2020. The total pension liability for December 31, 2022 is based upon a roll-forward of the liability calculated from the December 31, 2021 actuarial valuation.

Long-Term Expected Return on Plan Assets

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The target allocation and best estimates of geometric real rates of return for each major asset class as of December 31, 2023 are summarized in the following table:

Asset Allocation Targets and Expected Returns¹ as of December 31, 2022			
Core Fund Asset Class	Asset Allocation %	Long-Term Expected Nominal Rate of Return %	Long-Term Expected Real Rate of Return %²
Public Equity	48 %	7.6 %	5.0 %
Public Fixed Income	25	5.3	2.7
Inflation Sensitive	19	3.6	1.1
Real Estate	8	5.2	2.6
Private Equity/Debt	15	9.6	6.9
Total Core Fund ³	115	7.4	4.8
Variable Fund Asset			
U.S. Equities	70	7.2	4.6
International Equities	30	8.1	5.5
Total Variable Fund	100	7.7	5.1

¹ Asset Allocations are managed within established ranges; target percentages may differ from actual monthly allocations.

² New England Pension Consultants' Long-Term U.S. CPI (Inflation) Forecast: 2.5%.

³ The investment policy used for the Core Fund involves reducing equity exposure by leveraging lower-volatility assets, such as fixed income securities. This results in an asset allocation beyond 100%. Currently, an asset allocation target of 15% policy leverage is used subject to an allowable range of up to 20%.

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The target allocation and best estimates of arithmetic real rates of return for each major asset class as of December 31, 2022 are summarized in the following table:

Asset Allocation Targets and Expected Returns¹ as of December 31, 2021			
Core Fund Asset Class	Asset Allocation %	Long-Term Expected Nominal Rate of Return %	Long-Term Expected Real Rate of Return %²
Global Equities	52 %	6.8 %	4.2 %
Fixed Income	25	4.3	1.8
Inflation Sensitive	19	2.7	0.2
Real Estate	7	5.6	3.0
Private Equity/Debt	12	9.7	7.0
Total Core Fund ³	115	6.6	4.0
Variable Fund Asset			
U.S. Equities	70	6.3	3.7
International Equities	30	7.2	4.6
Total Variable Fund	100	6.8	4.2

¹ Asset Allocations are managed within established ranges; target percentages may differ from actual monthly allocations.

² New England Pension Consultants' Long-Term U.S. CPI (Inflation) Forecast: 2.5%.

³ The investment policy used for the Core Fund involves reducing equity exposure by leveraging lower-volatility assets, such as fixed income securities. This results in an asset allocation beyond 100%. Currently, an asset allocation target of 15% policy leverage is used subject to an allowable range of up to 20%.

Single Discount Rate

A single discount rate of 6.80% was used to measure the total pension liability as of December 31, 2023 and December 31, 2022. As of December 31, 2023, this discount rate was based on the expected rate of return on pension plan investments of 6.80% and a long term bond rate of 4.05%. As of December 31, 2022, the discount rate was based on the expected rate of return on pension plan investments of 6.80% and a long term bond rate of 1.84%. (Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity Index's "20-year Municipal GO AA Index" as of December 31, 2022 and 2021, respectively. In describing this index, Fidelity notes that the Municipal Curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax-exempt securities.) Because of the unique structure of WRS, the 6.80% expected rate of return implies that a dividend of approximately 1.7% will always be paid. For purposes of the single discount rate, it was assumed that the dividend would always be paid. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments (including expected dividends) of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Sensitivity of the Utilities' Proportionate Share of the Net Pension Liability (Asset) to Changes in the Discount Rate

The following presents the Utilities' proportionate share of the net pension liability (asset) calculated using the current discount rate, as well as what the Utilities' proportionate share of the net pension liability (asset) would be if it were calculated using a discount rate that is 1-percentage-point lower or 1-percentage-point higher than the current rate.

The sensitivity analysis as of December 31, 2023 follows:

	1% Decrease to Discount Rate (5.80%)	Current Discount Rate (6.80%)	1% Increase to Discount Rate (7.80%)
Water and Sewer Utility's proportionate share of the net position liability (asset)	\$ 422,614	\$ 127,333	\$ (75,795)
Storm Water Utility's proportionate share of the net position liability (asset)	14,071	44,915	(26,736)

The sensitivity analysis as of December 31, 2022 follows:

	1% Decrease to Discount Rate (5.80%)	Current Discount Rate (6.80%)	1% Increase to Discount Rate (7.80%)
Water and Sewer Utility's proportionate share of the net position liability (asset)	\$ 117,843	\$ (166,077)	\$ (370,447)
Storm Water Utility's proportionate share of the net position liability (asset)	47,105	(66,385)	(148,077)

Pension Plan Fiduciary Net Position

Detailed information about the pension plan's fiduciary net position is available in separately issued financial statements available at <http://etf.wi.gov/about-etf/reports-and-studies/financial-reports-and-statements>.

10. Commitments and Contingencies**Claims and Judgments**

From time to time, the Utilities are party to various pending claims and legal proceedings. Although the outcome of such matters cannot be forecasted with certainty, it is the opinion of management and the Utilities' legal counsel that the likelihood is remote that any such claims or proceedings will have a material adverse effect on the Utilities' financial position or results of operations.

11. Risk Management

The Utilities are exposed to various risks of loss related to torts; theft of, damage to, or destruction of assets; errors and omissions; workers compensation; and health care of its employees. These risks are covered through the purchase of commercial insurance, with minimal deductibles. Settled claims have not exceeded the commercial liability in any of the past three years. There were no significant reductions in coverage compared to the prior year.

12. Subsequent Events

The Utilities evaluated subsequent events through May 15, 2024, the date that the financial statements were available to be issued, for events requiring recording or disclosure in the financial statements.

Rate Adjustments

On April 4, 2024, the PSCW authorized new rates for the water utility, effective May 15, 2024.

Effective January 1, 2024, stormwater rates per equivalent residential unit (ERU) increase from \$14.83 per unit to \$20.00. The change impacts the bimonthly service charge. The rate increase was approved by the Public Works & Utilities Committee on November 27, 2023 and Village Board on December 12, 2023.

REQUIRED SUPPLEMENTARY INFORMATION

McFarland Utilities

Schedule of Proportionate Share of the Net Pension Liability (Asset) -
Wisconsin Retirement System
Year Ended December 31, 2023

The required supplementary information presented below represents the proportionate information for the enterprise funds included in this report.

Fiscal Year Ending	Proportion of the Net Pension Liability (Asset) - City	Utilities' Proportionate Share of the Net Pension Liability (Asset)	Covered Payroll	Proportionate Share of the Net Pension Liability (Asset) as a Percentage of Covered Payroll	Plan Fiduciary Net Position as a Percentage of the Total Pension Liability (Asset)
12/31/23	0.03264827%	\$ 172,248	\$ 442,410	38.93%	95.75%
12/31/22	0.03108080%	(232,462)	381,402	60.95%	106.02%
12/31/21	0.02979184%	(140,813)	301,886	46.81%	105.26%
12/31/20	0.02809358%	(77,334)	304,653	25.37%	102.96%
12/31/19	0.02660430%	84,737	392,821	21.57%	96.45%
12/31/18	0.02526343%	(66,445)	359,265	18.49%	102.93%
12/31/17	0.02403967%	19,856	388,576	5.11%	99.12%
12/31/16	0.02415237%	43,275	379,603	11.40%	98.20%

Schedule of Employer Contributions - Wisconsin Retirement System
Year Ended December 31, 2023

Fiscal Year Ending	Contractually Required Contributions	Contributions in Relation to the Contractually Required Contributions	Contribution Deficiency (Excess)	Covered Payroll	Contributions as a Percentage of Covered Payroll
12/31/23	\$ 56,198	\$ 56,198	\$ -	\$ 575,253	9.77%
12/31/22	39,330	39,330	-	442,410	8.98%
12/31/21	34,807	34,807	-	381,402	9.13%
12/31/20	27,337	27,337	-	301,886	9.06%
12/31/19	25,926	25,926	-	304,653	8.51%
12/31/18	26,319	26,319	-	392,821	6.70%
12/31/17	24,430	24,430	-	359,265	6.80%
12/31/16	25,646	25,646	-	388,576	6.60%

See notes to required supplementary information

McFarland Utilities

Notes to Required Supplementary Information

Year Ended December 31, 2023

Changes of benefit terms. There were no changes of benefit terms for any participating employer in WRS.

Changes of assumptions.

	2019-2021	2022-2023
Long-term expected rate of	7.0%	6.8%
Discount rate	7.0%	6.8%
Salary increases		
Inflation	3.0%	3.0%
Seniority/Merit	0.1%-5.6%	0.1%-5.6%
Mortality	Wisconsin 2018 Mortality Table	2020 WRS Experience Mortality Table
Postretirement adjustments	1.90%	1.70%

These schedules are presented to illustrate the requirements to show information for 10 years. However, until a full 10-year trend is compiled, information is presented for those years for which information is available.

SUPPLEMENTARY INFORMATION

McFarland Water and Sewer Utility

Water Utility Plant

Year Ended December 31, 2023

	Balance 1/1/23	Additions	Retirements	Balance 12/31/23
Source of Supply				
Land and land rights	\$ 32,300	\$ -	\$ -	\$ 32,300
Wells and springs	211,239	-	-	211,239
Total source of supply	243,539	-	-	243,539
Pumping				
Structures and improvements	145,092	-	-	145,092
Electric pumping equipment	190,402	30,438	-	220,840
Other pumping equipment	22,216	-	-	22,216
Total pumping	357,710	30,438	-	388,148
Water Treatment				
Water treatment equipment	4,498	-	-	4,498
Transmission and Distribution				
Land and land rights	55,250	-	-	55,250
Distribution reservoirs and standpipes	1,231,105	-	-	1,231,105
Transmission and distribution mains	11,519,410	739,276	44,710	12,213,976
Services	2,541,116	164,385	3,515	2,701,986
Meters	1,481,961	759,442	160,757	2,080,646
Hydrants	1,258,718	46,846	3,500	1,302,064
Total transmission and distribution	18,087,560	1,709,949	212,482	19,585,027
General				
Office furniture and equipment	9,946	-	-	9,946
Transportation equipment	268,027	15,669	24,709	258,987
Tools, shop and garage equipment	75,431	-	-	75,431
Laboratory equipment	6,649	-	-	6,649
Power-operated equipment	111,808	-	-	111,808
Communication equipment	180,943	-	-	180,943
Miscellaneous equipment	302	-	-	302
Total general	653,106	15,669	24,709	644,066
Total water utility plant	<u>\$19,346,413</u>	<u>\$ 1,756,056</u>	<u>\$ 237,191</u>	<u>\$20,865,278</u>

McFarland Water and Sewer Utility

Sewer Utility Plant

Year Ended December 31, 2023

	Balance 1/1/23	Additions	Retirements	Balance 12/31/23
Collecting System				
Land and land rights	\$ 78,020	\$ -	\$ -	\$ 78,020
Service connections	797,389	5,567	-	802,956
Collecting mains	5,882,200	64,634	-	5,946,834
Force mains	191,033	-	-	191,033
Total collecting system	6,948,642	70,201	-	7,018,843
Collecting System Pumping				
Structures and improvements	303,762	-	-	303,762
Receiving wells	14,403	-	-	14,403
Electric pumping equipment	661,422	-	-	661,422
Other power pumping equipment	60,159	-	-	60,159
Miscellaneous pumping equipment	3,342	-	-	3,342
Total collecting system pumping	1,043,088	-	-	1,043,088
General				
Office furniture and equipment	9,948	-	-	9,948
Transportation equipment	254,995	15,669	24,709	245,955
Communication equipment	144,871	-	-	144,871
Other general equipment	2,313	-	-	2,313
Other tangible property	19,817	-	-	19,817
Total general	431,944	15,669	24,709	422,904
Total sewer utility plant	<u>\$ 8,423,674</u>	<u>\$ 85,870</u>	<u>\$ 24,709</u>	<u>\$ 8,484,835</u>

McFarland Storm Water Utility

Stormwater Utility Plant

Year Ended December 31, 2023

	Balance 1/1/23	Additions	Retirements	Balance 12/31/23
Stormwater Plant				
Land and land rights	\$ 160,275	\$ -	\$ -	\$ 160,275
Pipes	3,998,698	330,010	-	4,328,708
Manholes	580,052	40,734	-	620,786
Inlets	848,870	6,640	-	855,510
Basins	719,431	-	-	719,431
Land improvements	153,321	-	-	153,321
Miscellaneous	112,370	-	-	112,370
Total stormwater plant	<u>6,573,017</u>	<u>377,384</u>	<u>-</u>	<u>6,950,401</u>
General				
Transportation equipment	254,995	15,670	24,709	245,956
Power-operated equipment	19,817	-	-	19,817
Communication equipment	13,946	-	-	13,946
Total general	<u>288,758</u>	<u>15,670</u>	<u>24,709</u>	<u>279,719</u>
Total stormwater utility plant	<u>\$ 6,861,775</u>	<u>\$ 393,054</u>	<u>\$ 24,709</u>	<u>\$ 7,230,120</u>

McFarland Water and Sewer Utility

Water Utility Operating Revenues and Expenses
Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Operating Revenues		
Sales of water:		
Unmetered	\$ 5,124	\$ 4,119
Metered:		
Residential	727,166	705,969
Multifamily residential	69,102	61,750
Commercial	92,572	86,433
Public authorities	31,274	29,477
Total metered sales	920,114	883,629
Private fire protection	56,069	52,161
Public fire protection	472,250	472,300
Total sales of water	1,453,557	1,412,209
Other operating revenues:		
Forfeited discounts	5,674	3,546
Miscellaneous service revenue	15,179	305
Other	94,633	51,623
Total operating revenues	1,569,043	1,467,683
Operating Expenses		
Operation and maintenance:		
Pumping:		
Operation labor	17,700	10,751
Fuel or power purchased for pumping	48,367	49,119
Operation supplies	12,977	29,716
Maintenance	10,522	70,674
Total pumping	89,566	160,260
Water treatment:		
Operation labor	9,709	10,390
Chemicals	16,980	17,481
Maintenance	1,496	3,056
Total water treatment	28,185	30,927
Transmission and distribution:		
Operation labor	105,287	46,892
Operation supplies	6,193	27,768
Maintenance:		
Distribution reservoirs and standpipes	210,771	-
Mains	39,621	19,365
Services	20,534	4,106
Meters	6,247	4,322
Hydrants	5,114	9,115
Other	-	75
Total transmission and distribution	393,767	111,643

McFarland Water and Sewer Utility

Water Utility Operating Revenues and Expenses
Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Customer accounts:		
Meter reading labor	\$ 18,471	\$ 13,986
Accounting and collecting labor	43,397	30,085
Supplies	<u>46,121</u>	<u>5,862</u>
Total customer accounts	<u>107,989</u>	<u>49,933</u>
Administrative and general:		
Salaries	173,839	185,473
Office supplies	21,747	11,948
Outside services employed	103,377	38,427
Property insurance	52,989	38,528
Employee pensions and benefits	91,120	(35,563)
Miscellaneous	58,404	58,783
Transportation	<u>40,173</u>	<u>19,031</u>
Total administrative and general	<u>541,649</u>	<u>316,627</u>
Taxes	<u>20,368</u>	<u>15,333</u>
Total operation and maintenance	1,181,524	684,723
Depreciation	<u>429,909</u>	<u>400,304</u>
Total operating expenses	<u>1,611,433</u>	<u>1,085,027</u>
Operating income (loss)	<u>\$ (42,390)</u>	<u>\$ 382,656</u>

McFarland Water and Sewer Utility

Sewer Utility Operating Revenues and Expenses
Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Operating Revenues		
Wastewater revenues:		
Residential	\$ 1,435,234	\$ 1,191,213
Commercial	308,443	238,934
Public authorities	37,823	27,031
Total sewer revenues	<u>1,781,500</u>	<u>1,457,178</u>
Other operating revenues:		
Forfeited discounts	10,392	5,638
Miscellaneous	1,767	-
Total operating revenues	<u>1,793,659</u>	<u>1,462,816</u>
Operating Expenses		
Operation and maintenance:		
Operation:		
Power and fuel for pumping	13,479	8,802
Treatment charges	956,857	857,180
Other operating supplies	11,800	-
Transportation	1,666	1,531
Total operation	<u>983,802</u>	<u>867,513</u>
Maintenance:		
Collection system	22,040	16,882
Pumping equipment	-	15,278
Treatment and disposal plant equipment	-	3,109
General plant structures and equipment	31,971	199,264
Total maintenance	<u>54,011</u>	<u>234,533</u>
Customer accounts:		
Accounting and collecting	24,491	23,925
Meter Reading	11,544	13,721
Total customer accounts	<u>36,035</u>	<u>37,646</u>
Administrative and general:		
Salaries	175,640	193,102
Office supplies	15,963	3,912
Outside services employed	72,542	43,698
Insurance	48,346	38,528
Employees pensions and benefits	83,932	13,783
Miscellaneous	-	833
Rents	146,396	109,971
Total administrative and general	<u>542,819</u>	<u>403,827</u>
Taxes	<u>17,406</u>	<u>14,994</u>
Total operation and maintenance	<u>1,634,073</u>	<u>1,558,513</u>
Depreciation	<u>174,119</u>	<u>178,058</u>
Total operating expenses	<u>1,808,192</u>	<u>1,736,571</u>
Operating loss	<u>\$ (14,533)</u>	<u>\$ (273,755)</u>

McFarland Storm Water Utility

Stormwater Utility Operating Revenues and Expenses
Years Ended December 31, 2023 and 2022

	<u>2023</u>	<u>2022</u>
Operating Revenues		
Stormwater revenues:		
Charges for services	\$ 582,442	\$ 544,101
Other operating revenues:		
Forfeited discounts	3,575	2,586
Other	<u>9,170</u>	<u>15,130</u>
Total operating revenues	<u>595,187</u>	<u>561,817</u>
Operating Expenses		
Operation and maintenance:		
Operations:		
Operation supervision and labor	176,754	173,025
Facility equipment and rental	64,805	54,103
Operation supplies	<u>94,076</u>	<u>131,562</u>
Total operations	<u>335,635</u>	<u>358,690</u>
Administrative and general:		
Office supplies	5,092	885
Outside services employed	61,040	46,167
Property insurance	52,698	43,480
Employee pensions and benefits	72,468	36,247
Miscellaneous	<u>5,475</u>	<u>34</u>
Total administrative and general	<u>196,773</u>	<u>126,813</u>
Total operation and maintenance	532,408	485,503
Depreciation	<u>161,839</u>	<u>160,151</u>
Total operating expenses	<u>694,247</u>	<u>645,654</u>
Operating loss	<u>\$ (99,060)</u>	<u>\$ (83,837)</u>

McFarland Water and Sewer Utility

Rate of Return - Regulatory Basis

Years Ended December 31, 2023 and 2022

	Water	
	2023	2022
Utility Financed Plant in Service		
Beginning of year	\$ 11,594,372	\$ 10,432,611
End of year	<u>13,113,239</u>	<u>11,594,372</u>
Average	<u>12,353,806</u>	<u>11,013,492</u>
Utility Financed Accumulated Depreciation		
Beginning of year	(3,563,878)	(3,371,902)
End of year	<u>(3,689,293)</u>	<u>(3,563,878)</u>
Average	<u>(3,626,586)</u>	<u>(3,467,890)</u>
Materials and Supplies		
Beginning of year	19,450	19,450
End of year	<u>19,450</u>	<u>19,450</u>
Average	<u>19,450</u>	<u>19,450</u>
Regulatory Liability		
Beginning of year	(22,822)	(45,645)
End of year	<u>-</u>	<u>(22,822)</u>
Average	<u>(11,411)</u>	<u>(34,234)</u>
Average net rate base	<u>\$ 8,735,259</u>	<u>\$ 7,530,818</u>
Operating income, regulatory basis	<u>\$ (95,937)</u>	<u>\$ 260,135</u>
Rate of return (percent)	<u>(1.10)%</u>	<u>3.45 %</u>
Authorized rate of return (percent)	<u>4.90 %</u>	<u>4.90 %</u>

This schedule is computed based on Public Service Commission of Wisconsin regulatory accounting which differs from accounting principles generally accepted in the United States of America due to GASB No. 34 as well as PSC order 05-US-105.

**VILLAGE OF
McFarland
SUMMARY SHEET**

MEETING DATE: Wednesday, May 29, 2024

SECTION: Business

DEPARTMENT: Public Works

CONTACT: Lee Igl, Public Works Director

AGENDA ITEM: Discussion and action to make a recommendation to the Village Board regarding the award of contract for the bulk fill station at the Public Works building.

PREVIOUS ACTION:

The Public Works and Utilities Committee first reviewed this matter at its meeting on February 26, 2024 when it made a recommendation to approve the design for the 2024 Paving and Utility work. The Village Board accepted this recommendation at its meeting on February 27, 2024.

The Public Works and Utilities Committee awarded contract for the above mentioned work at its meetings on May 2, 2024.

ISSUE SUMMARY:

The Village currently provides bulk water sales at the Public Works Center. The water is accessed through a fire hydrant adjacent the employee parking lot that also serves as an entrance to the yard waste drop off site. With the repaving improvements already approved for the parking lot at the Public Works Center, Staff recommended moving bulk water sales to the north side of the building to improve functionality and access. The trucks that collect bulk water are very large which combined with the parking lot and residential vehicles access the drop site does present some access challenges during heavy volume. Moving it to the north side also allows for the bulk filling to be created through plumbing designed for this purpose. The current system is fabricated in a manner that allows it but hydrants are not typically created for this purpose. The process is also done manually through paper and can now be tracked through the new equipment, not unlike the upgrade to the meter project the last few years but for bulk sales.

Two bids were received with the lowest from Portzen at \$93,000. This is the same contractor that has been awarded the project for Lift Station #2. The project design and recommendation letter is included in your packet.

FINANCIAL/BUDGET IMPACT:

Total revenue this year for the 2024 Paving and Utility Plan is \$471,750. The contracts already awarded for work in 2024 amount to \$385,000. This provides a variance of \$86,750 with the low bidder just over that at \$93,000. The Village Engineer is working with the low bidder to see if there are cost savings within the proposed design to allow the project to be within budget.

This is an expense of the Water Utility. It also is a revenue source for the utility in the sale of bulk water to customers. The 2024 Budget for this amount is \$4,250 with the actual collected in



2022 at \$4,119. With better tracking of actual water sales through the new station, we are hoping the metering is improved leading to additional revenue gains.

VILLAGE PLAN REFERENCE:

None.

ORDINANCE REFERENCE:

None.

BOARD, COMMISSION OR COMMITTEE RECOMMENDATION:

Recommended Action:

Motion, second to make a recommendation to the Village Board to approve the award of contract for a bulk fill station at the Public Works building.

ATTACHMENTS:

1. McFarland Bulk Water Fill Station BID SET
2. Recommendation Ltr- Bulk Water Filling

May 23, 2024

Village of McFarland
5915 Milwaukee Street, P.O. Box 110
McFarland, WI 53558

Attention: Mr. Matt Schuenke, Village Administrator

Subject: Analysis of Bids and Recommendation for Award of Contracts; 2024
Public Works Facility Bulk Water Filling Station; Village of McFarland

Bid Deadline: May 23, 2024 at 9:00 a.m. local time

Ladies and Gentlemen:

The purpose of this letter is to analyze the bids received for the 2024 Public Works Facility Bulk Water Filling Station project and to recommend award of a contract. This project involves installation of a new bulk water filling station at the Village of McFarland Public Works Shop along with all necessary plumbing and electrical items to facilitate the installation of the device.

Five general contractors, subcontractors, and material suppliers requested sets of the plans, specifications and bidding documents. Two contractors submitted bids.

A summary of the bids is as follows:

Contractor	Base Bid with Electrical Allowance
Portzen Construction, Inc.	\$93,000.00
H.J. Pertzborn Plumbing and Fire Protection	\$93,055.00

The bid from Portzen Construction, Inc. was properly submitted. H.J. Pertzborn submitted their prequalification information with their bid.

The low bidder is Portzen Construction, Inc. of Dubuque, Iowa, an experienced industrial contractor that has completed similar work for the Village of Cross Plains, Blanchardville, and the City of Dodgeville. The bid prices are higher than the original budget due to increased material costs. We recommend that Portzen Construction, Inc. be awarded a contract for \$93,000.00 if budgets allow.

This will be a unit price contract. That is, the contractor will be paid for the work actually performed on the basis on the unit prices bid. This means that the final line item costs could be either greater than or less than the bid totals. Also, unexpected conditions are sometimes encountered which result in increased project costs. Therefore, it would be wise to continue to carry the recommended 10% contingency.

If you have any questions with respect to our thoughts on this matter, I am available at your convenience to discuss them with you.

Respectfully,
TOWN & COUNTRY ENGINEERING, INC.

A handwritten signature in black ink, appearing to read 'Tim Stieve', with a stylized flourish at the end.

Tim Stieve, P.E.
Project Engineer

TS:sai

J:\JOB#S\McFarland\MC-221-M4 2024 Street and Utility Improvements\10. Construction\Public Works Facility Bulk Water Filling Station\Recommendation Ltr.docx

BID TABULATION

Project: 2024 Public Works Facility Bulk Water Filling Station; Village of McFarland
Engineer's Project Number: MC 221 Bid Deadline: May 23, 2024 at 9:00 a.m. local time

ITEM NO.	DESCRIPTION OF WORK	BID		Portzen Construction, Inc.		H.J. Pertzborn Plumbing and Fire Protection	
		QUANT.	UNITS	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT
BASE BID							
1.	Installation of New Bulk Water Filling Station	1	lump sum	\$ 78,000.00	\$ 78,000.00	\$ 78,055.00	\$ 78,055.00
2.	Electrical Allowance	1	lump sum	\$ 15,000.00	\$ 15,000.00	\$ 15,000.00	\$ 15,000.00
	TOTAL BASE BID				\$ 93,000.00		\$ 93,055.00

VILLAGE OF
McFarland
SUMMARY SHEET

MEETING DATE: Wednesday, May 29, 2024

SECTION: Business

DEPARTMENT: Public Works

CONTACT: Lee Igl, Public Works Director

AGENDA ITEM: Discussion and action to make a recommendation to the Village Board regarding the annual CMAR submittal for 2023

PREVIOUS ACTION:

None

ISSUE SUMMARY:

The 2023 CMAR (Compliance Maintenance Annual Report) is an annual DNR report that indicates the health of the sewer utility in the area of maintenance and its equipment replacement fund. We are required to submit this report on an annual basis.

The utility has a Grade of "A" for the 2023 reporting year.

Once completed and before submission to the DNR, the CMAR needs to be accepted by a governing board via resolution.

FINANCIAL/BUDGET IMPACT:

None

VILLAGE PLAN REFERENCE:

None

ORDINANCE REFERENCE:

None

BOARD, COMMISSION OR COMMITTEE RECOMMENDATION:

Recommended motion:

Motion, second to recommend approval to the Village Board regarding the 2023 Compliance Maintenance Annual Report (CMAR) as presented.

ATTACHMENTS:

1. 2023 CMAR

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:
5/9/2024 2023

Financial Management

1. Provider of Financial Information

Name:

Village of McFarland - Lee Igl

Telephone:

608-838-7287

(XXX) XXX-XXXX

E-Mail Address
(optional):

lee.igl@mcfarland.wi.gov

2. Treatment Works Operating Revenues

2.1 Are User Charges or other revenues sufficient to cover O&M expenses for your wastewater treatment plant AND/OR collection system ?

● Yes (0 points) ☐

○ No (40 points)

If No, please explain:

2.2 When was the User Charge System or other revenue source(s) last reviewed and/or revised?
Year:

2023

● 0-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A (private facility)

2.3 Did you have a special account (e.g., CWP required segregated Replacement Fund, etc.) or financial resources available for repairing or replacing equipment for your wastewater treatment plant and/or collection system?

● Yes (0 points)

○ No (40 points)

0

REPLACEMENT FUNDS [PUBLIC MUNICIPAL FACILITIES SHALL COMPLETE QUESTION 3]

3. Equipment Replacement Funds

3.1 When was the Equipment Replacement Fund last reviewed and/or revised?

Year:

2023

● 1-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A

If N/A, please explain:

3.2 Equipment Replacement Fund Activity

3.2.1 Ending Balance Reported on Last Year's CMAR

\$ 564,847.00

3.2.2 Adjustments - if necessary (e.g. earned interest, audit correction, withdrawal of excess funds, increase making up previous shortfall, etc.)

+ \$ 0.00

3.2.3 Adjusted January 1st Beginning Balance

\$ 564,847.00

3.2.4 Additions to Fund (e.g. portion of User Fee, earned interest, etc.)

+ \$ 0.00

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:

5/9/2024

2023

3.2.5 Subtractions from Fund (e.g., equipment replacement, major repairs - use description box 3.2.6.1 below*)

- \$ 87,440.00

3.2.6 Ending Balance as of December 31st for CMAR Reporting Year

\$ 477,407.00

All Sources: This ending balance should include all Equipment Replacement Funds whether held in a bank account(s), certificate(s) of deposit, etc.

3.2.6.1 Indicate adjustments, equipment purchases, and/or major repairs from 3.2.5 above.

Paulson Road sewer replacement.

3.3 What amount should be in your Replacement Fund? \$ 10,000.00

0

Please note: If you had a CWFPP loan, this amount was originally based on the Financial Assistance Agreement (FAA) and should be regularly updated as needed. Further calculation instructions and an example can be found by clicking the SectionInstructions link under Info header in the left-side menu.

3.3.1 Is the December 31 Ending Balance in your Replacement Fund above, (#3.2.6) equal to, or greater than the amount that should be in it (#3.3)?

☒ Yes

☐ No

If No, please explain.

4. Future Planning

4.1 During the next ten years, will you be involved in formal planning for upgrading, rehabilitating, or new construction of your treatment facility or collection system?

☒ Yes - If Yes, please provide major project information, if not already listed below. ☐ ☐

☐ No

Project #	Project Description	Estimated Cost	Approximate Construction Year
1	Upgrade to Lift Station #2	\$3,600,000	2025
2	Exchange Street sewer rehabilitation	\$425,000	2024

5. Financial Management General Comments

ENERGY EFFICIENCY AND USE

6. Collection System

6.1 Energy Usage

6.1.1 Enter the monthly energy usage from the different energy sources:

COLLECTION SYSTEM PUMPAGE: Total Power Consumed

Number of Municipally Owned Pump/Lift Stations: 5

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:
5/9/2024 **2023**

	Electricity Consumed (kWh)	Natural Gas Consumed (therms)
January	5,857	124
February	5,948	116
March	5,784	97
April	3,951	41
May	4,056	7
June	5,063	4
July	4,426	5
August	4,797	3
September	4,111	2
October	3,898	10
November	4,837	78
December	4,399	107
Total	57,127	594
Average	4,761	50

6.1.2 Comments:

6.2 Energy Related Processes and Equipment

6.2.1 Indicate equipment and practices utilized at your pump/lift stations (Check all that apply):

- ☐ Comminution or Screening
- ☐ Extended Shaft Pumps
- ☒ Flow Metering and Recording
- ☐ Pneumatic Pumping
- ☒ SCADA System
- ☐ Self-Priming Pumps
- ☒ Submersible Pumps
- ☐ Variable Speed Drives
- ☐ Other:

6.2.2 Comments:

6.3 Has an Energy Study been performed for your pump/lift stations?

● No

○ Yes

Year:

By Whom:

Describe and Comment:

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:
5/9/2024 **2023**

6.4 Future Energy Related Equipment	
6.4.1 What energy efficient equipment or practices do you have planned for the future for your pump/lift stations?	
Solar power and variable speed drive will be implemented with the new lift station #2 install.	

Total Points Generated	
Score (100 - Total Points Generated)	
Section Grade	

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:
5/9/2024 2023

Sanitary Sewer Collection Systems

1. Capacity, Management, Operation, and Maintenance (CMOM) Program

1.1 Do you have a CMOM program that is being implemented?

- ☒ Yes
- ☐ No

If No, explain:

1.2 Do you have a CMOM program that contains all the applicable components and items according to Wisc. Adm Code NR 210.23 (4)?

- ☒ Yes
- ☐ No (30 points)
- ☐ N/A

If No or N/A, explain:

1.3 Does your CMOM program contain the following components and items? (check the components and items that apply)

☒ Goals [NR 210.23 (4)(a)]

Describe the major goals you had for your collection system last year:

Did you accomplish them?

- ☒ Yes
- ☐ No

If No, explain:

☒ Organization [NR 210.23 (4) (b)] ☐ ☐

Does this chapter of your CMOM include:

- ☒ Organizational structure and positions (eg. organizational chart and position descriptions)
- ☒ Internal and external lines of communication responsibilities
- ☒ Person(s) responsible for reporting overflow events to the department and the public

☐ Legal Authority [NR 210.23 (4) (c)]

What is the legally binding document that regulates the use of your sewer system?

Village Ordinance Chapter 47, Article III - Sanitary Sewer System 47

If you have a Sewer Use Ordinance or other similar document, when was it last reviewed and revised? (MM/DD/YYYY) 2014-01-24

Does your sewer use ordinance or other legally binding document address the following:

- ☐ Private property inflow and infiltration
- ☐ New sewer and building sewer design, construction, installation, testing and inspection
- ☐ Rehabilitated sewer and lift station installation, testing and inspection
- ☐ Sewage flows satellite system and large private users are monitored and controlled, as necessary
- ☒ Fat, oil and grease control
- ☒ Enforcement procedures for sewer use non-compliance

☒ Operation and Maintenance [NR 210.23 (4) (d)]

Does your operation and maintenance program and equipment include the following:

- ☒ Equipment and replacement part inventories
- ☒ Up-to-date sewer system map
- ☒ A management system (computer database and/or file system) for collection system information for O&M activities, investigation and rehabilitation

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:

5/9/2024

2023

☒ A description of routine operation and maintenance activities (see question 2 below)

☐ Capacity assessment program

☐ Basement back assessment and correction

☒ Regular O&M training

☒ Design and Performance Provisions [NR 210.23 (4) (e)] ☐ ☐

What standards and procedures are established for the design, construction, and inspection of the sewer collection system, including building sewers and interceptor sewers on private property?

☒ State Plumbing Code, DNR NR 110 Standards and/or local Municipal Code Requirements

☒ Construction, Inspection, and Testing

☐ Others:

☒ Overflow Emergency Response Plan [NR 210.23 (4) (f)] ☐ ☐

Does your emergency response capability include:

☒ Responsible personnel communication procedures

☒ Response order, timing and clean-up

☒ Public notification protocols

☒ Training

☐ Emergency operation protocols and implementation procedures

☒ Annual Self-Auditing of your CMOM Program [NR 210.23 (5)] ☐ ☐

☐ Special Studies Last Year (check only those that apply):

☐ Infiltration/Inflow (I/I) Analysis

☐ Sewer System Evaluation Survey (SSES)

☐ Sewer Evaluation and Capacity Management Plan (SECAP)

☐ Lift Station Evaluation Report

☐ Others:

0

2. Operation and Maintenance

2.1 Did your sanitary sewer collection system maintenance program include the following maintenance activities? Complete all that apply and indicate the amount maintained.

Cleaning % of system/year

Root removal % of system/year

Flow monitoring % of system/year

Smoke testing % of system/year

Sewer line televising % of system/year

Manhole inspections % of system/year

Lift station O&M # per L.S./year

Manhole rehabilitation % of manholes rehabbed

Mainline rehabilitation % of sewer lines rehabbed

Private sewer inspections % of system/year

Private sewer I/I removal % of private services

Compliance Maintenance Annual Report

McFarland Sewage Collection System

Last Updated: Reporting For:

5/9/2024

2023

River or water crossings % of pipe crossings evaluated or maintained

Please include additional comments about your sanitary sewer collection system below:

3. Performance Indicators

3.1 Provide the following collection system and flow information for the past year.

29.75	Total actual amount of precipitation last year in inches
37.13	Annual average precipitation (for your location)
36.20	Miles of sanitary sewer
5	Number of lift stations
0	Number of lift station failures
1	Number of sewer pipe failures
4	Number of basement backup occurrences
8	Number of complaints
	Average daily flow in MGD (if available)
0	Peak monthly flow in MGD (if available)
0	Peak hourly flow in MGD (if available)

3.2 Performance ratios for the past year:

0.00	Lift station failures (failures/year)
0.03	Sewer pipe failures (pipe failures/sewer mile/yr)
0.03	Sanitary sewer overflows (number/sewer mile/yr)
0.11	Basement backups (number/sewer mile)
0.22	Complaints (number/sewer mile)
	Peaking factor ratio (Peak Monthly:Annual Daily Avg)
	Peaking factor ratio (Peak Hourly:Annual Daily Avg)

4. Overflows

LIST OF SANITARY SEWER (SSO) AND TREATMENT FACILITY (TFO) OVERFLOWS REPORTED **

Date	Location	Cause	Estimated Volume
0 4/14/2023 11:00:00 AM - 4/17/2023 9:00:00 AM	4601 Siggelkow Road, McFarland, WI 53558	Broken Sewer, Broken Sewer	50

** If there were any SSOs or TFOs that are not listed above, please contact the DNR and stop work on this section until corrected.

What actions were taken, or are underway, to reduce or eliminate SSO or TFO occurrences in the future?

No new actions were taken.

5. Infiltration / Inflow (I/I)

5.1 Was infiltration/inflow (I/I) significant in your community last year?

☐ Yes

☒ No

If Yes, please describe:

5.2 Has infiltration/inflow and resultant high flows affected performance or created problems in your collection system, lift stations, or treatment plant at any time in the past year?

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: 5/9/2024 Reporting For: 2023

☐ Yes ☒ No If Yes, please describe: 5.3 Explain any infiltration/inflow (I/I) changes this year from previous years: The last three years we have repaired over 40 major infiltrations in our system. 5.4 What is being done to address infiltration/inflow in your collection system? The last three years we have repaired over 40 major infiltrations in our system.	
--	--

Total Points Generated	
Score (100 - Total Points Generated)	
Section Grade	

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:
5/9/2024 **2023**

Grading Summary

WPDES No: 0047341

SECTIONS	LETTER GRADE	GRADE POINTS	WEIGHTING FACTORS	SECTION POINTS
Financial				
Collection				
TOTALS			0	0
GRADE POINT AVERAGE (GPA) =				

- Notes:
- A = Voluntary Range (Response Optional)
 - B = Voluntary Range (Response Optional)
 - C = Recommendation Range (Response Required)
 - D = Action Range (Response Required)
 - F = Action Range (Response Required)

Compliance Maintenance Annual Report

Mcfarland Sewage Collection System

Last Updated: Reporting For:
5/9/2024 **2023**

Resolution or Owner's Statement

Name of Governing Body or Owner:	Village of McFarland
Date of Resolution or Action Taken:	
Resolution Number:	
Date of Submittal:	

ACTIONS SET FORTH BY THE GOVERNING BODY OR OWNER RELATING TO SPECIFIC CMAR SECTIONS (Optional for grade A or B. Required for grade C, D, or F):
Financial Management: Grade =

Collection Systems: Grade =
(Regardless of grade, response required for Collection Systems if SSOs were reported)

ACTIONS SET FORTH BY THE GOVERNING BODY OR OWNER RELATING TO THE OVERALL GRADE POINT AVERAGE AND ANY GENERAL COMMENTS
(Optional for G.P.A. greater than or equal to 3.00, required for G.P.A. less than 3.00)
G.P.A. =

VILLAGE OF
McFarland
SUMMARY SHEET

MEETING DATE: Wednesday, May 29, 2024

SECTION: Business

DEPARTMENT: Public Works

CONTACT: Lee Igl, Public Works Director

AGENDA ITEM: Discussion regarding Paulson Road traffic study.

PREVIOUS ACTION:

None.

ISSUE SUMMARY:

Prior to Paulson Road being reconstructed in 2023, a traffic study was conducted by Dane County, to have a baseline of traffic counts and speeds, prior to removing the gate at the south end. In the same month, in 2024, a second traffic study was conducted again by Dane County to compare any changes in traffic flow and speeds. The study is attached. Traffic flow changes were minimal, and the 85th percentile speeds are still under the 25 mph speed limit. The Public Works department is recommending no action at this time.

FINANCIAL/BUDGET IMPACT:

None.

VILLAGE PLAN REFERENCE:

None.

ORDINANCE REFERENCE:

None.

BOARD, COMMISSION OR COMMITTEE RECOMMENDATION:

No action is required on this item.

ATTACHMENTS:

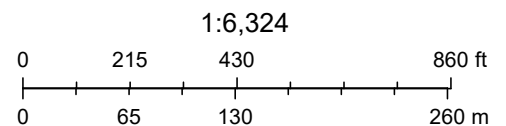
1. Traffic Count Results Summary
2. 3-19-24 Paulson Rd West of Ridge Rd N.side of Rd#1 N.B.-Volume
3. 3-19-24 Paulson Rd. S. of Siggelkow E. Side of Rd #1 S.B.-Volume
4. 3-24-23 Village of Mcfarland 168 ft south of sigglekow Rd-Volume
5. 3-24-23 Village of Mcfarland Paulson Rd 224' west of Ridge Rd-Volume

Paulson Road Traffic Count Results



4/10/2024, 8:17:09 AM

- Road Names (County GIS Link)
-  Municipalities (County GIS Link)
-  Parcels (County GIS Link)





DANE COUNTY HIGHWAY DEPARTMENT
2302 FISH HATCHERY ROAD
MADISON, WI 53713
(608) 283-1416

VOLUME
Latitude: 43.019372
Longitude: -89.297489

V. of Mcfarland
225' W. of Ridge Road

Time	Monday 3/18/2024	Tuesday 3/19/2024	Wednesday 3/20/2024	Thursday 3/21/2024	Friday 3/22/2024	Week Day Average
12:00 AM	*	0	1	4	*	2 
1:00 AM	*	0	0	0	*	0
2:00 AM	*	0	1	0	*	0
3:00 AM	*	0	0	0	*	0
4:00 AM	*	0	0	0	*	0
5:00 AM	*	5	7	13	*	8 
6:00 AM	*	24	30	27	*	27 
7:00 AM	*	69	70	57	*	65 
8:00 AM	*	32	37	63	*	44 
9:00 AM	*	32	30	35	*	32 
10:00 AM	*	44	34	45	*	41 
11:00 AM	*	24	31	36	*	30 
12:00 PM	*	28	47	40	*	38 
1:00 PM	*	42	35	40	*	39 
2:00 PM	*	49	43	41	*	44 
3:00 PM	*	55	57	58	*	57 
4:00 PM	*	79	70	67	*	72 
5:00 PM	*	56	35	53	*	48 
6:00 PM	*	39	23	31	*	31 
7:00 PM	*	17	11	20	*	16 
8:00 PM	*	11	9	11	*	10 
9:00 PM	*	3	4	9	*	5 
10:00 PM	*	5	0	4	*	3 
11:00 PM	*	1	5	6	*	4 
Total	0	615	580	660	0	616
ADT	ADT: 573					AADT: 596



DANE COUNTY HIGHWAY DEPARTMENT
2302 FISH HATCHERY ROAD
MADISON, WI 53713
(608) 283-1416

Paulson Road - VMcFarland
100' S. of Sigglekow Rd.

VOLUME
Latitude: 43.024125
Longitude: -89.297097

Time	Monday 3/18/2024	Tuesday 3/19/2024	Wednesday 3/20/2024	Thursday 3/21/2024	Friday 3/22/2024	Week Day Average
12:00 AM	*	1	2	6	*	3 
1:00 AM	*	1	2	1	*	1 
2:00 AM	*	0	0	0	*	0
3:00 AM	*	3	3	2	*	3 
4:00 AM	*	3	2	1	*	2 
5:00 AM	*	5	7	10	*	7 
6:00 AM	*	26	32	24	*	27 
7:00 AM	*	42	33	32	*	36 
8:00 AM	*	36	34	28	*	33 
9:00 AM	*	22	25	26	*	24 
10:00 AM	*	35	25	33	*	31 
11:00 AM	*	32	32	41	*	35 
12:00 PM	*	34	38	31	*	34 
1:00 PM	*	32	32	27	*	30 
2:00 PM	*	56	38	38	*	44 
3:00 PM	*	56	56	42	*	51 
4:00 PM	*	54	36	31	*	40 
5:00 PM	*	53	34	48	*	45 
6:00 PM	*	33	26	28	*	29 
7:00 PM	*	21	9	22	*	17 
8:00 PM	*	11	13	9	*	11 
9:00 PM	*	13	6	11	*	10 
10:00 PM	*	2	7	6	*	5 
11:00 PM	*	1	3	3	*	2 
Total	0	572	495	500	0	520
ADT	ADT: 485					AADT: 505



DANE COUNTY HIGHWAY DEPARTMENT
2302 FISH HATCHERY ROAD
MADISON, WI 53713
(608) 283-1416

Paulson Rd - VMcFarland
168' South of Siggelkow Rd

VOLUME
Latitude: 43.025346
Longitude: -89.296983

Time	Monday 3/20/2023	Tuesday 3/21/2023	Wednesday 3/22/2023	Thursday 3/23/2023	Friday 3/24/2023	Week Day Average
12:00 AM	*	7	2	2	*	4 
1:00 AM	*	2	3	3	*	3 
2:00 AM	*	2	4	3	*	3 
3:00 AM	*	3	2	7	*	4 
4:00 AM	*	1	3	3	*	2 
5:00 AM	*	8	12	10	*	10 
6:00 AM	*	14	13	11	*	13 
7:00 AM	*	31	40	29	*	33 
8:00 AM	*	38	35	24	*	32 
9:00 AM	*	37	17	29	*	28 
10:00 AM	*	35	19	24	*	26 
11:00 AM	*	38	40	26	*	35 
12:00 PM	*	24	17	25	*	22 
1:00 PM	*	39	36	35	*	37 
2:00 PM	*	36	36	42	*	38 
3:00 PM	*	42	35	26	*	34 
4:00 PM	*	41	44	52	*	46 
5:00 PM	*	41	53	40	*	45 
6:00 PM	*	34	35	41	*	37 
7:00 PM	*	23	21	18	*	21 
8:00 PM	*	19	12	14	*	15 
9:00 PM	*	11	11	12	*	11 
10:00 PM	*	5	11	8	*	8 
11:00 PM	*	8	7	14	*	10 
Total	0	539	508	498	0	517
ADT		ADT: 478		AADT: 497		



DANE COUNTY HIGHWAY DEPARTMENT
2302 FISH HATCHERY ROAD
MADISON, WI 53713
(608) 283-1416

Paulson Road - VMcFarland
224' West of Ridge Rd

VOLUME
Latitude: 43.019292
Longitude: -89.297457

Time	Monday 3/20/2023	Tuesday 3/21/2023	Wednesday 3/22/2023	Thursday 3/23/2023	Friday 3/24/2023	Week Day Average
12:00 AM	*	1	0	2	*	1 
1:00 AM	*	0	0	0	*	0
2:00 AM	*	0	0	0	*	0
3:00 AM	*	2	0	2	*	1 
4:00 AM	*	0	6	0	*	2 
5:00 AM	*	1	5	5	*	4 
6:00 AM	*	20	26	23	*	23 
7:00 AM	*	63	46	59	*	56 
8:00 AM	*	33	30	23	*	29 
9:00 AM	*	24	32	28	*	28 
10:00 AM	*	25	30	36	*	30 
11:00 AM	*	16	25	27	*	23 
12:00 PM	*	47	32	39	*	39 
1:00 PM	*	27	20	32	*	26 
2:00 PM	*	32	48	36	*	39 
3:00 PM	*	39	31	40	*	37 
4:00 PM	*	47	52	49	*	49 
5:00 PM	*	37	36	29	*	34 
6:00 PM	*	21	23	20	*	21 
7:00 PM	*	9	7	4	*	7 
8:00 PM	*	5	5	8	*	6 
9:00 PM	*	6	1	1	*	3 
10:00 PM	*	3	0	6	*	3 
11:00 PM	*	1	0	0	*	0
Total	0	459	455	469	0	461
ADT	ADT: 427					AADT: 444

VILLAGE OF
McFarland
SUMMARY SHEET

MEETING DATE: Wednesday, May 29, 2024

SECTION: Business

DEPARTMENT: Public Works

CONTACT: Lee Igl, Public Works Director

AGENDA ITEM: Discussion and action to approve the installation of an additional stop sign at Ridge Road and Paulson Road at the Larson Beach Road intersection.

PREVIOUS ACTION:

None.

ISSUE SUMMARY:

Several residents and businesses have reported near misses and driver confusion at the intersection of Ridge Road, Paulson Drive and Larson Beach Road. Currently, the intersection is a one-way stop on the public section, with an additional stop sign on the private access to the north at the Preston Place apartments. The village hired Lee Gibbs, PE and Senior Traffic Engineer from AECOM to conduct a traffic study. Lee's recommendation of a three-way stop and analysis is attached. Stop signs would be installed on Ridge Road and Paulson Road and would include signs indicating that traffic on Larson Beach Road does not stop. Flags would also be installed on the new stop signs to bring attention to the change in traffic patterns at the intersection. The changes to the intersection were reviewed and recommended by Police, Fire and Rescue, Planning, and the Public Works departments.

FINANCIAL/BUDGET IMPACT:

Installation of additional signage would come from the 2024 Public Works operation budget.

VILLAGE PLAN REFERENCE:

None.

ORDINANCE REFERENCE:

None.

BOARD, COMMISSION OR COMMITTEE RECOMMENDATION:

Recommended motion:

Motion, second to approve the installation of an additional stop sign on Ridge Road at Larson Beach Road intersection.

ATTACHMENTS:

1. 240426_Paulson draft report_v2_Optimized

Intersection Study for Paulson Road and Ridge Road

McFarland, Wisconsin

DRAFT Report

Prepared for:

Village of McFarland

Prepared by:

AECOM

April 2024

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Executive Summary

The intersection of Paulson Road and Ridge Road is a four-legged intersection located in the central portion of the Village of McFarland. Recent construction of Paulson Road and Ridge Road and development in the area resulted in their intersection providing stop-sign control along the north and east approaches to accommodate the higher-volume movements along the south and west approaches. This unconventional condition has led to motorist concerns regarding traffic flow at this intersection. Ridge Road traffic does not have to stop but also may not indicate their movement via turn signal since their “through movement” is a turning movement. This leads to driver expectancy issues for motorists along Paulson Road as they cannot anticipate the turning movements of approaching traffic along Ridge Road. Therefore, Village staff would like a review of the intersection to determine appropriate intersection control and/or intersection elements to aid in safety and mobility at the location.

Alternatives for the Paulson Road and Ridge Road intersection were developed based on deficiencies found in the following categories: geometric site reviews of the study area, a safety evaluation of the study intersection, and traffic operations analysis for the existing-year and Year 2045 horizon year. A preferred alternative was selected based on an evaluation of those results.

The following describes recommendations for the Paulson Road and Ridge Road intersection:

- It is recommended that the Paulson Road and Ridge Road intersection add an additional stop sign on the Ridge Road approach (Alternative 3b).
 - This alternative will help meter traffic traveling from Ridge Road to Paulson Road that was observed to queue and block the railroad crossing. Traffic making this movement must now stop before continuing west instead of its current free-flow condition.
 - This alternative allows the eastbound right-turn movement from Paulson Road to Ridge Road to continue to be a “major” movement which maintains favorable mobility and does not impact the railroad crossing.
 - Motorists making an east-to-north, left-turn onto Paulson Road will likely use their turn signal to indicate this movement, which alerts other motorists of their intention. Motorists making a right-turn onto Ridge Road would be identified as such (since eastbound motorists cannot continue onto Preston Place) and their use, or lack thereof, a turn signal would be recognized as such.
 - Sign plaques noting “TRAFFIC FROM LEFT(RIGHT) DOES NOT STOP” (MUTCD W4-4P) shall be placed under the stop signs on the north and south legs while the sign plaque “ONCOMING TRAFFIC DOES NOT STOP” (MUTCD W4-4P) shall be placed under the stop sign at Preston Place.
- It is recommended to provide additional signage may to help inform motorists of the close proximity the stop bar is to the railroad tracks (Alternative 1).

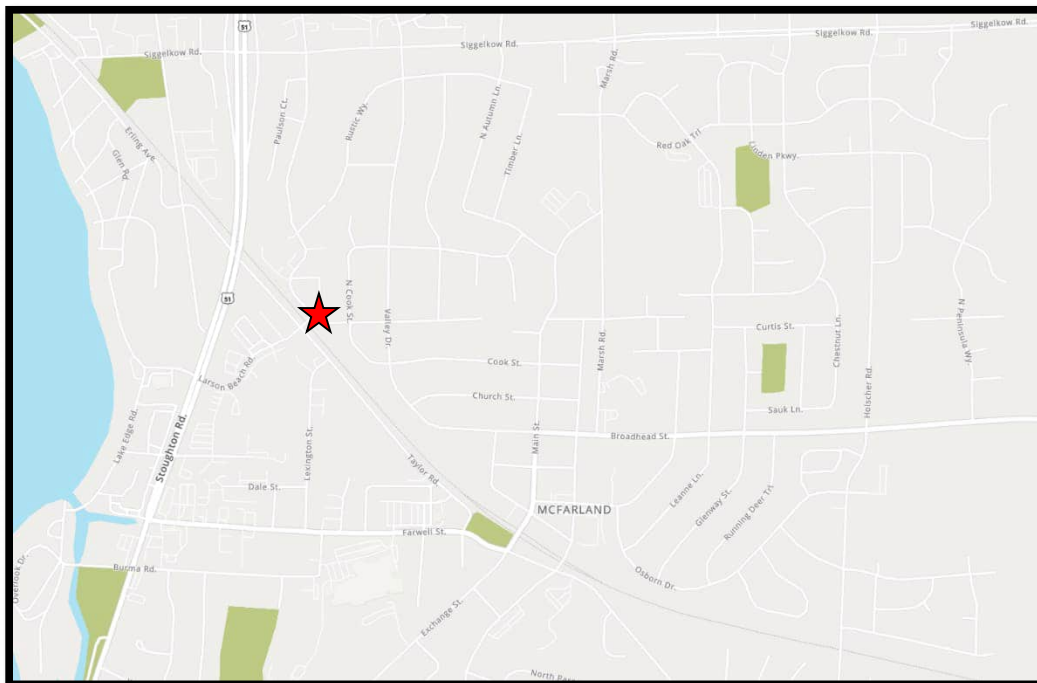
- Upgrading the intersection control from two-way stop control (TWSC) to all-way stop control (Alternative 2) is a viable alternative for consideration.
 - This alternative improves safety at this location by eliminating the unconventional stop-controlled condition and makes all vehicles stop before entering the intersection.
 - This alternative will help meter traffic traveling from Ridge Road to Paulson Road that was observed to queue and block the railroad crossing. Traffic making this movement must now stop before continuing west instead of its current free-flow condition.
 - Additional signage may be installed to help inform motorists of the close proximity the stop bar is to the railroad tracks (see Alternative 1).
- Reconfiguring the stop-controlled approaches to having the north and south legs under stop-sign control (Alternative 3a) is a viable alternative for consideration.
 - Similar to Alternative 2, this alternative aids in metering westbound traffic along Ridge Road, which should reduce queuing along the railroad tracks.
 - This alternative keeps eastbound Paulson Road traffic as the “major street” movement, allowing the right-turning traffic to continue unopposed which reduces queues near the railroad tracks.
 - This alternative, though, makes the residential street, Preston Place, a “major street” movement which could divert traffic from the north leg of Paulson Street to travel through the residential neighborhood adjacent to the intersection.
- Maintaining the existing intersection control and adding sign applications in the area (Alternative 1) is not recommended for implementation.
 - This alternative does not address the unconventional stop-controlled approaches at the Paulson Road and Ridge Road intersection which may continue to experience driver expectancy issues.
- Converting both Paulson Road and Ridge Road as well as Paulson Road and Taylor Road to TWSC (Alternative 4) is not recommended for implementation.
 - The Taylor Road approaches are anticipated to experience longer delays and queues as motorists on those approaches must now assess gaps before entering the intersection; the south approach of Taylor Road is anticipated to operate at LOS E during the weekday morning peak hour.
 - Users of the multi-use path crossing must now assess gaps before entering the intersection unless other applications are installed to aid in alerting motorists of their presence (e.g., RRFB installation).
- The traffic signal alternative (Alternative 5) is not recommended for implementation.
 - This alternative has significant construction costs to implement for a low number of vehicles it would serve.
 - A traffic signal warrant analysis of this location indicated that no volume warrants would be met.

1.0 Introduction

The intersection of Paulson Road and Ridge Road is a four-legged intersection located in the central portion of the Village of McFarland. Recent construction of Paulson Road and Ridge Road and development in the area resulted in their intersection providing stop-sign control along the north and east approaches to accommodate the higher-volume movements along the south and west approaches. This unconventional condition has led to motorist concerns regarding traffic flow at this intersection. Ridge Road traffic does not have to stop but also may not indicate their movement via turn signal since their “through movement” is a turning movement. This leads to driver expectancy issues for motorists along Paulson Road as they cannot anticipate the turning movements of approaching traffic along Ridge Road. Therefore, Village staff would like a review of the intersection to determine appropriate intersection control and/or intersection elements to aid in safety and mobility at the location.

The location of the study intersection is illustrated in **Figure 1.1**.

Figure 1.1: Project Study Area



Source: Mapquest

2.0 Existing Area Conditions

2.1 Roadway Transportation System

Descriptions of major area roadways within the study area are summarized below. Roadway and intersection characteristics are illustrated in **Figure 2.1**. It should be noted that the intersection approaches are not physically aligned with the cardinal directions; rather, the approaches align with the ordinal directions (northeast, southeast, southwest, northwest). For purposes of this study, Paulson Road comprises the intersection's north and west legs, Preston Place comprises the east leg, and Ridge Road comprises the south leg

Paulson Road

Paulson Road is a north-south, two-lane local street that begins at Taylor Road and ends via dead-end just north of Preston Place. At its unsignalized intersection with Ridge Road, the north approach of Paulson Road is under stop-sign control while the west approach does not have any intersection control. No exclusive turning lanes are provided along Paulson Road. On-street parking is prohibited on the west leg of Paulson Road and is permitted on the north leg. Paved paths are provided on both sides of the west leg of Paulson Road and connect to the Lower Yahara River Trail multi-use path at Taylor Road. An at-grade railroad crossing is present on the west leg of Paulson Road, separating the Ridge Road and Taylor Road intersections. Paulson Road does not have a posted speed limit in the vicinity of Ridge Road.

Ridge Road

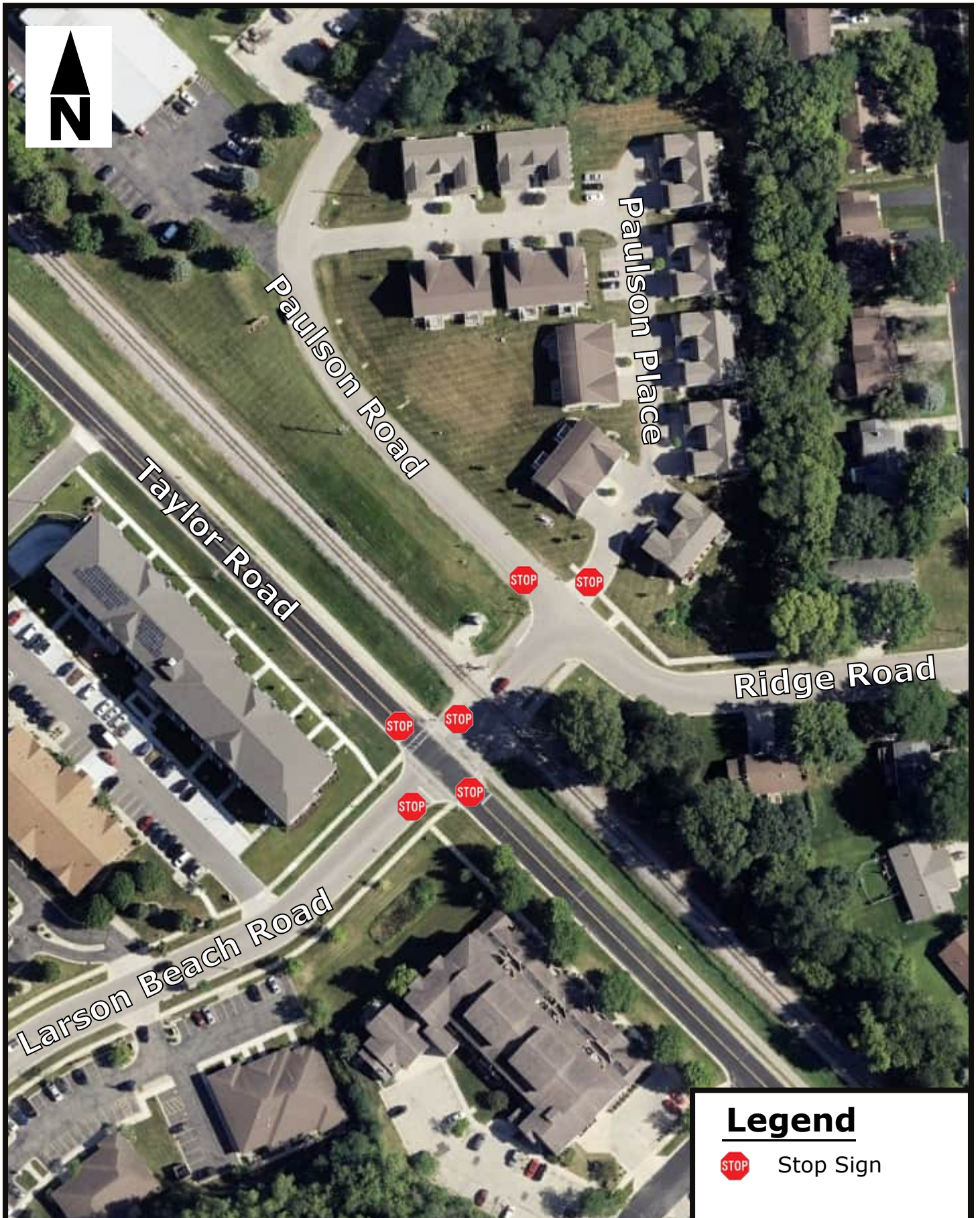
Ridge Road is an east-west, two-lane local street that runs from Paulson Road to just east of Falling Leaves Lane and provides a connection between residential neighborhoods in the Village with the US Highway 51 corridor (via Larson Beach Road). At its unsignalized intersection with Paulson Road, no intersection control is provided along the Ridge Road approach. No exclusive turning lanes are provided along Ridge Road and on-street parking is prohibited along the street. A sidewalk is provided on the east side of Ridge Road that connects to the two paved paths along Paulson Road via crosswalks. Ridge Road does not have a posted speed limit.

Preston Place

Preston Place is a private street that serves a residential neighborhood adjacent to the Paulson Road and Ridge Road intersection. Preston Place comprises the east leg of the Paulson Road and Ridge Road intersection. At the intersection, Paulson Road is one-way westbound (approaching) only and all movements from Preston Place are under stop-sign control.

2.2 Area Land Uses

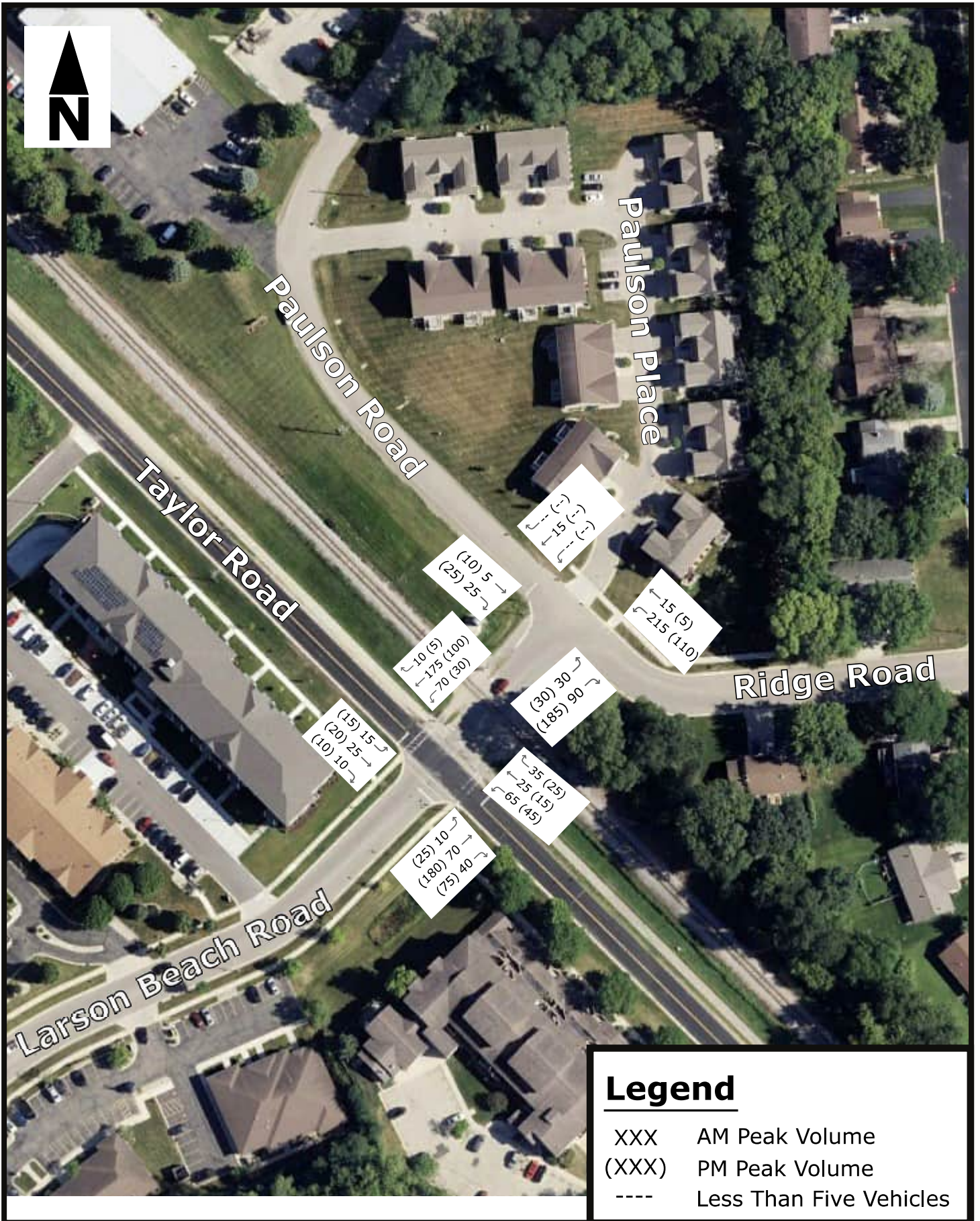
Land uses surrounding the intersection comprise primarily of single-family residential neighborhoods to the east along Ridge Road and multi-family residential developments to the east, south, and west of the intersection. An active railroad track runs northwest-southeast through the study area, separating the Paulson Road / Ridge Road intersection and the Paulson Road / Taylor Road intersection. The Lower Yahara River Trail multi-use path runs parallel to the railroad tracks



Existing Intersection Geometrics

Paulson Road and Ridge Road Intersection Study

Figure 2.1



Year 2024 Intersection Peak Hour Volumes Figure 2.2
 Paulson Road and Ridge Road Intersection Study

2.3 Peak Hour Turning Movement Counts

Intersection turning movement counts from 6:00 a.m. to 8:00 p.m. were collected at the intersections of Paulson Road and Ridge Road as well as Paulson Road and Taylor Road in January 2024. The counts were collected using video-based data collection technology to capture traffic operations at each intersection. The recorded video data were reviewed and quantified into traffic counts. The morning peak hour of the study area occurred from 7:15 a.m. to 8:15 a.m. and the afternoon peak hour occurred from 4:15 p.m. to 5:15 p.m. The peak hour turning movement volumes are illustrated in **Figure 2.2** while intersection turning movement count summaries for each intersection are provided in **Appendix A**.

2.4 Historical Crash Data

Intersection-related crashes reported at the Broadhead Street and Holscher Road intersection for the past five years (Years 2019 through 2023) were collected from the Wisconsin Department of Transportation's (WisDOT) crash database. This database serves as a clearinghouse for all reported crashes that occurred in the State of Wisconsin. From this inquiry, two reported crashes occurred at this intersection in the past five years. A detailed breakdown of these crashes is provided below:

- Crash severity
 - 1 crash resulted in a significant injuries (i.e., an A-type injury crash)
 - 1 crash resulted in property damage only
- Crash type
 - Both crashes were angle crashes
 - The injury crash was a vehicle-bicycle crash
- Crash date
 - 1 crash occurred in Year 2020
 - 1 crash occurred in Year 2021
- Time of crash
 - 1 crash occurred during the overnight time period (2am hour)
 - 1 crash occurred during the midday time period (1pm hour)
 - The injury crash occurred during this time period
- Other characteristics
 - The property damage crash was identified as being speed-related and aggressive driving-related

An intersection crash rate was developed to determine the crash risk exposure by motorists through the intersection. As a rule-of-thumb, locations with intersection crash rates above 1.00 crashes per million entering vehicles (MEV) indicate further investigation may be necessary to address safety issues. For the Paulson Road and Ridge Road intersection, an intersection crash rate of 0.34 crashes per million entering vehicles (MEV) was determined. However, since a vehicle-bicycle crash occurred at this intersection, which resulted in significant injuries, safety improvements should be investigated to aid all users in traveling through this intersection.

3.0 Site Review

A site review of the Paulson Road and Ridge Road intersection was performed to understand roadway characteristics, roadway and intersection geometrics, and motorist/non-motorist behavior. The results of this site review are described below.

The Paulson Road and Ridge Road intersection is a standard, four-legged intersection. The “major” street (i.e., movements not under stop-sign control) is not the traditional north-south or east-west approaches; rather, the “major” street is the south and west approaches. All movements from the north and east approaches are stop-sign control. The east approach (Preston Place) is a one-way street at the intersection with only westbound entering movements allowed. Asphalt sidewalks are provided along both sides of the west leg while a concrete sidewalk is provided on the east side of the Ridge Road leg; crosswalks connecting these sidewalks are provided on the intersection’s north, west, and south approaches. An at-grade railroad crossing with active warning devices is present approximately 50 feet west of the intersection. The all-way stop-controlled intersection of Paulson Road and Taylor Road is located approximately 105 feet west of the Paulson Road and Ridge Road intersection and approximately 25 feet west of the at-grade railroad crossing. The Lower Yahara River Trail multi-use path runs parallel to the railroad tracks and crosses the east leg of Paulson Road at the Taylor Road intersection. Intersection lighting is provided at both locations. The below image illustrates the study intersection and its surrounding elements in greater detail.



Motorist and bicycle/pedestrian behaviors were observed at the intersection via a site review and data collection video review to understand how motorists and other users travel through the intersection. Many observations were made of motorists on the north leg of Paulson Road performing a “rolling” stop at the intersection instead of coming to a full stop before proceeding into the intersection. Many observations were also made of motorists on the north leg of Paulson Road stopping past the marked stop bar to check for approaching vehicles on Ridge Road. This condition may be due to the low traffic volumes experienced at this intersection and motorists feeling comfortable to proceed into the intersection in such a manner. This, in turn, increases crash risk as this leads to driver expectancy issues for both the vehicle entering the intersection and vehicles approaching along Ridge Road regarding who has the right-of-way at this location. It should be noted that there were no observations of vehicles completely disregarding the stop signs and entering the intersection at their travel speed.

The images below show motorists on Holscher Road stopping past the stop bar.



Paulson and Ridge intersection, looking southeast – note the white vehicle stopped past the stop bar



Paulson and Ridge intersection, looking southeast – note the gray vehicle stopped past the stop bar

The short distance of Paulson Road between Taylor Road and Ridge Road, coupled with an at-grade railroad crossing over this roadway section, was another point of concern during the site review. From crosswalk to crosswalk, Paulson Road has approximately 115 feet of pavement between Taylor Road and Ridge Road. An at-grade railroad crossing is located along this short section, leaving approximately 35 feet of storage for vehicles leaving the Taylor Road intersection and approximately 55 feet of storage for vehicles approaching the Ridge Road intersection. These short distances may make storing vehicles, especially trucks, difficult when the railroad gates are activated for an approaching train. In addition, vehicles were observed stopping on the railroad tracks as they were approaching the Taylor Road intersection. This introduces crash risk in the event the railroad gates are activated while a vehicle is blocking the railroad tracks.

The images below show motorists on Paulson Road stopping in the railroad tracks.



Paulson and Taylor intersection, looking northeast – note the silver vehicle stopped on the tracks



Paulson and Taylor intersection, looking northeast – note the white vehicle stopped on the tracks

4.0 Traffic Operations Analysis

To determine how traffic operates under existing conditions, an operational analysis was conducted for intersections identified in Section 2.3 using methodologies published in the *Highway Capacity Manual* (HCM). The HCM module in the traffic operations software package, Synchro11, was used to document the results of the traffic operations analysis. Operational analysis results identify a Level of Service (LOS), which is intended to depict the quality of traffic flow through an intersection. Signalized and unsignalized intersections are given a ranking from LOS A through LOS F as a function of the average control delay as presented in **Table 4.1** for signalized intersections and **Table 4.2** for unsignalized and roundabout intersections. The minimum acceptable LOS for the intersection itself, as well as for a lane group, is LOS D.

Table 4.1 Level of Service (LOS) Criteria, Signalized Intersections

LOS Designation	Average Control Delay/Vehicle (seconds)	Description
A	≤ 10.0	Very low vehicle delays, free flow, signal progression extremely favorable, most vehicles arrive during given signal phase.
B	10.1 to 20.0	Good signal progression, more vehicles stop and experience higher delays than for LOS A.
C	20.1 to 35.0	Stable flow, fair signal progression, significant number of vehicles stop at signals.
D	35.1 to 55.0	Congestion noticeable, longer delays and unfavorable signal progression, many vehicles stop at signals.
E	55.1 to 80.0	Limit of acceptable delay, unstable flow, poor signal progression, traffic near roadway capacity, frequent cycle failures.
F	> 80.0	Unacceptable delays, extremely unstable flow and congestion, traffic exceeds roadway capacity, stop-and-go conditions

Table 4.2: Level of Service (LOS) Criteria, Unsignalized Intersections

LOS Designation		Average Control Delay/Vehicle (seconds)	Description
A		≤ 10.0	No delays at intersections with continuous flow of traffic. Uncongested operations: high frequency of long gaps available for all left and right turning traffic. No observable queues.
B		10.1 to 15.0	Same as LOS A
C		15.1 to 25.0	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches.
D		25.1 to 35.0	Increased probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. No standing long lines formed.
E		35.1 to 50.0	Heavy traffic flow condition. Heavy delays probable. No available gaps for cross-street traffic or main street turning traffic. Limited stable traffic flow.
F		> 50.0	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. Total breakdown.

SOURCE: *Highway Capacity Manual, Version 6.0*, Transportation Research Board, 2016.

4.1 Existing Conditions

To determine how traffic currently operates in the study area, an operational analysis was conducted for the weekday morning and afternoon peak hours at the key intersections. Existing geometrics, traffic controls, and peak hour traffic volumes for the key intersections are shown in **Figures 2.1 and 2.2**. Level of service and queueing results for each turning movement at the analyzed intersections are shown in **Table 4.3** for the weekday AM and weekday PM peak hours. The traffic operations output files are in **Appendix B**.

It should be noted that the existing stop-sign configuration at Paulson Road and Ridge Road cannot be evaluated using HCM methodologies since the stop-controlled approaches in a TWSC configuration are adjacent, not opposite, each other. Therefore, the intersection legs were reconfigured in Synchro to make the west leg of Paulson Road and Ridge Road the “major street” approaches and the north leg of Paulson Road and Preston Place the “minor street” approaches.

Table 4.3: Traffic Operations Analysis, Existing Conditions

Intersection	Overall		By Approach	Eastbound			Westbound			Northbound			Southbound		
	Delay (s)	LOS		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Paulson Road & Ridge Road, Weekday AM Peak Hour	2.1	A	Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	1>	-
			Volume	30	-	90	1	15	1	215	15	-	-	5	25
			Delay (s)	-	8.1	-	-	14.8	-	-	0.0	-	-	11.5	-
			LOS	-	A	-	-	B	-	-	A	-	-	B	-
			V/C Ratio	-	0.04	-	-	0.07	-	-	0.00	-	-	0.08	-
			95% Queue (ft)	-	5	-	-	5	-	-	0	-	-	10	-
Paulson Road & Ridge Road, Weekday PM Peak Hour	1.7	A	Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	1>	-
			Volume	30	-	185	1	1	1	110	5	-	-	10	25
			Delay (s)	-	7.6	-	-	11.3	-	-	0.0	-	-	10.0	-
			LOS	-	A	-	-	B	-	-	A	-	-	B	-
			V/C Ratio	-	0.03	-	-	0.03	-	-	0.00	-	-	0.06	-
			95% Queue (ft)	-	5	-	-	5	-	-	0	-	-	5	-
Paulson Road & Taylor Road, Weekday AM Peak Hour	11.3	B	Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
			Volume	10	70	40	70	175	10	65	25	35	15	25	10
			Delay (s)	-	9.6	-	-	12.9	-	-	10.4	-	-	9.4	-
			LOS	-	A	-	-	B	-	-	B	-	-	A	-
			V/C Ratio	-	0.24	-	-	0.51	-	-	0.27	-	-	0.12	-
			95% Queue (ft)	-	25	-	-	75	-	-	30	-	-	10	-
Paulson Road & Taylor Road, Weekday PM Peak Hour	9.1	A	Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
			Volume	25	180	75	30	100	5	45	15	25	15	20	10
			Delay (s)	-	9.6	-	-	8.7	-	-	8.6	-	-	8.3	-
			LOS	-	A	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.36	-	-	0.19	-	-	0.12	-	-	0.07	-
			95% Queue (ft)	-	40	-	-	20	-	-	10	-	-	5	-

The results of the existing-year traffic operations analysis indicate that the intersection of Paulson Road and Ridge Road as well as Paulson Road and Taylor Road currently operate at adequate levels of service (LOS C or better) during peak traffic periods. It should be noted, though, that the projected 95th percentile queues on westbound Paulson Road at Taylor Road during the weekday morning peak hour is approximately 75 feet, extending beyond the at-grade railroad crossing.

4.2 Year 2045 Conditions

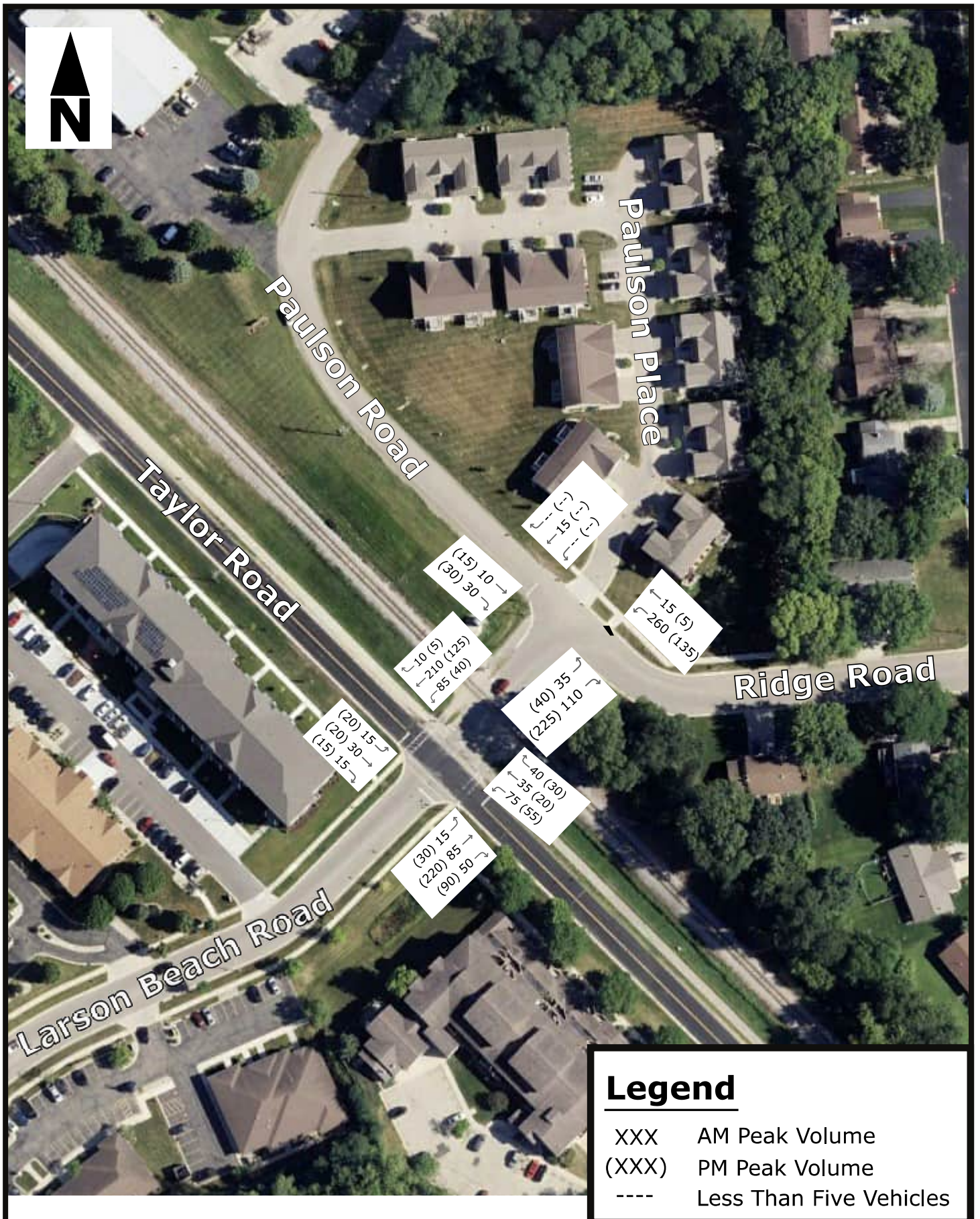
To determine if the Paulson Road and Ridge Road intersection will accommodate Year 2045 traffic volumes, a peak hour operations analysis was conducted that evaluated the existing intersection geometry, lane configuration, and control with forecasted Year 2045 peak hour volumes. Year 2045 traffic volumes were projected by increasing Year 2024 intersection turning movement counts collected for this study were increased by one percent per year for 21 years (21 percent total) to reflect local and regional growth not specifically cited in this study. The growth rate was determined by reviewing WisDOT-collected historical daily traffic volumes along roadways in the area as well as reviewing the function and traffic growth potential along Paulson Road and Ridge Road and the surrounding areas.

Analysis outputs are illustrated in **Table 4.4** for the Year 2045 weekday morning and afternoon peak traffic periods. Traffic operations output files for this scenario are provided in **Appendix C**. The Year 2045 peak-hour intersection turning movement counts are illustrated in **Figure 4.1**.

Table 4.4: Traffic Operations Analysis, Year 2045 No-Build Conditions

Intersection	Overall		By Approach	Eastbound			Westbound			Northbound			Southbound		
	Delay (s)	LOS		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Paulson Road & Ridge Road, Year 2045, Weekday AM Peak Hour	2.0	A	Lane Configuration	-	<1>	-	-	<1>	-	-	<1	-	-	1>	-
			Volume	35	-	110	1	15	1	260	15	-	-	10	30
			Delay (s)	-	8.0	-	-	13.5	-	-	0.0	-	-	11.3	-
			LOS	-	A	-	-	B	-	-	A	-	-	B	-
			V/C Ratio	-	0.03	-	-	0.05	-	-	0.00	-	-	0.08	-
			95% Queue (ft)	-	5	-	-	5	-	-	0	-	-	10	-
Paulson Road & Ridge Road, Year 2045, Weekday PM Peak Hour	1.9	A	Lane Configuration	-	<1>	-	-	<1>	-	-	<1	-	-	1>	-
			Volume	40	-	225	1	1	1	135	5	-	-	15	30
			Delay (s)	-	7.6	-	-	12.1	-	-	0.0	-	-	10.8	-
			LOS	-	A	-	-	B	-	-	A	-	-	B	-
			V/C Ratio	-	0.03	-	-	0.01	-	-	0.00	-	-	0.08	-
			95% Queue (ft)	-	5	-	-	5	-	-	0	-	-	10	-
Paulson Road & Taylor Road, Year 2045, Weekday AM Peak Hour	14.2	B	Lane Configuration	-	<1>	-	-	<1>	-	-	<1	-	-	1>	-
			Volume	15	85	50	85	210	10	75	35	40	15	30	15
			Delay (s)	-	11.0	-	-	17.7	-	-	12.0	-	-	10.3	-
			LOS	-	B	-	-	C	-	-	B	-	-	B	-
			V/C Ratio	-	0.33	-	-	0.66	-	-	0.36	-	-	0.15	-
			95% Queue (ft)	-	35	-	-	120	-	-	40	-	-	15	-
Paulson Road & Taylor Road, Year 2045, Weekday PM Peak Hour	10.1	B	Lane Configuration	-	<1>	-	-	<1>	-	-	<1	-	-	1>	-
			Volume	30	220	90	40	125	5	55	20	30	20	20	15
			Delay (s)	-	11.0	-	-	9.4	-	-	9.2	-	-	8.8	-
			LOS	-	B	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.45	-	-	0.24	-	-	0.16	-	-	0.09	-
			95% Queue (ft)	-	60	-	-	20	-	-	15	-	-	10	-

The results of the Year 2045 traffic operations analysis indicate that the intersections of Paulson Road and Ridge Road as well as Paulson Road and Taylor Road are anticipated to operate at LOS C or better during peak traffic periods. However, the anticipated queues along westbound Paulson Road at Taylor Road during the weekday morning peak hour is project to be approximately 120 feet, extending beyond the at-grade railroad crossing and into the Ridge Road intersection. This condition suggests that intersection geometrics and/or intersection control updates are necessary to mitigate these operations.



Year 2045 Intersection Peak Hour Volumes Figure 4.1
 Paulson Road and Ridge Road Intersection Study

5.0 Alternatives Evaluation

Chapter 2 discussed the results of a review of observed crashes at the intersection of Paulson Road and Ridge Road. Chapter 3 highlighted a site review of the study intersection, noting potential deficiencies that may increase crash risk. Chapter 4 indicated that while adequate traffic operations occur at the study area intersections, westbound Paulson Road traffic may block the at-grade railroad crossing. Therefore, alternatives were developed that address these issues while maintaining favorable safety, mobility, access, and multimodal accommodations. These alternatives, and their evaluation, are provided below.

5.1 Intersection Control Improvements

Alternative 1: Maintain existing intersection control and add signing elements

This alternative would maintain the existing intersection control at Paulson Road and Ridge Road but add signing installations to alert and inform motorists of the unconventional stop-control configuration and the short distances from the railroad tracks to the intersection stop bars. These applications may include the following:

- Warning signs that state the distance between the railroad tracks and the stop bar (MUTCD W10-11 sign series)
- Regulatory signs that instruct motorists not to stop on the railroad tracks (MUTCD R8-8 sign)
- Warning signs that inform motorists that other approaches may not stop (MUTCD W4-4 sign series)

Advantages	Disadvantages
• Provides additional traveler information for motorists approaching and at the intersection • Minimal construction costs to implement • No roadway cross-section changes or right of way needed to implement	• Unconventional stop-controlled intersection would still remain • May not mitigate driver behavior of motorists stopping on railroad tracks

Alternative 2: Convert Paulson Road and Ridge Road intersection from TWSC to AWSC

This alternative would convert the existing two-way stop-control at the Paulson Road and Ridge Road intersection to all-way stop-control. All movements from all approaches would be under stop-sign control before entering the intersection. No other geometric changes from the no-build condition were assumed for this alternative.

Advantages	Disadvantages
• Allows traffic from all approaches the ability to enter the intersection as a protected movement • Overall safety is improved as all traffic must stop before entering intersection • Minimal construction costs to implement • No roadway cross-section changes or right of way needed to implement • Meters westbound traffic across railroad tracks, reducing queues at Taylor Road	• Increased delay along Ridge Road and eastbound Paulson Road approaches as all vehicles must stop

Alternative 3a: Reconfigure stop-controlled approaches at Paulson Road and Ridge Road

This alternative would reconfigure the stop-controlled approaches at the Paulson Road and Ridge Road intersection. Currently, the intersection's north and east legs are under stop-sign control; this alternative would make the north and south legs under stop-sign control. No other geometric changes from the no-build condition were assumed for this alternative.

Advantages	Disadvantages
• Meters westbound Paulson Road traffic across railroad tracks since Ridge Road traffic must stop at Paulson Road • Overall safety is improved as the intersection has more traditional stop-controlled configuration • Minimal construction costs to implement • No roadway cross-section changes or right of way needed to implement	• Increased delay along Ridge Road approach as all vehicles must stop • May increase cut-through traffic along Preston Place since it would be a "major" approach to the intersection

Alternative 3b: Reconfigure stop-controlled approaches at Paulson Road and Ridge Road

Similar to Alternative 3a, this alternative would reconfigure the stop-controlled approaches at the Paulson Road and Ridge Road intersection. For this alternative, the north, east and south legs would be under stop-sign control. No other geometric changes from the no-build condition were assumed for this alternative.

Advantages	Disadvantages
• Meters westbound Paulson Road traffic across railroad tracks since Ridge Road traffic must stop at Paulson Road • Eastbound queueing onto railroad tracks will be minimal as this movement does not stop at Ridge Road • Minimal construction costs to implement • No roadway cross-section changes or right of way needed to implement	• Increased delay along Ridge Road approach as all vehicles must stop • Stop-controlled configuration at Ridge Road is not traditional as one approach operates as the “major” street • Additional signage needed for stop signs on Paulson Road and Ridge Road approaching noting free-flow movement

Alternative 4: Reconfigure stop-controlled approaches at Paulson Road and Ridge Road and convert Paulson Road and Taylor Road intersection from AWSC to TWSC

This alternative would reconfigure the stop-controlled approaches at the Paulson Road and Ridge Road intersection (Alternative 3) and convert the Paulson Road and Taylor Road intersection from AWSC to TWSC. No other geometric changes from the no-build condition were assumed for this alternative.

Advantages	Disadvantages
• Makes all traffic across railroad tracks a free-flow movement, reducing queues between the intersections • Paulson / Ridge safety is improved as the intersection has more traditional stop-controlled configuration • Minimal construction costs to implement • No roadway cross-section changes or right of way needed to implement	• Increased delay along Ridge Road approach as all vehicles must stop • May increase cut-through traffic along Preston Place since it would be a “major” approach to the intersection • Increased delay and crash risk along Taylor Road approaches as this traffic must wait for gaps • Increased crash risk along trail crossing as Paulson Road does not stop at Taylor Road • RRFB installations may be necessary at the trail crossing to alert motorists

Alternative 5: Upgrade Paulson / Ridge and Paulson / Taylor to traffic signal control

This alternative would convert the existing intersection control at the Paulson Road / Ridge Road and Paulson Road / Taylor Road intersections to traffic signal control. Traffic signals would be installed at both intersections to help control traffic movements across the railroad tracks. The traffic signals would be coordinated with each other to maximize vehicle progression in the area and would have railroad pre-emption when trains are approaching the area.

Advantages

- Traffic signals coordinated to control movements at both intersections, improving driver expectancy
- Provide railroad pre-emption to halt movements when trains approach
- Eliminates unconventional stop-sign control configuration at Paulson / Ridge

Disadvantages

- Significant construction costs to implement
- Low traffic volumes at intersections may increase driver frustration having to stop and wait for phase change

Year 2045 weekday morning and afternoon peak-hour traffic operations analysis was performed for the intersection control alternatives and the results are provided below:

Intersection	Overall		By Approach	Eastbound			Westbound			Northbound			Southbound		
	Delay (s)	LOS		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Paulson Road & Ridge Road, Year 2045, Weekday AM Peak Hour, AWSC (Alternative 2)	12.1	B	Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	1>	-
			Volume	35	-	110	1	15	1	260	15	-	-	10	30
			Delay (s)	-	9.8	-	-	8.7	-	-	14.1	-	-	8.2	-
			LOS	-	A	-	-	A	-	-	B	-	-	A	-
			V/C Ratio	-	0.30	-	-	0.04	-	-	0.58	-	-	0.04	-
			95% Queue (ft)	-	30	-	-	5	-	-	95	-	-	5	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	1>	-
Paulson Road & Ridge Road, Year 2045, Weekday PM Peak Hour, AWSC (Alternative 2)	9.0	A	Lane Configuration	40	-	225	1	1	1	135	5	-	-	15	30
			Volume	-	9.1	-	-	7.7	-	-	9.2	-	-	7.7	-
			Delay (s)	-	A	-	-	A	-	-	A	-	-	A	-
			LOS	-	A	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.35	-	-	0.01	-	-	0.22	-	-	0.07	-
			95% Queue (ft)	-	40	-	-	5	-	-	20	-	-	5	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	1>	-
Paulson Road & Ridge Road, Year 2045, Weekday AM Peak Hour, TWSC (Alternatives 3 and 4)	13.9	B	Lane Configuration	35	-	110	1	15	1	260	15	-	-	10	30
			Volume	-	7.3	-	-	7.5	-	-	21.8	-	-	9.5	-
			Delay (s)	-	A	-	-	A	-	-	C	-	-	A	-
			LOS	-	A	-	-	A	-	-	C	-	-	A	-
			V/C Ratio	-	0.03	-	-	0.01	-	-	0.68	-	-	0.07	-
			95% Queue (ft)	-	5	-	-	5	-	-	135	-	-	5	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	1>	-
Paulson Road & Ridge Road, Year 2045, Weekday PM Peak Hour, TWSC (Alternatives 3 and 4)	5.5	A	Lane Configuration	40	-	225	1	1	1	135	5	-	-	15	30
			Volume	-	7.3	-	-	7.8	-	-	12.6	-	-	9.8	-
			Delay (s)	-	A	-	-	A	-	-	B	-	-	A	-
			LOS	-	A	-	-	A	-	-	B	-	-	A	-
			V/C Ratio	-	0.03	-	-	0.01	-	-	0.26	-	-	0.07	-
			95% Queue (ft)	-	5	-	-	5	-	-	25	-	-	5	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
Paulson Road & Taylor Road, Year 2045, Weekday AM Peak Hour, TWSC (Alternative 4)	13.1	B	Lane Configuration	15	85	50	85	210	10	75	35	40	15	30	15
			Volume	-	8.0	-	-	7.9	-	-	43.8	-	-	22.8	-
			Delay (s)	-	A	-	-	A	-	-	E	-	-	C	-
			LOS	-	A	-	-	A	-	-	E	-	-	C	-
			V/C Ratio	-	0.02	-	-	0.09	-	-	0.73	-	-	0.30	-
			95% Queue (ft)	-	5	-	-	10	-	-	135	-	-	30	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
Paulson Road & Taylor Road, Year 2045, Weekday PM Peak Hour, TWSC (Alternative 4)	4.8	A	Lane Configuration	30	220	90	40	125	5	55	20	30	20	20	15
			Volume	-	7.6	-	-	8.2	-	-	17.2	-	-	15.6	-
			Delay (s)	-	A	-	-	A	-	-	C	-	-	C	-
			LOS	-	A	-	-	A	-	-	C	-	-	C	-
			V/C Ratio	-	0.02	-	-	0.04	-	-	0.27	-	-	0.15	-
			95% Queue (ft)	-	5	-	-	5	-	-	30	-	-	15	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
Paulson Road & Ridge Road, Year 2045, Weekday AM Peak Hour, Traffic Signal (Alternative 5)	7.8	A	Lane Configuration	35	-	110	1	15	1	260	15	-	-	10	30
			Volume	-	10.6	-	-	8.8	-	-	6.7	-	-	4.3	-
			Delay (s)	-	B	-	-	A	-	-	A	-	-	A	-
			LOS	-	B	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.45	-	-	0.05	-	-	0.50	-	-	0.09	-
			95% Queue (ft)	-	45	-	-	5	-	-	50	-	-	5	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
Paulson Road & Ridge Road, Year 2045, Weekday PM Peak Hour, Traffic Signal (Alternative 5)	6.7	A	Lane Configuration	40	-	225	1	1	1	135	5	-	-	15	30
			Volume	-	6.7	-	-	5.0	-	-	7.1	-	-	6.1	-
			Delay (s)	-	A	-	-	A	-	-	A	-	-	A	-
			LOS	-	A	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.45	-	-	0.01	-	-	0.25	-	-	0.12	-
			95% Queue (ft)	-	25	-	-	5	-	-	20	-	-	5	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
Paulson Road & Taylor Road, Year 2045, Weekday AM Peak Hour, Traffic Signal (Alternative 5)	10.1	B	Lane Configuration	15	85	50	85	210	10	75	35	40	15	30	15
			Volume	-	11.0	-	-	9.4	-	-	9.2	-	-	8.8	-
			Delay (s)	-	B	-	-	A	-	-	A	-	-	A	-
			LOS	-	B	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.45	-	-	0.24	-	-	0.16	-	-	0.09	-
			95% Queue (ft)	-	60	-	-	20	-	-	15	-	-	10	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
Paulson Road & Taylor Road, Year 2045, Weekday PM Peak Hour, Traffic Signal (Alternative 5)	6.1	A	Lane Configuration	30	220	90	40	125	5	55	20	30	20	20	15
			Volume	-	5.9	-	-	5.1	-	-	7.7	-	-	7.4	-
			Delay (s)	-	A	-	-	A	-	-	A	-	-	A	-
			LOS	-	A	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.43	-	-	0.21	-	-	0.19	-	-	0.10	-
			95% Queue (ft)	-	35	-	-	15	-	-	15	-	-	10	-
			Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-

The analysis indicated that all alternatives are anticipated to provide adequate traffic operations to motorists traveling through the intersection. An exception is when the Paulson Road and Taylor Road intersection is converted from AWSC to TWSC (Alternative 4) – the south leg of Taylor Road is anticipated to operate at LOS E during the weekday morning peak hour.

5.2 Intersection Control Warrant Analysis

While intersection control improvements such as AWSC and traffic signals can be installed by an agency as policy, it is sound engineering practice to investigate whether the need of applying these devices is valid. The Manual of Uniform Traffic Control Devices (MUTCD) outlines several warrants that should be evaluated when AWSC and traffic signals are considered at a location. These warrants investigate elements such as traffic operations, traffic safety, and proximity to significant features. A warrant analysis for AWSC and traffic signals was performed at this intersection.

All-way stop-control (AWSC) warrant analysis

Crash experience. Per Section 2B.13 of the MUTCD, AWSC may be installed at an intersection where there are five or more reported crashes in a 12-month periods or six or more crashes in a 36-month period that were a crash type that can be corrected by an AWSC condition. The intersection experienced two crashes within a 24-month period that could be corrected by an AWSC condition. Therefore, this warrant is not met.

Sight distance. Per Section 2B.14 of the MUTCD, AWSC may be installed at an intersection where the sight distance on the minor street approaches (in this case, the north leg of Paulson Road) is not adequate to see approaching traffic. WisDOT Facilities Development Manual (FDM) Chapter 11-10-5.1.4 discusses intersection sight distance (ISD) criteria for this analysis. For Paulson Road, the minimum ISD of intersecting approaches is 335 feet. A site review of the intersection indicated that the minimum ISD is not achieved for the north leg of Paulson Road and along Preston Place. Therefore, this warrant is met.

Transition to traffic signal or roundabout. Per Section 2B.15 of the MUTCD, AWSC may be installed at an intersection where AWSC is used as an interim measure to transition the intersection to a traffic signal or roundabout. This intersection is not currently committed for neither a traffic signal nor a roundabout, so this warrant is not met.

Minimum traffic volumes. Per Section 2B.16 of the MUTCD, AWSC may be installed at an intersection where the combined vehicle, bicycle, and pedestrian volume entering an intersection from the major-street (Paulson Road / Ridge Road) is at least 300 units per hours for 8 hours and 200 units along the minor-street (north leg of Paulson Road) for the same 8 hours. A review of the intersection turning movement data indicated that these volume requirements were not met for any of the observed hours. Therefore, this warrant is not met.

Other factors. Per Section 2B.17 of the MUTCD, AWSC may be installed at an intersection based on other factors, such as left-turn conflicts, similar roadway characteristics, and pedestrian / bicycle movements. With the railroad tracks and multi-use path in close proximity to the intersection, these elements would benefit from the intersection having all-way stop control. Therefore, this warrant is met.

Traffic signal warrant analysis

A worksheet that highlights the results of a traffic signal warrant analysis for Warrants 1 through 4 for this intersection can be found in **Appendix D**.

Warrant 1, Eight-hour volume. Volumes met 0 of 8 hours; this warrant is not met.

Warrant 2, Four-hour volume. Volumes met 0 of 4 hours; this warrant is not met.

Warrant 3, Peak-hour volume. Volumes did not meet minimum volumes; this warrant is not met.

Warrant 4, Pedestrian volume. Volumes did not meet minimum volumes; this warrant is not met.

Warrant 5, School crossing. Not applicable as the intersection is not located near a school.

Warrant 6, Coordinated signal system. Not applicable as the intersection is not within a coordinated signal system.

Warrant 7, Crash experience. Per Section 4C.08 of the MUTCD, a traffic signal may be considered for installation at an intersection where there are five or more reported crashes in a 12-month periods or six or more crashes in a 36-month period that were a crash type that can be corrected by a traffic signal condition. The intersection experienced two crashes within a 12-month period that could be corrected by a traffic signal condition. Therefore, this warrant is not met.

Warrant 8, Roadway network. Not applicable as Broadhead Street is not identified as a principal arterial roadway.

Warrant 9, Railroad crossing. Per Section 4C.10 of the MUTCD, a traffic signal may be considered for installation at an intersection based on the distance between the railroad tracks and the intersection and traffic volumes at the affected intersection. Based on this guidance, minimum volumes are met in this area given the distance from the railroad tracks to the stop bar. Therefore, this warrant is met.

6.0 Recommendations

Alternatives for the Paulson Road and Ridge Road intersection were developed based on deficiencies found in the following categories: geometric site reviews of the study area, a safety evaluation of the study intersection, and traffic operations analysis for the existing-year and Year 2045 horizon year. A preferred alternative was selected based on an evaluation of those results.

The following describes recommendations for the Paulson Road and Ridge Road intersection:

- It is recommended that the Paulson Road and Ridge Road intersection add an additional stop sign on the Ridge Road approach (Alternative 3b).
 - This alternative will help meter traffic traveling from Ridge Road to Paulson Road that was observed to queue and block the railroad crossing. Traffic making this movement must now stop before continuing west instead of its current free-flow condition.
 - This alternative allows the eastbound right-turn movement from Paulson Road to Ridge Road to continue to be a “major” movement which maintains favorable mobility and does not impact the railroad crossing.
 - Motorists making an east-to-north, left-turn onto Paulson Road will likely use their turn signal to indicate this movement, which alerts other motorists of their intention. Motorists making a right-turn onto Ridge Road would be identified as such (since eastbound motorists cannot continue onto Preston Place) and their use, or lack thereof, a turn signal would be recognized as such.
 - Sign plaques noting “TRAFFIC FROM LEFT(RIGHT) DOES NOT STOP” (MUTCD W4-4P) shall be placed under the stop signs on the north and south legs while the sign plaque “ONCOMING TRAFFIC DOES NOT STOP” (MUTCD W4-4P) shall be placed under the stop sign at Preston Place.
- It is recommended to provide additional signage may to help inform motorists of the close proximity the stop bar is to the railroad tracks (Alternative 1).
- Upgrading the intersection control from two-way stop control (TWSC) to all-way stop control (Alternative 2) is a viable alternative for consideration.
 - This alternative improves safety at this location by eliminating the unconventional stop-controlled condition and makes all vehicles stop before entering the intersection.
 - This alternative will help meter traffic traveling from Ridge Road to Paulson Road that was observed to queue and block the railroad crossing. Traffic making this movement must now stop before continuing west instead of its current free-flow condition.
 - Additional signage may be installed to help inform motorists of the close proximity the stop bar is to the railroad tracks (see Alternative 1).

- Reconfiguring the stop-controlled approaches to having the north and south legs under stop-sign control (Alternative 3a) is a viable alternative for consideration.
 - Similar to Alternative 2, this alternative aids in metering westbound traffic along Ridge Road, which should reduce queuing along the railroad tracks.
 - This alternative keeps eastbound Paulson Road traffic as the “major street” movement, allowing the right-turning traffic to continue unopposed which reduces queues near the railroad tracks.
 - This alternative, though, makes the residential street, Preston Place, a “major street” movement which could divert traffic from the north leg of Paulson Street to travel through the residential neighborhood adjacent to the intersection.
- Maintaining the existing intersection control and adding sign applications in the area (Alternative 1) is not recommended for implementation.
 - This alternative does not address the unconventional stop-controlled approaches at the Paulson Road and Ridge Road intersection which may continue to experience driver expectancy issues.
- Converting both Paulson Road and Ridge Road as well as Paulson Road and Taylor Road to TWSC (Alternative 4) is not recommended for implementation.
 - The Taylor Road approaches are anticipated to experience longer delays and queues as motorists on those approaches must now assess gaps before entering the intersection; the south approach of Taylor Road is anticipated to operate at LOS E during the weekday morning peak hour.
 - Users of the multi-use path crossing must now assess gaps before entering the intersection unless other applications are installed to aid in alerting motorists of their presence (e.g., RRFB installation).
- The traffic signal alternative (Alternative 5) is not recommended for implementation.
 - This alternative has significant construction costs to implement for a low number of vehicles it would serve.
 - A traffic signal warrant analysis of this location indicated that no volume warrants would be met.

Appendix

Appendix A: Intersection Turning Movement Counts

**Appendix B: Existing-Year (Year 2022) Traffic Operations
Analysis Worksheets**

**Appendix C: Future-Year (Year 2045) Traffic Operations
Analysis Worksheets**

Appendix D: Traffic Signal Warrant Worksheets

Appendix A: Intersection Turning Movement Counts

Intersection Traffic Volume Report

Count Basics		Version 2013.J4.1	Page 1 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

Base Information, Observed (14) Hour and Estimated (24) Hour Volume Summaries

Intersection of: **Preston Pl and Ridge Rd**



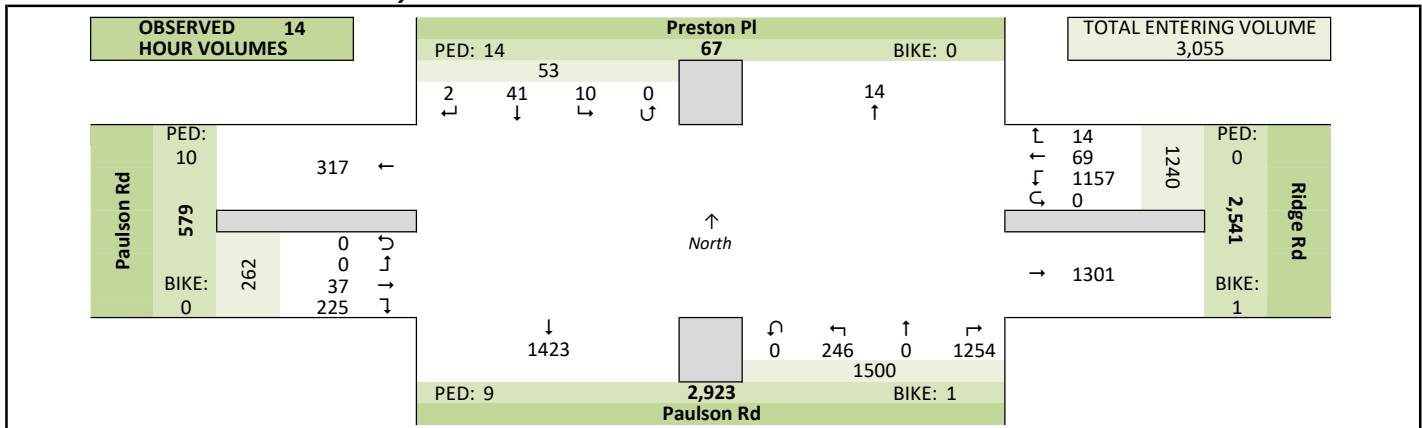
Site Information

Municipality	Village of McFarland		
County	Dane	WisDOT Region	SW-M
Traffic Control	Partial Stop Control		
Roadway Names	North Direction	↑	
North Leg	Preston Pl		
East Leg	Ridge Rd		
South Leg	Paulson Rd		
West Leg	Paulson Rd		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
	Pre-school children	None	
	Elementry school age children	None	
	Visually impaired (white cane/helper dog)	None	
	Elderly/disabled (except wheelchairs)	None	
	Wheelchairs/electric scooters	None	
	Other (describe)	None	

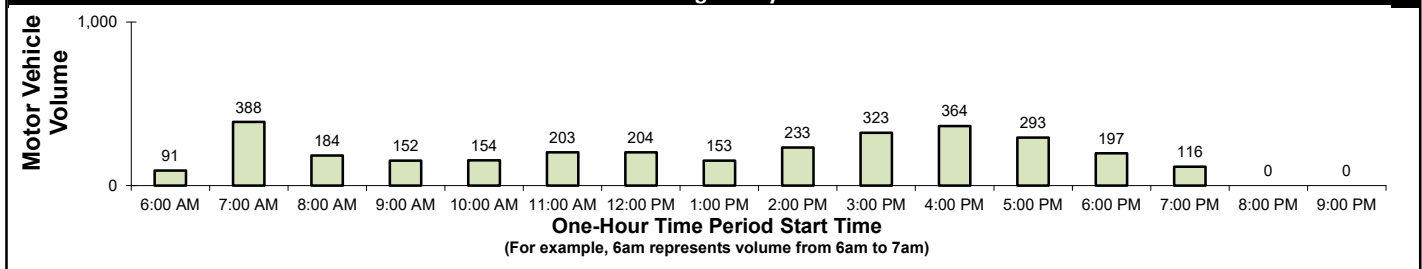
Count Information

Hrs Counted: 6:00 AM-8:00 PM					
1st Day of Count		Wednesday, January 31, 2024		Weather	
AM Peak Period		Wednesday, January 31, 2024		Clear & Dry	
Midday Peak Period		Wednesday, January 31, 2024		Clear & Dry	
PM Peak Period		Wednesday, January 31, 2024		Clear & Dry	
Calculated Peak Hours					
	AM	7:15-8:15am	MD	11:45-12:45pm	PM 4:15-5:15pm
Peak Hours Selected for Analysis					
	AM	7:15-8:15am	MD	11:45-12:45pm	PM 4:15-5:15pm
Daily/Seasonal Adjustment Group					
Count Expansion Group					
Daily/Seasonal Adjustment Factor			1	Count Expansion Factor #N/A	
Company Name AECOM				Manual Adj. 1.000	
Observers	AM Peak Period				
	Midday Peak Period				
	PM Peak Period				
Comments					

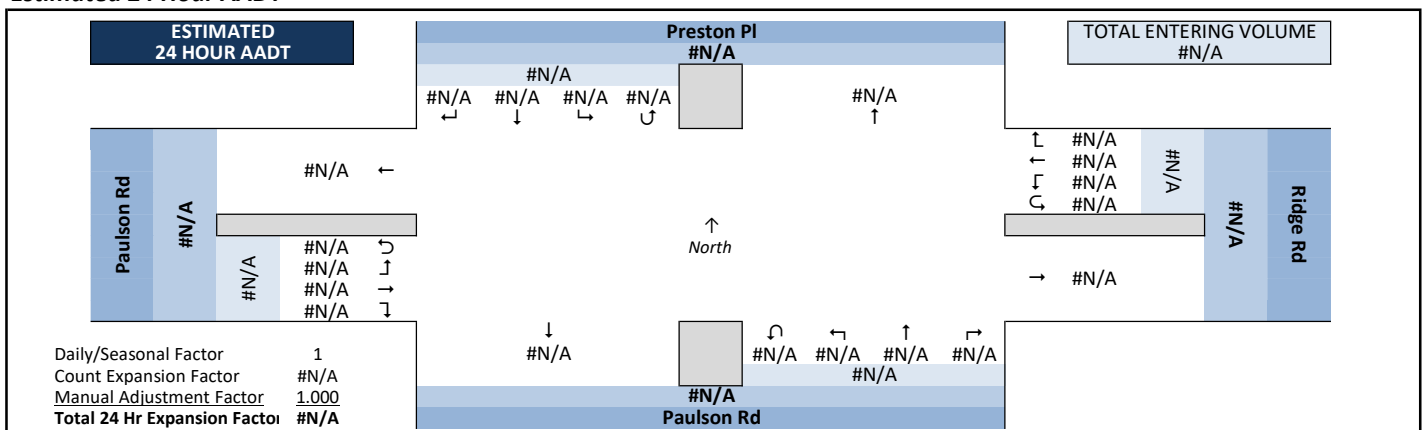
Observed 14 Hour Volume Summary



Total Entering Hourly Volume



Estimated 24 Hour AADT



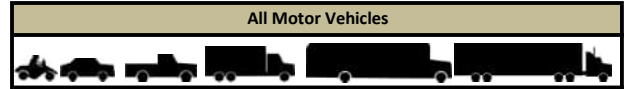
Intersection Traffic Volume Report

Peak Hour Volume Summary

Preston Pl and Ridge Rd

Peak Hour Volumes, Truck Percentages, and PHFs

Count Basics			Page 3 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events



Wednesday, January 31, 2024		From North					From East					From South					From West						
AM Peak Hour	AM Peak Hour	Preston Pl					Ridge Rd					Paulson Rd					Paulson Rd						
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals	
	7:15 AM	0	6	0	0	6	1	3	32	0	36	12	0	7	0	19	3	1	0	0	4	65	
	7:30 AM	0	1	0	0	1	0	2	72	0	74	19	0	7	0	26	7	2	0	0	9	110	
	7:45 AM	0	5	0	0	5	0	7	80	0	87	43	0	9	0	52	8	2	0	0	10	154	
	8:00 AM	0	1	0	0	1	0	2	31	0	33	18	0	6	0	24	6	2	0	0	8	66	
	Peak Hour Volume	0	13	0	0	13	1	14	215	0	230	92	0	29	0	121	24	7	0	0	31	395	
	Rounded Hourly Volume	0	15	0	0	15	0	15	215	0	230	90	0	30	0	120	25	5	0	0	30	395	
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	1.3	1.1	0.0	0.0	0.0	0.8	8.3	14.3	0.0	0.0	9.7	1.8	
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	1.3	1.1	0.0	0.0	0.0	0.8	8.3	14.3	0.0	0.0	9.7	1.8	
Peak Hour Factor (PHF)	0.00	0.54	0.00	0.00	0.54	0.25	0.50	0.67	0.00	0.66	0.53	0.00	0.81	0.00	0.58	0.75	0.87	0.00	0.00	0.77	0.64		

Wednesday, January 31, 2024		↓ From North					← From East					↑ From South					→ From West						
Midday (MD) Peak Hour	MD Peak Hour	Preston Pl					Ridge Rd					Paulson Rd					Paulson Rd						
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals	
	11:45 AM	0	0	0	0	0	0	0	1	24	0	25	25	0	7	0	32	1	0	0	0	1	58
	12:00 PM	0	0	0	0	0	0	0	1	24	0	25	19	0	2	0	21	4	2	0	0	6	52
	12:15 PM	0	0	0	0	0	0	2	1	16	0	19	23	0	6	0	29	4	1	0	0	5	53
	12:30 PM	0	0	0	0	0	0	0	4	22	0	26	21	0	4	0	25	8	1	0	0	9	60
	Peak Hour Volume	0	0	0	0	0	0	2	7	86	0	95	88	0	19	0	107	17	4	0	0	21	223
	Rounded Hourly Volume	0	0	0	0	0	0	0	5	85	0	90	90	0	20	0	110	15	5	0	0	20	220
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	1.2	0.0	2.1	1.1	0.0	15.8	0.0	3.7	5.9	25.0	0.0	0.0	9.5	3.6
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	1.2	0.0	2.1	1.1	0.0	15.8	0.0	3.7	5.9	25.0	0.0	0.0	9.5	3.6	
Peak Hour Factor (PHF)	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.44	0.90	0.00	0.91	0.88	0.00	0.68	0.00	0.84	0.53	0.50	0.00	0.00	0.58	0.93	

Wednesday, January 31, 2024		↓					←					↑					→					
		From North					From East					From South					From West					
PM Peak Hour	PM Peak Hour	Preston Pl					Ridge Rd					Paulson Rd					Paulson Rd					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	4:15 PM	0	1	0	0	1	0	1	30	0	31	56	0	8	0	64	9	6	0	0	15	111
	4:30 PM	0	0	1	0	1	0	0	24	0	24	43	0	10	0	53	4	0	0	0	4	82
	4:45 PM	0	0	0	0	0	0	1	32	0	33	45	0	6	0	51	3	4	0	0	7	91
	5:00 PM	0	1	0	0	1	11	1	26	0	38	42	0	7	0	49	7	1	0	0	8	96
	Peak Hour Volume	0	2	1	0	3	11	3	112	0	126	186	0	31	0	217	23	11	0	0	34	380
	Rounded Hourly Volume	0	0	0	0	0	10	5	110	0	125	185	0	30	0	215	25	10	0	0	35	375
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.8	0.0	0.0	12.9	0.0	1.8	0.0	0.0	0.0	0.0	0.0	1.3
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.8	0.0	0.0	12.9	0.0	1.8	0.0	0.0	0.0	0.0	1.3	
Peak Hour Factor (PHF)		0.00	0.50	0.25	0.00	0.75	0.25	0.75	0.87	0.00	0.83	0.83	0.00	0.77	0.00	0.85	0.64	0.46	0.00	0.00	0.57	0.86

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing 			Crossing 			Crossing 			Crossing 			Total Ped & Bike Volume
 		North Approach			East Approach			South Approach			West Approach			
		Preston Pl			Ridge Rd			Paulson Rd			Paulson Rd			
15-Minute Start Time		Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
	8:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	
	Total	0	0	0	0	0	0	0	0	0	1	0	1	
MD	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
	12:00 PM	0	0	0	0	0	0	1	0	1	1	0	1	
	12:15 PM	0	0	0	0	0	0	0	0	0	2	0	2	
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
	Total	0	0	0	0	0	0	1	0	1	3	0	3	
PM	4:15 PM	2	0	2	0	0	0	0	0	0	0	0	0	
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
	5:00 PM	1	0	1	0	0	0	0	0	0	0	0	1	
	Total	3	0	3	0	0	0	0	0	0	0	0	0	

Intersection Traffic Volume Report

Count Basics			Page 4 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

Hourly Volume Summary - Motor Vehicle Data

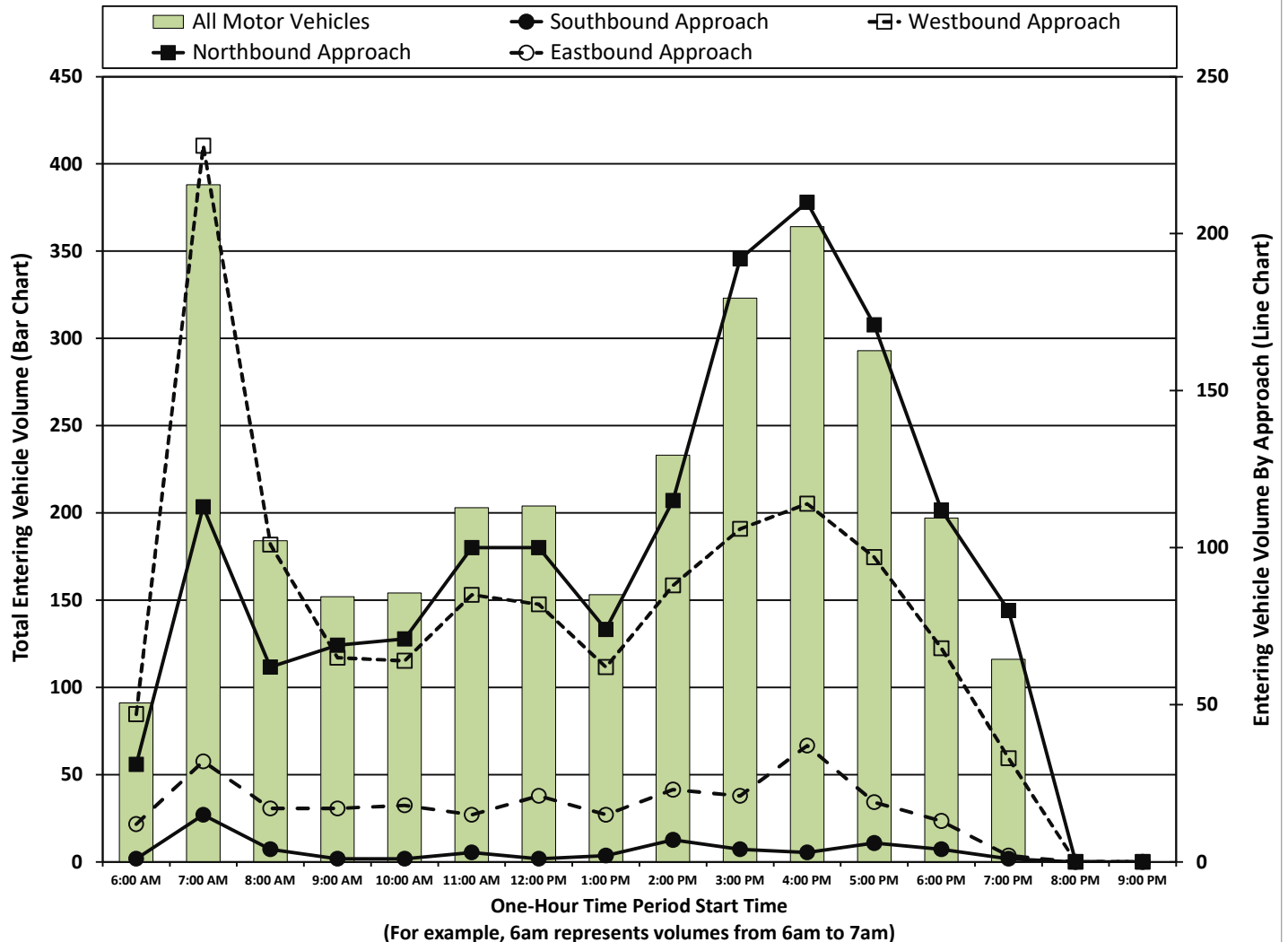
Preston Pl and Ridge Rd



One-Hour Motor Vehicle Data

One-Hour Time Period	↓ From North					← From East					↑ From South					→ From West					Total Vehicle Volume	Directional Volume Totals		
	Preston Pl					Ridge Rd					Paulson Rd					Paulson Rd								
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		E/W	N/S	
Start Time																								
AM	6:00 AM	0	1	0	0	1	0	1	46	0	47	16	0	15	0	31	12	0	0	0	12	91	59	32
	7:00 AM	0	15	0	0	15	1	13	214	0	228	84	0	29	0	113	25	7	0	0	32	388	260	128
	8:00 AM	1	3	0	0	4	0	6	95	0	101	50	0	12	0	62	13	4	0	0	17	184	118	66
	9:00 AM	0	1	0	0	1	2	4	59	0	65	56	0	13	0	69	17	0	0	0	17	152	82	70
MD	10:00 AM	0	0	1	0	1	1	3	60	0	64	61	0	10	0	71	17	1	0	0	18	154	82	72
	11:00 AM	0	2	1	0	3	0	8	77	0	85	81	0	19	0	100	12	3	0	0	15	203	100	103
	12:00 PM	0	0	1	0	1	2	8	72	0	82	81	0	19	0	100	17	4	0	0	21	204	103	101
	1:00 PM	0	1	1	0	2	2	2	58	0	62	60	0	14	0	74	15	0	0	0	15	153	77	76
PM	2:00 PM	1	3	3	0	7	2	7	79	0	88	95	0	20	0	115	21	2	0	0	23	233	111	122
	3:00 PM	0	4	0	0	4	1	5	100	0	106	170	0	22	0	192	17	4	0	0	21	323	127	196
	4:00 PM	0	2	1	0	3	0	5	109	0	114	177	0	33	0	210	27	10	0	0	37	364	151	213
	5:00 PM	0	5	1	0	6	3	2	92	0	97	149	0	22	0	171	18	1	0	0	19	293	116	177
	6:00 PM	0	3	1	0	4	0	4	64	0	68	102	0	10	0	112	13	0	0	0	13	197	81	116
	7:00 PM	0	1	0	0	1	0	1	32	0	33	72	0	8	0	80	1	1	0	0	2	116	35	81
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals	2	41	10	0	53	14	69	1157	0	1240	1254	0	246	0	1500	225	37	0	0	262	3055	1502	1553

Graphical Summary of Hourly Volumes



Intersection Traffic Volume Report

Count Basics			Page 5 of 11	
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session	
Total Number of Hours Counted:	14	Non-Holiday	No Special Events	

15-Minute Motor Vehicle Data

Preston Pl and Ridge Rd



15-Minute Motor Vehicle Data

15-Minute Time Period Start Time	↓ From North					← From East					↑ From South					→ From West					15-Min Totals	Hourly Sum	PHF	
	Preston Pl					Ridge Rd					Paulson Rd					Paulson Rd								
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total				
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	4	0	4	1	0	6	0	7	0	0	0	0	0	11	91	0.60
	6:15 AM	0	0	0	0	0	0	0	7	0	7	2	0	4	0	6	4	0	0	0	4	17	139	0.59
	6:30 AM	0	1	0	0	1	0	0	12	0	12	7	0	1	0	8	4	0	0	0	4	25	187	0.72
	6:45 AM	0	0	0	0	0	0	1	23	0	24	6	0	4	0	10	4	0	0	0	4	38	272	0.62
	7:00 AM	0	3	0	0	3	0	1	30	0	31	10	0	6	0	16	7	2	0	0	9	59	388	0.63
	7:15 AM	0	6	0	0	6	1	3	32	0	36	12	0	7	0	19	3	1	0	0	4	65	395	0.64
	7:30 AM	0	1	0	0	1	0	2	72	0	74	19	0	7	0	26	7	2	0	0	9	110	362	0.59
	7:45 AM	0	5	0	0	5	0	7	80	0	87	43	0	9	0	52	8	2	0	0	10	154	290	0.47
	8:00 AM	0	1	0	0	1	0	2	31	0	33	18	0	6	0	24	6	2	0	0	8	66	184	0.70
	8:15 AM	0	1	0	0	1	0	1	16	0	17	10	0	1	0	11	2	1	0	0	3	32	151	0.79
	8:30 AM	1	0	0	0	1	0	3	18	0	21	9	0	4	0	13	2	1	0	0	3	38	157	0.82
	8:45 AM	0	1	0	0	1	0	0	30	0	30	13	0	1	0	14	3	0	0	0	3	48	156	0.81
	9:00 AM	0	0	0	0	0	0	0	9	0	9	17	0	4	0	21	3	0	0	0	3	33	152	0.86
	9:15 AM	0	1	0	0	1	1	2	16	0	19	11	0	1	0	12	6	0	0	0	6	38	162	0.92
	9:30 AM	0	0	0	0	0	1	1	13	0	15	14	0	5	0	19	3	0	0	0	3	37	154	0.88
	9:45 AM	0	0	0	0	0	0	1	21	0	22	14	0	3	0	17	5	0	0	0	5	44	149	0.85
Midday Peak Period	10:00 AM	0	0	0	0	0	1	0	14	0	15	18	0	5	0	23	5	0	0	0	5	43	154	0.79
	10:15 AM	0	0	1	0	1	0	1	14	0	15	10	0	0	0	10	4	0	0	0	4	30	154	0.79
	10:30 AM	0	0	0	0	0	0	1	14	0	15	11	0	1	0	12	5	0	0	0	5	32	173	0.88
	10:45 AM	0	0	0	0	0	0	1	18	0	19	22	0	4	0	26	3	1	0	0	4	49	194	0.92
	11:00 AM	0	1	0	0	1	0	2	21	0	23	13	0	3	0	16	3	0	0	0	3	43	203	0.88
	11:15 AM	0	0	0	0	0	0	5	14	0	19	17	0	7	0	24	3	3	0	0	6	49	212	0.91
	11:30 AM	0	1	1	0	2	0	0	18	0	18	26	0	2	0	28	5	0	0	0	5	53	216	0.93
	11:45 AM	0	0	0	0	0	0	1	24	0	25	25	0	7	0	32	1	0	0	0	1	58	223	0.93
	12:00 PM	0	0	0	0	0	0	1	24	0	25	19	0	2	0	21	4	2	0	0	6	52	204	0.85
	12:15 PM	0	0	0	0	0	2	1	16	0	19	23	0	6	0	29	4	1	0	0	5	53	182	0.76
	12:30 PM	0	0	0	0	0	0	4	22	0	26	21	0	4	0	25	8	1	0	0	9	60	171	0.71
	12:45 PM	0	0	1	0	1	0	2	10	0	12	18	0	7	0	25	1	0	0	0	1	39	149	0.89
	1:00 PM	0	0	0	0	0	0	1	10	0	11	13	0	2	0	15	4	0	0	0	4	30	153	0.89
	1:15 PM	0	0	0	0	0	1	1	15	0	17	17	0	3	0	20	5	0	0	0	5	42	176	0.83
	1:30 PM	0	1	0	0	1	0	0	14	0	14	15	0	6	0	21	2	0	0	0	2	38	189	0.86
	1:45 PM	0	0	1	0	1	1	0	19	0	20	15	0	3	0	18	4	0	0	0	4	43	211	0.88
PM Peak Period	2:00 PM	0	2	1	0	3	1	4	13	0	18	20	0	7	0	27	4	1	0	0	5	53	233	0.90
	2:15 PM	0	0	0	0	0	0	0	23	0	23	23	0	2	0	25	7	0	0	0	7	55	249	0.90
	2:30 PM	1	1	2	0	4	0	1	21	0	22	21	0	6	0	27	6	1	0	0	7	60	294	0.74
	2:45 PM	0	0	0	0	0	1	2	22	0	25	31	0	5	0	36	4	0	0	0	4	65	300	0.75
	3:00 PM	0	0	0	0	0	0	3	27	0	30	30	0	3	0	33	4	2	0	0	6	69	323	0.81
	3:15 PM	0	3	0	0	3	0	1	27	0	28	64	0	1	0	65	3	1	0	0	4	100	334	0.84
	3:30 PM	0	0	0	0	0	0	0	24	0	24	31	0	8	0	39	3	0	0	0	3	66	345	0.78
	3:45 PM	0	1	0	0	1	1	1	22	0	24	45	0	10	0	55	7	1	0	0	8	88	361	0.81
	4:00 PM	0	1	0	0	1	0	3	23	0	26	33	0	9	0	42	11	0	0	0	11	80	364	0.82
	4:15 PM	0	1	0	0	1	0	1	30	0	31	56	0	8	0	64	9	6	0	0	15	111	372	0.84
	4:30 PM	0	0	1	0	1	0	0	24	0	24	43	0	10	0	53	4	0	0	0	4	82	342	0.94
	4:45 PM	0	0	0	0	0	0	1	32	0	33	45	0	6	0	51	3	4	0	0	7	91	331	0.91
	5:00 PM	0	1	0	0	1	3	1	26	0	30	42	0	7	0	49	7	1	0	0	8	88	293	0.83
	5:15 PM	0	0	1	0	1	0	0	21	0	21	44	0	8	0	52	7	0	0	0	7	81	249	0.77
	5:30 PM	0	3	0	0	3	0	0	25	0	25	36	0	4	0	40	3	0	0	0	3	71	219	0.77
	5:45 PM	0	1	0	0	1	0	1	20	0	21	27	0	3	0	30	1	0	0	0	1	53	196	0.92
	6:00 PM	0	0	1	0	1	0	3	13	0	16	20	0	4	0	24	3	0	0	0	3	44	197	0.91
	6:15 PM	0	2	0	0	2	0	1	16	0	17	28	0	2	0	30	2	0	0	0	2	51	189	0.88
	6:30 PM	0	0	0	0	0	0	0	16	0	16	29	0	1	0	30	2	0	0	0	2	48	169	0.78
	6:45 PM	0	1	0	0	1	0	0	19	0	19	25	0	3	0	28	6	0	0	0	6	54	142	0.66
	7:00 PM	0	0	0	0	0	0	0	11	0	11	21	0	3	0	24	0	1	0	0	1	36	116	0.81
	7:15 PM	0	1	0	0	1	0	0	9	0	9	18	0	2	0	20	1	0	0	0	1	31		
	7:30 PM	0	0	0	0	0	0	0	7	0	7	13	0	1	0	14	0	0	0	0	0	21		
	7:45 PM	0	0	0	0	0	0	1	5	0	6	20	0	2	0	22	0	0	0	0	0	28		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Totals	2	41	10	0	53	14	69	1157	0	1240	1254	0	246	0	1500	225	37	0	0	262	3055			

15-Minute Heavy Vehicle Data

Heavy Vehicles (Single-Unit Trucks, Buses & Semi-Trucks)

15-Minute Heavy Vehicle Data

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time	From North					From East					From South					From West					Total Hourly Volume
	Preston PI					Ridge Rd					Paulson Rd					Paulson Rd					
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM 7:15 AM	0	0	0	0	0	0	0	3	0	3	1	0	0	0	1	2	1	0	0	3	7
MD 11:45 AM	0	0	0	0	0	0	1	1	0	2	1	0	3	0	4	1	1	0	0	2	8
PM 4:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	4	0	4	0	0	0	0	0	5

Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

Peak Hour Volume Summary

Taylor Road and Paulson Road



Peak Hour Volumes, Truck Percentages, and PHFs

Wednesday, January 31, 2024		From North					From East					From South					From West						
AM Peak Hour	AM Peak Hour	Taylor Road					Paulson Road					Taylor Road					Larson Beach Road						
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals	
	7:15 AM	2	9	3	0	14	0	32	9	0	41	4	5	13	0	22	10	11	0	0	21	98	
	7:30 AM	3	6	7	0	16	3	43	32	0	78	8	7	15	0	30	7	11	4	0	22	146	
	7:45 AM	1	5	3	0	9	5	65	25	0	95	18	12	22	0	52	11	30	3	0	44	200	
	8:00 AM	6	3	1	0	10	1	34	3	0	38	3	3	13	0	19	12	20	4	0	36	103	
	Peak Hour Volume	12	23	14	0	49	9	174	69	0	252	33	27	63	0	123	40	72	11	0	123	547	
	Rounded Hourly Volume	10	25	15	0	50	10	175	70	0	255	35	25	65	0	125	40	70	10	0	120	550	
	% Single Unit Trucks	0.0	4.3	14.3	0.0	6.1	0.0	2.3	1.4	0.0	2.0	0.0	3.7	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	1.6	
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
% Trucks (Total)	0.0	4.3	14.3	0.0	6.1	0.0	2.3	1.4	0.0	2.0	0.0	3.7	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	1.6		
Peak Hour Factor (PHF)	0.50	0.64	0.50	0.00	0.77	0.45	0.67	0.54	0.00	0.66	0.46	0.56	0.72	0.00	0.59	0.83	0.60	0.69	0.00	0.70	0.68		

Wednesday, January 31, 2024		↓					←					↑					→						
		From North					From East					From South					From West						
Midday (MD) Peak Hour	MD Peak Hour	Taylor Road					Paulson Road					Taylor Road					Larson Beach Road					Totals	
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
	11:30 AM	3	4	2	0	9	4	16	4	0	24	1	6	10	0	17	9	25	3	0	37	87	
	11:45 AM	5	2	3	0	10	1	20	3	0	24	2	4	9	0	15	12	27	6	0	45	94	
	12:00 PM	2	1	1	0	4	2	23	4	0	29	1	2	8	0	11	12	18	4	0	34	78	
	12:15 PM	1	2	1	0	4	0	18	3	0	21	2	0	11	0	13	7	26	0	0	33	71	
	Peak Hour Volume	11	9	7	0	27	7	77	14	0	98	6	12	38	0	56	40	96	13	0	149	330	
	Rounded Hourly Volume	10	10	5	0	25	5	75	15	0	95	5	10	40	0	55	40	95	15	0	150	325	
	% Single Unit Trucks	0.0	0.0	14.3	0.0	3.7	14.3	0.0	0.0	0.0	1.0	16.7	16.7	0.0	0.0	5.4	0.0	2.1	7.7	0.0	2.0	2.4	
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
% Trucks (Total)	0.0	0.0	14.3	0.0	3.7	14.3	0.0	0.0	0.0	1.0	16.7	16.7	0.0	0.0	5.4	0.0	2.1	7.7	0.0	2.0	2.4		
Peak Hour Factor (PHF)		0.55	0.56	0.58	0.00	0.67	0.44	0.84	0.87	0.00	0.84	0.75	0.50	0.86	0.00	0.82	0.83	0.89	0.54	0.00	0.83	0.88	

Wednesday, January 31, 2024		↓ From North					← From East					↑ From South					→ From West					Totals
PM Peak Hour	PM Peak Hour	Taylor Road					Paulson Road					Taylor Road					Larson Beach Road					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	4:15 PM	1	3	2	0	6	0	27	11	0	38	6	5	8	0	19	18	57	8	0	83	146
	4:30 PM	3	8	4	0	15	1	22	6	0	29	4	2	12	0	18	15	46	5	0	66	128
	4:45 PM	2	3	5	0	10	0	28	6	0	34	8	6	11	0	25	20	41	6	0	67	136
	5:00 PM	5	4	5	0	14	3	25	8	0	36	6	4	15	0	25	23	36	5	0	64	139
	Peak Hour Volume	11	18	16	0	45	4	102	31	0	137	24	17	46	0	87	76	180	24	0	280	549
	Rounded Hourly Volume	10	20	15	0	45	5	100	30	0	135	25	15	45	0	85	75	180	25	0	280	545
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	25.0	1.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	1.4	1.1
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	25.0	1.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	1.4	1.1	
Peak Hour Factor (PHF)	0.55	0.56	0.80	0.00	0.75	0.33	0.91	0.70	0.00	0.90	0.75	0.71	0.77	0.00	0.87	0.83	0.79	0.75	0.00	0.84	0.94	

Peak Hour Pedestrian and Bicyclist Volumes

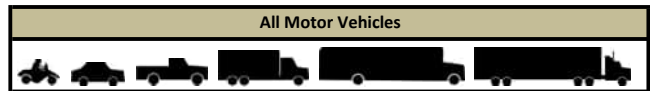
Pedestrians and Bicyclists		Crossing 			Crossing 			Crossing 			Crossing 			Total Ped & Bike Volume
 		North Approach			East Approach			South Approach			West Approach			
		Taylor Road			Paulson Road			Taylor Road			Larson Beach Road			
15-Minute Start Time		Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	1	0	1	1	0	1	0	0	0	0	0	0	2
	7:45 AM	0	0	0	0	0	0	1	0	1	0	0	0	1
	8:00 AM	1	0	1	0	0	0	0	0	0	0	0	0	1
	Total	2	0	2	1	0	1	1	0	1	0	0	0	4
MD	11:30 AM	0	0	0	2	0	2	0	0	0	0	0	0	2
	11:45 AM	0	0	0	0	0	0	1	0	1	0	0	0	1
	12:00 PM	2	0	2	0	0	0	1	0	1	0	0	0	3
	12:15 PM	2	0	2	0	0	0	2	0	2	0	0	0	4
	Total	4	0	4	2	0	2	4	0	4	0	0	0	10
PM	4:15 PM	0	0	0	4	0	4	2	0	2	0	0	0	6
	4:30 PM	1	0	1	1	0	1	0	0	0	1	0	1	3
	4:45 PM	2	0	2	7	0	7	2	0	2	0	0	0	11
	5:00 PM	0	0	0	5	0	5	2	0	2	0	0	0	7
	Total	3	0	3	17	0	17	6	0	6	1	0	1	27

Intersection Traffic Volume Report

Count Basics			Page 4 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

Hourly Volume Summary - Motor Vehicle Data

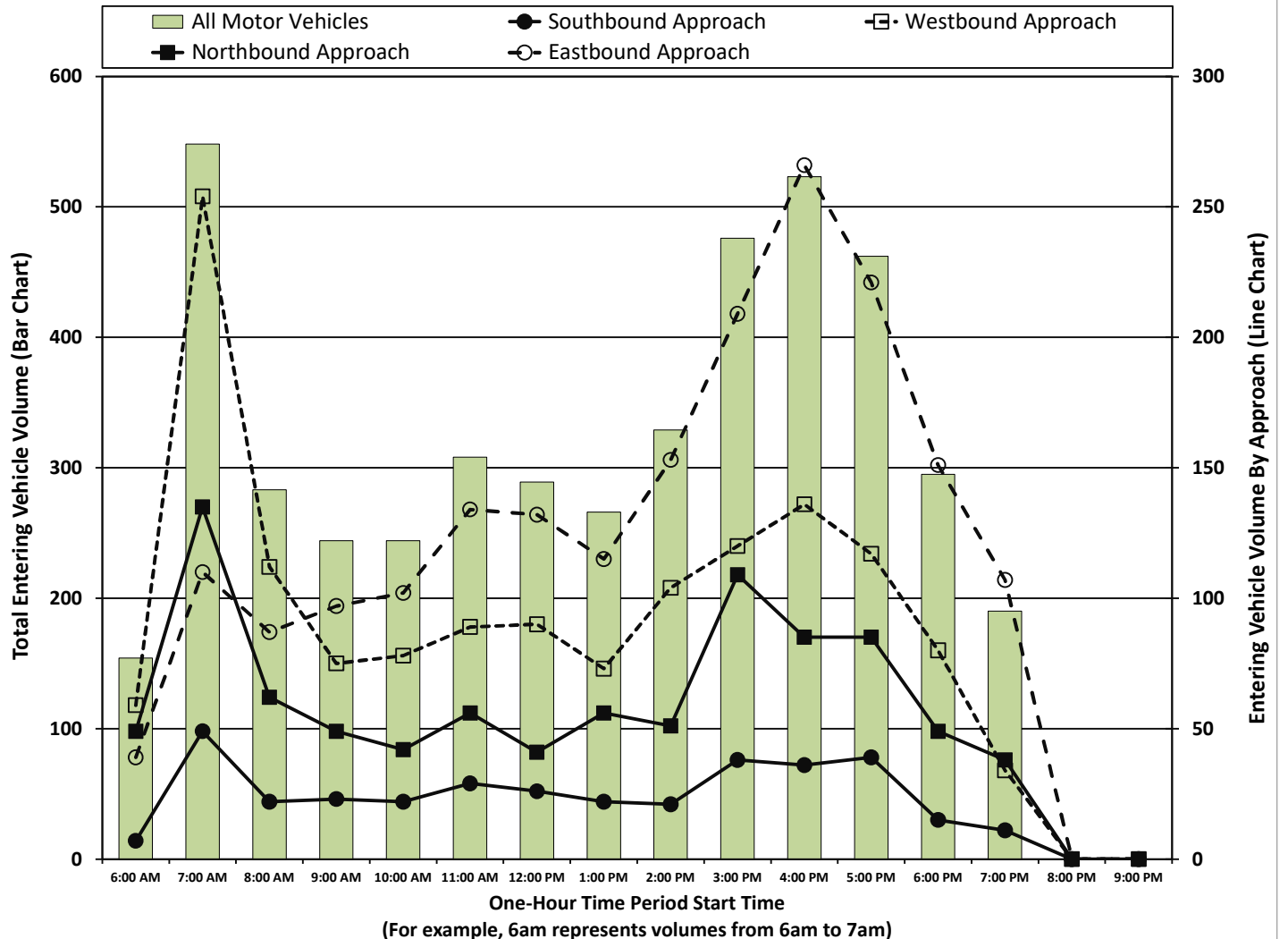
Taylor Road and Paulson Road



One-Hour Motor Vehicle Data

One-Hour Time Period	From North					From East					From South					From West					Total Vehicle Volume	Directional Volume Totals		
	Taylor Road					Paulson Road					Taylor Road					Larson Beach Road								
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		E/W	N/S	
Start Time																								
AM	6:00 AM	3	4	0	0	7	3	50	6	0	59	4	7	38	0	49	5	26	8	0	39	154	98	56
	7:00 AM	10	25	14	0	49	9	176	69	0	254	34	25	76	0	135	37	64	9	0	110	548	364	184
	8:00 AM	10	8	4	0	22	5	96	11	0	112	6	8	48	0	62	24	52	11	0	87	283	199	84
	9:00 AM	13	7	3	0	23	4	60	11	0	75	5	7	37	0	49	24	63	10	0	97	244	172	72
MD	10:00 AM	5	14	3	0	22	6	66	6	0	78	7	7	28	0	42	35	62	5	0	102	244	180	64
	11:00 AM	13	9	7	0	29	9	70	10	0	89	7	13	36	0	56	32	87	15	0	134	308	223	85
	12:00 PM	9	13	4	0	26	3	77	10	0	90	8	5	28	0	41	32	87	13	0	132	289	222	67
	1:00 PM	10	11	1	0	22	5	61	7	0	73	8	9	39	0	56	40	65	10	0	115	266	188	78
PM	2:00 PM	8	10	3	0	21	11	84	9	0	104	10	10	31	0	51	41	103	9	0	153	329	257	72
	3:00 PM	7	22	9	0	38	10	77	33	0	120	45	19	45	0	109	57	138	14	0	209	476	329	147
	4:00 PM	6	17	13	0	36	4	104	28	0	136	24	15	46	0	85	67	179	20	0	266	523	402	121
	5:00 PM	15	15	9	0	39	9	89	19	0	117	18	17	50	0	85	62	141	18	0	221	462	338	124
	6:00 PM	5	6	4	0	15	3	59	18	0	80	10	7	32	0	49	51	93	7	0	151	295	231	64
	7:00 PM	3	3	5	0	11	1	31	2	0	34	8	8	22	0	38	33	68	6	0	107	190	141	49
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals	117	164	79	0	360	82	1100	239	0	1421	194	157	556	0	907	540	1228	155	0	1923	4611	3344	1267

Graphical Summary of Hourly Volumes



Intersection Traffic Volume Report

Count Basics			Page 5 of 11	
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session	
Total Number of Hours Counted:	14	Non-Holiday	No Special Events	

15-Minute Motor Vehicle Data

Taylor Road and Paulson Road



15-Minute Motor Vehicle Data

15-Minute Time Period Start Time	From North					From East					From South					From West					15-Min Totals	Hourly Sum	PHF	
	Taylor Road					Paulson Road					Taylor Road					Larson Beach Road								
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total				
AM Peak Period	6:00 AM	1	0	0	0	1	0	2	1	0	3	1	0	7	0	8	0	6	1	0	7	19	154	0.64
	6:15 AM	0	2	0	0	2	0	11	0	0	11	0	1	9	0	10	1	6	1	0	8	31	239	0.57
	6:30 AM	1	0	0	0	1	1	16	0	0	17	1	2	12	0	15	1	6	4	0	11	44	306	0.74
	6:45 AM	1	2	0	0	3	2	21	5	0	28	2	4	10	0	16	3	8	2	0	13	60	408	0.70
	7:00 AM	4	5	1	0	10	1	36	3	0	40	4	1	26	0	31	9	12	2	0	23	104	548	0.69
	7:15 AM	2	9	3	0	14	0	32	9	0	41	4	5	13	0	22	10	11	0	0	21	98	547	0.68
	7:30 AM	3	6	7	0	16	3	43	32	0	78	8	7	15	0	30	7	11	4	0	22	146	501	0.63
	7:45 AM	1	5	3	0	9	5	65	25	0	95	18	12	22	0	52	11	30	3	0	44	200	400	0.50
	8:00 AM	6	3	1	0	10	1	34	3	0	38	3	3	13	0	19	12	20	4	0	36	103	283	0.69
	8:15 AM	2	1	1	0	4	0	15	4	0	19	0	0	12	0	12	2	12	3	0	17	52	240	0.72
	8:30 AM	1	1	1	0	3	1	17	1	0	19	2	1	11	0	14	0	9	0	0	9	45	246	0.74
	8:45 AM	1	3	1	0	5	3	30	3	0	36	1	4	12	0	17	10	11	4	0	25	83	257	0.77
	9:00 AM	6	1	1	0	8	0	10	1	0	11	1	2	10	0	13	7	19	2	0	28	60	244	0.87
	9:15 AM	1	1	0	0	2	1	13	7	0	21	0	2	12	0	14	3	14	4	0	21	58	253	0.90
	9:30 AM	4	1	0	0	5	0	14	1	0	15	2	3	9	0	14	4	16	2	0	22	56	247	0.88
	9:45 AM	2	4	2	0	8	3	23	2	0	28	2	0	6	0	8	10	14	2	0	26	70	248	0.89
Midday Peak Period	10:00 AM	1	3	1	0	5	0	18	2	0	20	3	2	6	0	11	11	20	2	0	33	69	244	0.88
	10:15 AM	1	5	0	0	6	2	14	2	0	18	1	2	8	0	11	7	9	1	0	17	52	238	0.90
	10:30 AM	2	2	0	0	4	2	16	1	0	19	0	1	9	0	10	12	12	0	0	24	57	250	0.95
	10:45 AM	1	4	2	0	7	2	18	1	0	21	3	2	5	0	10	5	21	2	0	28	66	280	0.80
	11:00 AM	3	1	1	0	5	2	21	1	0	24	2	1	10	0	13	5	13	3	0	21	63	308	0.82
	11:15 AM	2	2	1	0	5	2	13	2	0	17	2	2	7	0	11	6	22	3	0	31	64	323	0.86
	11:30 AM	3	4	2	0	9	4	16	4	0	24	1	6	10	0	17	9	25	3	0	37	87	330	0.88
	11:45 AM	5	2	3	0	10	1	20	3	0	24	2	4	9	0	15	12	27	6	0	45	94	322	0.86
	12:00 PM	2	1	1	0	4	2	23	4	0	29	1	2	8	0	11	12	18	4	0	34	78	289	0.91
	12:15 PM	1	2	1	0	4	0	18	3	0	21	2	0	11	0	13	7	26	0	0	33	71	261	0.83
	12:30 PM	5	5	2	0	12	1	25	3	0	29	2	0	3	0	5	6	22	5	0	33	79	264	0.84
	12:45 PM	1	5	0	0	6	0	11	0	0	11	3	3	6	0	12	7	21	4	0	32	61	258	0.87
	1:00 PM	2	4	0	0	6	0	12	1	0	13	1	1	9	0	11	6	13	1	0	20	50	266	0.90
	1:15 PM	3	3	0	0	6	0	14	5	0	19	3	3	9	0	15	11	19	4	0	34	74	277	0.94
	1:30 PM	2	2	1	0	5	1	15	1	0	17	2	2	12	0	16	15	18	2	0	35	73	285	0.87
	1:45 PM	3	2	0	0	5	4	20	0	0	24	2	3	9	0	14	8	15	3	0	26	69	305	0.82
PM Peak Period	2:00 PM	2	0	0	0	2	2	15	2	0	19	2	0	3	0	5	8	25	2	0	35	61	329	0.88
	2:15 PM	0	3	1	0	4	5	26	0	0	31	2	1	10	0	13	8	23	3	0	34	82	366	0.93
	2:30 PM	5	4	1	0	10	2	25	1	0	28	4	0	9	0	13	18	23	1	0	42	93	439	0.71
	2:45 PM	1	3	1	0	5	2	18	6	0	26	2	9	9	0	20	7	32	3	0	42	93	459	0.74
	3:00 PM	2	6	1	0	9	4	16	11	0	31	1	5	4	0	10	13	30	5	0	48	98	476	0.77
	3:15 PM	1	5	1	0	7	3	19	11	0	33	34	9	17	0	60	17	32	6	0	55	155	491	0.79
	3:30 PM	4	6	3	0	13	1	22	4	0	27	4	5	17	0	26	15	30	2	0	47	113	482	0.83
	3:45 PM	0	5	4	0	9	2	20	7	0	29	6	0	7	0	13	12	46	1	0	59	110	497	0.85
	4:00 PM	0	3	2	0	5	3	27	5	0	35	6	2	15	0	23	14	35	1	0	50	113	523	0.90
	4:15 PM	1	3	2	0	6	0	27	11	0	38	6	5	8	0	19	18	57	8	0	83	146	549	0.94
	4:30 PM	3	8	4	0	15	1	22	6	0	29	4	2	12	0	18	15	46	5	0	66	128	531	0.96
	4:45 PM	2	3	5	0	10	0	28	6	0	34	8	6	11	0	25	20	41	6	0	67	136	507	0.91
	5:00 PM	5	4	5	0	14	3	25	8	0	36	6	4	15	0	25	23	36	5	0	64	139	462	0.83
	5:15 PM	4	6	2	0	12	1	24	2	0	27	5	6	14	0	25	15	45	4	0	64	128	399	0.78
	5:30 PM	3	3	2	0	8	3	23	6	0	32	5	5	6	0	16	13	33	2	0	48	104	350	0.84
	5:45 PM	3	2	0	0	5	2	17	3	0	22	2	2	15	0	19	11	27	7	0	45	91	320	0.88
	6:00 PM	0	1	2	0	3	0	11	4	0	15	3	3	8	0	14	23	21	0	0	44	76	295	0.93
	6:15 PM	2	1	0	0	3	0	17	4	0	21	0	1	10	0	11	12	29	3	0	44	79	281	0.89
	6:30 PM	3	3	1	0	7	1	13	4	0	18	5	3	7	0	15	10	21	3	0	34	74	252	0.85
	6:45 PM	0	1	1	0	2	2	18	6	0	26	2	0	7	0	9	6	22	1	0	29	66	209	0.79
	7:00 PM	1	1	2	0	4	1	9	1	0	11	3	1	11	0	15	10	19	3	0	32	62	190	0.77
	7:15 PM	2	1	0	0	3	0	9	1	0	10	2	2	0	0	4	14	18	1	0	33	50		
	7:30 PM	0	0	1	0	1	0	8	0	0	8	0	1	4	0	5	2	13	2	0	17	31		
	7:45 PM	0	1	2	0	3	0	5	0	0	5	3	4	7	0	14	7	18	0	0	25	47		
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Totals	117	164	79	0	360	82	1100	239	0	1421	194	157	556	0	907	540	1228	155	0	1923	4611			

Intersection Traffic Volume Report

Count Basics			Page 9 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Taylor Road and Paulson Road



15-Minute Heavy Vehicle Data

15-Minute Time Period Start Time	From North					From East					From South					From West					15-Min Totals	Hourly Sum	
	Taylor Road					Paulson Road					Taylor Road					Larson Beach Road							
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
	6:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	9	
	6:30 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	3	9	
	6:45 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	12	
	7:00 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	0	0	0	1	11	
	7:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
	7:30 AM	0	0	2	0	2	0	2	1	0	3	0	1	0	0	1	0	0	0	0	0	6	8
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
	8:00 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2	2
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	8	
9:15 AM	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	8	
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	7	
9:45 AM	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	4	7	
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	6	
	10:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	10
	10:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	12
	10:45 AM	0	1	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3	12
	11:00 AM	1	0	0	0	1	1	1	0	0	2	0	0	1	0	1	0	1	0	0	1	5	11
	11:15 AM	0	0	0	0	0	1	1	0	0	2	1	0	0	0	1	0	0	0	0	0	3	9
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	8
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2	12
	12:00 PM	0	0	1	0	1	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	3	10
	12:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	2	7
	12:30 PM	0	2	0	0	2	0	1	0	0	1	1	0	0	0	1	1	0	0	0	1	5	5
	12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	3
PM Peak Period	2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
	2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	
	2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	13	
	2:45 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	2	0	0	0	2	5	11
	3:00 PM	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	1	0	0	1	3	11
	3:15 PM	0	0	0	0	0	1	0	1	0	2	0	1	0	0	1	0	0	0	0	0	3	9
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
	3:45 PM	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	1	2	0	0	3	5	8
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	4
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	6
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	8
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	8
	5:00 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	1	0	0	1	3	7
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	2	3	4
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	6:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals		2	5	4	0	11	8	22	4	0	34	3	8	3	0	14	4	20	1	0	25	84	

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time	From North					From East					From South					From West					Total Hourly Volume
	Taylor Road					Paulson Road					Taylor Road					Larson Beach Road					
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM 7:15 AM	0	1	2	0	3	0	4	1	0	5	0	1	0	0	1	0	0	0	0	0	9
MD 11:30 AM	0	0	1	0	1	1	0	0	0	1	1	2	0	0	3	0	2	1	0	3	8
PM 4:15 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	4	0	0	4	

Appendix B: Existing-Year (Year 2022) Traffic Operations Analysis Worksheets

HCM 6th AWSC
6: Taylor Rd & Larson Beach Rd/Paulson Rd

03/27/2024

Intersection

Intersection Delay, s/veh 11.3
Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	70	40	70	175	10	65	25	35	15	25	10
Future Vol, veh/h	10	70	40	70	175	10	65	25	35	15	25	10
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Heavy Vehicles, %	0	0	0	2	2	2	1	1	1	6	6	6
Mvmt Flow	15	103	59	103	257	15	96	37	51	22	37	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	12.9	10.4	9.4
HCM LOS	A	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	52%	8%	27%	30%
Vol Thru, %	20%	58%	69%	50%
Vol Right, %	28%	33%	4%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	120	255	50
LT Vol	65	10	70	15
Through Vol	25	70	175	25
RT Vol	35	40	10	10
Lane Flow Rate	184	176	375	74
Geometry Grp	1	1	1	1
Degree of Util (X)	0.274	0.244	0.506	0.116
Departure Headway (Hd)	5.371	4.98	4.961	5.66
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	671	725	731	635
Service Time	3.385	2.98	2.961	3.678
HCM Lane V/C Ratio	0.274	0.243	0.513	0.117
HCM Control Delay	10.4	9.6	12.9	9.4
HCM Lane LOS	B	A	B	A
HCM 95th-tile Q	1.1	1	2.9	0.4

HCM 6th TWSC
11: Paulson Place & Paulson Road & Ridge Road

03/27/2024

Intersection													
Int Delay, s/veh	2.1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Traffic Vol, veh/h	30	90	0	0	215	15	15	1	1	5	0	25	
Future Vol, veh/h	30	90	0	0	215	15	15	1	1	5	0	25	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	64	64	64	64	64	64	64	64	64	64	64	64	
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	10	10	10	
Mvmt Flow	47	141	0	0	336	23	23	2	2	8	0	39	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	359	0	-	-	-	-	0	602	594	141	585	583	348
Stage 1	-	-	-	-	-	-	-	235	235	-	348	348	-
Stage 2	-	-	-	-	-	-	-	367	359	-	237	235	-
Critical Hdwy	4.11	-	-	-	-	-	-	7.1	6.5	6.2	7.2	6.6	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.1	5.5	-	6.2	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.1	5.5	-	6.2	5.6	-
Follow-up Hdwy	2.209	-	-	-	-	-	-	3.5	4	3.3	3.59	4.09	3.39
Pot Cap-1 Maneuver	1205	-	0	0	-	-	-	414	421	912	411	413	677
Stage 1	-	-	0	0	-	-	-	773	714	-	652	620	-
Stage 2	-	-	0	0	-	-	-	657	631	-	749	696	-
Platoon blocked, %		-			-	-							
Mov Cap-1 Maneuver	1205	-	-	-	-	-	-	378	403	912	396	396	677
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	378	403	-	396	396	-
Stage 1	-	-	-	-	-	-	-	741	684	-	625	620	-
Stage 2	-	-	-	-	-	-	-	619	631	-	715	667	-
Approach	EB			WB			NB			SB			
HCM Control Delay, s	2			0			14.8			11.5			
HCM LOS							B			B			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1							
Capacity (veh/h)	393	1205	-	-	-	605							
HCM Lane V/C Ratio	0.068	0.039	-	-	-	0.077							
HCM Control Delay (s)	14.8	8.1	0	-	-	11.5							
HCM Lane LOS	B	A	A	-	-	B							
HCM 95th %tile Q(veh)	0.2	0.1	-	-	-	0.3							

HCM 6th AWSC
6: Taylor Rd & Larson Beach Rd/Paulson Rd

03/27/2024

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	180	75	30	100	5	45	15	25	15	20	10
Future Vol, veh/h	25	180	75	30	100	5	45	15	25	15	20	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	1	1	1	2	2	2	0	0	0	0	0	0
Mvmt Flow	27	191	80	32	106	5	48	16	27	16	21	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	8.7	8.6	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	53%	9%	22%	33%
Vol Thru, %	18%	64%	74%	44%
Vol Right, %	29%	27%	4%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	280	135	45
LT Vol	45	25	30	15
Through Vol	15	180	100	20
RT Vol	25	75	5	10
Lane Flow Rate	90	298	144	48
Geometry Grp	1	1	1	1
Degree of Util (X)	0.122	0.354	0.184	0.066
Departure Headway (Hd)	4.872	4.28	4.613	4.936
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	734	840	777	724
Service Time	2.913	2.306	2.646	2.98
HCM Lane V/C Ratio	0.123	0.355	0.185	0.066
HCM Control Delay	8.6	9.6	8.7	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	1.6	0.7	0.2

HCM 6th TWSC
11: Paulson Place & Paulson Road & Ridge Road

03/27/2024

Intersection													
Int Delay, s/veh	1.7												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Vol, veh/h	30	185	0	0	110	5	1	1	1	10	0	25	
Future Vol, veh/h	30	185	0	0	110	5	1	1	1	10	0	25	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84	
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0	
Mvmt Flow	36	220	0	0	131	6	1	1	1	12	0	30	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	137	0	-	-	-	-	0	441	429	220	427	426	134
Stage 1	-	-	-	-	-	-	-	292	292	-	134	134	-
Stage 2	-	-	-	-	-	-	-	149	137	-	293	292	-
Critical Hdwy	4.12	-	-	-	-	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	-	-	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1447	-	0	0	-	-	-	530	521	825	541	524	920
Stage 1	-	-	0	0	-	-	-	720	675	-	874	789	-
Stage 2	-	-	0	0	-	-	-	858	787	-	719	675	-
Platoon blocked, %		-			-	-							
Mov Cap-1 Maneuver	1447	-	-	-	-	-	-	502	506	825	527	509	920
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	502	506	-	527	509	-
Stage 1	-	-	-	-	-	-	-	700	656	-	850	789	-
Stage 2	-	-	-	-	-	-	-	830	787	-	697	656	-
Approach	EB			WB			NB			SB			
HCM Control Delay, s	1.1			0			11.3			10			
HCM LOS							B			B			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBL	WBT	WBR	SBLn1						
Capacity (veh/h)	579	1447	-	-	-	-	758						
HCM Lane V/C Ratio	0.006	0.025	-	-	-	-	0.055						
HCM Control Delay (s)	11.3	7.6	0	-	-	-	10						
HCM Lane LOS	B	A	A	-	-	-	B						
HCM 95th %tile Q(veh)	0	0.1	-	-	-	-	0.2						

Appendix C: Future-Year (Year 2045) Traffic Operations Analysis Worksheets

HCM 6th AWSC
6: Larson Beach Rd/Paulson Rd & Taylor Rd

03/27/2024

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	15	30	15	75	35	40	15	85	50	85	210	10
Future Vol, veh/h	15	30	15	75	35	40	15	85	50	85	210	10
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Heavy Vehicles, %	5	5	5	1	1	1	0	0	0	2	2	2
Mvmt Flow	22	44	22	110	51	59	22	125	74	125	309	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	12	11	17.7
HCM LOS	B	B	B	C

Lane	NELn1	NWLn1	SELn1	SWLn1
Vol Left, %	10%	50%	25%	28%
Vol Thru, %	57%	23%	50%	69%
Vol Right, %	33%	27%	25%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	150	150	60	305
LT Vol	15	75	15	85
Through Vol	85	35	30	210
RT Vol	50	40	15	10
Lane Flow Rate	221	221	88	449
Geometry Grp	1	1	1	1
Degree of Util (X)	0.327	0.355	0.15	0.653
Departure Headway (Hd)	5.337	5.794	6.109	5.242
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	671	620	584	686
Service Time	3.391	3.849	4.178	3.285
HCM Lane V/C Ratio	0.329	0.356	0.151	0.655
HCM Control Delay	11	12	10.3	17.7
HCM Lane LOS	B	B	B	C
HCM 95th-tile Q	1.4	1.6	0.5	4.8

HCM 6th AWSC
11: Paulson Place & Paulson Road & Ridge Road

03/27/2024

Intersection

Intersection Delay, s/veh 9.3

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	35	110	0	0	260	15	1	15	1	10	0	30
Future Vol, veh/h	35	110	0	0	260	15	1	15	1	10	0	30
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	42	131	0	0	310	18	1	18	1	12	0	36
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	9.9	8.2	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	24%	0%	25%
Vol Thru, %	88%	76%	95%	0%
Vol Right, %	6%	0%	5%	75%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	17	145	275	40
LT Vol	1	35	0	10
Through Vol	15	110	260	0
RT Vol	1	0	15	30
Lane Flow Rate	20	173	327	48
Geometry Grp	1	1	1	1
Degree of Util (X)	0.028	0.215	0.386	0.061
Departure Headway (Hd)	5.036	4.476	4.245	4.62
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	711	804	854	775
Service Time	3.069	2.493	2.245	2.649
HCM Lane V/C Ratio	0.028	0.215	0.383	0.062
HCM Control Delay	8.2	8.7	9.9	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.8	1.8	0.2

HCM 6th AWSC
6: Larson Beach Rd/Paulson Rd & Taylor Rd

03/27/2024

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	20	20	15	55	20	30	30	220	90	40	125	5
Future Vol, veh/h	20	20	15	55	20	30	30	220	90	40	125	5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	1	1	1
Mvmt Flow	21	21	16	59	21	32	32	234	96	43	133	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.8	9.2	11	9.4
HCM LOS	A	A	B	A

Lane	NELn1	NWLn1	SELn1	SWLn1
Vol Left, %	9%	52%	36%	24%
Vol Thru, %	65%	19%	36%	74%
Vol Right, %	26%	29%	27%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	340	105	55	170
LT Vol	30	55	20	40
Through Vol	220	20	20	125
RT Vol	90	30	15	5
Lane Flow Rate	362	112	59	181
Geometry Grp	1	1	1	1
Degree of Util (X)	0.445	0.159	0.084	0.24
Departure Headway (Hd)	4.427	5.136	5.197	4.782
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	810	694	683	747
Service Time	2.47	3.205	3.273	2.837
HCM Lane V/C Ratio	0.447	0.161	0.086	0.242
HCM Control Delay	11	9.2	8.8	9.4
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2.3	0.6	0.3	0.9

HCM 6th TWSC
11: Paulson Place & Paulson Road & Ridge Road

03/27/2024

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰			↱	
Traffic Vol, veh/h	40	225	0	0	135	5	1	1	1	15	0	30
Future Vol, veh/h	40	225	0	0	135	5	1	1	1	15	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	1	1	1	2	2	2	0	0	0	0	0	0
Mvmt Flow	47	265	0	0	159	6	1	1	1	18	0	35
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	165	0	-	-	-	0	539	524	265	522	521	162
Stage 1	-	-	-	-	-	-	359	359	-	162	162	-
Stage 2	-	-	-	-	-	-	180	165	-	360	359	-
Critical Hdwy	4.11	-	-	-	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	-	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1419	-	0	0	-	-	456	461	779	468	463	888
Stage 1	-	-	0	0	-	-	663	631	-	845	768	-
Stage 2	-	-	0	0	-	-	826	766	-	662	631	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1419	-	-	-	-	-	425	443	779	453	445	888
Mov Cap-2 Maneuver	-	-	-	-	-	-	425	443	-	453	445	-
Stage 1	-	-	-	-	-	-	637	606	-	812	768	-
Stage 2	-	-	-	-	-	-	793	766	-	634	606	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	1.2		0			12.1			10.8			
HCM LOS						B			B			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1						
Capacity (veh/h)	509	1419	-	-	-	673						
HCM Lane V/C Ratio	0.007	0.033	-	-	-	0.079						
HCM Control Delay (s)	12.1	7.6	0	-	-	10.8						
HCM Lane LOS	B	A	A	-	-	B						
HCM 95th %tile Q(veh)	0	0.1	-	-	-	0.3						

Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	0	10	30	260	15	0	35	0	110	1	15	1
Future Vol, veh/h	0	10	30	260	15	0	35	0	110	1	15	1
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles, %	8	8	8	1	1	1	1	1	1	0	0	0
Mvmt Flow	0	16	47	406	23	0	55	0	172	2	23	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	14.1	9.8	8.7
HCM LOS	A	B	A	A

Lane	NELn1	NWLn1	SELn1	SWLn1
Vol Left, %	24%	95%	0%	6%
Vol Thru, %	0%	5%	25%	88%
Vol Right, %	76%	0%	75%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	275	40	17
LT Vol	35	260	0	1
Through Vol	0	15	10	15
RT Vol	110	0	30	1
Lane Flow Rate	227	430	62	27
Geometry Grp	1	1	1	1
Degree of Util (X)	0.298	0.571	0.082	0.04
Departure Headway (Hd)	4.743	4.784	4.722	5.387
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	754	748	751	658
Service Time	2.8	2.843	2.803	3.47
HCM Lane V/C Ratio	0.301	0.575	0.083	0.041
HCM Control Delay	9.8	14.1	8.2	8.7
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	1.2	3.7	0.3	0.1

HCM 6th AWSC
1: Paulson Rd & Ridge Rd & Preston Pl

03/27/2024

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	0	15	30	135	5	0	40	0	225	1	1	1
Future Vol, veh/h	0	15	30	135	5	0	40	0	225	1	1	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	0	0	0	1	1	1	2	2	2	0	0	0
Mvmt Flow	0	18	35	159	6	0	47	0	265	1	1	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	9.2	9.1	7.7
HCM LOS	A	A	A	A

Lane	NELn1	NWLn1	SELn1	SWLn1
Vol Left, %	15%	96%	0%	33%
Vol Thru, %	0%	4%	33%	33%
Vol Right, %	85%	0%	67%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	265	140	45	3
LT Vol	40	135	0	1
Through Vol	0	5	15	1
RT Vol	225	0	30	1
Lane Flow Rate	312	165	53	4
Geometry Grp	1	1	1	1
Degree of Util (X)	0.346	0.221	0.064	0.005
Departure Headway (Hd)	3.99	4.83	4.365	4.62
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	904	743	818	774
Service Time	2.006	2.861	2.402	2.65
HCM Lane V/C Ratio	0.345	0.222	0.065	0.005
HCM Control Delay	9.1	9.2	7.7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.6	0.8	0.2	0

HCM 6th TWSC
1: Ridge Rd & Paulson Rd & Preston Pl

03/27/2024

Intersection												
Int Delay, s/veh	13.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	35	0	110	1	15	1	260	15	0	0	10	30
Future Vol, veh/h	35	0	110	1	15	1	260	15	0	0	10	30
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	64	64	64	64	64	64	64	64	64
Heavy Vehicles, %	1	1	1	0	0	0	1	1	1	8	8	8
Mvmt Flow	55	0	172	2	23	2	406	23	0	0	16	47
Major/Minor	Major1			Major2			Minor1		Minor2			
Conflicting Flow All	26	0	0	172	0	0	257	226	-	-	311	26
Stage 1	-	-	-	-	-	-	196	196	-	-	29	-
Stage 2	-	-	-	-	-	-	61	30	-	-	282	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.11	6.51	-	-	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	-	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	-	5.58	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.509	4.009	-	-	4.072	3.372
Pot Cap-1 Maneuver	1595	-	-	1417	-	-	698	675	0	0	594	1033
Stage 1	-	-	-	-	-	-	808	740	0	0	859	-
Stage 2	-	-	-	-	-	-	953	872	0	0	667	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1593	-	-	1417	-	-	632	647	-	-	570	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	632	647	-	-	570	-
Stage 1	-	-	-	-	-	-	776	711	-	-	857	-
Stage 2	-	-	-	-	-	-	891	870	-	-	641	-
Approach	EB			WB			NB		SB			
HCM Control Delay, s	1.8			0.4			21.8		9.5			
HCM LOS							C		A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	633	1593	-	-	1417	-	-	858				
HCM Lane V/C Ratio	0.679	0.034	-	-	0.001	-	-	0.073				
HCM Control Delay (s)	21.8	7.3	0	-	7.5	0	-	9.5				
HCM Lane LOS	C	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	5.3	0.1	-	-	0	-	-	0.2				

HCM 6th TWSC
6: Taylor Rd & Larson Beach Rd/Paulson Rd

03/27/2024

Intersection												
Int Delay, s/veh	13.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	85	50	85	210	10	75	35	40	15	30	15
Future Vol, veh/h	15	85	50	85	210	10	75	35	40	15	30	15
Conflicting Peds, #/hr	2	0	1	2	0	3	1	0	2	3	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	2	2	2	1	1	1	5	5	5
Mvmt Flow	22	125	74	125	309	15	110	51	59	22	44	22
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	327	0	0	201	0	0	810	785	167	834	815	322
Stage 1	-	-	-	-	-	-	208	208	-	570	570	-
Stage 2	-	-	-	-	-	-	602	577	-	264	245	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.11	6.51	6.21	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.15	5.55	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.509	4.009	3.309	3.545	4.045	3.345
Pot Cap-1 Maneuver	1244	-	-	1371	-	-	300	326	880	284	308	712
Stage 1	-	-	-	-	-	-	796	732	-	501	501	-
Stage 2	-	-	-	-	-	-	488	503	-	735	698	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1240	-	-	1368	-	-	228	282	876	205	267	709
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	282	-	205	267	-
Stage 1	-	-	-	-	-	-	778	716	-	489	443	-
Stage 2	-	-	-	-	-	-	377	445	-	622	683	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			2.2			43.8			22.8		
HCM LOS							E			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	301	1240	-	-	1368	-	-	290				
HCM Lane V/C Ratio	0.733	0.018	-	-	0.091	-	-	0.304				
HCM Control Delay (s)	43.8	8	0	-	7.9	0	-	22.8				
HCM Lane LOS	E	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	5.4	0.1	-	-	0.3	-	-	1.2				

HCM 6th TWSC
1: Ridge Rd & Paulson Rd & Preston Pl

03/27/2024

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	40	0	225	1	1	1	135	5	0	0	15	30
Future Vol, veh/h	40	0	225	1	1	1	135	5	0	0	15	30
Conflicting Peds, #/hr	0	0	0	3	0	3	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	0	0	0	1	1	1	0	0	0
Mvmt Flow	47	0	265	1	1	1	159	6	0	0	18	35
Major/Minor	Major1			Major2			Minor1		Minor2			
Conflicting Flow All	5	0	0	268	0	0	260	237	-	-	369	5
Stage 1	-	-	-	-	-	-	230	230	-	-	7	-
Stage 2	-	-	-	-	-	-	30	7	-	-	362	-
Critical Hdwy	4.12	-	-	4.1	-	-	7.11	6.51	-	-	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	-	5.5	-
Follow-up Hdwy	2.218	-	-	2.2	-	-	3.509	4.009	-	-	4	3.3
Pot Cap-1 Maneuver	1616	-	-	1307	-	-	695	666	0	0	563	1084
Stage 1	-	-	-	-	-	-	775	716	0	0	894	-
Stage 2	-	-	-	-	-	-	989	892	0	0	629	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1611	-	-	1303	-	-	636	638	-	-	539	1081
Mov Cap-2 Maneuver	-	-	-	-	-	-	636	638	-	-	539	-
Stage 1	-	-	-	-	-	-	746	689	-	-	890	-
Stage 2	-	-	-	-	-	-	937	888	-	-	605	-
Approach	EB			WB			NB		SB			
HCM Control Delay, s	1.1			2.6			12.6		9.8			
HCM LOS							B		A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	636	1611	-	-	1303	-	-	810				
HCM Lane V/C Ratio	0.259	0.029	-	-	0.001	-	-	0.065				
HCM Control Delay (s)	12.6	7.3	0	-	7.8	0	-	9.8				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	1	0.1	-	-	0	-	-	0.2				

HCM 6th TWSC
6: Taylor Rd & Larson Beach Rd/Paulson Rd

03/27/2024

Intersection												
Int Delay, s/veh	4.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	220	90	40	125	5	55	20	30	20	20	15
Future Vol, veh/h	30	220	90	40	125	5	55	20	30	20	20	15
Conflicting Peds, #/hr	4	0	7	26	0	23	7	0	26	23	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	32	234	96	43	133	5	59	21	32	21	21	16
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	161	0	0	356	0	0	619	619	334	644	665	166
Stage 1	-	-	-	-	-	-	372	372	-	245	245	-
Stage 2	-	-	-	-	-	-	247	247	-	399	420	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1424	-	-	1208	-	-	404	407	712	389	383	884
Stage 1	-	-	-	-	-	-	653	622	-	763	707	-
Stage 2	-	-	-	-	-	-	761	706	-	631	593	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1393	-	-	1178	-	-	347	362	677	321	341	859
Mov Cap-2 Maneuver	-	-	-	-	-	-	347	362	-	321	341	-
Stage 1	-	-	-	-	-	-	619	590	-	726	664	-
Stage 2	-	-	-	-	-	-	689	663	-	549	562	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.9			17.2			15.6		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	407	1393	-	-	1178	-	-	397				
HCM Lane V/C Ratio	0.274	0.023	-	-	0.036	-	-	0.147				
HCM Control Delay (s)	17.2	7.6	0	-	8.2	0	-	15.6				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.1	0.1	-	-	0.1	-	-	0.5				

HCM 6th Signalized Intersection Summary

1: Ridge Rd & Paulson Rd & Preston Pl

03/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	0	110	1	15	1	260	15	0	0	10	30
Future Volume (veh/h)	35	0	110	1	15	1	260	15	0	0	10	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1885	1885	0	0	1781	1781
Adj Flow Rate, veh/h	55	0	172	2	23	2	406	23	0	0	16	47
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	0	0	8	8
Cap, veh/h	218	24	257	150	358	30	821	40	0	0	184	541
Arrive On Green	0.22	0.00	0.22	0.22	0.22	0.22	0.46	0.46	0.00	0.00	0.46	0.46
Sat Flow, veh/h	271	109	1191	52	1657	137	1233	86	0	0	399	1171
Grp Volume(v), veh/h	227	0	0	27	0	0	429	0	0	0	0	63
Grp Sat Flow(s),veh/h/ln	1572	0	0	1847	0	0	1319	0	0	0	0	1569
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.6
Cycle Q Clear(g_c), s	3.6	0.0	0.0	0.3	0.0	0.0	7.5	0.0	0.0	0.0	0.0	0.6
Prop In Lane	0.24		0.76	0.07		0.07	0.95		0.00	0.00		0.75
Lane Grp Cap(c), veh/h	499	0	0	537	0	0	861	0	0	0	0	726
V/C Ratio(X)	0.45	0.00	0.00	0.05	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.09
Avail Cap(c_a), veh/h	1351	0	0	1534	0	0	2651	0	0	0	0	2778
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	10.0	0.0	0.0	8.7	0.0	0.0	6.3	0.0	0.0	0.0	0.0	4.2
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	0.0	0.0	0.2	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.6	0.0	0.0	8.8	0.0	0.0	6.7	0.0	0.0	0.0	0.0	4.3
LnGrp LOS	B	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	227			27			429			63		
Approach Delay, s/veh	10.6			8.8			6.7			4.3		
Approach LOS	B			A			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	17.4			10.5			17.4			10.5		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	49.5			21.5			49.5			21.5		
Max Q Clear Time (g_c+I1), s	9.5			5.6			2.6			2.3		
Green Ext Time (p_c), s	3.4			1.3			0.4			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	7.8											
HCM 6th LOS	A											

HCM 6th Signalized Intersection Summary

6: Taylor Rd & Larson Beach Rd/Paulson Rd

03/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	85	50	85	210	10	75	35	40	15	30	15
Future Volume (veh/h)	15	85	50	85	210	10	75	35	40	15	30	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	0.99		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1885	1885	1885	1826	1826	1826
Adj Flow Rate, veh/h	22	125	74	125	309	15	110	51	59	22	44	22
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Percent Heavy Veh, %	0	0	0	2	2	2	1	1	1	5	5	5
Cap, veh/h	176	449	240	308	529	23	358	130	105	221	259	104
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	70	1087	582	330	1281	56	623	515	417	211	1028	413
Grp Volume(v), veh/h	221	0	0	449	0	0	220	0	0	88	0	0
Grp Sat Flow(s),veh/h/ln	1739	0	0	1668	0	0	1554	0	0	1653	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.6	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	5.5	0.0	0.0	3.2	0.0	0.0	1.1	0.0	0.0
Prop In Lane	0.10		0.33	0.28		0.03	0.50		0.27	0.25		0.25
Lane Grp Cap(c), veh/h	866	0	0	860	0	0	593	0	0	584	0	0
V/C Ratio(X)	0.26	0.00	0.00	0.52	0.00	0.00	0.37	0.00	0.00	0.15	0.00	0.00
Avail Cap(c_a), veh/h	2819	0	0	2733	0	0	1811	0	0	1856	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.3	0.0	0.0	6.2	0.0	0.0	8.6	0.0	0.0	7.9	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.8	0.0	0.0	2.0	0.0	0.0	1.4	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.4	0.0	0.0	6.7	0.0	0.0	9.0	0.0	0.0	8.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		221			449			220			88	
Approach Delay, s/veh		5.4			6.7			9.0			8.0	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		15.6		11.3		15.6		11.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		42.5		28.5		42.5		28.5				
Max Q Clear Time (g_c+I1), s		4.2		3.1		7.5		5.2				
Green Ext Time (p_c), s		1.6		0.5		3.5		1.4				
Intersection Summary												
HCM 6th Ctrl Delay				7.0								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary

1: Ridge Rd & Paulson Rd & Preston Pl

03/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	0	225	1	1	1	135	5	0	0	15	30
Future Volume (veh/h)	40	0	225	1	1	1	135	5	0	0	15	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1900	1900	1900	1885	1885	0	0	1900	1900
Adj Flow Rate, veh/h	47	0	265	1	1	1	159	6	0	0	18	35
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	0	0	0	1	1	0	0	0	0
Cap, veh/h	239	30	424	315	257	173	648	19	0	0	152	295
Arrive On Green	0.32	0.00	0.32	0.32	0.32	0.32	0.26	0.26	0.00	0.00	0.26	0.26
Sat Flow, veh/h	144	94	1343	285	812	549	1206	71	0	0	577	1121
Grp Volume(v), veh/h	312	0	0	3	0	0	165	0	0	0	0	53
Grp Sat Flow(s),veh/h/ln	1581	0	0	1646	0	0	1277	0	0	0	0	1698
Q Serve(g_s), s	0.9	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.5
Cycle Q Clear(g_c), s	3.5	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.5
Prop In Lane	0.15		0.85	0.33		0.33	0.96		0.00	0.00		0.66
Lane Grp Cap(c), veh/h	693	0	0	744	0	0	667	0	0	0	0	447
V/C Ratio(X)	0.45	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.12
Avail Cap(c_a), veh/h	2855	0	0	2795	0	0	2523	0	0	0	0	2738
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	5.0	0.0	0.0	6.9	0.0	0.0	0.0	0.0	6.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.1	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.7	0.0	0.0	5.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	6.1
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	312			3			165			53		
Approach Delay, s/veh	6.7			5.0			7.1			6.1		
Approach LOS	A			A			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	10.1			11.3			10.1			11.3		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	34.5			36.5			34.5			36.5		
Max Q Clear Time (g_c+I1), s	4.6			5.5			2.5			2.0		
Green Ext Time (p_c), s	1.0			2.3			0.3			0.0		
Intersection Summary												
HCM 6th Ctrl Delay	6.7											
HCM 6th LOS	A											

HCM 6th Signalized Intersection Summary

6: Taylor Rd & Larson Beach Rd/Paulson Rd

03/27/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	220	90	40	125	5	55	20	30	20	20	15
Future Volume (veh/h)	30	220	90	40	125	5	55	20	30	20	20	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.99	1.00		0.97	0.96		0.94	0.95		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	32	234	96	43	133	5	59	21	32	21	21	16
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	0	0	0
Cap, veh/h	192	476	182	264	574	19	361	126	104	279	204	106
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	74	1216	466	201	1467	47	568	538	442	322	869	454
Grp Volume(v), veh/h	362	0	0	181	0	0	112	0	0	58	0	0
Grp Sat Flow(s),veh/h/ln	1757	0	0	1716	0	0	1547	0	0	1645	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.6	0.0	0.0	1.2	0.0	0.0	0.6	0.0	0.0
Prop In Lane	0.09		0.27	0.24		0.03	0.53		0.29	0.36		0.28
Lane Grp Cap(c), veh/h	851	0	0	857	0	0	591	0	0	590	0	0
V/C Ratio(X)	0.43	0.00	0.00	0.21	0.00	0.00	0.19	0.00	0.00	0.10	0.00	0.00
Avail Cap(c_a), veh/h	3282	0	0	3093	0	0	1922	0	0	1993	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	4.9	0.0	0.0	7.5	0.0	0.0	7.3	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.3	0.0	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	0.0	0.0	5.1	0.0	0.0	7.7	0.0	0.0	7.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h		362			181			112			58	
Approach Delay, s/veh		5.9			5.1			7.7			7.4	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		13.9		10.1		13.9		10.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		43.5		27.5		43.5		27.5				
Max Q Clear Time (g_c+I1), s		5.7		2.6		3.6		3.2				
Green Ext Time (p_c), s		2.7		0.3		1.3		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				6.1								
HCM 6th LOS				A								

Appendix D: Traffic Signal Warrant Worksheets

Wisconsin Department of Transportation Traffic Signal Warrant

Summary Worksheet

100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Paulson Road and Ridge Road

County: Dane

Village: McFarland

Major Street: Ridge Road

Minor Street: Paulson Road

Critical Approach Speed: 25 mph

Critical Approach Speed: 25 mph

Lanes: 1 lane

Lanes: 1 lane

% Right Turns Included

From North (SB) 100%

From East (WB) 100%

From South (NB) 100%

From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No

Total number of approaches at intersection? 4 or more

If it is a "T" intersection, inflate minor threshold to 150%?

Manually set volume level?

Analysis based on **EXISTING** volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
31-Jan-24	Wednesday	6:00	AM	8:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	No
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	No
Warrant 3: Peak Hour Volume	No
Warrant 4: Pedestrian Volume	No
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	No
Warrant 6: Coordinated Signal System	No
Warrant 7: Crash Experience	No
Warrant 8: Roadway Network	No
Warrant 9: Intersection Near a Grade Crossing	Yes

Warrant Analysis Conducted By:

Name: Lee Gibbs

Agency: AECOM

Date: 3/21/2024

Warrant 1: Eight - Hour Vehicular Volume

100%

Warrant Evaluated? Yes

Condition A : Min. Veh. Volume		
Volume Level	100%	80%
Major Rd. Req	500	400
Minor Rd. Req	150	120
Number of Hours	0	0

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	100%	80%
Major Rd. Req	750	600
Minor Rd. Req	75	60
Number of Hours	0	0

Satisfied? No

Condition C: Combination of A & B at 80%		
---	--	--

Satisfied? No

Warrant Satisfied? No

Manually Set To:

6:00 AM		Enter Start Time (Military Time) (HH:MM)			Total
Time Period	From	To	Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	
1	6:00	7:00	32	47	79
2	7:00	8:00	128	228	356
3	8:00	9:00	66	101	167
4	9:00	10:00	70	65	135
5	10:00	11:00	72	64	136
6	11:00	12:00	103	85	188
7	12:00	13:00	101	82	183
8	13:00	14:00	76	62	138
9	14:00	15:00	122	88	210
10	15:00	16:00	196	106	302
11	16:00	17:00	213	114	327
12	17:00	18:00	177	97	274
13	18:00	19:00	116	68	184
14	19:00	20:00	81	33	114
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume

100%

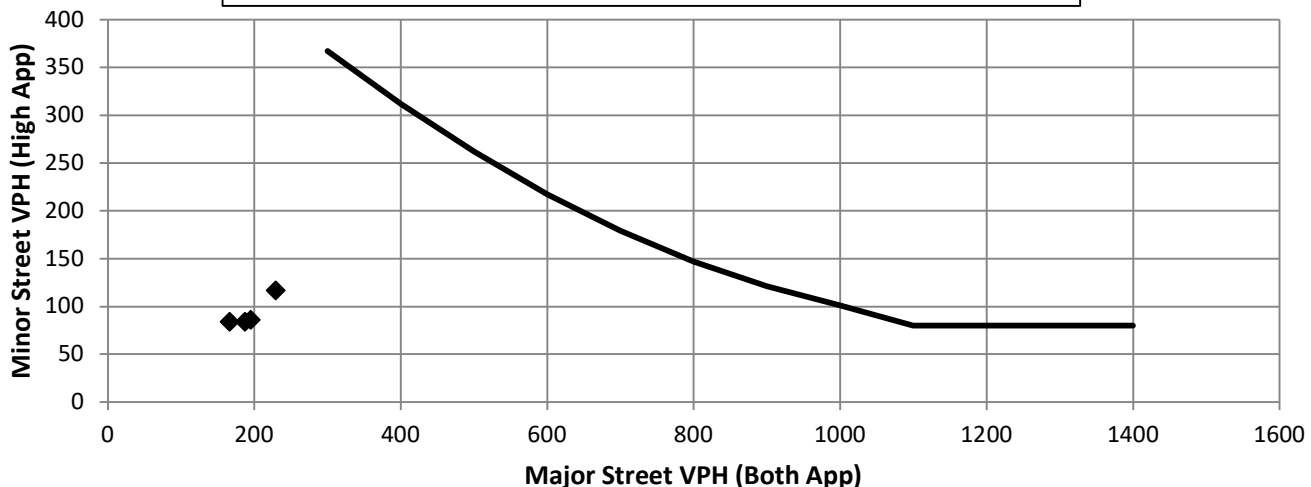
Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Hour Start	7:00	15:00	16:00	17:00
Major Road Vol.	229	195	187	166
Minor Road Vol.	117	86	84	84

Figure 4C-1 Warrant 2, Four-Hour Vehicular Volume



Warrant 3: Peak Hour Volume

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

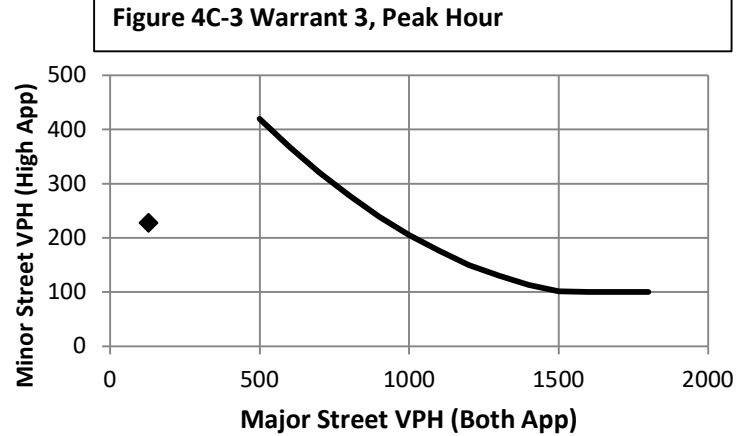
Manually Set To:

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	No
Volume on Minor Approach	100	
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
7:00	128	228



Warrant 4: Pedestrian Volume

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

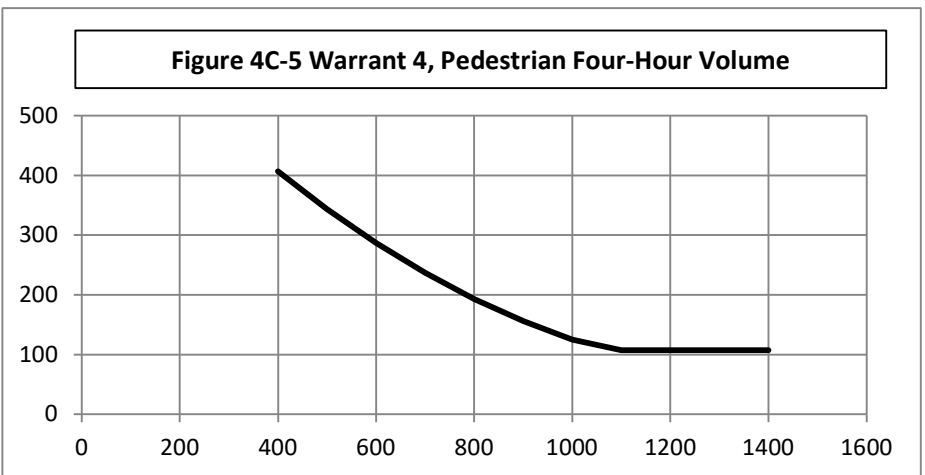
Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

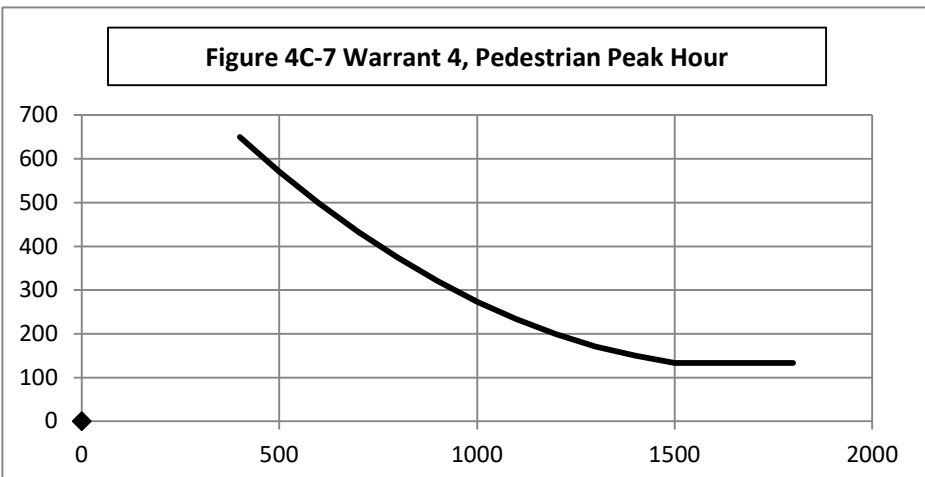
Criterion A Satisfied?



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?



Warrant 5: School Crossing

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	No
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	No
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	No

Warrant 6: Coordinated Signal System

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Fulfilled?
1	Signal spacing > 1000 ft	Yes
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	No
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	No

Warrant 7: Crash Experience

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.		
	Measures Tried:		
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months 2.5	No
3	Warrant 1, Condition A (80%)	No	Yes
	Warrant 1, Condition B (80%)	No	
	Warrant 4, Criterion A (80%)	No	
	Warrant 4, Criterion B (80%)	Yes	

Warrant 8: Roadway Network

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour	356	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		No
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)		
	Hour		
	Volume		

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic		Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To: Yes

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	7:00	128	228	76.38

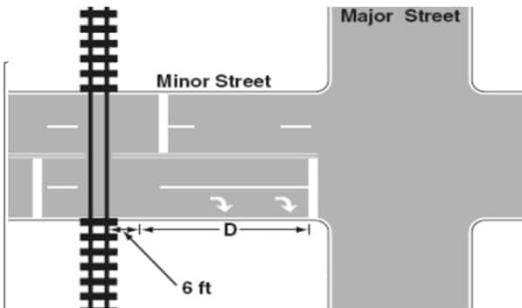
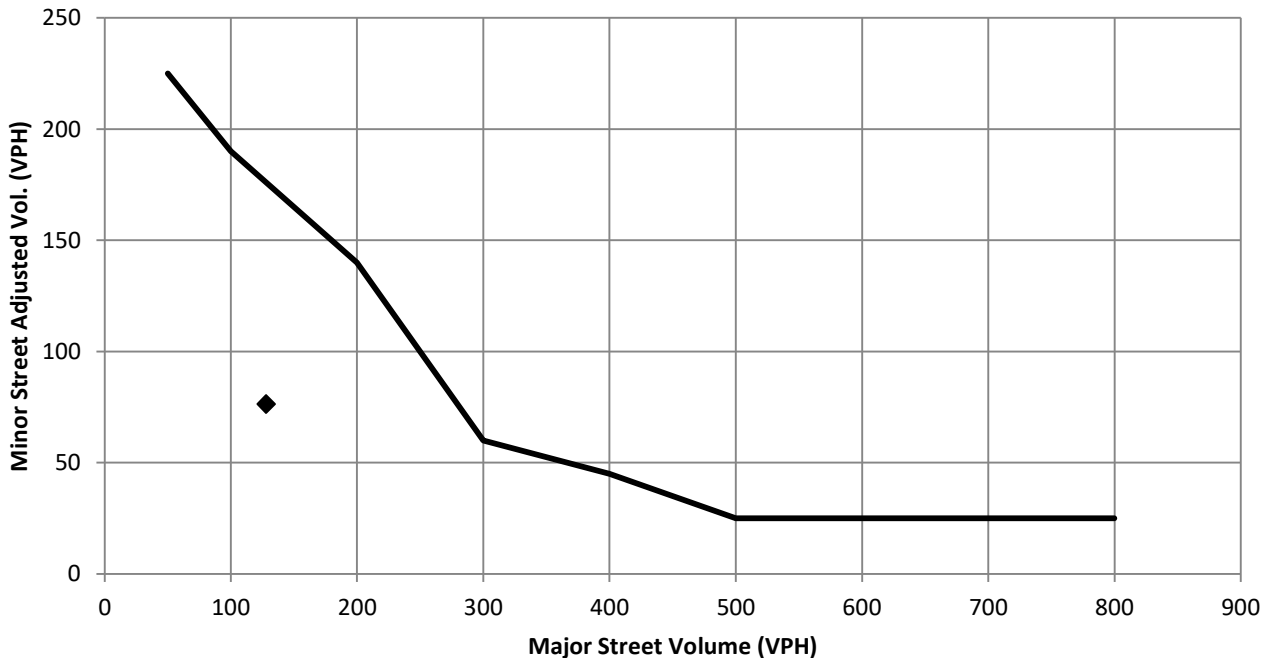


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

VILLAGE OF
McFarland
SUMMARY SHEET

MEETING DATE: Wednesday, May 29, 2024

SECTION: Business

DEPARTMENT: Public Works

CONTACT: Lee Igl, Public Works Director, Matt Schuenke, Village Administrator

AGENDA ITEM: Discussion and action to approve the addition of stop signs on Broadhead Street at Holscher Road.

PREVIOUS ACTION:

None.

ISSUE SUMMARY:

Several residents have reported near misses and driver confusion at the intersection of Broadhead Street and Holscher Road. Currently, the intersection is a two-way stop. The village hired Lee Gibbs, PE and Senior Traffic Engineer from AECOM to conduct a traffic study.

Gibbs' recommendation of a four-way stop and analysis is attached. Stop signs would be installed in both directions of Broadhead Street and would include signs indicating a four-way stop. Flags would also be installed on the new stop signs to bring attention to the change in traffic patterns at the intersection. The changes to the intersection were reviewed and recommended by Police, Fire and Rescue, Planning, and the Public Works departments.

FINANCIAL/BUDGET IMPACT:

Installation of additional signage would come from the 2024 Public Works operation budget.

VILLAGE PLAN REFERENCE:

None.

ORDINANCE REFERENCE:

None.

BOARD, COMMISSION OR COMMITTEE RECOMMENDATION:

Recommended motion:

Motion, second to approve the installation of additional stop signs in both directions of Broadhead Street at the Holscher Road intersection.

ATTACHMENTS:

1. 240401_CTH MN draft report

Intersection Control Evaluation (ICE) Study for Broadhead Street and Holscher Road

McFarland, Wisconsin

DRAFT Report

Prepared for:

Village of McFarland

Prepared by:

AECOM

March 2024

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Executive Summary

The intersection of Broadhead Street (also known as Dane County Trunk Highway MN) and Holscher Road is a four-legged intersection located on the eastern edge of the Village of McFarland. Recent development east of this intersection and the improvement of Broadhead Street to provide an urban cross-section has introduced more vehicular and non-vehicular traffic to this location. An intersection control evaluation (ICE) study of the intersection was performed in June 2020 and determined that the location should maintain its current two-way stop-control (TWSC) condition; however, this study was conducted before the roadway and land use developments occurred. Therefore, Village staff would like to review the intersection again to determine whether intersection control or intersection elements should be implemented to aid in safety and mobility at the location.

Alternatives for the Broadhead Street and Holscher Road intersection were developed based on deficiencies found in the following categories: geometric site reviews of the study area, a safety evaluation of the corridor and the study intersections, and intersection operations analysis for the existing-year and Year 2045 horizon year. A preferred alternative was selected based on an evaluation of those results.

The following describes recommendations for the Broadhead Street and Holscher Road intersection:

- It is recommended that the intersection upgrade its intersection control from two-way stop control (TWSC) to all-way stop control (AWSC)
 - The recent crash frequency at this intersection, coupled with the intersection crash analysis, indicate that intersection-related crashes are occurring at a higher rate than what is anticipated. In addition, motorists along Holscher Road will likely experience longer delays as traffic volumes increase and may start to accept smaller gaps to enter the intersection, further increasing safety risk.
 - The AWSC condition improves mobility at the intersection by making all vehicles stop before entering the intersection instead of relying on gap assessment.
 - Year 2045 traffic operations analysis indicated that mobility would improve during the weekday morning peak hour from the current TWSC condition if an AWSC condition was implemented. While the weekday afternoon peak is anticipated to experience more delay as an AWSC, all movements are projected to operate at LOS A and LOS B.
 - If an AWSC is implemented, the existing RRFB installations along Broadhead Street must be removed as they are no longer applicable since all traffic movements are required to stop at this intersection.
 - The RRFB installation can be repurposed elsewhere within the Village.
 - Additional and/or supplemental advance warning signs and at the intersection are recommended to alert all motorists of the AWSC condition.

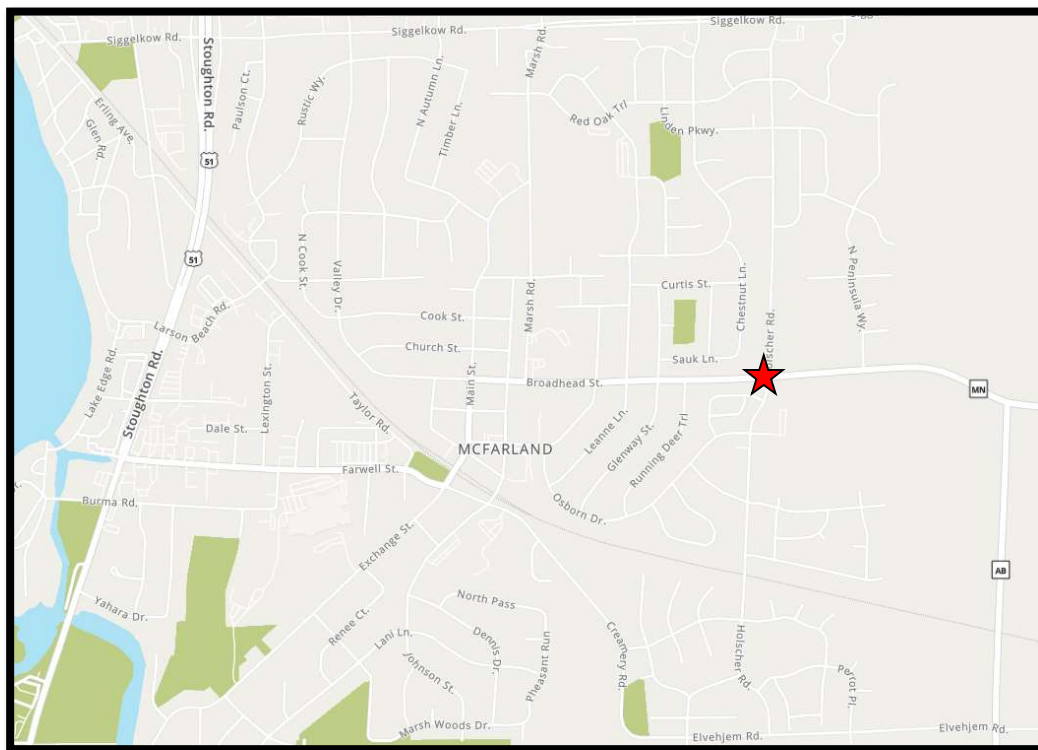
- The existing intersection turning movement counts do not meet warrants for traffic signal consideration this improvement is not recommended
 - Installing traffic signals at low-volume intersections like this can lead to noncompliance by motorists that have to wait during a red phase in which few or no other vehicles are traveling through the intersection
- The roundabout alternative is not recommended due to the right of way impacts and construction costs anticipated for this application.

1.0 Introduction

The intersection of Broadhead Street (also known as Dane County Trunk Highway MN) and Holscher Road is a four-legged intersection located on the eastern edge of the Village of McFarland. Recent development east of this intersection and the improvement of Broadhead Street to provide an urban cross-section has introduced more vehicular and non-vehicular traffic to this location. An intersection control evaluation (ICE) study of the intersection was performed in June 2020 and determined that the location should maintain its current two-way stop-control (TWSC) condition; however, this study was conducted before the roadway and land use developments occurred. Therefore, Village staff would like to review the intersection again to determine whether intersection control or intersection elements should be implemented to aid in safety and mobility at the location.

The location of the study intersection is illustrated in **Figure 1.1**.

Figure 1.1: Project Study Area



Source: Mapquest

2.0 Existing Area Conditions

2.1 Roadway Transportation System

Descriptions of major area roadways within the study area are summarized below. Roadway and intersection characteristics are illustrated in **Figure 2.1**.

Broadhead Street (County MN)

Broadhead Street is a two-lane minor arterial that serves as a primary east-west route in the Village of McFarland. At its unsignalized intersection with Holscher Road, the east and west approaches provide a shared left/through lane and an exclusive right-turn lane. On-street bike lanes are present on both sides of Broadhead Street and on-street parking is prohibited along Broadhead Street. A paved multi-use path is provided on the north side of Broadhead Street while a sidewalk is provided on the south side of the roadway. Broadhead Street has a posted speed limit of 25 miles per hour.

Holscher Road

Holscher Road is a north-south, two-lane collector roadway that serves residential neighborhoods on the eastern edge of the Village. At its unsignalized intersection with Broadhead Street, the north approach provides an exclusive left-turn lane and shared through/right-turn lane while the south approach provides a shared left/through lane and an exclusive right-turn lane. All movements from Holscher Road are under stop-sign control. On-street bike lanes are present on both sides of Holscher Road, and on-street parking is allowed along Holscher Road. Sidewalks are present on both sides of Holscher Road and has a posted speed limit of 25 miles per hour.

2.2 Area Land Uses

Land uses surrounding the location comprise primarily of single-family residential neighborhoods west of Holscher Road and the McFarland Cemetery in the northwest quadrant of the intersection. Multi-family residential neighborhoods are located in the northeast quadrant of the intersection while the southeast quadrant comprises of the McFarland Police Department and McFarland Fire and Rescue stations as well as the baseball fields for the McFarland School District.

2.3 Peak Hour Turning Movement Counts

Intersection turning movement counts from 6:00 a.m. to 8:00 p.m. were collected at the Broadhead Street and Holscher Road intersection in February 2024. The counts were collected using video-based data collection technology to capture traffic operations at each intersection. The recorded video data were reviewed and quantified into traffic counts. The morning peak hour of the study area occurred from 7:00 a.m. to 8:00 a.m. and the afternoon peak hour occurred from 4:00 p.m. to 5:00 p.m. The peak hour turning movement volumes are illustrated in **Figure 2.2** while intersection turning movement count summaries for each intersection are provided in **Appendix A**.



Existing Intersection Geometrics

Broadhead Street and Holscher Road Intersection Study

Figure 2.1



Year 2024 Intersection Peak Hour Volumes Figure 2.2
 Broadhead Street and Holscher Road Intersection Study

2.4 Historical Crash Data

Intersection-related crashes reported at the Broadhead Street and Holscher Road intersection for the past five years (Years 2019 through 2023) were collected from the Wisconsin Department of Transportation's (WisDOT) crash database. This database serves as a clearinghouse for all reported crashes that occurred in the State of Wisconsin. From this inquiry, five reported crashes occurred at this intersection in the past five years. A detailed breakdown of these crashes is provided below:

- Crash severity
 - 4 crashes were property damage only
 - 1 crash resulted in a possible injury (i.e., C-type injury crash)
- Crash type
 - 3 crashes were angle crashes
 - 2 crashes were single-vehicle crashes
 - Both single-vehicle crashes involved a vehicle striking a signpost
- Crash date
 - 3 crashes occurred in Year 2022
 - 2 crashes occurred in Year 2023
- Time of crash
 - 2 crashes occurred during the morning time period (6am hour and 8am hour)
 - 1 crash occurred during the midday time period (12pm hour)
 - 2 crashes occurred during the afternoon time period (4pm hour and 5pm hour)
- Driver age
 - 2 crashes identified a driver that was 16-19 years old (i.e., teenage driver)
 - Both teenage driver identified crashes were angle crashes
 - 1 crash identified a driver over 65 years old

An intersection crash rate was developed to determine the crash risk exposure by motorists through the intersection. As a rule-of-thumb, locations with intersection crash rates above 1.00 crashes per million entering vehicles (MEV) indicate further investigation may be necessary to address safety issues. For the Broadhead Street and Holscher Road intersection, an intersection crash rate of 0.60 crashes per million entering vehicles (MEV) was determined. It should be noted, though, that crash rate determination typically uses a minimum of five years of crash data to identify a longer-term trend and not short-term spikes or fluctuations in crash frequency. As noted above, all five crashes occurred over the most recent two years; if the intersection crash rate was calculated for a two-year time period, it would be 1.50 crashes per MEV. This value is significant and would merit further investigation.

In addition, the intersection was evaluated using the Interactive Highway Design Safety Model (IHSDM) software to determine the number of crashes anticipated, or "predicted", at this location. This method uses intersection elements such as traffic volumes, intersection control, and intersection geometrics, and inputs them in an equation that predicts crash statistics of locations with similar characteristics. The IHSDM method does not take previous crash history into consideration which avoids short-term fluctuations in crash frequency. The results of the IHSDM evaluation (provided in **Appendix B**) determined a predicted crash frequency of 0.36 crashes per year, which is significantly lower than the observed crash frequency at this intersection. This would indicate that further investigation of this location for potential safety improvements is warranted.

3.0 Site Review

A site review of the Broadhead Street and Holscher Road intersection was performed to understand roadway characteristics, roadway and intersection geometrics, and motorist/non-motorist behavior. The results of this site review are described below.

The Broadhead Street and Holscher Road intersection is a standard, four-legged intersection. Broadhead Street is the “major” street and Holscher Road is the “minor” street; all movements from Holscher Road are under stop-sign control. Raised, six-foot medians are provided on all intersection approaches to separate the travel lanes. Double stop signs are present on the Holscher Road approaches. Crosswalks and on-street bicycle lanes are provided on all intersection approaches for multimodal travel. Both approaches of Broadhead Street have multiple pedestrian crossing signs, including overhead cantilever applications and rapid rectangular flashing beacons (RRFBs). Overhead lighting is provided in the southeast quadrant of the intersection.

Motorist and bicycle/pedestrian behaviors were observed at the intersection via a site review and data collection video review to understand how motorists and other users travel through the intersection. Many observations were made of motorists on the Holscher Road approaches performing a “rolling” stop at the intersection instead of coming to a full stop before proceeding into the intersection. There were no observations of vehicles completely disregarding the stop signs and entering the intersection at their travel speed. Many observations were also made of motorists on the Holscher Road approaches stopping past the marked stop bar to check for approaching vehicles on Broadhead Street. This condition may be due to the long distance between the stop bar and the crosswalk. The distance between the stop bar and the crosswalk was measured at approximately 16 feet on the Holscher Road north leg and approximately 10 feet on the south leg (for reference, WisDOT cites a minimum of 4 feet distance from stop bar to crosswalk). The rationale for this driver behavior may be due to motorists feeling the need to stop close to the physical intersection so they can begin their turning movement into the intersection quickly. In addition, moving closer to the sidewalk allows motorists to clear the nose of the raised median immediately, further decreasing their time to enter and travel through the intersection.

The images below show motorists on Holscher Road stopping past the stop bar.



Broadhead and Holscher intersection, looking northwest – note the white vehicle stopped past the stop bar



Broadhead and Holscher intersection, looking northwest – note the white vehicle stopped past the stop bar

4.0 Traffic Operations Analysis

To determine how traffic operates under existing conditions, an operational analysis was conducted for intersections identified in Section 2.4 using methodologies published in the *Highway Capacity Manual* (HCM). The HCM module in the traffic operations software package, Synchro11, was used to document the results of the traffic operations analysis. Operational analysis results identify a Level of Service (LOS), which is intended to depict the quality of traffic flow through an intersection. Signalized and unsignalized intersections are given a ranking from LOS A through LOS F as a function of the average control delay as presented in **Table 4.1** for signalized intersections and **Table 4.2** for unsignalized and roundabout intersections. For two-lane arterials such as CTH A, the minimum acceptable LOS for the intersection itself, as well as for a lane group, is LOS D.

Table 4.1 Level of Service (LOS) Criteria, Signalized Intersections

LOS Designation	Average Control Delay/Vehicle (seconds)	Description
A	≤ 10.0	Very low vehicle delays, free flow, signal progression extremely favorable, most vehicles arrive during given signal phase.
B	10.1 to 20.0	Good signal progression, more vehicles stop and experience higher delays than for LOS A.
C	20.1 to 35.0	Stable flow, fair signal progression, significant number of vehicles stop at signals.
D	35.1 to 55.0	Congestion noticeable, longer delays and unfavorable signal progression, many vehicles stop at signals.
E	55.1 to 80.0	Limit of acceptable delay, unstable flow, poor signal progression, traffic near roadway capacity, frequent cycle failures.
F	> 80.0	Unacceptable delays, extremely unstable flow and congestion, traffic exceeds roadway capacity, stop-and-go conditions

Table 4.2: Level of Service (LOS) Criteria, Unsignalized Intersections

LOS Designation		Average Control Delay/Vehicle (seconds)	Description
A		≤ 10.0	No delays at intersections with continuous flow of traffic. Uncongested operations: high frequency of long gaps available for all left and right turning traffic. No observable queues.
B		10.1 to 15.0	Same as LOS A
C		15.1 to 25.0	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches.
D		25.1 to 35.0	Increased probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. No standing long lines formed.
E		35.1 to 50.0	Heavy traffic flow condition. Heavy delays probable. No available gaps for cross-street traffic or main street turning traffic. Limited stable traffic flow.
F		> 50.0	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. Total breakdown.

SOURCE: *Highway Capacity Manual, Version 6.0*, Transportation Research Board, 2016.

4.1 Existing Conditions

To determine how traffic currently operates in the study area, an operational analysis was conducted for the weekday morning and afternoon peak hours at the key intersections. Existing geometrics, traffic controls, and peak hour traffic volumes for the key intersections are shown in **Figures 2.1 and 2.2**. Level of service and queueing results for each turning movement at the analyzed intersections are shown in **Table 4.3** for the weekday AM and weekday PM peak hours. The traffic operations output files are in **Appendix C**.

Table 4.3: Traffic Operations Analysis, Existing Conditions

Intersection	Overall		By Approach	Eastbound			Westbound			Northbound			Southbound		
	Delay (s)	LOS		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Broadhead Street & Holscher Road, Weekday AM Peak Hour	7.3	A	Lane Configuration	-	<1	1	-	<1	1	-	<1	1	1	1>	-
			Volume	30	70	25	15	115	20	40	80	20	5	45	40
			Delay (s)	-	7.7	-	-	7.5	-	-	17.0	8.9	14.5	12.2	-
			LOS	-	A	-	-	A	-	-	C	A	B	B	-
			V/C Ratio	-	0.03	-	-	0.01	-	-	0.36	0.03	0.02	0.19	-
			95% Queue (ft)	-	5	-	-	5	-	-	40	5	5	20	-
Broadhead Street & Holscher Road, Weekday PM Peak Hour	5.5	A	Lane Configuration	-	<1	1	-	<1	1	-	<1	1	1	1>	-
			Volume	55	90	30	10	60	10	20	40	10	10	40	30
			Delay (s)	-	7.5	-	-	7.6	-	-	12.7	8.9	12.1	11.1	-
			LOS	-	A	-	-	A	-	-	B	A	B	B	-
			V/C Ratio	-	0.04	-	-	0.01	-	-	0.12	0.01	0.02	0.12	-
			95% Queue (ft)	-	5	-	-	5	-	-	10	5	5	10	-

The results of the existing-year traffic operations analysis indicate that all intersections currently operate at adequate levels of service (LOS C or better) during peak traffic periods.

4.2 Year 2045 Conditions

To determine if the Broadhead Street and Holscher Road intersection will accommodate Year 2045 traffic volumes, a peak hour operations analysis was conducted that evaluated the existing intersection geometry, lane configuration, and control with forecasted Year 2045 peak hour volumes. Year 2045 traffic volumes were projected by increasing Year 2024 intersection turning movement counts collected for this study were increased by three percent per year for 21 years (63 percent total) to reflect local and regional growth not specifically cited in this study. The growth rate was determined by reviewing WisDOT-collected historical daily traffic volumes along roadways on the east side of McFarland, such as Broadhead Street, Holscher Road, CTH AB, CTH MN, and Siggelkow Road, and averaging the annual growth rate for each location.

Analysis outputs are illustrated in **Table 4.4** for the Year 2045 weekday morning and afternoon peak traffic periods. Traffic operations output files for this scenario are provided in **Appendix D**. The Year 2045 peak-hour intersection turning movement counts are illustrated in **Figure 4.1**.



Year 2045 Intersection Peak Hour Volumes Figure 4.1
 Broadhead Street and Holscher Road Intersection Study

Table 4.4: Traffic Operations Analysis, Year 2045 No-Build Conditions

Intersection	Overall		By Approach	Eastbound			Westbound			Northbound			Southbound		
	Delay (s)	LOS		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Broadhead Street & Holscher Road, Year 2045, Weekday AM Peak Hour	26.5	D	Lane Configuration	-	<1	1	-	<1	1	-	<1	1	1	1>	-
			Volume	50	115	40	25	185	35	65	130	35	10	75	70
			Delay (s)	-	8.1	-	-	7.7	-	-	93.1	9.3	29.6	19.0	-
			LOS	-	A	-	-	A	-	-	F	A	D	C	-
			V/C Ratio	-	0.06	-	-	0.03	-	-	0.99	0.06	0.09	0.44	-
			95% Queue (ft)	-	5	-	-	5	-	-	250	5	10	55	-
Broadhead Street & Holscher Road, Year 2045, Weekday PM Peak Hour	7.1	A	Lane Configuration	-	<1	1	-	<1	1	-	<1	1	1	1>	-
			Volume	90	145	50	15	100	15	35	65	15	15	65	50
			Delay (s)	-	7.7	-	-	7.5	-	-	18.8	9.3	16.4	14.2	-
			LOS	-	A	-	-	A	-	-	C	A	C	B	-
			V/C Ratio	-	0.07	-	-	0.01	-	-	0.30	0.02	0.05	0.24	-
			95% Queue (ft)	-	5	-	-	5	-	-	30	5	5	25	-

The results of the traffic operations analysis indicate that the Holscher Road approaches are anticipated to operate poorly during the weekday morning peak-hour when traffic volumes are projected to Year 2045 conditions. This is due to the existing intersection control (two-way stop-control) and the potential inability of vehicles along Holscher Road to find adequate gaps in the Broadhead Street traffic stream to enter the intersection. It should be noted that this is anticipated during the Year 2045 weekday morning peak hour but not during the weekday afternoon peak hour. This condition suggests that intersection geometrics and/or intersection control updates are necessary to mitigate these operations.

5.0 Alternatives Evaluation

Chapter 2 discussed the results of a review of observed crashes at the intersection of Broadhead Street and Holscher Road. Chapter 3 highlighted a site review of the study intersection, noting potential deficiencies that may increase crash risk. Chapter 4 indicated that the intersection is anticipated to experience operational deficiencies during the weekday morning peak traffic period. Therefore, alternatives were developed that address these issues while maintaining favorable safety, mobility, access, and multimodal accommodations. These alternatives, and their evaluation, are provided below.

5.1 Intersection Control Improvements

Alternative 1: Upgrade from two-way stop control to all-way stop control

This alternative would convert the existing two-way stop-control intersection to an all-way stop-control. All movements from all approaches would be under stop-sign control before entering the intersection. No other geometric changes from the no-build condition were assumed for this alternative.

Advantages	Disadvantages
• All-way stop condition allows Holscher Road approaches the ability to enter the intersection as a protected movement • Minimal construction costs to implement • No roadway cross-section changes or right of way needed to implement	• Increased delay along Broadhead Street approaches as all vehicles must stop • Potential increase in rear-end crashes along Broadhead Street approaches as traffic must now stop • RRFBs along Broadhead Street would no longer be needed

Alternative 2: Upgrade from two-way stop control to traffic signal control

This alternative would convert the existing two-way stop-control intersection to a traffic signal. Each intersection approach would be configured to provide an exclusive left-turn lane and a shared through/right-turn lane to accommodate the Year 2045 forecasted traffic volumes.

Advantages	Disadvantages
• Mobility for Holscher Road approaches is improved due to dedicated green time to enter intersection • Traffic signal can provide dedicated green time to bicyclists and pedestrians • Minimal right of way needed to implement	• Safety and mobility for Broadhead Street approaches may be reduced as free-flow movements must stop during red phase • Negative left-turn lane offset increases left-turn crash risk • Higher construction costs to implement as well as higher annual costs for operations and maintenance

Alternative 3: Upgrade from two-way stop control to roundabout control

This alternative would convert the existing two-way stop-control intersection to a roundabout. The roundabout would have single-lane approaches on all approach legs. Raised splitter islands would separate the travel lanes on each approach and a mountable truck apron would be present to accommodate truck movements.

Advantages	Disadvantages
• Mobility for Holscher Road approaches is improved due to yield control • Overall safety is improved due to elimination of angle and head-on crashes • Travel speeds through roundabout is decreased due to roundabout design • Splitter islands provide two-stage crossing for bicyclists and pedestrians	• Significant construction costs to implement • Possible right of way needed for construction

Year 2045 weekday morning and afternoon peak-hour traffic operations analysis was performed for each of the three intersection control alternatives and the results are provided below:

Intersection	Overall		By Approach	Eastbound			Westbound			Northbound			Southbound		
	Delay (s)	LOS		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Broadhead Street & Holscher Road, Year 2045, Weekday AM Peak Hour, AWSC	16.0	C	Lane Configuration	-	<1	1	-	<1	1	-	<1	1	1	1>	-
			Volume	50	115	40	25	185	35	65	130	35	10	75	70
			Delay (s)	-	16.1	9.8	-	18.6	9.6	-	18.3	9.7	10.8	14.2	-
			LOS	-	C	A	-	C	A	-	C	A	B	B	-
			V/C Ratio	-	0.46	0.10	-	0.57	0.09	-	0.54	0.09	0.03	0.39	-
			95% Queue (ft)	-	60	10	-	90	10	-	80	10	5	45	-
Broadhead Street & Holscher Road, Year 2045, Weekday PM Peak Hour, AWSC	10.6	B	Lane Configuration	-	<1	1	-	<1	1	-	<1	1	1	1>	-
			Volume	90	145	50	15	100	15	35	65	15	15	65	50
			Delay (s)	-	12.3	7.9	-	10.1	7.9	-	10.4	8.2	9.4	9.8	-
			LOS	-	B	A	-	B	A	-	B	A	A	A	-
			V/C Ratio	-	0.41	0.07	-	0.21	0.02	-	0.19	0.02	0.03	0.20	-
			95% Queue (ft)	-	50	5	-	20	5	-	20	5	5	20	-
Broadhead Street & Holscher Road, Year 2045, Weekday AM Peak Hour, Signal	7.9	A	Lane Configuration	1	1>	-	1	1>	-	1	1>	-	1	1>	-
			Volume	50	115	40	25	185	35	65	130	35	10	75	70
			Delay (s)	9.4	7.1	-	8.0	7.8	-	9.3	7.9	-	8.7	7.8	-
			LOS	A	A	-	A	A	-	A	A	-	A	A	-
			V/C Ratio	0.15	0.38	-	0.07	0.52	-	0.18	0.44	-	0.03	0.41	-
			95% Queue (ft)	15	30	-	5	45	-	15	35	-	5	30	-
Broadhead Street & Holscher Road, Year 2045, Weekday PM Peak Hour, Signal	6.1	A	Lane Configuration	1	1>	-	1	1>	-	1	1>	-	1	1>	-
			Volume	90	145	50	15	100	15	35	65	15	15	65	50
			Delay (s)	5.8	5.6	-	6.0	5.0	-	7.6	6.9	-	7.0	7.4	-
			LOS	A	A	-	A	A	-	A	A	-	A	A	-
			V/C Ratio	0.15	0.39	-	0.03	0.23	-	0.07	0.24	-	0.03	0.36	-
			95% Queue (ft)	10	15	-	5	10	-	5	10	-	5	15	-
Broadhead Street & Holscher Road, Year 2045, Weekday AM Peak Hour, RAB	6.3	A	Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
			Volume	50	115	40	25	185	35	65	130	35	10	75	70
			Delay (s)	-	5.3	-	-	7.2	-	-	6.2	-	-	6.1	-
			LOS	-	A	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.24	-	-	0.34	-	-	0.30	-	-	0.23	-
			95% Queue (ft)	-	25	-	-	50	-	-	25	-	-	25	-
Broadhead Street & Holscher Road, Year 2045, Weekday PM Peak Hour, RAB	4.7	A	Lane Configuration	-	<1>	-	-	<1>	-	-	<1>	-	-	<1>	-
			Volume	90	145	50	15	100	15	35	65	15	15	65	50
			Delay (s)	-	5.1	-	-	4.5	-	-	4.5	-	-	4.1	-
			LOS	-	A	-	-	A	-	-	A	-	-	A	-
			V/C Ratio	-	0.25	-	-	0.13	-	-	0.12	-	-	0.12	-
			95% Queue (ft)	-	25	-	-	25	-	-	25	-	-	25	-

The analysis indicated that all alternatives are anticipated to provide adequate traffic operations to motorists traveling through the intersection. Therefore, from a mobility standpoint, all three alternatives are viable options.

5.2 Intersection Control Warrant Analysis

While intersection control improvements such as AWSC and traffic signals can be installed by an agency as policy, it is sound engineering practice to investigate whether the need of applying these devices is valid. The Manual of Uniform Traffic Control Devices (MUTCD) outlines several warrants that should be evaluated when AWSC and traffic signals are considered at a location. These warrants investigate elements such as traffic operations, traffic safety, and proximity to significant features. A warrant analysis for AWSC and traffic signals was performed at this intersection.

All-way stop-control (AWSC) warrant analysis

Crash experience. Per Section 2B.13 of the MUTCD, AWSC may be installed at an intersection where there are five or more reported crashes in a 12-month periods or six or more crashes in a 36-month period that were a crash type that can be corrected by an AWSC condition. The intersection experienced five crashes within the past 24 months and two of the five crashes were single-vehicle run-off-the-road crashes that are not corrected by an AWSC condition. Therefore, this warrant is not met.

Sight distance. Per Section 2B.14 of the MUTCD, AWSC may be installed at an intersection where the sight distance on the minor street approaches (in this case, Holscher Road) is not adequate to see approaching traffic. WisDOT Facilities Development Manual (FDM) Chapter 11-10-5.1.4 discusses intersection sight distance (ISD) criteria for this analysis. For Broadhead Street, the minimum ISD of intersecting approaches is 335 feet. A site review of the intersection indicated that the minimum ISD is achieved for both Holscher Road approaches. Therefore, this warrant is not met.

Transition to traffic signal or roundabout. Per Section 2B.15 of the MUTCD, AWSC may be installed at an intersection where AWSC is used as an interim measure to transition the intersection to a traffic signal or roundabout. This intersection is not currently committed for neither a traffic signal nor a roundabout, so this warrant is not met.

Minimum traffic volumes. Per Section 2B.16 of the MUTCD, AWSC may be installed at an intersection where the combined vehicle, bicycle, and pedestrian volume entering an intersection from the major-street (Broadhead Street) is at least 300 units per hours for 8 hours and 200 units along the minor-street (Holscher Road) for the same 8 hours. A review of the intersection turning movement data indicated that these volume requirements were not met for any of the observed hours. Therefore, this warrant is not met.

Other factors. Per Section 2B.17 of the MUTCD, AWSC may be installed at an intersection based on other factors, such as left-turn conflicts, similar roadway characteristics, and pedestrian / bicycle movements. The current intersection design promotes these factors and are not substandard. Therefore, this warrant is not met.

Traffic signal warrant analysis

A worksheet that highlights the results of a traffic signal warrant analysis for Warrants 1 through 4 for this intersection can be found in **Appendix E**.

Warrant 1, Eight-hour volume. Volumes met 0 of 8 hours; this warrant is not met.

Warrant 2, Four-hour volume. Volumes met 0 of 4 hours; this warrant is not met.

Warrant 3, Peak-hour volume. Volumes did not meet minimum volumes; this warrant is not met.

Warrant 4, Pedestrian volume. Volumes did not meet minimum volumes; this warrant is not met.

Warrant 5, School crossing. Not applicable as the intersection is not located near a school.

Warrant 6, Coordinated signal system. Not applicable as the intersection is not within a coordinated signal system.

Warrant 7, Crash experience. Per Section 4C.08 of the MUTCD, a traffic signal may be installed at an intersection where there are five or more reported crashes in a 12-month periods or six or more crashes in a 36-month period that were a crash type that can be corrected by a traffic signal condition. The intersection experienced five crashes within the past 24 months and two of the five crashes were single-vehicle run-off-the-road crashes that are not corrected by a traffic signal condition. Therefore, this warrant is not met.

Warrant 8, Roadway network. Not applicable as Broadhead Street is not identified as a principal arterial roadway.

Warrant 9, Railroad crossing. Not applicable as the intersection is not located near a railroad crossing.

6.0 Recommendations

Alternatives for the Broadhead Street and Holscher Road intersection were developed based on deficiencies found in the following categories: geometric site reviews of the study area, a safety evaluation of the corridor and the study intersections, and intersection operations analysis for the existing-year and Year 2045 horizon year. A preferred alternative was selected based on an evaluation of those results.

The following describes recommendations for the Broadhead Street and Holscher Road intersection:

- It is recommended that the intersection upgrade its intersection control from two-way stop control (TWSC) to all-way stop control (AWSC)
 - The recent crash frequency at this intersection, coupled with the intersection crash analysis, indicate that intersection-related crashes are occurring at a higher rate than what is anticipated. In addition, motorists along Holscher Road will likely experience longer delays as traffic volumes increase and may start to accept smaller gaps to enter the intersection, further increasing safety risk.
 - The AWSC condition improves mobility at the intersection by making all vehicles stop before entering the intersection instead of relying on gap assessment.
 - Year 2045 traffic operations analysis indicated that mobility would improve during the weekday morning peak hour from the current TWSC condition if an AWSC condition was implemented. While the weekday afternoon peak is anticipated to experience more delay as an AWSC, all movements are projected to operate at LOS A and LOS B.
 - If an AWSC is implemented, the existing RRFB installations along Broadhead Street must be removed as they are no longer applicable since all traffic movements are required to stop at this intersection.
 - The RRFB installation can be repurposed elsewhere within the Village.
 - Additional and/or supplemental advance warning signs and at the intersection are recommended to alert all motorists of the AWSC condition.
- The existing intersection turning movement counts do not meet warrants for traffic signal consideration this improvement is not recommended
 - Installing traffic signals at low-volume intersections like this can lead to noncompliance by motorists that have to wait during a red phase in which few or no other vehicles are traveling through the intersection
- The roundabout alternative is not recommended due to the right of way impacts and construction costs anticipated for this application.

Appendix

Appendix A: Intersection Turning Movement Counts

Appendix B: IHSDM Output Worksheets

Appendix C: Existing-Year (Year 2022) Traffic Operations Analysis Worksheets

Appendix D: Future-Year (Year 2022) Traffic Operations Analysis Worksheets

Appendix E: Traffic Signal Warrant Worksheets

Appendix A: Intersection Turning Movement Counts

Intersection Traffic Volume Report

Count Basics			Page 3 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

Peak Hour Volume Summary

Holscher Road and CTH MN



Peak Hour Volumes, Truck Percentages, and PHFs

Wednesday, January 31, 2024		From North					From East					From South					From West						
AM Peak Hour	AM Peak Hour	Holscher Road					CTH MN					Holscher Road					CTH MN						
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Totals	
	7:15 AM	16	6	3	0	25	0	31	4	0	35	7	15	7	0	29	3	10	4	0	17	106	
	7:30 AM	13	17	0	0	30	7	41	12	0	60	7	32	15	0	54	7	16	7	0	30	174	
	7:45 AM	9	17	3	0	29	1	30	2	0	33	4	17	14	0	35	9	24	12	0	45	142	
	8:00 AM	3	5	1	0	9	6	14	1	0	21	2	17	2	0	21	6	19	6	0	31	82	
	Peak Hour Volume	41	45	7	0	93	14	116	19	0	149	20	81	38	0	139	25	69	29	0	123	504	
	Rounded Hourly Volume	40	45	5	0	90	15	115	20	0	150	20	80	40	0	140	25	70	30	0	125	505	
	% Single Unit Trucks	7.3	0.0	0.0	0.0	3.2	0.0	0.9	0.0	0.0	0.7	0.0	1.2	0.0	0.0	0.7	0.0	1.4	3.4	0.0	1.6	1.4	
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
% Trucks (Total)	7.3	0.0	0.0	0.0	3.2	0.0	0.9	0.0	0.0	0.7	0.0	1.2	0.0	0.0	0.7	0.0	1.4	3.4	0.0	1.6	1.4		
Peak Hour Factor (PHF)	0.64	0.66	0.58	0.00	0.77	0.50	0.71	0.40	0.00	0.62	0.71	0.63	0.63	0.00	0.64	0.69	0.72	0.60	0.00	0.68	0.72		

Wednesday, January 31, 2024		↓ From North					← From East					↑ From South					→ From West					Totals
Midday (MD) Peak Hour	MD Peak Hour	Holscher Road					CTH MN					Holscher Road					CTH MN					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	12:00 PM	1	2	3	0	6	4	16	4	0	24	2	6	1	0	9	5	7	2	0	14	53
	12:15 PM	3	7	5	0	15	1	13	2	0	16	4	2	5	0	11	5	14	6	0	25	67
	12:30 PM	2	2	0	0	4	3	13	1	0	17	2	9	1	0	12	4	10	8	0	22	55
	12:45 PM	2	6	5	0	13	5	10	2	0	17	1	4	4	0	9	6	18	2	0	26	65
	Peak Hour Volume	8	17	13	0	38	13	52	9	0	74	9	21	11	0	41	20	49	18	0	87	240
	Rounded Hourly Volume	10	15	15	0	40	15	50	10	0	75	10	20	10	0	40	20	50	20	0	90	245
	% Single Unit Trucks	0.0	0.0	7.7	0.0	2.6	7.7	3.8	11.1	0.0	5.4	11.1	0.0	54.5	0.0	17.1	35.0	0.0	0.0	0.0	8.0	7.9
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Trucks (Total)	0.0	0.0	7.7	0.0	2.6	7.7	3.8	11.1	0.0	5.4	11.1	0.0	54.5	0.0	17.1	35.0	0.0	0.0	0.0	8.0	7.9	
Peak Hour Factor (PHF)	0.67	0.61	0.65	0.00	0.63	0.65	0.81	0.56	0.00	0.77	0.56	0.58	0.55	0.00	0.85	0.83	0.68	0.56	0.00	0.84	0.90	

Wednesday, January 31, 2024		↓ From North					← From East					↑ From South					→ From West					Totals
PM Peak Hour	PM Peak Hour	Holscher Road					CTH MN					Holscher Road					CTH MN					
	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	3:15 PM	10	9	3	0	22	6	14	2	0	22	2	7	6	0	15	12	29	8	0	49	
	3:30 PM	6	15	5	0	26	1	12	2	0	15	2	10	7	0	19	4	23	25	0	52	
	3:45 PM	3	7	2	0	12	4	24	2	0	30	2	9	5	0	16	7	17	14	0	38	
	4:00 PM	9	11	2	0	22	0	10	6	0	16	3	12	1	0	16	7	22	8	0	37	
	Peak Hour Volume	28	42	12	0	82	11	60	12	0	83	9	38	19	0	66	30	91	55	0	176	
	Rounded Hourly Volume	30	40	10	0	80	10	60	10	0	80	10	40	20	0	70	30	90	55	0	175	
	% Single Unit Trucks	0.0	0.0	0.0	0.0	0.0	0.0	5.0	8.3	0.0	4.8	11.1	0.0	0.0	0.0	1.5	0.0	0.0	1.8	0.0	0.6	
% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
% Trucks (Total)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	8.3	0.0	4.8	11.1	0.0	0.0	1.5	0.0	0.0	1.8	0.0	0.6		
Peak Hour Factor (PHF)	0.70	0.70	0.60	0.00	0.79	0.46	0.62	0.50	0.00	0.69	0.75	0.79	0.68	0.00	0.87	0.62	0.78	0.55	0.00	0.85		

Peak Hour Pedestrian and Bicyclist Volumes

Pedestrians and Bicyclists		Crossing 			Crossing 			Crossing 			Crossing 			Total Ped & Bike Volume
		North Approach			East Approach			South Approach			West Approach			
		Holscher Road			CTH MN			Holscher Road			CTH MN			
15-Minute Start Time		Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	
AM	7:15 AM	1	0	1	0	0	0	0	0	0	0	0	0	1
	7:30 AM	0	0	0	0	0	0	1	0	1	0	0	0	1
	7:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	1
	8:00 AM	0	0	0	0	0	0	0	0	0	2	0	2	2
	Total	1	0	1	0	0	0	1	0	1	3	0	3	5
MD	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	12:45 PM	2	0	2	1	0	1	0	0	0	0	0	0	3
	Total	2	0	2	1	0	1	0	0	0	1	0	1	4
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	1	0	1	1	0	1	0	0	0	3	0	3	5
	3:45 PM	2	0	2	1	0	1	0	0	0	0	0	0	3
	4:00 PM	1	0	1	1	0	1	0	0	0	2	0	2	4
	Total	4	0	4	3	0	3	0	0	0	5	0	5	12

Intersection Traffic Volume Report

Count Basics			Page 5 of 11	
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session	
Total Number of Hours Counted:	14	Non-Holiday	No Special Events	

15-Minute Motor Vehicle Data

Holscher Road and CTH MN



15-Minute Motor Vehicle Data

15-Minute Time Period Start Time	↓ From North					← From East					↑ From South					→ From West					15-Min Totals	Hourly Sum	PHF	
	Holscher Road					CTH MN					Holscher Road					CTH MN								
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total				
AM Peak Period	6:00 AM	0	1	1	0	2	1	1	0	0	2	3	6	0	0	9	1	0	1	0	2	15	108	0.57
	6:15 AM	1	1	0	0	2	1	5	0	0	6	3	7	3	0	13	0	3	3	0	6	27	159	0.60
	6:30 AM	1	0	2	0	3	3	1	0	0	4	2	4	1	0	7	0	5	0	0	5	19	238	0.56
	6:45 AM	2	4	2	0	8	4	6	1	0	11	4	9	4	0	17	2	7	2	0	11	47	393	0.56
	7:00 AM	3	2	1	0	6	1	18	2	0	21	5	14	3	0	22	1	13	3	0	17	66	488	0.70
	7:15 AM	16	6	3	0	25	0	31	4	0	35	7	15	7	0	29	3	10	4	0	17	106	504	0.72
	7:30 AM	13	17	0	0	30	7	41	12	0	60	7	32	15	0	54	7	16	7	0	30	174	450	0.65
	7:45 AM	9	17	3	0	29	1	30	2	0	33	4	17	14	0	35	9	24	12	0	45	142	334	0.59
	8:00 AM	3	5	1	0	9	6	14	1	0	21	2	17	2	0	21	6	19	6	0	31	82	241	0.73
	8:15 AM	1	3	3	0	7	2	5	0	0	7	3	15	6	0	24	3	8	3	0	14	52	198	0.85
	8:30 AM	3	2	3	0	8	2	15	2	0	19	3	14	3	0	20	0	8	3	0	11	58	180	0.78
	8:45 AM	2	2	0	0	4	2	14	3	0	19	2	7	4	0	13	1	10	2	0	13	49	166	0.85
	9:00 AM	0	3	2	0	5	2	5	2	0	9	0	7	3	0	10	3	9	3	0	15	39	169	0.81
	9:15 AM	1	3	3	0	7	4	7	1	0	12	3	4	2	0	9	2	4	0	0	6	34	188	0.81
	9:30 AM	5	3	0	0	8	0	9	0	0	9	2	11	3	0	16	3	5	3	0	11	44	202	0.87
	9:45 AM	2	7	2	0	11	2	13	1	0	16	2	11	3	0	16	3	6	0	0	9	52	204	0.88
Midday Peak Period	10:00 AM	2	5	4	0	11	3	12	0	0	15	0	13	2	0	15	4	11	2	0	17	58	203	0.88
	10:15 AM	3	8	1	0	12	1	9	0	0	10	0	11	3	0	14	2	10	0	0	12	48	195	0.96
	10:30 AM	1	3	1	0	5	0	14	1	0	15	1	3	5	0	9	6	11	0	0	17	46	196	0.96
	10:45 AM	3	3	2	0	8	2	13	1	0	16	0	6	5	0	11	5	9	2	0	16	51	215	0.83
	11:00 AM	1	7	1	0	9	0	9	0	0	9	3	4	5	0	12	4	11	5	0	20	50	215	0.83
	11:15 AM	5	8	0	0	13	3	9	2	0	14	1	4	4	0	9	5	5	3	0	13	49	218	0.84
	11:30 AM	4	4	3	0	11	0	10	1	0	11	2	11	4	0	17	4	17	5	0	26	65	236	0.88
	11:45 AM	2	3	2	0	7	1	17	0	0	18	3	2	5	0	10	6	8	2	0	16	51	226	0.84
	12:00 PM	1	2	3	0	6	4	16	4	0	24	2	6	1	0	9	5	7	2	0	14	53	240	0.90
	12:15 PM	3	7	5	0	15	1	13	2	0	16	4	2	5	0	11	5	14	6	0	25	67	235	0.88
	12:30 PM	2	2	0	0	4	3	13	1	0	17	2	9	1	0	12	4	10	8	0	22	55	212	0.82
	12:45 PM	2	6	5	0	13	5	10	2	0	17	1	4	4	0	9	6	18	2	0	26	65	194	0.75
	1:00 PM	1	6	3	0	10	1	7	1	0	9	0	5	5	0	10	2	11	6	0	19	48	160	0.83
	1:15 PM	2	6	5	0	13	3	4	1	0	8	1	6	4	0	11	1	8	3	0	12	44	164	0.79
	1:30 PM	3	7	2	0	12	2	4	1	0	7	3	5	3	0	11	0	6	1	0	7	37	175	0.80
	1:45 PM	1	4	3	0	8	0	10	1	0	11	0	3	1	0	4	2	5	1	0	8	31	200	0.81
PM Peak Period	2:00 PM	2	2	3	0	7	3	14	2	0	19	3	6	0	0	9	5	8	4	0	17	52	249	0.78
	2:15 PM	5	7	0	0	12	3	16	3	0	22	1	3	4	0	8	4	8	1	0	13	55	279	0.85
	2:30 PM	5	6	2	0	13	1	10	5	0	16	4	7	1	0	12	6	9	6	0	21	62	332	0.77
	2:45 PM	2	9	3	0	14	1	15	0	0	16	4	10	4	0	18	11	13	8	0	32	80	382	0.85
	3:00 PM	6	17	3	0	26	2	10	1	0	13	8	8	2	0	18	13	8	4	0	25	82	398	0.89
	3:15 PM	10	9	3	0	22	6	14	2	0	22	2	7	6	0	15	12	29	8	0	49	108	407	0.91
	3:30 PM	6	15	5	0	26	1	12	2	0	15	2	10	7	0	19	4	23	25	0	52	112	392	0.88
	3:45 PM	3	7	2	0	12	4	24	2	0	30	2	9	5	0	16	7	17	14	0	38	96	366	0.95
	4:00 PM	9	11	2	0	22	0	10	6	0	16	3	12	1	0	16	7	22	8	0	37	91	362	0.97
	4:15 PM	6	9	4	0	19	4	22	4	0	30	4	6	3	0	13	7	18	6	0	31	93	355	0.95
	4:30 PM	4	16	3	0	23	5	10	3	0	18	1	6	3	0	10	13	17	5	0	35	86	369	0.86
	4:45 PM	7	9	4	0	20	3	23	7	0	33	2	7	1	0	10	3	19	7	0	29	92	378	0.88
	5:00 PM	5	12	0	0	17	4	23	1	0	28	4	8	2	0	14	6	14	5	0	25	84	357	0.83
	5:15 PM	12	14	1	0	27	7	21	2	0	30	3	10	6	0	19	7	14	10	0	31	107	339	0.79
	5:30 PM	11	13	1	0	25	5	14	5	0	24	2	8	5	0	15	5	18	8	0	31	95	308	0.81
	5:45 PM	8	7	0	0	15	4	12	3	0	19	1	9	4	0	14	7	12	4	0	23	71	293	0.92
	6:00 PM	9	7	2	0	18	2	15	6	0	23	0	8	2	0	10	3	10	2	0	15	66	284	0.89
	6:15 PM	1	8	3	0	12	3	19	3	0	25	0	11	0	0	11	3	12	13	0	28	76	277	0.87
	6:30 PM	7	7	4	0	18	0	13	1	0	14	0	8	2	0	10	4	20	14	0	38	80	239	0.75
	6:45 PM	6	5	1	0	12	2	12	2	0	16	0	8	2	0	10	3	13	8	0	24	62	193	0.78
	7:00 PM	2	11	4	0	17	1	2	1	0	4	2	4	3	0	9	1	20	8	0	29	59	174	0.74
	7:15 PM	1	9	2	0	12	0	7	0	0	7	1	5	0	0	6	1	10	2	0	13	38		
	7:30 PM	2	4	4	0	10	0	9	0	0	9	1	1	2	0	4	0	10	1	0	11	34		
	7:45 PM	3	2	1	0	6	0	2	2	0	4	0	5	0	0	5	2	15	11	0	28	43		
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Totals	230	373	123	0	726	128	714	112	0	954	125	460	195	0	780	239	667	282	0	1188	3648			

Intersection Traffic Volume Report

Count Basics			Page 9 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

Holscher Road and CTH MN



15-Minute Heavy Vehicle Data

15-Minute Time Period Start Time	From North						From East						From South						From West						15-Min Totals	Hourly Sum
	Holscher Road						CTH MN						Holscher Road						CTH MN							
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total						
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4			
	6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6			
	6:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	9			
	6:45 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	3	9			
	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2	8			
	7:15 AM	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	3	7			
	7:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6			
	7:45 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	10			
	8:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	10		
	8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	2	13			
	8:30 AM	0	0	0	0	0	1	1	0	0	2	0	0	1	0	1	0	0	2	0	2	5	16			
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	2	15			
	9:00 AM	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	2	0	0	2	4	15			
	9:15 AM	0	0	0	0	0	0	1	0	0	1	2	0	0	0	2	1	1	0	0	2	5	14			
9:30 AM	1	0	0	0	1	0	1	0	0	1	0	0	2	0	2	0	0	0	0	0	4	10				
9:45 AM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2	10				
Midday Peak Period	10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3	3	12			
	10:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	12			
	10:30 AM	0	0	0	0	0	0	1	0	0	1	0	2	0	2	1	0	0	0	0	1	4	17			
	10:45 AM	0	0	0	0	0	1	0	0	0	1	0	2	0	2	1	0	0	0	0	1	4	17			
	11:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	0	0	0	0	1	3	20			
	11:15 AM	0	1	0	0	1	0	0	1	0	1	0	3	0	3	1	0	0	0	0	1	6	22			
	11:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	0	0	0	3	4	23			
	11:45 AM	0	0	1	0	1	0	0	0	0	1	0	3	0	4	1	1	0	0	0	2	7	21			
	12:00 PM	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	2	0	0	0	2	5	19			
	12:15 PM	0	0	1	0	1	0	0	0	0	0	0	4	0	4	2	0	0	0	0	2	7	21			
	12:30 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1	2	21			
	12:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	2	0	0	0	2	5	20			
	1:00 PM	0	2	0	0	2	0	0	0	0	0	0	1	2	0	3	1	1	0	0	2	7	18			
	1:15 PM	0	0	0	0	0	1	0	0	0	1	0	3	0	3	1	1	1	0	0	3	7	15			
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	15				
1:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	3	16				
PM Peak Period	2:00 PM	0	0	2	0	2	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	4	17			
	2:15 PM	1	0	0	0	1	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	7	15			
	2:30 PM	0	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2	10			
	2:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	2	0	3	4	9				
	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2	8				
	3:15 PM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	2	6	6			
	3:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	4			
	3:45 PM	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	1	0	1	3	3				
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
	7:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1				
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Totals		6	4	5	0	15	6	19	4	0	29	8	4	31	0	43	19	16	10	0	45	132				

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period Start Time	From North					From East					From South					From West					Total Hourly Volume
	Holscher Road					CTH MN					Holscher Road					CTH MN					
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM 7:15 AM	3	0	0	0	3	0	1	0	0	1	0	1	0	0	1	0	1	1	0	2	7
MD 12:00 PM	0	0	1	0	1	1	2	1	0	4	1	0	6	0	7	7	0	0	0	7	19
PM 3:15 PM	0	0	0	0	0	0	3	1	0	4	1	0	0	0	1	0	0	1	0	1	6

Intersection Traffic Volume Report

15-Minute Pedestrian and Bicyclist Data

Count Basics			Page 11 of 11
Start Date:	Wednesday, January 31, 2024	Weekday	Schools in Session
Total Number of Hours Counted:	14	Non-Holiday	No Special Events

Holscher Road and CTH MN



15-Minute Pedestrian and Bicyclist Data

15-Minute Time Period Start Time		Crossing 			Crossing 			Crossing 			Crossing 			15-Min Totals	Hourly Sum
		North Approach			East Approach			South Approach			West Approach				
		Holscher Road			CTH MN			Holscher Road			CTH MN				
		Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total		
AM Peak Period	6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	7:00 AM	0	0	0	0	0	0	1	0	1	0	0	0	1	4
	7:15 AM	1	0	1	0	0	0	0	0	0	0	0	0	1	5
	7:30 AM	0	0	0	0	0	0	1	0	1	0	0	0	1	4
	7:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	7
	8:00 AM	0	0	0	0	0	0	0	0	0	2	0	2	2	6
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Midday Peak Period	8:30 AM	2	0	2	1	0	1	1	0	1	0	0	0	4	8
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6
	9:00 AM	1	0	1	0	0	0	0	0	0	1	0	1	2	7
	9:15 AM	1	0	1	1	0	1	0	0	0	0	0	0	2	6
	9:30 AM	1	0	1	0	0	0	0	0	0	1	0	1	2	5
	9:45 AM	0	0	0	1	0	1	0	0	0	0	0	0	1	4
	10:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	4
	10:15 AM	0	0	0	1	0	1	0	0	0	0	0	0	1	4
	10:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	1	3
	10:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	2
PM Peak Period	11:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	1
	11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	12:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	1	7
	12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7
	12:45 PM	2	0	2	1	0	1	0	0	0	0	0	0	3	7
	1:00 PM	1	0	1	2	0	2	0	0	0	0	0	0	3	4
	1:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	1	5
PM Peak Period	1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	10
	1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	11
	2:00 PM	1	0	1	2	0	2	1	0	1	0	0	0	4	15
	2:15 PM	1	0	1	3	0	3	0	0	0	2	0	2	6	12
	2:30 PM	0	0	0	0	0	0	1	0	1	0	0	0	1	6
	2:45 PM	2	0	2	0	0	0	0	0	0	2	0	2	4	10
	3:00 PM	1	0	1	0	0	0	0	0	0	0	0	0	1	9
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	12
	3:30 PM	1	0	1	1	0	1	0	0	0	3	0	3	5	15
	3:45 PM	2	0	2	1	0	1	0	0	0	0	0	0	3	11
	4:00 PM	1	0	1	1	0	1	0	0	0	2	0	2	4	11
	4:15 PM	1	0	1	2	0	2	0	0	0	0	0	0	3	7
	4:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	1	4
	4:45 PM	1	0	1	2	0	2	0	0	0	0	0	0	3	3
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	5:45 PM	0	0	0	1	0	1	0	0	0	0	0	0	1	5
	6:00 PM	0	0	0	1	0	1	0	0	0	0	0	0	1	4
	6:15 PM	0	0	0	2	0	2	0	0	0	0	0	0	2	4
	6:30 PM	0	0	0	1	0	1	0	0	0	0	0	0	1	4
	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	7:00 PM	0	0	0	1	0	1	0	0	0	0	0	0	1	3
	7:15 PM	0	0	0	2	0	2	0	0	0	0	0	0	2	
	7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals		20	0	20	28	0	28	5	0	5	20	0	20	73	

Special Pedestrians

Pedestrian Type	None	1 or 2	A Few	Several	Many	Unknown
Pre-school Children	x					
Elementary School Age Children	x					
Visually Impaired (white cane/helper dog)	x					
Elderly/Disabled (except wheelchairs)	x					
Wheelchairs/Electric Scooters	x					
Other (None)	x					

Appendix B: IHSDM Output Worksheets

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

March 15, 2024

Disclaimer

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Report Overview

Report Generated: Mar 15, 2024 9:09 AM

Report Template: System: Single Page [System] (sscpm3, Mar 26, 2021 11:57 AM)

Evaluation Date: Fri Mar 01 11:17:59 CST 2024

IHS DM Version: v16.0.0 (Sep 30, 2020)

Site Set Crash Prediction Module: v[ModuleInfo.moduleVersion] ([ModuleInfo.moduleDate])

User Name: gibbsl

Organization Name:

Phone:

E-Mail: lee.gibbs@aecom.com

Project Title: Broadhead and Holscher

Project Comment: Created Fri Mar 01 11:09:09 CST 2024

Project Unit System: U.S. Customary

Site Set: Existing TWSC

Site Set Comment: Created Fri Mar 01 11:09:31 CST 2024

Site Set Version: v1

Evaluation Title: Evaluation 2

Evaluation Comment: Created Fri Mar 01 11:17:33 CST 2024

Policy for Superelevation: AASHTO 2011 U.S. Customary

Calibration: WisDOT_Calibration_v16-3

Crash Distribution: WisDOT_Distributions_v16-3

Model/CMF: WisDOT_Models_v16-3

Note: A Model Data Set other than the HSM (Highway Safety Manual) Configuration was selected for this Evaluation. If Crash Modification Factors (CMFs) were modified, then the results will not be in accordance with the HSM (see HSM Appendix to Part C, section A.1.3).

First Year of Analysis: 2025

Last Year of Analysis: 2034

Empirical-Bayes Analysis: None

Disclaimer Regarding Crash Prediction Method

IMPORTANT NOTICE ABOUT COMPARING RESULTS FROM HIGHWAY SAFETY MANUAL FIRST EDITION (2010) MODELS TO RESULTS FROM NEW MODELS DEVELOPED UNDER NCHRP PROJECTS 17-70 AND 17-58

Since the publication of the Highway Safety Manual - First Edition (HSM-1), in 2010 by the American Association of State

Highway and Transportation Officials (AASHTO), multiple research efforts have been undertaken through the National Cooperative Highway Research Program (NCHRP) to develop safety performance models for road segment and intersection facility types that were not initially reflected in the HSM-1, in order to expand the breadth and depth of the HSM in the future.

The IHSDM Crash Prediction Module (CPM) is intended as a faithful implementation of HSM Part C predictive methods. As NCHRP projects to develop new predictive methods for the HSM are completed, FHWA works to incorporate the new methods into IHSDM, sometimes in advance of publication in the HSM. The following new crash predictive methods have been accepted by NCHRP project panels and incorporated into IHSDM, while pending AASHTO's approval for incorporation into a future edition of the HSM:

- Roundabouts: completed in 2018 under NCHRP Project 17-70, the new methods will provide improved outcomes for the safety analysis of roundabouts.
- 6+ lane and one-way urban/suburban arterials (including models for segments and intersections): completed under NCHRP Project 17-58.

However, in the absence of local calibration factors (see HSM-1 Part C, Appendix A for guidance on calibration of the predictive models), it is neither appropriate nor advisable to directly compare the results from new models (from NCHRP Projects 17-58 and 17-70) to results from HSM-1 models, as the models were not calibrated to the same base state data sets, and consequently can produce unexpected results. If local calibration factors are available and applied to both new models and HSM-1 models, then it may be appropriate to directly compare the results. [Note: Work being performed under NCHRP Project 17-72 (Update of Crash Modification Factors for the Highway Safety Manual) is expected to re-calibrate many of the old (HSM-1) and new (e.g., NCHRP 17-70) models to data from a single (or small number of) states, that would allow results from all models to be directly compared.]

The models produced for NCHRP Project 17-70 have independent value in terms of informing the design of a roundabout and assessing the effects of different design characteristics on the expected safety performance of a roundabout.

The HSM-1 interim method previously included in IHSDM for evaluating roundabouts on urban/suburban arterials (i.e., evaluating an existing intersection and then applying a Crash Modification Factor for replacing the existing intersection with a roundabout) has been deactivated in IHSDM, to minimize any confusion with the new roundabout methodology.

Section Types

Urban Arterial Site Set CPM Evaluation

Site Type

Type: 4ST

Calibration Factor: 1

Table 1. Evaluation and Crash Data (CSD) (if applicable) Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting
1	4ST2x2L6S	Broadhead Street	at Holscher Road	2025: 2676; 2026: 2752; 2027: 2828; 2028: 2904; 2029: 2980; 2030: 3057; 2031: 3133; 2032: 3209; 2033: 3285; 2034: 3361	2025: 2061; 2026: 2123; 2027: 2185; 2028: 2247; 2029: 2309; 2030: 2371; 2031: 2433; 2032: 2495; 2033: 2557; 2034: 2619	1	2	yes

Table 2. Predicted Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Total Predicted Crashes for Evaluation Period	Predicted Total Crash Frequency (crashes/yr)	Predicted FI Crash Frequency (crashes/yr)	Predicted PDO Crash Frequency (crashes/yr)	Predicted Intersection Crash Rate (crashes/million veh)	Intersection Crash Rate (crashes/yr)
1	4ST	Broadhead Street	at Holscher Road	3.641	0.3641	0.0999	0.2642	0.19	0.3641
	Total		Total	3.641	0.3641	0.0999	0.2642	0.19	0.3641

Table 3. Predicted Crash Frequencies by Year (4ST)

Year	Total Crashes	FI Crashes	Percent FI (%)	PDO Crashes	Percent PDO (%)
2025	0.33	0.09	26.974	0.24	73.026
2026	0.33	0.09	27.077	0.24	72.923
2027	0.34	0.09	27.178	0.25	72.822
2028	0.35	0.10	27.277	0.26	72.723
2029	0.36	0.10	27.374	0.26	72.626
2030	0.37	0.10	27.471	0.27	72.529
2031	0.38	0.10	27.564	0.27	72.436
2032	0.39	0.11	27.655	0.28	72.345
2033	0.40	0.11	27.745	0.28	72.255
2034	0.40	0.11	27.833	0.29	72.167
Total	3.64	1.00	27.434	2.64	72.566
Average	0.36	0.10	27.434	0.26	72.566

Note: Fatal and Injury Crashes and Property Damage Only Crashes do not necessarily sum up to Total Crashes because the distribution of these three crashes had been derived

independently.

Table 4. Predicted 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.01	0.6	0.01	0.6
Intersection	Collision with Bicycle	0.06	2.5	0.00	0.0	0.06	2.5
Intersection	Collision with Fixed Object	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Non-Collision	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Other Object	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Other Single-vehicle Collision	0.02	0.8	0.10	4.2	0.12	5.0
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.08	3.0	0.00	0.0	0.08	3.0
Intersection	Total Intersection Single Vehicle Crashes	0.16	6.3	0.12	4.8	0.28	11.1
Intersection	Angle Collision	0.34	13.6	0.66	26.2	1.00	39.7
Intersection	Head-on Collision	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Other Multi-vehicle Collision	0.01	0.5	0.04	1.5	0.05	2.1
Intersection	Rear-end Collision	0.20	8.0	0.55	21.8	0.75	29.7
Intersection	Sideswipe	0.06	2.2	0.38	15.1	0.44	17.3
Intersection	Total Intersection Multiple Vehicle Crashes	0.61	24.3	1.63	64.6	2.25	88.9
Intersection	Total Intersection Crashes	0.78	30.7	1.75	69.3	2.53	100.0
	Total Crashes	0.78	30.7	1.75	69.3	2.53	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Appendix C: Existing-Year (Year 2022) Traffic Operations Analysis Worksheets

HCM 6th TWSC
10: Holscher Road & Broadhead Street

02/13/2024

Intersection												
Int Delay, s/veh	7.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	↱	↰	↱	
Traffic Vol, veh/h	30	70	25	15	115	20	40	80	20	5	45	40
Future Vol, veh/h	30	70	25	15	115	20	40	80	20	5	45	40
Conflicting Peds, #/hr	4	0	4	1	0	1	4	0	1	1	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	125	-	-	125	-	-	100	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	3	3	3
Mvmt Flow	42	97	35	21	160	28	56	111	28	7	63	56
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	192	0	0	136	0	0	465	419	102	475	426	168
Stage 1	-	-	-	-	-	-	185	185	-	206	206	-
Stage 2	-	-	-	-	-	-	280	234	-	269	220	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.11	6.51	6.21	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.13	5.53	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.509	4.009	3.309	3.527	4.027	3.327
Pot Cap-1 Maneuver	1381	-	-	1454	-	-	509	527	956	498	519	874
Stage 1	-	-	-	-	-	-	819	749	-	794	729	-
Stage 2	-	-	-	-	-	-	729	713	-	734	719	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1376	-	-	1448	-	-	411	497	951	384	490	867
Mov Cap-2 Maneuver	-	-	-	-	-	-	411	497	-	384	490	-
Stage 1	-	-	-	-	-	-	789	721	-	765	714	-
Stage 2	-	-	-	-	-	-	610	699	-	582	692	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.8			0.8			15.8			12.3		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	465	951	1376	-	-	1448	-	-	384	616		
HCM Lane V/C Ratio	0.358	0.029	0.03	-	-	0.014	-	-	0.018	0.192		
HCM Control Delay (s)	17	8.9	7.7	0	-	7.5	0	-	14.5	12.2		
HCM Lane LOS	C	A	A	A	-	A	A	-	B	B		
HCM 95th %tile Q(veh)	1.6	0.1	0.1	-	-	0	-	-	0.1	0.7		

HCM 6th TWSC
10: Holscher Road & Broadhead Street

02/13/2024

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	↱	↰	↱	
Traffic Vol, veh/h	55	90	30	10	60	10	20	40	10	10	40	30
Future Vol, veh/h	55	90	30	10	60	10	20	40	10	10	40	30
Conflicting Peds, #/hr	9	0	5	3	0	7	5	0	3	7	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	125	-	-	125	-	-	100	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	0	0	0
Mvmt Flow	60	99	33	11	66	11	22	44	11	11	44	33
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	86	0	0	137	0	0	365	332	111	367	354	84
Stage 1	-	-	-	-	-	-	224	224	-	97	97	-
Stage 2	-	-	-	-	-	-	141	108	-	270	257	-
Critical Hdwy	4.11	-	-	4.15	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.245	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1517	-	-	1429	-	-	591	588	942	593	574	981
Stage 1	-	-	-	-	-	-	779	718	-	914	819	-
Stage 2	-	-	-	-	-	-	862	806	-	740	699	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1504	-	-	1422	-	-	508	550	931	521	537	964
Mov Cap-2 Maneuver	-	-	-	-	-	-	508	550	-	521	537	-
Stage 1	-	-	-	-	-	-	742	684	-	867	805	-
Stage 2	-	-	-	-	-	-	774	792	-	650	665	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.4			0.9			12.2			11.2		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	535	931	1504	-	-	1422	-	-	521	663		
HCM Lane V/C Ratio	0.123	0.012	0.04	-	-	0.008	-	-	0.021	0.116		
HCM Control Delay (s)	12.7	8.9	7.5	0	-	7.6	0	-	12.1	11.1		
HCM Lane LOS	B	A	A	A	-	A	A	-	B	B		
HCM 95th %tile Q(veh)	0.4	0	0.1	-	-	0	-	-	0.1	0.4		

Appendix D: Future-Year (Year 2045) Traffic Operations Analysis Worksheets

HCM 6th TWSC
10: Holscher Road & Broadhead Street

02/13/2024

Intersection												
Int Delay, s/veh	26.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	↱	↰	↱	
Traffic Vol, veh/h	50	115	40	25	185	35	65	130	35	10	75	70
Future Vol, veh/h	50	115	40	25	185	35	65	130	35	10	75	70
Conflicting Peds, #/hr	4	0	4	1	0	1	4	0	1	1	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	125	-	-	125	-	-	100	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	3	3	3
Mvmt Flow	69	160	56	35	257	49	90	181	49	14	104	97

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	310	0	0	220	0	0	758	682	165	773	689	265
Stage 1	-	-	-	-	-	-	302	302	-	331	331	-
Stage 2	-	-	-	-	-	-	456	380	-	442	358	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.11	6.51	6.21	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.13	5.53	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.509	4.009	3.309	3.527	4.027	3.327
Pot Cap-1 Maneuver	1250	-	-	1355	-	-	325	373	882	315	367	771
Stage 1	-	-	-	-	-	-	709	666	-	680	643	-
Stage 2	-	-	-	-	-	-	586	616	-	592	626	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1245	-	-	1350	-	-	199	336	878	160	331	765
Mov Cap-2 Maneuver	-	-	-	-	-	-	199	336	-	160	331	-
Stage 1	-	-	-	-	-	-	661	621	-	634	620	-
Stage 2	-	-	-	-	-	-	411	594	-	371	584	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	0.8	80.3	19.7
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	273	878	1245	-	-	1350	-	-	160	456
HCM Lane V/C Ratio	0.992	0.055	0.056	-	-	0.026	-	-	0.087	0.442
HCM Control Delay (s)	93.1	9.3	8.1	0	-	7.7	0	-	29.6	19
HCM Lane LOS	F	A	A	A	-	A	A	-	D	C
HCM 95th %tile Q(veh)	9.9	0.2	0.2	-	-	0.1	-	-	0.3	2.2

HCM 6th TWSC
10: Holscher Road & Broadhead Street

02/13/2024

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	↱	↰	↱	
Traffic Vol, veh/h	90	145	50	15	100	15	35	65	15	15	65	50
Future Vol, veh/h	90	145	50	15	100	15	35	65	15	15	65	50
Conflicting Peds, #/hr	9	0	5	3	0	7	5	0	3	7	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	125	-	-	125	-	-	100	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	0	0	0
Mvmt Flow	99	159	55	16	110	16	38	71	16	16	71	55
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	135	0	0	219	0	0	584	529	171	586	568	128
Stage 1	-	-	-	-	-	-	362	362	-	151	151	-
Stage 2	-	-	-	-	-	-	222	167	-	435	417	-
Critical Hdwy	4.11	-	-	4.15	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.245	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1456	-	-	1333	-	-	423	455	873	425	435	927
Stage 1	-	-	-	-	-	-	657	625	-	856	776	-
Stage 2	-	-	-	-	-	-	780	760	-	604	595	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1444	-	-	1327	-	-	315	408	863	332	390	911
Mov Cap-2 Maneuver	-	-	-	-	-	-	315	408	-	332	390	-
Stage 1	-	-	-	-	-	-	603	573	-	782	759	-
Stage 2	-	-	-	-	-	-	650	743	-	475	546	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.4			0.9			17.6			14.5		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	370	863	1444	-	-	1327	-	-	332	519		
HCM Lane V/C Ratio	0.297	0.019	0.068	-	-	0.012	-	-	0.05	0.243		
HCM Control Delay (s)	18.8	9.3	7.7	0	-	7.7	0	-	16.4	14.2		
HCM Lane LOS	C	A	A	A	-	A	A	-	C	B		
HCM 95th %tile Q(veh)	1.2	0.1	0.2	-	-	0	-	-	0.2	0.9		

HCM 6th AWSC
10: Holscher Road & Broadhead Street

02/20/2024

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	↱	↰	↱	
Traffic Vol, veh/h	50	115	40	25	185	35	65	130	35	10	75	70
Future Vol, veh/h	50	115	40	25	185	35	65	130	35	10	75	70
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	3	3	3
Mvmt Flow	69	160	56	35	257	49	90	181	49	14	104	97
Number of Lanes	0	1	1	0	1	1	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	14.9	17.3	17	14
HCM LOS	B	C	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	33%	0%	30%	0%	12%	0%	100%	0%
Vol Thru, %	67%	0%	70%	0%	88%	0%	0%	52%
Vol Right, %	0%	100%	0%	100%	0%	100%	0%	48%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	195	35	165	40	210	35	10	145
LT Vol	65	0	50	0	25	0	10	0
Through Vol	130	0	115	0	185	0	0	75
RT Vol	0	35	0	40	0	35	0	70
Lane Flow Rate	271	49	229	56	292	49	14	201
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.543	0.086	0.461	0.098	0.568	0.084	0.03	0.391
Departure Headway (Hd)	7.218	6.332	7.236	6.364	7.009	6.233	7.845	6.985
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	498	565	497	562	513	574	456	514
Service Time	4.969	4.082	4.989	4.117	4.759	3.982	5.602	4.742
HCM Lane V/C Ratio	0.544	0.087	0.461	0.1	0.569	0.085	0.031	0.391
HCM Control Delay	18.3	9.7	16.1	9.8	18.6	9.6	10.8	14.2
HCM Lane LOS	C	A	C	A	C	A	B	B
HCM 95th-tile Q	3.2	0.3	2.4	0.3	3.5	0.3	0.1	1.8

HCM 6th AWSC
10: Holscher Road & Broadhead Street

02/20/2024

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	90	145	50	15	100	15	35	65	15	15	65	50
Future Vol, veh/h	90	145	50	15	100	15	35	65	15	15	65	50
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	1	1	1	5	5	5	2	2	2	0	0	0
Mvmt Flow	99	159	55	16	110	16	38	71	16	16	71	55
Number of Lanes	0	1	1	0	1	1	0	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	11.5	9.8	10.1	9.8
HCM LOS	B	A	B	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	35%	0%	38%	0%	13%	0%	100%	0%
Vol Thru, %	65%	0%	62%	0%	87%	0%	0%	57%
Vol Right, %	0%	100%	0%	100%	0%	100%	0%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	15	235	50	115	15	15	115
LT Vol	35	0	90	0	15	0	15	0
Through Vol	65	0	145	0	100	0	0	65
RT Vol	0	15	0	50	0	15	0	50
Lane Flow Rate	110	16	258	55	126	16	16	126
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.189	0.024	0.41	0.073	0.205	0.023	0.03	0.198
Departure Headway (Hd)	6.184	5.298	5.713	4.814	5.85	5.077	6.464	5.65
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	581	676	635	749	615	706	555	636
Service Time	3.909	3.024	3.413	2.514	3.572	2.799	4.188	3.375
HCM Lane V/C Ratio	0.189	0.024	0.406	0.073	0.205	0.023	0.029	0.198
HCM Control Delay	10.4	8.2	12.3	7.9	10.1	7.9	9.4	9.8
HCM Lane LOS	B	A	B	A	B	A	A	A
HCM 95th-tile Q	0.7	0.1	2	0.2	0.8	0.1	0.1	0.7

HCM 6th Signalized Intersection Summary

10: Holscher Road & Broadhead Street

02/20/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	115	40	25	185	35	65	130	35	10	75	70
Future Volume (veh/h)	50	115	40	25	185	35	65	130	35	10	75	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1703	1703	1870	1717	1717	1885	1717	1717	1885	1690	1690	1856
Adj Flow Rate, veh/h	69	160	56	35	257	49	90	181	49	14	104	97
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	1	1	1	1	1	1	3	3	3
Cap, veh/h	464	422	148	531	491	94	499	415	112	481	256	239
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	977	1203	421	1066	1401	267	1080	1299	352	1035	802	748
Grp Volume(v), veh/h	69	0	216	35	0	306	90	0	230	14	0	201
Grp Sat Flow(s),veh/h/ln	977	0	1624	1066	0	1668	1080	0	1651	1035	0	1549
Q Serve(g_s), s	1.7	0.0	2.7	0.7	0.0	4.0	1.9	0.0	3.0	0.3	0.0	2.8
Cycle Q Clear(g_c), s	5.6	0.0	2.7	3.4	0.0	4.0	4.7	0.0	3.0	3.3	0.0	2.8
Prop In Lane	1.00		0.26	1.00		0.16	1.00		0.21	1.00		0.48
Lane Grp Cap(c), veh/h	464	0	570	531	0	585	499	0	528	481	0	495
V/C Ratio(X)	0.15	0.00	0.38	0.07	0.00	0.52	0.18	0.00	0.44	0.03	0.00	0.41
Avail Cap(c_a), veh/h	1463	0	2231	1621	0	2291	1479	0	2025	1420	0	1901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.3	0.0	6.6	7.9	0.0	7.0	9.1	0.0	7.3	8.6	0.0	7.3
Incr Delay (d2), s/veh	0.1	0.0	0.4	0.1	0.0	0.7	0.2	0.0	0.6	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	1.1	0.2	0.0	1.7	0.6	0.0	1.3	0.1	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	0.0	7.1	8.0	0.0	7.8	9.3	0.0	7.9	8.7	0.0	7.8
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	285			341			320			215		
Approach Delay, s/veh	7.6			7.8			8.3			7.9		
Approach LOS	A			A			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	14.1			13.2			14.1			13.2		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	37.5			33.5			37.5			33.5		
Max Q Clear Time (g_c+I1), s	7.6			5.3			6.0			6.7		
Green Ext Time (p_c), s	1.8			1.4			2.3			1.9		
Intersection Summary												
HCM 6th Ctrl Delay	7.9											
HCM 6th LOS	A											

HCM 6th Signalized Intersection Summary

10: Holscher Road & Broadhead Street

02/20/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	145	50	15	100	15	35	65	15	15	65	50
Future Volume (veh/h)	90	145	50	15	100	15	35	65	15	15	65	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	0.99		0.99	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1717	1717	1885	1663	1663	1826	1703	1703	1870	1730	1730	1900
Adj Flow Rate, veh/h	99	159	55	16	110	16	38	71	16	16	71	55
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	5	5	5	2	2	2	0	0	0
Cap, veh/h	679	410	142	600	479	70	527	294	66	565	196	152
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	1151	1214	420	1029	1417	206	1135	1342	303	1201	896	694
Grp Volume(v), veh/h	99	0	214	16	0	126	38	0	87	16	0	126
Grp Sat Flow(s),veh/h/ln	1151	0	1634	1029	0	1623	1135	0	1645	1201	0	1590
Q Serve(g_s), s	1.4	0.0	2.0	0.2	0.0	1.1	0.6	0.0	0.9	0.2	0.0	1.4
Cycle Q Clear(g_c), s	2.5	0.0	2.0	2.3	0.0	1.1	2.0	0.0	0.9	1.1	0.0	1.4
Prop In Lane	1.00		0.26	1.00		0.13	1.00		0.18	1.00		0.44
Lane Grp Cap(c), veh/h	679	0	552	600	0	548	527	0	360	565	0	348
V/C Ratio(X)	0.15	0.00	0.39	0.03	0.00	0.23	0.07	0.00	0.24	0.03	0.00	0.36
Avail Cap(c_a), veh/h	2473	0	3098	2202	0	3076	2094	0	2632	2224	0	2544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.7	0.0	5.1	6.0	0.0	4.8	7.6	0.0	6.5	7.0	0.0	6.7
Incr Delay (d2), s/veh	0.1	0.0	0.4	0.0	0.0	0.2	0.1	0.0	0.3	0.0	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	0.6	0.1	0.0	0.3	0.2	0.0	0.3	0.1	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.8	0.0	5.6	6.0	0.0	5.0	7.6	0.0	6.9	7.0	0.0	7.4
LnGrp LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Vol, veh/h	313			142			125			142		
Approach Delay, s/veh	5.6			5.1			7.1			7.3		
Approach LOS	A			A			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	11.4			8.9			11.4			8.9		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	38.5			32.5			38.5			32.5		
Max Q Clear Time (g_c+I1), s	4.5			3.4			4.3			4.0		
Green Ext Time (p_c), s	1.8			0.8			0.8			0.6		
Intersection Summary												
HCM 6th Ctrl Delay	6.1											
HCM 6th LOS	A											

HCM 6th Roundabout
10: Holscher Road & Broadhead Street

02/20/2024

Intersection				
Intersection Delay, s/veh	6.3			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	285	341	320	215
Demand Flow Rate, veh/h	290	344	323	221
Vehicles Circulating, veh/h	156	344	247	386
Vehicles Exiting, veh/h	451	226	199	302
Ped Vol Crossing Leg, #/h	4	1	4	4
Ped Cap Adj	0.999	1.000	0.999	0.999
Approach Delay, s/veh	5.3	7.2	6.2	6.1
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.600	2.600	2.600	2.600
Critical Headway, s	4.700	4.700	4.700	4.700
Entry Flow, veh/h	290	344	323	221
Cap Entry Lane, veh/h	1195	1001	1097	962
Entry HV Adj Factor	0.982	0.993	0.991	0.972
Flow Entry, veh/h	285	341	320	215
Cap Entry, veh/h	1173	993	1086	934
V/C Ratio	0.243	0.344	0.295	0.230
Control Delay, s/veh	5.3	7.2	6.2	6.1
LOS	A	A	A	A
95th %tile Queue, veh	1	2	1	1

HCM 6th Roundabout
10: Holscher Road & Broadhead Street

02/20/2024

Intersection				
Intersection Delay, s/veh	4.7			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	313	142	125	142
Demand Flow Rate, veh/h	317	150	127	142
Vehicles Circulating, veh/h	104	211	277	171
Vehicles Exiting, veh/h	209	193	144	189
Ped Vol Crossing Leg, #/h	9	7	5	9
Ped Cap Adj	0.999	0.999	0.999	0.999
Approach Delay, s/veh	5.1	4.5	4.5	4.1
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.600	2.600	2.600	2.600
Critical Headway, s	4.700	4.700	4.700	4.700
Entry Flow, veh/h	317	150	127	142
Cap Entry Lane, veh/h	1255	1134	1066	1178
Entry HV Adj Factor	0.989	0.950	0.981	1.000
Flow Entry, veh/h	313	142	125	142
Cap Entry, veh/h	1239	1077	1045	1177
V/C Ratio	0.253	0.132	0.119	0.121
Control Delay, s/veh	5.1	4.5	4.5	4.1
LOS	A	A	A	A
95th %tile Queue, veh	1	0	0	0

Appendix E: Traffic Signal Warrant Worksheets

Wisconsin Department of Transportation Traffic Signal Warrant

Summary Worksheet

100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: Broadhead Street and Holscher Road

County: Dane

Village: McFarland

Major Street: Broadhead Street

Minor Street: Holscher Road

Critical Approach Speed: 25 mph

Critical Approach Speed: 25 mph

Lanes: 1 lane

Lanes: 1 lane

% Right Turns Included

From North (SB) 100%

From East (WB) 0%

From South (NB) 0%

From West (EB) 0%

In built-up area of isolated community of < 10,000 population? No

Total number of approaches at intersection? 4 or more

If it is a "T" intersection, inflate minor threshold to 150%?

Manually set volume level?

Analysis based on **EXISTING** volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
31-Jan-24	Wednesday	6:00	AM	8:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	No
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	No
Warrant 3: Peak Hour Volume	No
Warrant 4: Pedestrian Volume	No
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	No
Warrant 6: Coordinated Signal System	No
Warrant 7: Crash Experience	No
Warrant 8: Roadway Network	No
Warrant 9: Intersection Near a Grade Crossing	No

Warrant Analysis Conducted By:

Name: Lee Gibbs

Agency: AECOM

Date: 3/1/2024

Warrant 1: Eight - Hour Vehicular Volume

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Condition A : Min. Veh. Volume		
Volume Level	100%	80%
Major Rd. Req	500	400
Minor Rd. Req	150	120
Number of Hours	0	0

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	100%	80%
Major Rd. Req	750	600
Minor Rd. Req	75	60
Number of Hours	0	0

Satisfied? No

Condition C: Combination of A & B at 80%		
---	--	--

Satisfied? No

6:00 AM		Enter Start Time (Military Time) (HH:MM)			Total
Time Period	From	To	Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	
1	6:00	7:00	35	34	69
2	7:00	8:00	229	117	346
3	8:00	9:00	113	68	181
4	9:00	10:00	68	44	112
5	10:00	11:00	95	48	143
6	11:00	12:00	104	40	144
7	12:00	13:00	128	38	166
8	13:00	14:00	70	43	113
9	14:00	15:00	122	46	168
10	15:00	16:00	195	86	281
11	16:00	17:00	187	84	271
12	17:00	18:00	166	84	250
13	18:00	19:00	163	60	223
14	19:00	20:00	100	45	145
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume

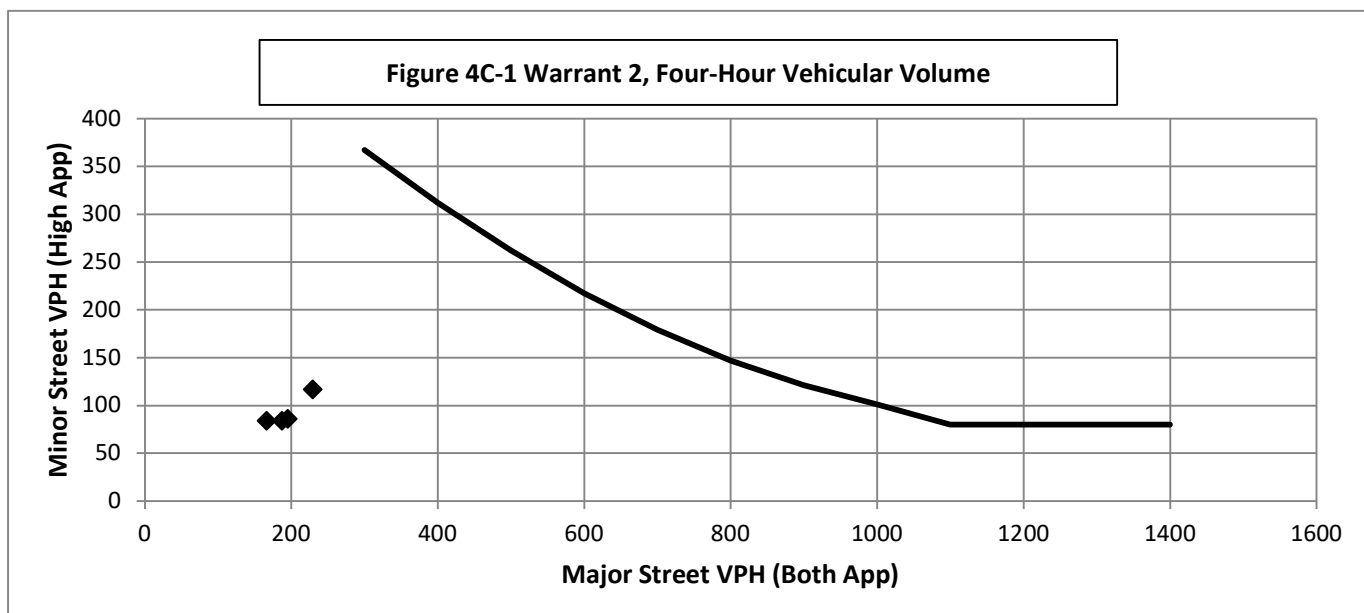
100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Hour Start	7:00	15:00	16:00	17:00
Major Road Vol.	229	195	187	166
Minor Road Vol.	117	86	84	84



Warrant 3: Peak Hour Volume

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

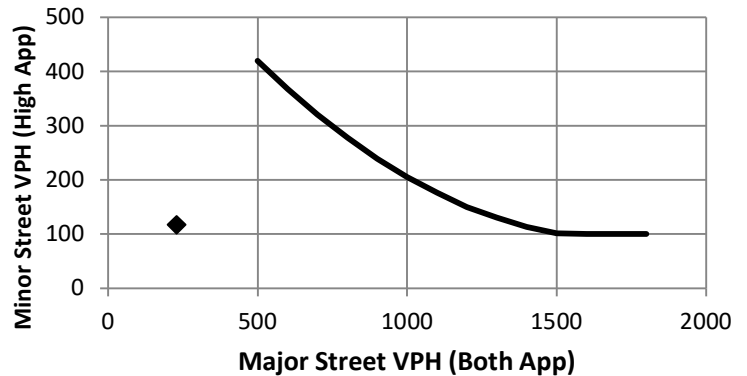
Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	No
Volume on Minor Approach	100	
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
7:00	229	117

Figure 4C-3 Warrant 3, Peak Hour



Warrant 4: Pedestrian Volume

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criterion A: Four Hour

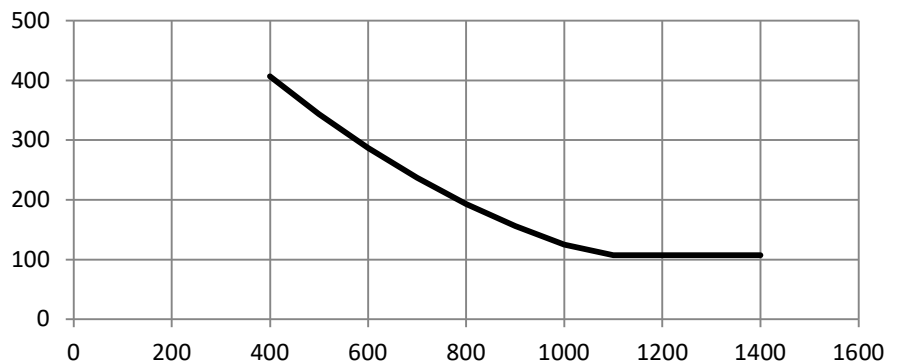
Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

Criterion A Satisfied?

Figure 4C-5 Warrant 4, Pedestrian Four-Hour Volume

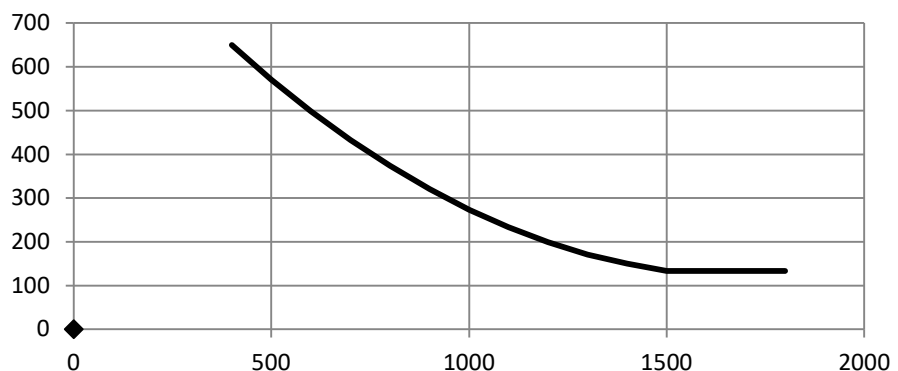


Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?

Figure 4C-7 Warrant 4, Pedestrian Peak Hour



Warrant 5: School Crossing

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	No
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	No
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	No

Warrant 6: Coordinated Signal System

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Fulfilled?
1	Signal spacing > 1000 ft	Yes
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	No
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	No

Warrant 7: Crash Experience

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.		
	Measures Tried:		
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months 2.5	No
3	Warrant 1, Condition A (80%)	No	Yes
	Warrant 1, Condition B (80%)	No	
	Warrant 4, Criterion A (80%)	No	
	Warrant 4, Criterion B (80%)	Yes	

Warrant 8: Roadway Network

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour	346	No
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		No
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)		
	Hour		
	Volume		

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic		Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	
2	Rural or suburban highway outside of, entering, or traversing a city	
3	Appears as a major route on an official plan	

Warrant 9: Intersection Near a Grade Crossing

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	7:00	229	117	39.195

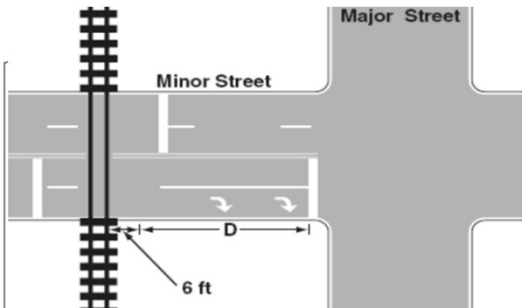
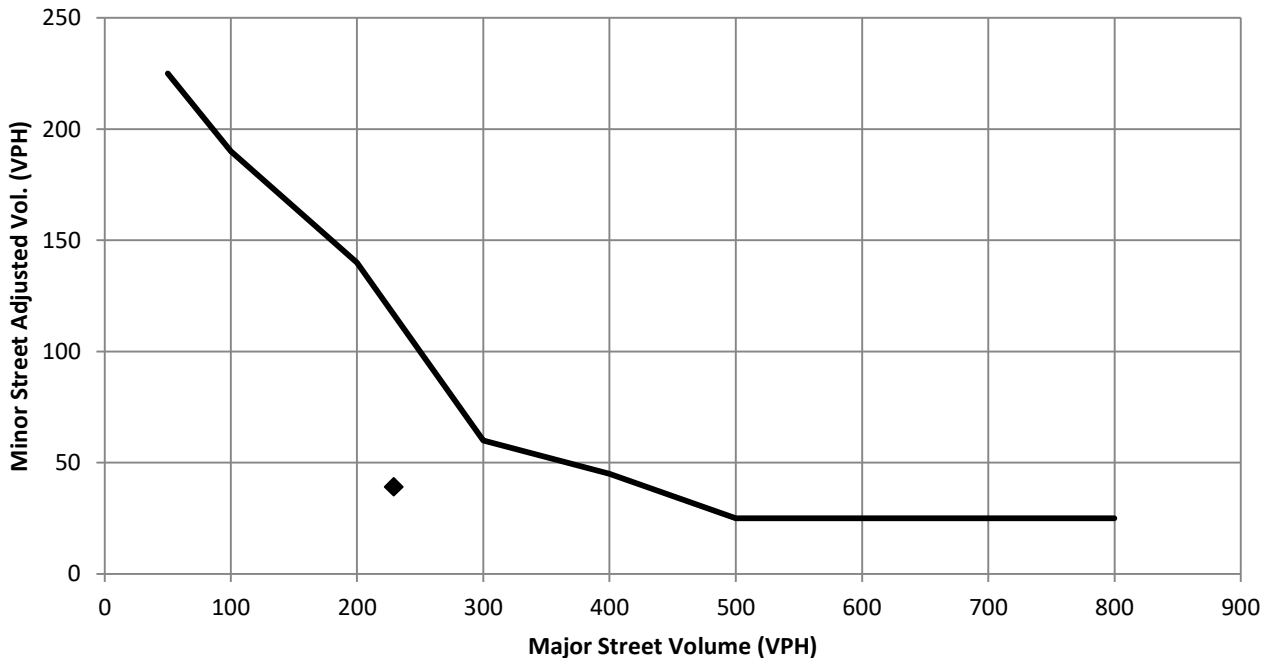


Figure 4C-9 Warrant9, Intersection Near a grade Crossing (One Approach Lane at the Track Crossing)



Conclusions/Comments:

Updated: 12/6/2017

McFarland
SUMMARY SHEET

MEETING DATE: Wednesday, May 29, 2024

SECTION: Business

DEPARTMENT: Public Works

CONTACT: Lee Igl, Public Works Director

AGENDA ITEM: Public Works Week Presentation

PREVIOUS ACTION:

None.

ISSUE SUMMARY:

Public Works week was celebrated from May 19th through 25th. In honor of this year's celebration, a PowerPoint presentation was presented to the Village Board on May 14th. The presentation captures the many facets of the Public Works Department and will be presented to the committee for viewing.

FINANCIAL/BUDGET IMPACT:

None.

VILLAGE PLAN REFERENCE:

None.

ORDINANCE REFERENCE:

None.

BOARD, COMMISSION OR COMMITTEE RECOMMENDATION:

No action is required on this item.

ATTACHMENTS:

None