

OFFICE OF THE COUNCIL

COUNCIL MEMBERS

BRANDON McCULLOUGH, President
MARTHA PTASHNIK, Vice President
CARRIE BUDZINSKI
ROB GJONAJ DONOVIC
JIM JOLLY
SCOTT MORGAN
LAURA M. TOY



33000 CIVIC CENTER DRIVE
LIVONIA, MICHIGAN 48154-3097
(734) 466-2250
citycouncil@livonia.gov

OFFICE OF THE COUNCIL

**ELECTRONIC AGENDA PACKET FOR
THE REGULAR MEETING OF
MONDAY, APRIL 15, 2024
7:00 P.M.**

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(734) 466-2250**

The official documents are on file in the City Clerk's office.

1991ST Regular Meeting Agenda of the Council of the City of Livonia
Monday, April 15, 2024 - Revised

7:00 p.m. - City Hall Auditorium
33000 Civic Center Drive, Livonia, Michigan

CALL TO ORDER

INVOCATION/PLEDGE OF ALLEGIANCE

ROLL CALL

PRESENTATION OF MINUTES – Regular Meeting Minutes of April 1, 2024

AUDIENCE COMMUNICATION

REPORTS FROM THE MAYOR AND OTHER CITY OFFICIALS

- a. [Communication from the Department of Finance, dated March 25, 2024, re: forwarding various financial statements of the City of Livonia for the month ending December 31, 2023.](#)
- b. [Communication from the Department of Finance, dated March 26, 2024, re: forwarding various financial statements of the City of Livonia for the month ending January 31, 2024.](#)
- c. [Communication from the Department of Finance, dated March 26, 2024, re: forwarding Quarterly Investment Report for the City of Livonia for the quarter ending February 29, 2024.](#)

CONSENT AGENDA

- 1. [REQUEST TO WAIVE THE CITY'S NOISE ORDINANCE: Karen Bonanno, re: to host a wedding reception with a DJ at the property located at 31025 Munger Drive, on Saturday, June 8, 2024, from 5:00 p.m. to 11:00 p.m.](#)
- 2. [WAIVER PETITION: Planning Commission, re: Petition 2024-02-02-03 by Stonefield Engineering & Design on behalf of Haggerty Six Partners, LLC, seeking special waiver use approval for a Planned General Development consisting of eleven \(11\) buildings, including eight \(8\) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest ¼ of Section 7.](#)
- 3. [REAPPOINTMENT OF DAVID CASH TO THE LOCAL OFFICERS COMPENSATION COMMISSION: Office of the Mayor, re: for a seven-year term, which will expire on April 2, 2031.](#)
- 4. [REAPPOINTMENT OF MARTHA FOLEY TO THE LOCAL OFFICERS COMPENSATION COMMISSION: Office of the Mayor, re: for a seven-year term, which will expire on April 2, 2031.](#)
- 5. [REQUEST TO APPROVE AN ADDITIONAL EXPENDITURE: Parks and Recreation, re: for Alexander Blue House Chimney Repair and Replacement with an additional not-to-exceed amount of \\$4,500 and the new total not-to-exceed amount of \\$22,500.](#)

6. AWARD OF CONTRACT: Department of Public Works, re: for the City's Cross-Connection Control Program, in the amount of \$76,536.00 annually, for a period of three (3) years, with an optional two-year extension, from budgeted funds.
7. REQUEST FOR AUTHORIZATION TO PURCHASE ONE (1) 2024 CASE BACKHOE MODEL 580SN THROUGH THE SOURCEWELL CONTRACT (FORMERLY NJPA): Public Works Division, re: to be used by the Roads Department, from budgeted funds.
8. REQUEST FOR AUTHORIZATION TO PURCHASE ONE (1) SELF-CONTAINED LEAF VACUUM; Public Works Division, re: to be used by the Roads Department, from budgeted funds.
9. REQUEST TO AMEND THE CONTRACT WITH OHM ADVISORS FOR THE PRELIMINARY ENGINEERING (PE) DESIGN SERVICES CONTRACT FOR THE NEWBURGH ROAD RECONSTRUCTION FROM ANN ARBOR TRAIL TO PLYMOUTH ROAD AND THE REPLACEMENT OF FIVE TRAFFIC SIGNALS ALONG THE NEWBURGH ROAD CORRIDOR AT CHURCHILL HIGH SCHOOL, ANN ARBOR TRAIL, HINES DRIVE, PLYMOUTH ROAD AND SEVEN MILE ROAD: Engineering Division, re: same. (CR 336-21)

UNFINISHED BUSINESS – MEETINGS OF THE COMMITTEE

10. CAPITAL OUTLAY AND INFRASTRUCTURE COMMITTEE MEETING OF APRIL 10, 2024
 - a. The subject matter of the 2022 Facility Condition Assessment and Space Needs Assessment. (CR 02-23)

UNFINISHED BUSINESS

11. REQUEST FOR COUNCIL APPROVAL ON A PROPOSED LOT SPLIT: Department of Assessment, re: for the property located at the Northeast corner of Seven Mile and Merriman, in the Southwest 1/4 of Section 2 (19200 Merriman Ct) and to waive lot depth and lot area issue relative to Parcel 2.

NEW BUSINESS

12. APPOINTMENT OF JULIE ALEXANDER FOR THE POSITION OF DEPUTY TREASURER: Office of the City Treasurer, re: same.

AUDIENCE COMMUNICATION

NOTICE(S)

In accordance with Title II of the American with Disabilities Act as it pertains to access to Public Meetings, the City Clerk's Office of the City of Livonia, upon adequate notice, will make reasonable accommodations for persons with disabilities. Please call (734) 466-2236 or email clerk@livonia.gov if you need assistance. Council agendas are available on the City's website www.livonia.gov - under Your Government, City Council, Agendas & Minutes.

LORI L. MILLER, CITY CLERK



LETTER TO THE LIVONIA CITY COUNCIL

a.

Finance
March 25, 2024

MEETING DATE

R041524

PRESENTED BY

Michael Slater, Finance Director

AGENDA ITEM

a. Communication from the Department of Finance, dated March 25, 2024, re: forwarding various financial statements of the City of Livonia for the month ending December 31, 2023.

BACKGROUND DETAILS

Attached hereto are the various financial statements of the City of Livonia for the month ending December 31, 2023. These statements are summarized so that you may make a quick financial overview of the various funds. Detailed statements, in support of the summarized statements, have been forwarded electronically to the Council Office.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

We respectfully request that City Council receive and file this report.

ATTACHMENTS

1. BUDGET TO ACTUAL - COUNCIL SUMMARY - DECEMBER 31, 2023

APPROVED BY

Michael Slater, Finance Director

Date: March 26, 2024

Maureen Miller Brosnan, Mayor

Date: March 28, 2024



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 101 - GENERAL FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	71,521,472.00	.00	71,521,472.00	42,318,271.17	.00	42,318,271.17	29,203,200.83	59	39,865,820.42
REVENUE TOTALS	\$71,521,472.00	\$0.00	\$71,521,472.00	\$42,318,271.17	\$0.00	\$42,318,271.17	\$29,203,200.83	59%	\$39,865,820.42
EXPENSE									
Department 101 - CITY COUNCIL	334,005.00	.00	334,005.00	15,063.03	.00	15,063.03	318,941.97	5	14,166.99
Department 173 - MAYOR'S OFFICE	584,792.00	.00	584,792.00	37,625.45	.00	37,625.45	547,166.55	6	31,107.12
Department 174 - COMMUNICATIONS	429,649.00	.00	429,649.00	29,833.66	.00	29,833.66	399,815.34	7	19,212.63
Department 175 - GOVERNMENT AFFAIRS	13,801.00	94,000.00	107,801.00	1,150.09	.00	1,150.09	106,650.91	1	6,404.39
Department 191 - ACCOUNTING	326,094.00	.00	326,094.00	8,189.81	.00	8,189.81	317,904.19	3	9,280.44
Department 192 - FINANCE DEPARTMENT	534,554.00	(13,000.00)	521,554.00	29,281.05	.00	29,281.05	492,272.95	6	28,190.02
Department 215 - CITY CLERK	633,636.00	.00	633,636.00	30,644.79	1,434.33	30,644.79	601,556.88	5	29,462.47
Department 223 - INDEPENDENT AUDIT	54,512.00	.00	54,512.00	(1,566.00)	.00	(1,566.00)	56,078.00	-3	(1,270.00)
Department 228 - INFORMATION SYSTEMS	1,605,679.00	.00	1,605,679.00	230,396.21	48,206.19	230,396.21	1,327,076.60	17	163,595.31
Department 236 - ETHICS BOARD	550.00	.00	550.00	.00	.00	.00	550.00	0	.00
Department 247 - BOARD OF REVIEW	3,545.00	.00	3,545.00	344.48	.00	344.48	3,200.52	10	344.48
Department 253 - TREASURER	679,921.00	.00	679,921.00	53,901.76	.00	53,901.76	626,019.24	8	50,000.82
Department 257 - ASSESSING	756,439.00	.00	756,439.00	61,669.69	.00	61,669.69	694,769.31	8	51,540.34
Department 261 - UTILITIES AND SUPPLIES	546,613.00	.00	546,613.00	65,195.30	.00	65,195.30	481,417.70	12	25,746.30
Department 262 - ELECTION COMMISSION	679,174.00	.00	679,174.00	9,644.36	2,847.00	9,644.36	666,682.64	2	13,131.13
Department 263 - INSURANCE-GENERAL	102,452.00	.00	102,452.00	279,209.71	.00	279,209.71	(176,757.71)	273	226,818.95
Department 264 - INSURANCE-WORKERS COMP	435,194.00	.00	435,194.00	207,028.57	.00	207,028.57	228,165.43	48	222,030.44
Department 265 - NON DEPARTMENTAL	4,000.00	.00	4,000.00	.00	.00	.00	4,000.00	0	.00
Department 266 - LAW DEPARTMENT	980,880.00	.00	980,880.00	51,498.23	.00	51,498.23	929,381.77	5	49,606.28
Department 267 - EMPLOYEE BENEFITS CONTROL	42,000.00	.00	42,000.00	(376,259.10)	.00	(376,259.10)	418,259.10	-896	(195,642.32)
Department 268 - NON-DEPT CAPITAL PROJECTS	5,000.00	.00	5,000.00	.00	.00	.00	5,000.00	0	.00
Department 269 - CIVIL SERVICE	959,897.00	.00	959,897.00	39,181.61	.00	39,181.61	920,715.39	4	56,429.02
Department 270 - TERMINATION PAY	2,395,000.00	.00	2,395,000.00	.00	.00	.00	2,395,000.00	0	41,798.85
Department 271 - LABOR RELATIONS	92,500.00	.00	92,500.00	5,625.00	.00	5,625.00	86,875.00	6	5,625.00
Department 272 - DUES AND SUBSCRIPTIONS	58,000.00	.00	58,000.00	.00	.00	.00	58,000.00	0	.00
Department 286 - 16TH DISTRICT COURT	3,502,513.00	.00	3,502,513.00	245,883.70	.00	245,883.70	3,256,629.30	7	251,898.24
Department 302 - TRAFFIC BUREAU	1,262,039.00	.00	1,262,039.00	62,064.58	.00	62,064.58	1,199,974.42	5	60,003.10
Department 304 - POLICE ADMINISTRATION	3,010,074.00	.00	3,010,074.00	118,545.17	.00	118,545.17	2,891,528.83	4	104,443.38
Department 306 - POLICE DATA PROCESSING	999,901.00	.00	999,901.00	64,287.25	5,000.00	64,287.25	930,613.75	7	28,224.03
Department 307 - DETECTIVE BUREAU	3,357,544.00	.00	3,357,544.00	159,613.32	.00	159,613.32	3,197,930.68	5	193,093.45
Department 309 - AUTOMOTIVE SERVICE	586,150.00	.00	586,150.00	15,579.71	.00	15,579.71	570,570.29	3	26,662.57
Department 310 - POLICE COMMUNICATIONS	1,014,332.00	.00	1,014,332.00	44,639.20	.00	44,639.20	969,692.80	4	44,067.46
Department 313 - CROSSING GUARDS	81,488.00	.00	81,488.00	4,576.16	.00	4,576.16	76,911.84	6	4,527.78
Department 316 - SCHOOL LIAISON	578,567.00	.00	578,567.00	31,900.04	.00	31,900.04	546,666.96	6	29,855.90
Department 318 - OFFICE OF EMERG PREP	184,118.00	.00	184,118.00	26,987.87	.00	26,987.87	157,130.13	15	25,468.27
Department 319 - RESERVE POL/SPECIAL EVENT	407,969.00	.00	407,969.00	15,480.63	.00	15,480.63	392,488.37	4	14,425.69



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 101 - GENERAL FUND									
EXPENSE									
Department 325 - POLICE PATROL BUREAU	14,764,790.00	.00	14,764,790.00	653,283.16	.00	653,283.16	14,111,506.84	4	640,070.32
Department 329 - INTELLIGENCE BUREAU	2,582,175.00	.00	2,582,175.00	176,902.95	.00	176,902.95	2,405,272.05	7	98,731.70
Department 336 - FIRE ADMINISTRATION	1,440,863.00	.00	1,440,863.00	86,272.21	2,776.29	86,272.21	1,351,814.50	6	77,594.28
Department 338 - FIRE FIGHTING	14,759,162.00	.00	14,759,162.00	703,568.10	.00	703,568.10	14,055,593.90	5	716,004.28
Department 341 - FIRE PREVENTION	865,073.00	.00	865,073.00	44,249.12	.00	44,249.12	820,823.88	5	48,720.18
Department 371 - INSPECTION	2,007,116.00	.00	2,007,116.00	75,686.08	.00	75,686.08	1,931,429.92	4	74,930.25
Department 381 - BLDG CODE BD OF APPEALS	1,361.00	.00	1,361.00	.00	.00	.00	1,361.00	0	.00
Department 435 - TRAFFIC COMMISSION	2,353.00	.00	2,353.00	.00	.00	.00	2,353.00	0	172.24
Department 441 - PUBLIC SERV ADMIN	85,450.00	.00	85,450.00	(47,378.12)	.00	(47,378.12)	132,828.12	-55	(37,256.59)
Department 443 - PUBLIC SERV-EQUIP MAINT	108,602.00	.00	108,602.00	(96,092.96)	.00	(96,092.96)	204,694.96	-88	(68,162.78)
Department 447 - ENGINEERING	43,534.00	.00	43,534.00	(51,856.66)	.00	(51,856.66)	95,390.66	-119	(43,176.93)
Department 448 - STREET LIGHTING	266,328.00	.00	266,328.00	22,885.11	.00	22,885.11	243,442.89	9	24,963.01
Department 463 - MAINTENANCE-STREET	600,843.00	.00	600,843.00	(115,681.31)	.00	(115,681.31)	716,524.31	-19	(45,995.57)
Department 523 - PUBLIC SERV-BLDG MAINT	2,026,738.00	.00	2,026,738.00	76,785.41	10,079.46	76,785.41	1,939,873.13	4	30,603.31
Department 524 - PARKS	1,726,526.00	.00	1,726,526.00	14,343.60	.00	14,343.60	1,712,182.40	1	14,386.33
Department 701 - PLANNING	726,556.00	(49,500.00)	677,056.00	37,918.98	.00	37,918.98	639,137.02	6	31,194.44
Department 702 - ZONING BOARD OF APPEALS	53,825.00	(31,500.00)	22,325.00	4,295.31	.00	4,295.31	18,029.69	19	6,898.40
Department 752 - RECREATION ADMINISTRATION	352,803.00	.00	352,803.00	8,638.23	.00	8,638.23	344,164.77	2	(1,427.86)
Department 758 - RECREATION FACILITIES	54,189.00	.00	54,189.00	114.24	.00	114.24	54,074.76	0	149.67
Department 759 - RECREATION ATHLETICS	144,447.00	.00	144,447.00	77.00	.00	77.00	144,370.00	0	984.31
Department 820 - PARKS & REC - SENIOR SERVICES	564,761.00	.00	564,761.00	33,754.01	.00	33,754.01	531,006.99	6	38,969.82
Department 821 - P&R - GREENMEAD AND CULTURAL	1,099,726.00	.00	1,099,726.00	53,447.63	2,728.87	53,447.63	1,043,549.50	5	64,179.62
EXPENSE TOTALS	\$71,519,803.00	\$0.00	\$71,519,803.00	\$3,248,427.42	\$73,072.14	\$3,248,427.42	\$68,198,303.44	5%	\$3,302,780.96
Fund 101 - GENERAL FUND Totals									
REVENUE TOTALS	71,521,472.00	.00	71,521,472.00	42,318,271.17	.00	42,318,271.17	29,203,200.83	59%	39,865,820.42
EXPENSE TOTALS	71,519,803.00	.00	71,519,803.00	3,248,427.42	73,072.14	3,248,427.42	68,198,303.44	5%	3,302,780.96
Fund 101 - GENERAL FUND Totals	\$1,669.00	\$0.00	\$1,669.00	\$39,069,843.75	(\$73,072.14)	\$39,069,843.75	(\$38,995,102.61)		\$36,563,039.46



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 202 - MAJOR STREET FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	9,344,198.00	.00	9,344,198.00	14,861.71	.00	14,861.71	9,329,336.29	0	4,469.17
REVENUE TOTALS	\$9,344,198.00	\$0.00	\$9,344,198.00	\$14,861.71	\$0.00	\$14,861.71	\$9,329,336.29	0%	\$4,469.17
EXPENSE									
Department 448 - STREET LIGHTING	668,359.00	.00	668,359.00	44,500.00	.00	44,500.00	623,859.00	7	39,667.00
Department 451 - CONST-STREET AND BRIDGES	60,000.00	.00	60,000.00	.00	.00	.00	60,000.00	0	.00
Department 463 - MAINTENANCE-STREET	1,133,076.00	255,226.00	1,388,302.00	33,676.35	.00	33,676.35	1,354,625.65	2	31,718.63
Department 475 - MAINTENANCE-TRAFFIC SERV	.00	.00	.00	.00	.00	.00	.00	+++	.00
Department 478 - MAINT-FREEWAY LIGHTING	20,000.00	.00	20,000.00	1,565.01	.00	1,565.01	18,434.99	8	1,505.09
Department 479 - SNOW AND ICE REMOVAL	327,061.00	.00	327,061.00	27,255.00	.00	27,255.00	299,806.00	8	26,769.00
Department 483 - ADMIN, ENGIN RECORD KEEPI	138,700.00	.00	138,700.00	11,558.00	.00	11,558.00	127,142.00	8	12,267.00
Department 484 - FUND TRANSFERS	7,600,000.00	.00	7,600,000.00	633,333.00	.00	633,333.00	6,966,667.00	8	558,333.33
EXPENSE TOTALS	\$9,947,196.00	\$255,226.00	\$10,202,422.00	\$751,887.36	\$0.00	\$751,887.36	\$9,450,534.64	7%	\$670,260.05
Fund 202 - MAJOR STREET FUND Totals									
REVENUE TOTALS	9,344,198.00	.00	9,344,198.00	14,861.71	.00	14,861.71	9,329,336.29	0%	4,469.17
EXPENSE TOTALS	9,947,196.00	255,226.00	10,202,422.00	751,887.36	.00	751,887.36	9,450,534.64	7%	670,260.05
Fund 202 - MAJOR STREET FUND Totals	(\$602,998.00)	(\$255,226.00)	(\$858,224.00)	(\$737,025.65)	\$0.00	(\$737,025.65)	(\$121,198.35)		(\$665,790.88)



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 203 - LOCAL STREET FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	11,149,971.00	.00	11,149,971.00	639,362.12	.00	639,362.12	10,510,608.88	6	560,689.51
REVENUE TOTALS	\$11,149,971.00	\$0.00	\$11,149,971.00	\$639,362.12	\$0.00	\$639,362.12	\$10,510,608.88	6%	\$560,689.51
EXPENSE									
Department 448 - STREET LIGHTING	137,000.00	.00	137,000.00	11,416.00	.00	11,416.00	125,584.00	8	10,833.00
Department 451 - CONST-STREET AND BRIDGES	125,000.00	.00	125,000.00	.00	.00	.00	125,000.00	0	.00
Department 463 - MAINTENANCE-STREET	1,959,694.00	.00	1,959,694.00	146,119.00	.00	146,119.00	1,813,575.00	7	131,515.00
Department 475 - MAINTENANCE-TRAFFIC SERV	.00	.00	.00	.00	.00	.00	.00	+++	.00
Department 479 - SNOW AND ICE REMOVAL	450,169.00	.00	450,169.00	37,514.00	.00	37,514.00	412,655.00	8	37,430.00
Department 483 - ADMIN, ENGIN RECORD KEEPI	769,870.00	.00	769,870.00	64,154.00	.00	64,154.00	705,716.00	8	59,136.00
Department 484 - FUND TRANSFERS	7,800,000.00	.00	7,800,000.00	650,000.00	.00	650,000.00	7,150,000.00	8	595,833.00
EXPENSE TOTALS	\$11,241,733.00	\$0.00	\$11,241,733.00	\$909,203.00	\$0.00	\$909,203.00	\$10,332,530.00	8%	\$834,747.00
Fund 203 - LOCAL STREET FUND Totals									
REVENUE TOTALS	11,149,971.00	.00	11,149,971.00	639,362.12	.00	639,362.12	10,510,608.88	6%	560,689.51
EXPENSE TOTALS	11,241,733.00	.00	11,241,733.00	909,203.00	.00	909,203.00	10,332,530.00	8%	834,747.00
Fund 203 - LOCAL STREET FUND Totals	(\$91,762.00)	\$0.00	(\$91,762.00)	(\$269,840.88)	\$0.00	(\$269,840.88)	\$178,078.88		(\$274,057.49)



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 204 - ROAD - SIDEWALK & TREE									
REVENUE									
Department 000 - ACCOUNT BALANCES	13,033,702.00	.00	13,033,702.00	5,267,535.52	.00	5,267,535.52	7,766,166.48	40	4,959,215.56
REVENUE TOTALS	\$13,033,702.00	\$0.00	\$13,033,702.00	\$5,267,535.52	\$0.00	\$5,267,535.52	\$7,766,166.48	40%	\$4,959,215.56
EXPENSE									
Department 441 - PUBLIC SERV ADMIN	33,338.00	.00	33,338.00	2,778.00	.00	2,778.00	30,560.00	8	2,580.00
Department 447 - ENGINEERING	2,700,196.00	90,366.00	2,790,562.00	12,516.00	.00	12,516.00	2,778,046.00	0	11,412.00
Department 463 - MAINTENANCE-STREET	10,880,000.00	78,480.00	10,958,480.00	.00	.00	.00	10,958,480.00	0	.00
Department 530 - FORESTRY	150,000.00	9,855.00	159,855.00	.00	.00	.00	159,855.00	0	.00
EXPENSE TOTALS	\$13,763,534.00	\$178,701.00	\$13,942,235.00	\$15,294.00	\$0.00	\$15,294.00	\$13,926,941.00	0%	\$13,992.00
Fund 204 - ROAD - SIDEWALK & TREE Totals									
REVENUE TOTALS	13,033,702.00	.00	13,033,702.00	5,267,535.52	.00	5,267,535.52	7,766,166.48	40%	4,959,215.56
EXPENSE TOTALS	13,763,534.00	178,701.00	13,942,235.00	15,294.00	.00	15,294.00	13,926,941.00	0%	13,992.00
Fund 204 - ROAD - SIDEWALK & TREE Totals	(\$729,832.00)	(\$178,701.00)	(\$908,533.00)	\$5,252,241.52	\$0.00	\$5,252,241.52	(\$6,160,774.52)		\$4,945,223.56



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 208 - COMMUNITY RECREATION									
REVENUE									
Department 000 - ACCOUNT BALANCES	9,239,176.00	.00	9,239,176.00	4,483,822.03	.00	4,483,822.03	4,755,353.97	49	4,200,530.07
REVENUE TOTALS	\$9,239,176.00	\$0.00	\$9,239,176.00	\$4,483,822.03	\$0.00	\$4,483,822.03	\$4,755,353.97	49%	\$4,200,530.07
EXPENSE									
Department 755 - RECREATION CENTER	7,557,580.00	408,262.00	7,965,842.00	387,978.55	59,161.50	387,978.55	7,518,701.95	6	351,812.00
Department 756 - OTHER RECREATION	172,100.00	324,298.00	496,398.00	7,734.62	.00	7,734.62	488,663.38	2	34,058.08
Department 757 - ICE RINK	390,446.00	.00	390,446.00	.00	.00	.00	390,446.00	0	.00
Department 776 - SPECIAL EVENTS	168,611.00	.00	168,611.00	3,050.72	.00	3,050.72	165,560.28	2	3,480.45
Department 795 - SWIMMING POOL - BOTSFORD	165,492.00	51,665.00	217,157.00	274.18	168.00	274.18	216,714.82	0	269.60
Department 796 - SWIMMING POOL - CLEMENT C	551,775.00	(55,000.00)	496,775.00	502.94	336.00	502.94	495,936.06	0	515.93
Department 797 - SWIMMING POOL - SHELDON	97,736.00	.00	97,736.00	158.14	168.00	158.14	97,409.86	0	155.69
EXPENSE TOTALS	\$9,103,740.00	\$729,225.00	\$9,832,965.00	\$399,699.15	\$59,833.50	\$399,699.15	\$9,373,432.35	5%	\$390,291.75
Fund 208 - COMMUNITY RECREATION Totals									
REVENUE TOTALS	9,239,176.00	.00	9,239,176.00	4,483,822.03	.00	4,483,822.03	4,755,353.97	49%	4,200,530.07
EXPENSE TOTALS	9,103,740.00	729,225.00	9,832,965.00	399,699.15	59,833.50	399,699.15	9,373,432.35	5%	390,291.75
Fund 208 - COMMUNITY RECREATION Totals	\$135,436.00	(\$729,225.00)	(\$593,789.00)	\$4,084,122.88	(\$59,833.50)	\$4,084,122.88	(\$4,618,078.38)		\$3,810,238.32



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 211 - DESIGNATED PURPOSE									
REVENUE									
Department 000 - ACCOUNT BALANCES	150,000.00	.00	150,000.00	12,096.75	.00	12,096.75	137,903.25	8	10,039.76
REVENUE TOTALS	\$150,000.00	\$0.00	\$150,000.00	\$12,096.75	\$0.00	\$12,096.75	\$137,903.25	8%	\$10,039.76
EXPENSE									
Department 000 - ACCOUNT BALANCES	180,000.00	.00	180,000.00	5,891.45	.00	5,891.45	174,108.55	3	12,125.61
EXPENSE TOTALS	\$180,000.00	\$0.00	\$180,000.00	\$5,891.45	\$0.00	\$5,891.45	\$174,108.55	3%	\$12,125.61
Fund 211 - DESIGNATED PURPOSE Totals									
REVENUE TOTALS	150,000.00	.00	150,000.00	12,096.75	.00	12,096.75	137,903.25	8%	10,039.76
EXPENSE TOTALS	180,000.00	.00	180,000.00	5,891.45	.00	5,891.45	174,108.55	3%	12,125.61
Fund 211 - DESIGNATED PURPOSE Totals	(\$30,000.00)	\$0.00	(\$30,000.00)	\$6,205.30	\$0.00	\$6,205.30	(\$36,205.30)		(\$2,085.85)



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 219 - SP ASSESS-LIGHTING									
REVENUE									
Department 000 - ACCOUNT BALANCES	17,000.00	.00	17,000.00	5,130.96	.00	5,130.96	11,869.04	30	2,063.47
Department 457 - STREETLIGHTING	1,086,610.00	.00	1,086,610.00	1,086,651.52	.00	1,086,651.52	(41.52)	100	1,154,117.51
REVENUE TOTALS	\$1,103,610.00	\$0.00	\$1,103,610.00	\$1,091,782.48	\$0.00	\$1,091,782.48	\$11,827.52	99%	\$1,156,180.98
EXPENSE									
Department 000 - ACCOUNT BALANCES	.00	.00	.00	.00	.00	.00	.00	+++	.00
Department 457 - STREETLIGHTING	1,158,452.00	.00	1,158,452.00	103,857.54	.00	103,857.54	1,054,594.46	9	100,006.21
EXPENSE TOTALS	\$1,158,452.00	\$0.00	\$1,158,452.00	\$103,857.54	\$0.00	\$103,857.54	\$1,054,594.46	9%	\$100,006.21
Fund 219 - SP ASSESS-LIGHTING Totals									
REVENUE TOTALS	1,103,610.00	.00	1,103,610.00	1,091,782.48	.00	1,091,782.48	11,827.52	99%	1,156,180.98
EXPENSE TOTALS	1,158,452.00	.00	1,158,452.00	103,857.54	.00	103,857.54	1,054,594.46	9%	100,006.21
Fund 219 - SP ASSESS-LIGHTING Totals	(\$54,842.00)	\$0.00	(\$54,842.00)	\$987,924.94	\$0.00	\$987,924.94	(\$1,042,766.94)		\$1,056,174.77



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 226 - MUNICIPAL REFUSE FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	14,062,303.00	.00	14,062,303.00	12,555,550.20	.00	12,555,550.20	1,506,752.80	89	11,840,773.12
REVENUE TOTALS	\$14,062,303.00	\$0.00	\$14,062,303.00	\$12,555,550.20	\$0.00	\$12,555,550.20	\$1,506,752.80	89%	\$11,840,773.12
EXPENSE									
Department 521 - SANITATION	1,452,031.00	.00	1,452,031.00	112,055.69	.00	112,055.69	1,339,975.31	8	110,769.27
Department 528 - PUBLIC SERVICE	14,524,078.00	355,217.00	14,879,295.00	996,067.81	.00	996,067.81	13,883,227.19	7	825,786.68
Department 529 - ANIMAL CONTROL	410,048.00	.00	410,048.00	8,504.49	.00	8,504.49	401,543.51	2	9,726.55
EXPENSE TOTALS	\$16,386,157.00	\$355,217.00	\$16,741,374.00	\$1,116,627.99	\$0.00	\$1,116,627.99	\$15,624,746.01	7%	\$946,282.50
Fund 226 - MUNICIPAL REFUSE FUND Totals									
REVENUE TOTALS	14,062,303.00	.00	14,062,303.00	12,555,550.20	.00	12,555,550.20	1,506,752.80	89%	11,840,773.12
EXPENSE TOTALS	16,386,157.00	355,217.00	16,741,374.00	1,116,627.99	.00	1,116,627.99	15,624,746.01	7%	946,282.50
Fund 226 - MUNICIPAL REFUSE FUND Totals	(\$2,323,854.00)	(\$355,217.00)	(\$2,679,071.00)	\$11,438,922.21	\$0.00	\$11,438,922.21	(\$14,117,993.21)		\$10,894,490.62



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Fund 242 - LIVONIA BROWNFIELD - LSRRF									
REVENUE									
Department 000 - ACCOUNT BALANCES	180,000.00	.00	180,000.00	3,095.97	.00	3,095.97	176,904.03	2	66,833.14
REVENUE TOTALS	\$180,000.00	\$0.00	\$180,000.00	\$3,095.97	\$0.00	\$3,095.97	\$176,904.03	2%	\$66,833.14
EXPENSE									
Department 000 - ACCOUNT BALANCES	38,300.00	.00	38,300.00	2,775.00	.00	2,775.00	35,525.00	7	2,640.00
EXPENSE TOTALS	\$38,300.00	\$0.00	\$38,300.00	\$2,775.00	\$0.00	\$2,775.00	\$35,525.00	7%	\$2,640.00
Fund 242 - LIVONIA BROWNFIELD - LSRRF Totals									
REVENUE TOTALS	180,000.00	.00	180,000.00	3,095.97	.00	3,095.97	176,904.03	2%	66,833.14
EXPENSE TOTALS	38,300.00	.00	38,300.00	2,775.00	.00	2,775.00	35,525.00	7%	2,640.00
Fund 242 - LIVONIA BROWNFIELD - LSRRF Totals	\$141,700.00	\$0.00	\$141,700.00	\$320.97	\$0.00	\$320.97	\$141,379.03		\$64,193.14



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 243 - LIVONIA BROWNFIELD REDEV AUTH									
REVENUE									
Department 000 - ACCOUNT BALANCES	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0	293,895.84
REVENUE TOTALS	\$1,170,000.00	\$0.00	\$1,170,000.00	\$0.00	\$0.00	\$0.00	\$1,170,000.00	0%	\$293,895.84
EXPENSE									
Department 000 - ACCOUNT BALANCES	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0	.00
EXPENSE TOTALS	\$1,170,000.00	\$0.00	\$1,170,000.00	\$0.00	\$0.00	\$0.00	\$1,170,000.00	0%	\$0.00
Fund 243 - LIVONIA BROWNFIELD REDEV AUTH Totals									
REVENUE TOTALS	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0%	293,895.84
EXPENSE TOTALS	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0%	.00
Fund 243 - LIVONIA BROWNFIELD REDEV AUTH Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$293,895.84



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 244 - ECONOMIC DEVEL CORP									
REVENUE									
Department 000 - ACCOUNT BALANCES	1,000.00	.00	1,000.00	159.03	.00	159.03	840.97	16	58.59
REVENUE TOTALS	\$1,000.00	\$0.00	\$1,000.00	\$159.03	\$0.00	\$159.03	\$840.97	16%	\$58.59
EXPENSE									
Department 000 - ACCOUNT BALANCES	107.00	.00	107.00	.00	.00	.00	107.00	0	.00
EXPENSE TOTALS	\$107.00	\$0.00	\$107.00	\$0.00	\$0.00	\$0.00	\$107.00	0%	\$0.00
Fund 244 - ECONOMIC DEVEL CORP Totals									
REVENUE TOTALS	1,000.00	.00	1,000.00	159.03	.00	159.03	840.97	16%	58.59
EXPENSE TOTALS	107.00	.00	107.00	.00	.00	.00	107.00	0%	.00
Fund 244 - ECONOMIC DEVEL CORP Totals	\$893.00	\$0.00	\$893.00	\$159.03	\$0.00	\$159.03	\$733.97		\$58.59



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Fund 248 - PLYMOUTH RD DEV AUTHORITY									
REVENUE									
Department 000 - ACCOUNT BALANCES	799,117.00	.00	799,117.00	430.32	.00	430.32	798,686.68	0	332.50
REVENUE TOTALS	\$799,117.00	\$0.00	\$799,117.00	\$430.32	\$0.00	\$430.32	\$798,686.68	0%	\$332.50
EXPENSE									
Department 000 - ACCOUNT BALANCES	842,524.00	.00	842,524.00	25.00	.00	25.00	842,499.00	0	15.00
EXPENSE TOTALS	\$842,524.00	\$0.00	\$842,524.00	\$25.00	\$0.00	\$25.00	\$842,499.00	0%	\$15.00
Fund 248 - PLYMOUTH RD DEV AUTHORITY Totals									
REVENUE TOTALS	799,117.00	.00	799,117.00	430.32	.00	430.32	798,686.68	0%	332.50
EXPENSE TOTALS	842,524.00	.00	842,524.00	25.00	.00	25.00	842,499.00	0%	15.00
Fund 248 - PLYMOUTH RD DEV AUTHORITY Totals	(\$43,407.00)	\$0.00	(\$43,407.00)	\$405.32	\$0.00	\$405.32	(\$43,812.32)		\$317.50



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Fund 260 - MIDC GRANT									
REVENUE									
Department 000 - ACCOUNT BALANCES	362,299.00	.00	362,299.00	241,464.54	.00	241,464.54	120,834.46	67	418,643.64
REVENUE TOTALS	\$362,299.00	\$0.00	\$362,299.00	\$241,464.54	\$0.00	\$241,464.54	\$120,834.46	67%	\$418,643.64
EXPENSE									
Department 000 - ACCOUNT BALANCES	362,299.00	.00	362,299.00	19,485.34	.00	19,485.34	342,813.66	5	12,878.32
EXPENSE TOTALS	\$362,299.00	\$0.00	\$362,299.00	\$19,485.34	\$0.00	\$19,485.34	\$342,813.66	5%	\$12,878.32
Fund 260 - MIDC GRANT Totals									
REVENUE TOTALS	362,299.00	.00	362,299.00	241,464.54	.00	241,464.54	120,834.46	67%	418,643.64
EXPENSE TOTALS	362,299.00	.00	362,299.00	19,485.34	.00	19,485.34	342,813.66	5%	12,878.32
Fund 260 - MIDC GRANT Totals	\$0.00	\$0.00	\$0.00	\$221,979.20	\$0.00	\$221,979.20	(\$221,979.20)		\$405,765.32



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Fund 261 - PUB. SAFETY COMMUNICATION									
REVENUE									
Department 000 - ACCOUNT BALANCES	623,000.00	.00	623,000.00	244,976.81	.00	244,976.81	378,023.19	39	233,307.44
REVENUE TOTALS	\$623,000.00	\$0.00	\$623,000.00	\$244,976.81	\$0.00	\$244,976.81	\$378,023.19	39%	\$233,307.44
EXPENSE									
Department 000 - ACCOUNT BALANCES	1,258,000.00	2,314,579.00	3,572,579.00	1,851.00	2,314,578.63	1,851.00	1,256,149.37	65	1,845.00
EXPENSE TOTALS	\$1,258,000.00	\$2,314,579.00	\$3,572,579.00	\$1,851.00	\$2,314,578.63	\$1,851.00	\$1,256,149.37	65%	\$1,845.00
Fund 261 - PUB. SAFETY COMMUNICATION Totals									
REVENUE TOTALS	623,000.00	.00	623,000.00	244,976.81	.00	244,976.81	378,023.19	39%	233,307.44
EXPENSE TOTALS	1,258,000.00	2,314,579.00	3,572,579.00	1,851.00	2,314,578.63	1,851.00	1,256,149.37	65%	1,845.00
Fund 261 - PUB. SAFETY COMMUNICATION Totals	(\$635,000.00)	(\$2,314,579.00)	(\$2,949,579.00)	\$243,125.81	(\$2,314,578.63)	\$243,125.81	(\$878,126.18)		\$231,462.44



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 262 - ADJUDICATED FORFEITURES									
REVENUE									
Department 000 - ACCOUNT BALANCES	297,500.00	.00	297,500.00	22,473.77	.00	22,473.77	275,026.23	8	6,789.13
REVENUE TOTALS	\$297,500.00	\$0.00	\$297,500.00	\$22,473.77	\$0.00	\$22,473.77	\$275,026.23	8%	\$6,789.13
EXPENSE									
Department 333 - STATE/LOCAL FORFEITURE EX	1,199,527.00	.00	1,199,527.00	(28,094.00)	.00	(28,094.00)	1,227,621.00	-2	5,600.21
Department 334 - FEDERAL FORFEITURE EXP	53,750.00	36,004.00	89,754.00	.00	36,004.00	.00	53,750.00	40	.00
Department 335 - CONTINUING CRIMINAL ENTERPRISE	212,500.00	.00	212,500.00	.00	.00	.00	212,500.00	0	.00
EXPENSE TOTALS	\$1,465,777.00	\$36,004.00	\$1,501,781.00	(\$28,094.00)	\$36,004.00	(\$28,094.00)	\$1,493,871.00	1%	\$5,600.21
Fund 262 - ADJUDICATED FORFEITURES Totals									
REVENUE TOTALS	297,500.00	.00	297,500.00	22,473.77	.00	22,473.77	275,026.23	8%	6,789.13
EXPENSE TOTALS	1,465,777.00	36,004.00	1,501,781.00	(28,094.00)	36,004.00	(28,094.00)	1,493,871.00	1%	5,600.21
Fund 262 - ADJUDICATED FORFEITURES Totals	(\$1,168,277.00)	(\$36,004.00)	(\$1,204,281.00)	\$50,567.77	(\$36,004.00)	\$50,567.77	(\$1,218,844.77)		\$1,188.92



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 270 - HISTORICAL COMMISSION									
REVENUE									
Department 000 - ACCOUNT BALANCES	107,700.00	.00	107,700.00	17,770.42	.00	17,770.42	89,929.58	16	9,976.84
REVENUE TOTALS	\$107,700.00	\$0.00	\$107,700.00	\$17,770.42	\$0.00	\$17,770.42	\$89,929.58	16%	\$9,976.84
EXPENSE									
Department 000 - ACCOUNT BALANCES	106,000.00	.00	106,000.00	1,890.03	.00	1,890.03	104,109.97	2	9,688.67
EXPENSE TOTALS	\$106,000.00	\$0.00	\$106,000.00	\$1,890.03	\$0.00	\$1,890.03	\$104,109.97	2%	\$9,688.67
Fund 270 - HISTORICAL COMMISSION Totals									
REVENUE TOTALS	107,700.00	.00	107,700.00	17,770.42	.00	17,770.42	89,929.58	16%	9,976.84
EXPENSE TOTALS	106,000.00	.00	106,000.00	1,890.03	.00	1,890.03	104,109.97	2%	9,688.67
Fund 270 - HISTORICAL COMMISSION Totals	\$1,700.00	\$0.00	\$1,700.00	\$15,880.39	\$0.00	\$15,880.39	(\$14,180.39)		\$288.17



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 271 - LIBRARY FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	5,028,550.00	.00	5,028,550.00	4,269,190.93	.00	4,269,190.93	759,359.07	85	4,034,134.60
REVENUE TOTALS	\$5,028,550.00	\$0.00	\$5,028,550.00	\$4,269,190.93	\$0.00	\$4,269,190.93	\$759,359.07	85%	\$4,034,134.60
EXPENSE									
Department 778 - CIVIC CENTER LIBRARY	4,427,071.00	1,380,836.00	5,807,907.00	169,894.81	5,449.96	169,894.81	5,632,562.23	3	174,992.81
Department 779 - NOBLE LIBRARY	15,000.00	(6,500.00)	8,500.00	167.90	.00	167.90	8,332.10	2	152.25
Department 780 - SANDBURG LIBRARY	1,055,083.00	33,091.00	1,088,174.00	45,859.67	2,799.98	45,859.67	1,039,514.35	4	52,269.49
EXPENSE TOTALS	\$5,497,154.00	\$1,407,427.00	\$6,904,581.00	\$215,922.38	\$8,249.94	\$215,922.38	\$6,680,408.68	3%	\$227,414.55
Fund 271 - LIBRARY FUND Totals									
REVENUE TOTALS	5,028,550.00	.00	5,028,550.00	4,269,190.93	.00	4,269,190.93	759,359.07	85%	4,034,134.60
EXPENSE TOTALS	5,497,154.00	1,407,427.00	6,904,581.00	215,922.38	8,249.94	215,922.38	6,680,408.68	3%	227,414.55
Fund 271 - LIBRARY FUND Totals	(\$468,604.00)	(\$1,407,427.00)	(\$1,876,031.00)	\$4,053,268.55	(\$8,249.94)	\$4,053,268.55	(\$5,921,049.61)		\$3,806,720.05



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Fund 272 - ARTS COMMISSION FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	6,000.00	.00	6,000.00	499.92	.00	499.92	5,500.08	8	224.29
REVENUE TOTALS	\$6,000.00	\$0.00	\$6,000.00	\$499.92	\$0.00	\$499.92	\$5,500.08	8%	\$224.29
EXPENSE									
Department 000 - ACCOUNT BALANCES	17,700.00	.00	17,700.00	.00	.00	.00	17,700.00	0	.00
EXPENSE TOTALS	\$17,700.00	\$0.00	\$17,700.00	\$0.00	\$0.00	\$0.00	\$17,700.00	0%	\$0.00
Fund 272 - ARTS COMMISSION FUND Totals									
REVENUE TOTALS	6,000.00	.00	6,000.00	499.92	.00	499.92	5,500.08	8%	224.29
EXPENSE TOTALS	17,700.00	.00	17,700.00	.00	.00	.00	17,700.00	0%	.00
Fund 272 - ARTS COMMISSION FUND Totals	(\$11,700.00)	\$0.00	(\$11,700.00)	\$499.92	\$0.00	\$499.92	(\$12,199.92)		\$224.29



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Fund 284 - OPIOID SETTLEMENT FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	105,153.00	.00	105,153.00	2,303.61	.00	2,303.61	102,849.39	2	.00
REVENUE TOTALS	\$105,153.00	\$0.00	\$105,153.00	\$2,303.61	\$0.00	\$2,303.61	\$102,849.39	2%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	100,765.00	.00	100,765.00	.00	.00	.00	100,765.00	0	.00
EXPENSE TOTALS	\$100,765.00	\$0.00	\$100,765.00	\$0.00	\$0.00	\$0.00	\$100,765.00	0%	\$0.00
Fund 284 - OPIOID SETTLEMENT FUND Totals									
REVENUE TOTALS	105,153.00	.00	105,153.00	2,303.61	.00	2,303.61	102,849.39	2%	.00
EXPENSE TOTALS	100,765.00	.00	100,765.00	.00	.00	.00	100,765.00	0%	.00
Fund 284 - OPIOID SETTLEMENT FUND Totals	\$4,388.00	\$0.00	\$4,388.00	\$2,303.61	\$0.00	\$2,303.61	\$2,084.39		\$0.00



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Fund 286 - TRANSIT & CAPITAL IMPR									
REVENUE									
Department 000 - ACCOUNT BALANCES	2,776,240.00	.00	2,776,240.00	2,585,710.86	.00	2,585,710.86	190,529.14	93	2,444,863.00
REVENUE TOTALS	\$2,776,240.00	\$0.00	\$2,776,240.00	\$2,585,710.86	\$0.00	\$2,585,710.86	\$190,529.14	93%	\$2,444,863.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	2,776,240.00	.00	2,776,240.00	2,776,240.00	.00	2,776,240.00	.00	100	2,608,950.00
EXPENSE TOTALS	\$2,776,240.00	\$0.00	\$2,776,240.00	\$2,776,240.00	\$0.00	\$2,776,240.00	\$0.00	100%	\$2,608,950.00
Fund 286 - TRANSIT & CAPITAL IMPR Totals									
REVENUE TOTALS	2,776,240.00	.00	2,776,240.00	2,585,710.86	.00	2,585,710.86	190,529.14	93%	2,444,863.00
EXPENSE TOTALS	2,776,240.00	.00	2,776,240.00	2,776,240.00	.00	2,776,240.00	.00	100%	2,608,950.00
Fund 286 - TRANSIT & CAPITAL IMPR Totals	\$0.00	\$0.00	\$0.00	(\$190,529.14)	\$0.00	(\$190,529.14)	\$190,529.14		(\$164,087.00)



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Fund 288 - COMMUNITY TRANSIT PROGRAM									
REVENUE									
Department 000 - ACCOUNT BALANCES	716,445.00	.00	716,445.00	512,117.17	.00	512,117.17	204,327.83	71	556,696.31
REVENUE TOTALS	\$716,445.00	\$0.00	\$716,445.00	\$512,117.17	\$0.00	\$512,117.17	\$204,327.83	71%	\$556,696.31
EXPENSE									
Department 606 - COMM TRANSIT DISPATCHERS	109,938.00	.00	109,938.00	4,190.58	.00	4,190.58	105,747.42	4	4,378.79
Department 607 - COMMUNITY TRANSIT ADMIN	166,398.00	50,400.00	216,798.00	7,169.29	.00	7,169.29	209,628.71	3	9,518.51
Department 608 - COMMUNITY TRANSIT	977,513.00	.00	977,513.00	144,710.84	.00	144,710.84	832,802.16	15	268,510.67
EXPENSE TOTALS	\$1,253,849.00	\$50,400.00	\$1,304,249.00	\$156,070.71	\$0.00	\$156,070.71	\$1,148,178.29	12%	\$282,407.97
Fund 288 - COMMUNITY TRANSIT PROGRAM Totals									
REVENUE TOTALS	716,445.00	.00	716,445.00	512,117.17	.00	512,117.17	204,327.83	71%	556,696.31
EXPENSE TOTALS	1,253,849.00	50,400.00	1,304,249.00	156,070.71	.00	156,070.71	1,148,178.29	12%	282,407.97
Fund 288 - COMMUNITY TRANSIT PROGRAM Totals	(\$537,404.00)	(\$50,400.00)	(\$587,804.00)	\$356,046.46	\$0.00	\$356,046.46	(\$943,850.46)		\$274,288.34



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Fund 297 - CABLE TELEVISION FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	378,200.00	.00	378,200.00	2,909.20	.00	2,909.20	375,290.80	1	1,708.65
REVENUE TOTALS	\$378,200.00	\$0.00	\$378,200.00	\$2,909.20	\$0.00	\$2,909.20	\$375,290.80	1%	\$1,708.65
EXPENSE									
Department 806 - CABLE TELEVISION	569,659.00	.00	569,659.00	23,021.09	.00	23,021.09	546,637.91	4	25,630.80
EXPENSE TOTALS	\$569,659.00	\$0.00	\$569,659.00	\$23,021.09	\$0.00	\$23,021.09	\$546,637.91	4%	\$25,630.80
Fund 297 - CABLE TELEVISION FUND Totals									
REVENUE TOTALS	378,200.00	.00	378,200.00	2,909.20	.00	2,909.20	375,290.80	1%	1,708.65
EXPENSE TOTALS	569,659.00	.00	569,659.00	23,021.09	.00	23,021.09	546,637.91	4%	25,630.80
Fund 297 - CABLE TELEVISION FUND Totals	(\$191,459.00)	\$0.00	(\$191,459.00)	(\$20,111.89)	\$0.00	(\$20,111.89)	(\$171,347.11)		(\$23,922.15)



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Fund 372 - D/S 2015 MBA REFUNDING									
REVENUE									
Department 000 - ACCOUNT BALANCES	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0	.00
REVENUE TOTALS	\$181,984.00	\$0.00	\$181,984.00	\$0.00	\$0.00	\$0.00	\$181,984.00	0%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0	.00
EXPENSE TOTALS	\$181,984.00	\$0.00	\$181,984.00	\$0.00	\$0.00	\$0.00	\$181,984.00	0%	\$0.00
Fund 372 - D/S 2015 MBA REFUNDING Totals									
REVENUE TOTALS	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0%	.00
EXPENSE TOTALS	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0%	.00
Fund 372 - D/S 2015 MBA REFUNDING Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00



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Fund 373 - D/S 2016 MBA REFUNDING									
REVENUE									
Department 000 - ACCOUNT BALANCES	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0	.00
REVENUE TOTALS	\$548,600.00	\$0.00	\$548,600.00	\$0.00	\$0.00	\$0.00	\$548,600.00	0%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0	.00
EXPENSE TOTALS	\$548,600.00	\$0.00	\$548,600.00	\$0.00	\$0.00	\$0.00	\$548,600.00	0%	\$0.00
Fund 373 - D/S 2016 MBA REFUNDING Totals									
REVENUE TOTALS	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0%	.00
EXPENSE TOTALS	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0%	.00
Fund 373 - D/S 2016 MBA REFUNDING Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 374 - D/S 2017 MBA REFUNDING									
REVENUE									
Department 000 - ACCOUNT BALANCES	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0	.00
REVENUE TOTALS	\$1,994,850.00	\$0.00	\$1,994,850.00	\$0.00	\$0.00	\$0.00	\$1,994,850.00	0%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0	.00
EXPENSE TOTALS	\$1,994,850.00	\$0.00	\$1,994,850.00	\$0.00	\$0.00	\$0.00	\$1,994,850.00	0%	\$0.00
Fund 374 - D/S 2017 MBA REFUNDING Totals									
REVENUE TOTALS	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0%	.00
EXPENSE TOTALS	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0%	.00
Fund 374 - D/S 2017 MBA REFUNDING Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00



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Fund 401 - CAPITAL PROJECTS									
REVENUE									
Department 000 - ACCOUNT BALANCES	2,672,240.00	.00	2,672,240.00	2,355,789.84	.00	2,355,789.84	316,450.16	88	2,572,443.54
REVENUE TOTALS	\$2,672,240.00	\$0.00	\$2,672,240.00	\$2,355,789.84	\$0.00	\$2,355,789.84	\$316,450.16	88%	\$2,572,443.54
EXPENSE									
Department 000 - ACCOUNT BALANCES	3,755,000.00	6,497,959.00	10,252,959.00	62,262.81	418,657.04	62,262.81	9,772,039.15	5	17,329.89
EXPENSE TOTALS	\$3,755,000.00	\$6,497,959.00	\$10,252,959.00	\$62,262.81	\$418,657.04	\$62,262.81	\$9,772,039.15	5%	\$17,329.89
Fund 401 - CAPITAL PROJECTS Totals									
REVENUE TOTALS	2,672,240.00	.00	2,672,240.00	2,355,789.84	.00	2,355,789.84	316,450.16	88%	2,572,443.54
EXPENSE TOTALS	3,755,000.00	6,497,959.00	10,252,959.00	62,262.81	418,657.04	62,262.81	9,772,039.15	5%	17,329.89
Fund 401 - CAPITAL PROJECTS Totals	(\$1,082,760.00)	(\$6,497,959.00)	(\$7,580,719.00)	\$2,293,527.03	(\$418,657.04)	\$2,293,527.03	(\$9,455,588.99)		\$2,555,113.65



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Fund 409 - GOLF COURSE CAPITAL IMPR									
REVENUE									
Department 000 - ACCOUNT BALANCES	461,000.00	.00	461,000.00	261,614.27	.00	261,614.27	199,385.73	57	(4,075.07)
REVENUE TOTALS	\$461,000.00	\$0.00	\$461,000.00	\$261,614.27	\$0.00	\$261,614.27	\$199,385.73	57%	(\$4,075.07)
EXPENSE									
Department 000 - ACCOUNT BALANCES	335,234.00	.00	335,234.00	.00	100,000.00	.00	235,234.00	30	.00
EXPENSE TOTALS	\$335,234.00	\$0.00	\$335,234.00	\$0.00	\$100,000.00	\$0.00	\$235,234.00	30%	\$0.00
Fund 409 - GOLF COURSE CAPITAL IMPR Totals									
REVENUE TOTALS	461,000.00	.00	461,000.00	261,614.27	.00	261,614.27	199,385.73	57%	(4,075.07)
EXPENSE TOTALS	335,234.00	.00	335,234.00	.00	100,000.00	.00	235,234.00	30%	.00
Fund 409 - GOLF COURSE CAPITAL IMPR Totals	\$125,766.00	\$0.00	\$125,766.00	\$261,614.27	(\$100,000.00)	\$261,614.27	(\$35,848.27)		(\$4,075.07)



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Fund 418 - BUILDING IMPROVEMENT FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	330,000.00	.00	330,000.00	67,068.14	.00	67,068.14	262,931.86	20	22,147.36
REVENUE TOTALS	\$330,000.00	\$0.00	\$330,000.00	\$67,068.14	\$0.00	\$67,068.14	\$262,931.86	20%	\$22,147.36
EXPENSE									
Department 000 - ACCOUNT BALANCES	150,000.00	50,000.00	200,000.00	.00	.00	.00	200,000.00	0	.00
EXPENSE TOTALS	\$150,000.00	\$50,000.00	\$200,000.00	\$0.00	\$0.00	\$0.00	\$200,000.00	0%	\$0.00
Fund 418 - BUILDING IMPROVEMENT FUND Totals									
REVENUE TOTALS	330,000.00	.00	330,000.00	67,068.14	.00	67,068.14	262,931.86	20%	22,147.36
EXPENSE TOTALS	150,000.00	50,000.00	200,000.00	.00	.00	.00	200,000.00	0%	.00
Fund 418 - BUILDING IMPROVEMENT FUND Totals	\$180,000.00	(\$50,000.00)	\$130,000.00	\$67,068.14	\$0.00	\$67,068.14	\$62,931.86		\$22,147.36



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 419 - SENIOR CENTER CONSTRUCTION FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	140,000.00	.00	140,000.00	25,132.62	.00	25,132.62	114,867.38	18	9,419.04
REVENUE TOTALS	\$140,000.00	\$0.00	\$140,000.00	\$25,132.62	\$0.00	\$25,132.62	\$114,867.38	18%	\$9,419.04
EXPENSE									
Department 000 - ACCOUNT BALANCES	.00	629,337.00	629,337.00	16,587.05	.00	16,587.05	612,749.95	3	.00
EXPENSE TOTALS	\$0.00	\$629,337.00	\$629,337.00	\$16,587.05	\$0.00	\$16,587.05	\$612,749.95	3%	\$0.00
Fund 419 - SENIOR CENTER CONSTRUCTION FUND Totals									
REVENUE TOTALS	140,000.00	.00	140,000.00	25,132.62	.00	25,132.62	114,867.38	18%	9,419.04
EXPENSE TOTALS	.00	629,337.00	629,337.00	16,587.05	.00	16,587.05	612,749.95	3%	.00
Fund 419 - SENIOR CENTER CONSTRUCTION FUND Totals	\$140,000.00	(\$629,337.00)	(\$489,337.00)	\$8,545.57	\$0.00	\$8,545.57	(\$497,882.57)		\$9,419.04



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 470 - COURT BUILDING IMPROVEMENTS									
REVENUE									
Department 000 - ACCOUNT BALANCES	600,000.00	.00	600,000.00	47,515.34	.00	47,515.34	552,484.66	8	29,258.63
REVENUE TOTALS	\$600,000.00	\$0.00	\$600,000.00	\$47,515.34	\$0.00	\$47,515.34	\$552,484.66	8%	\$29,258.63
EXPENSE									
Department 000 - ACCOUNT BALANCES	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0	.00
EXPENSE TOTALS	\$548,600.00	\$0.00	\$548,600.00	\$0.00	\$0.00	\$0.00	\$548,600.00	0%	\$0.00
Fund 470 - COURT BUILDING IMPROVEMENTS Totals									
REVENUE TOTALS	600,000.00	.00	600,000.00	47,515.34	.00	47,515.34	552,484.66	8%	29,258.63
EXPENSE TOTALS	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0%	.00
Fund 470 - COURT BUILDING IMPROVEMENTS Totals	\$51,400.00	\$0.00	\$51,400.00	\$47,515.34	\$0.00	\$47,515.34	\$3,884.66		\$29,258.63



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 536 - NEWBURGH VILLAGE									
REVENUE									
Department 000 - ACCOUNT BALANCES	900,200.00	.00	900,200.00	75,969.65	.00	75,969.65	824,230.35	8	71,565.35
REVENUE TOTALS	\$900,200.00	\$0.00	\$900,200.00	\$75,969.65	\$0.00	\$75,969.65	\$824,230.35	8%	\$71,565.35
EXPENSE									
Department 677 - NEWBURGH VILLAGE	1,101,864.00	183,143.00	1,285,007.00	30,745.72	28,000.00	30,745.72	1,226,261.28	5	41,192.21
EXPENSE TOTALS	\$1,101,864.00	\$183,143.00	\$1,285,007.00	\$30,745.72	\$28,000.00	\$30,745.72	\$1,226,261.28	5%	\$41,192.21
Fund 536 - NEWBURGH VILLAGE Totals									
REVENUE TOTALS	900,200.00	.00	900,200.00	75,969.65	.00	75,969.65	824,230.35	8%	71,565.35
EXPENSE TOTALS	1,101,864.00	183,143.00	1,285,007.00	30,745.72	28,000.00	30,745.72	1,226,261.28	5%	41,192.21
Fund 536 - NEWBURGH VILLAGE Totals	(\$201,664.00)	(\$183,143.00)	(\$384,807.00)	\$45,223.93	(\$28,000.00)	\$45,223.93	(\$402,030.93)		\$30,373.14



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 538 - SILVER VILLAGE FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	750,780.00	.00	750,780.00	70,019.91	.00	70,019.91	680,760.09	9	57,775.79
REVENUE TOTALS	\$750,780.00	\$0.00	\$750,780.00	\$70,019.91	\$0.00	\$70,019.91	\$680,760.09	9%	\$57,775.79
EXPENSE									
Department 676 - SILVER VILLAGE	724,020.00	104,516.00	828,536.00	29,109.09	.00	29,109.09	799,426.91	4	40,068.35
EXPENSE TOTALS	\$724,020.00	\$104,516.00	\$828,536.00	\$29,109.09	\$0.00	\$29,109.09	\$799,426.91	4%	\$40,068.35
Fund 538 - SILVER VILLAGE FUND Totals									
REVENUE TOTALS	750,780.00	.00	750,780.00	70,019.91	.00	70,019.91	680,760.09	9%	57,775.79
EXPENSE TOTALS	724,020.00	104,516.00	828,536.00	29,109.09	.00	29,109.09	799,426.91	4%	40,068.35
Fund 538 - SILVER VILLAGE FUND Totals	\$26,760.00	(\$104,516.00)	(\$77,756.00)	\$40,910.82	\$0.00	\$40,910.82	(\$118,666.82)		\$17,707.44



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 584 - GOLF COURSE FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	2,289,051.00	.00	2,289,051.00	28,936.06	.00	28,936.06	2,260,114.94	1	21,814.09
REVENUE TOTALS	\$2,289,051.00	\$0.00	\$2,289,051.00	\$28,936.06	\$0.00	\$28,936.06	\$2,260,114.94	1%	\$21,814.09
EXPENSE									
Department 000 - ACCOUNT BALANCES	250,000.00	.00	250,000.00	250,000.00	.00	250,000.00	.00	100	.00
Department 773 - WHISPERING WILLOWS	790,311.00	.00	790,311.00	44,133.60	1,516.66	44,133.60	744,660.74	6	25,525.82
Department 774 - IDYL WYLD	645,211.00	.00	645,211.00	43,824.01	1,516.66	43,824.01	599,870.33	7	26,935.57
Department 775 - FOX CREEK	810,581.00	.00	810,581.00	36,249.22	8,168.68	36,249.22	766,163.10	5	31,989.86
EXPENSE TOTALS	\$2,496,103.00	\$0.00	\$2,496,103.00	\$374,206.83	\$11,202.00	\$374,206.83	\$2,110,694.17	15%	\$84,451.25
Fund 584 - GOLF COURSE FUND Totals									
REVENUE TOTALS	2,289,051.00	.00	2,289,051.00	28,936.06	.00	28,936.06	2,260,114.94	1%	21,814.09
EXPENSE TOTALS	2,496,103.00	.00	2,496,103.00	374,206.83	11,202.00	374,206.83	2,110,694.17	15%	84,451.25
Fund 584 - GOLF COURSE FUND Totals	(\$207,052.00)	\$0.00	(\$207,052.00)	(\$345,270.77)	(\$11,202.00)	(\$345,270.77)	\$149,420.77		(\$62,637.16)



BUDGET TO ACTUAL - COUNCIL SUMMARY - 12/31/2023

Through 12/31/23

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 592 - WATER AND SEWER FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	45,909,967.00	.00	45,909,967.00	3,099,968.08	.00	3,099,968.08	42,809,998.92	7	3,078,746.43
Department 558 - W & S FINANCIAL ADMIN	.00	.00	.00	.00	.00	.00	.00	+++	.00
REVENUE TOTALS	\$45,909,967.00	\$0.00	\$45,909,967.00	\$3,099,968.08	\$0.00	\$3,099,968.08	\$42,809,998.92	7%	\$3,078,746.43
EXPENSE									
Department 558 - W & S FINANCIAL ADMIN	35,408,704.00	.00	35,408,704.00	2,601,263.18	1,000.00	2,601,263.18	32,806,440.82	7	2,915,343.57
Department 559 - W & S FIELD OPERATIONS	9,236,819.00	1,900,243.00	11,137,062.00	351,173.86	221,276.00	351,173.86	10,564,612.14	5	284,555.80
EXPENSE TOTALS	\$44,645,523.00	\$1,900,243.00	\$46,545,766.00	\$2,952,437.04	\$222,276.00	\$2,952,437.04	\$43,371,052.96	7%	\$3,199,899.37
Fund 592 - WATER AND SEWER FUND Totals									
REVENUE TOTALS	45,909,967.00	.00	45,909,967.00	3,099,968.08	.00	3,099,968.08	42,809,998.92	7%	3,078,746.43
EXPENSE TOTALS	44,645,523.00	1,900,243.00	46,545,766.00	2,952,437.04	222,276.00	2,952,437.04	43,371,052.96	7%	3,199,899.37
Fund 592 - WATER AND SEWER FUND Totals	\$1,264,444.00	(\$1,900,243.00)	(\$635,799.00)	\$147,531.04	(\$222,276.00)	\$147,531.04	(\$561,054.04)		(\$121,152.94)
Grand Totals									
REVENUE TOTALS	198,934,308.00	.00	198,934,308.00	80,318,398.44	.00	80,318,398.44	118,615,909.56	40%	76,524,277.72
EXPENSE TOTALS	205,240,767.00	14,691,977.00	219,932,744.00	13,185,423.00	3,271,873.25	13,185,423.00	203,475,447.75	7%	12,830,497.67
Grand Totals	(\$6,306,459.00)	(\$14,691,977.00)	(\$20,998,436.00)	\$67,132,975.44	(\$3,271,873.25)	\$67,132,975.44	(\$84,859,538.19)		\$63,693,780.05



LETTER TO THE LIVONIA CITY COUNCIL

b.

Finance
March 26, 2024

MEETING DATE

R041524

PRESENTED BY

Michael Slater, Finance Director

AGENDA ITEM

b. Communication from the Department of Finance, dated March 26, 2024, re: forwarding various financial statements of the City of Livonia for the month ending January 31, 2024.

BACKGROUND DETAILS

Attached hereto are the various financial statements of the City of Livonia for the month ending January 31, 2024. These statements are summarized so that you may make a quick financial overview of the various funds. Detailed statements, in support of the summarized statements, have been forwarded electronically to the Council Office.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

We respectfully request that City Council receive and file this report.

ATTACHMENTS

1. BUDGET TO ACTUAL - COUNCIL SUMMARY - JANUARY 2024

APPROVED BY

Michael Slater, Finance Director

Date: March 27, 2024

Maureen Miller Brosnan, Mayor

Date: March 28, 2024



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 101 - GENERAL FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	71,521,472.00	.00	71,521,472.00	1,018,355.47	.00	43,336,626.64	28,184,845.36	61	41,226,312.11
REVENUE TOTALS	\$71,521,472.00	\$0.00	\$71,521,472.00	\$1,018,355.47	\$0.00	\$43,336,626.64	\$28,184,845.36	61%	\$41,226,312.11
EXPENSE									
Department 101 - CITY COUNCIL	334,005.00	.00	334,005.00	24,384.38	.00	39,447.41	294,557.59	12	35,309.20
Department 173 - MAYOR'S OFFICE	584,792.00	.00	584,792.00	47,497.80	.00	85,123.25	499,668.75	15	73,501.41
Department 174 - COMMUNICATIONS	429,649.00	.00	429,649.00	27,450.27	.00	57,283.93	372,365.07	13	45,510.19
Department 175 - GOVERNMENT AFFAIRS	13,801.00	94,000.00	107,801.00	1,150.09	.00	2,300.18	105,500.82	2	6,525.64
Department 191 - ACCOUNTING	326,094.00	.00	326,094.00	36,259.15	.00	44,448.96	281,645.04	14	37,400.57
Department 192 - FINANCE DEPARTMENT	534,554.00	(13,000.00)	521,554.00	29,157.31	.00	58,438.36	463,115.64	11	64,056.85
Department 215 - CITY CLERK	633,636.00	.00	633,636.00	53,028.13	.00	83,672.92	549,963.08	13	82,462.07
Department 223 - INDEPENDENT AUDIT	54,512.00	.00	54,512.00	(1,566.00)	.00	(3,132.00)	57,644.00	-6	22,828.22
Department 228 - INFORMATION SYSTEMS	1,605,679.00	.00	1,605,679.00	67,135.58	49,776.48	297,531.79	1,258,370.73	22	288,090.36
Department 236 - ETHICS BOARD	550.00	.00	550.00	.00	.00	.00	550.00	0	.00
Department 247 - BOARD OF REVIEW	3,545.00	.00	3,545.00	.00	.00	344.48	3,200.52	10	344.48
Department 253 - TREASURER	679,921.00	.00	679,921.00	47,398.24	.00	101,300.00	578,621.00	15	91,393.49
Department 257 - ASSESSING	756,439.00	.00	756,439.00	53,505.52	.00	115,175.21	641,263.79	15	106,631.43
Department 261 - UTILITIES AND SUPPLIES	546,613.00	.00	546,613.00	27,147.52	.00	92,342.82	454,270.18	17	55,856.68
Department 262 - ELECTION COMMISSION	679,174.00	.00	679,174.00	71,516.92	.00	81,161.28	598,012.72	12	61,924.76
Department 263 - INSURANCE-GENERAL	102,452.00	.00	102,452.00	(4,235.00)	.00	274,974.71	(172,522.71)	268	223,132.95
Department 264 - INSURANCE-WORKERS COMP	435,194.00	.00	435,194.00	57,752.73	.00	264,781.30	170,412.70	61	291,538.11
Department 265 - NON DEPARTMENTAL	4,000.00	.00	4,000.00	.00	.00	.00	4,000.00	0	.00
Department 266 - LAW DEPARTMENT	980,880.00	.00	980,880.00	76,134.43	.00	127,632.66	853,247.34	13	118,795.23
Department 267 - EMPLOYEE BENEFITS CONTROL	42,000.00	.00	42,000.00	29,428.25	.00	(346,830.85)	388,830.85	-826	(686,349.62)
Department 268 - NON-DEPT CAPITAL PROJECTS	5,000.00	.00	5,000.00	.00	.00	.00	5,000.00	0	.00
Department 269 - CIVIL SERVICE	959,897.00	.00	959,897.00	87,851.40	513.01	127,033.01	832,350.98	13	131,012.87
Department 270 - TERMINATION PAY	2,395,000.00	.00	2,395,000.00	.00	.00	.00	2,395,000.00	0	45,101.31
Department 271 - LABOR RELATIONS	92,500.00	.00	92,500.00	6,192.00	.00	11,817.00	80,683.00	13	6,640.00
Department 272 - DUES AND SUBSCRIPTIONS	58,000.00	.00	58,000.00	.00	.00	.00	58,000.00	0	.00
Department 286 - 16TH DISTRICT COURT	3,502,513.00	.00	3,502,513.00	249,403.97	.00	494,467.67	3,008,045.33	14	455,148.65
Department 302 - TRAFFIC BUREAU	1,262,039.00	.00	1,262,039.00	84,120.76	.00	146,185.34	1,115,853.66	12	129,096.78
Department 304 - POLICE ADMINISTRATION	3,010,074.00	.00	3,010,074.00	228,628.27	.00	347,173.44	2,662,900.56	12	281,045.09
Department 306 - POLICE DATA PROCESSING	999,901.00	.00	999,901.00	60,267.93	81,708.56	124,555.18	793,637.26	21	61,992.01
Department 307 - DETECTIVE BUREAU	3,357,544.00	.00	3,357,544.00	212,035.77	.00	371,649.09	2,985,894.91	11	427,400.06
Department 309 - AUTOMOTIVE SERVICE	586,150.00	.00	586,150.00	32,183.96	.00	47,763.67	538,386.33	8	68,412.34
Department 310 - POLICE COMMUNICATIONS	1,014,332.00	.00	1,014,332.00	73,463.07	.00	118,102.27	896,229.73	12	106,418.34
Department 313 - CROSSING GUARDS	81,488.00	.00	81,488.00	3,891.61	.00	8,467.77	73,020.23	10	7,902.66
Department 316 - SCHOOL LIAISON	578,567.00	.00	578,567.00	43,867.75	.00	75,767.79	502,799.21	13	68,336.45
Department 318 - OFFICE OF EMERG PREP	184,118.00	.00	184,118.00	12,095.56	.00	39,083.43	145,034.57	21	36,888.49
Department 319 - RESERVE POL/SPECIAL EVENT	407,969.00	.00	407,969.00	21,607.76	.00	37,088.39	370,880.61	9	32,319.63



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 101 - GENERAL FUND									
EXPENSE									
Department 325 - POLICE PATROL BUREAU	14,764,790.00	.00	14,764,790.00	999,255.26	.00	1,652,538.42	13,112,251.58	11	1,526,835.95
Department 329 - INTELLIGENCE BUREAU	2,582,175.00	.00	2,582,175.00	151,915.34	.00	328,818.29	2,253,356.71	13	243,377.39
Department 336 - FIRE ADMINISTRATION	1,440,863.00	.00	1,440,863.00	105,884.66	2,776.29	192,156.87	1,245,929.84	14	185,275.44
Department 338 - FIRE FIGHTING	14,759,162.00	.00	14,759,162.00	1,030,297.14	.00	1,733,865.24	13,025,296.76	12	1,758,224.60
Department 341 - FIRE PREVENTION	865,073.00	.00	865,073.00	61,938.75	.00	106,187.87	758,885.13	12	113,039.70
Department 371 - INSPECTION	2,007,116.00	.00	2,007,116.00	133,589.73	.00	209,275.81	1,797,840.19	10	197,966.38
Department 381 - BLDG CODE BD OF APPEALS	1,361.00	.00	1,361.00	.00	.00	.00	1,361.00	0	.00
Department 435 - TRAFFIC COMMISSION	2,353.00	.00	2,353.00	290.66	.00	290.66	2,062.34	12	290.65
Department 441 - PUBLIC SERV ADMIN	85,450.00	.00	85,450.00	(1,518.11)	.00	(48,896.23)	134,346.23	-57	(44,035.38)
Department 443 - PUBLIC SERV-EQUIP MAINT	108,602.00	.00	108,602.00	(53,779.69)	2,025.66	(149,872.65)	256,448.99	-136	(97,372.17)
Department 447 - ENGINEERING	43,534.00	.00	43,534.00	(10,558.92)	.00	(62,415.58)	105,949.58	-143	(56,084.59)
Department 448 - STREET LIGHTING	266,328.00	.00	266,328.00	24,902.55	.00	47,787.66	218,540.34	18	48,545.63
Department 463 - MAINTENANCE-STREET	600,843.00	.00	600,843.00	31,292.56	.00	(84,388.75)	685,231.75	-14	(18,972.64)
Department 523 - PUBLIC SERV-BLDG MAINT	2,026,738.00	.00	2,026,738.00	125,721.40	15,394.33	202,506.81	1,808,836.86	11	156,756.73
Department 524 - PARKS	1,726,526.00	.00	1,726,526.00	77,661.08	12,339.08	92,004.68	1,622,182.24	6	95,076.30
Department 701 - PLANNING	726,556.00	(49,500.00)	677,056.00	51,659.47	.00	89,578.45	587,477.55	13	86,441.82
Department 702 - ZONING BOARD OF APPEALS	53,825.00	(31,500.00)	22,325.00	2,091.46	.00	6,386.77	15,938.23	29	8,278.98
Department 752 - RECREATION ADMINISTRATION	352,803.00	.00	352,803.00	21,960.05	.00	30,598.28	322,204.72	9	4,577.81
Department 758 - RECREATION FACILITIES	54,189.00	.00	54,189.00	335.42	.00	449.66	53,739.34	1	410.63
Department 759 - RECREATION ATHLETICS	144,447.00	.00	144,447.00	878.98	4,868.50	955.98	138,622.52	4	8,043.77
Department 820 - PARKS & REC - SENIOR SERVICES	564,761.00	.00	564,761.00	42,679.26	.00	76,433.27	488,327.73	14	85,055.43
Department 821 - P&R - GREENMEAD AND CULTURAL	1,099,726.00	.00	1,099,726.00	62,819.07	4,906.87	116,266.70	978,552.43	11	131,630.24
EXPENSE TOTALS	\$71,519,803.00	\$0.00	\$71,519,803.00	\$4,618,071.25	\$174,308.78	\$7,865,678.67	\$63,479,815.55	11%	\$7,210,029.37
Fund 101 - GENERAL FUND Totals									
REVENUE TOTALS	71,521,472.00	.00	71,521,472.00	1,018,355.47	.00	43,336,626.64	28,184,845.36	61%	41,226,312.11
EXPENSE TOTALS	71,519,803.00	.00	71,519,803.00	4,618,071.25	174,308.78	7,865,678.67	63,479,815.55	11%	7,210,029.37
Fund 101 - GENERAL FUND Totals	\$1,669.00	\$0.00	\$1,669.00	(\$3,599,715.78)	(\$174,308.78)	\$35,470,947.97	(\$35,294,970.19)		\$34,016,282.74



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 202 - MAJOR STREET FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	9,344,198.00	.00	9,344,198.00	9,355.10	.00	24,216.81	9,319,981.19	0	11,347.21
REVENUE TOTALS	\$9,344,198.00	\$0.00	\$9,344,198.00	\$9,355.10	\$0.00	\$24,216.81	\$9,319,981.19	0%	\$11,347.21
EXPENSE									
Department 448 - STREET LIGHTING	668,359.00	.00	668,359.00	44,500.00	.00	89,000.00	579,359.00	13	79,334.00
Department 451 - CONST-STREET AND BRIDGES	60,000.00	.00	60,000.00	.00	.00	.00	60,000.00	0	.00
Department 463 - MAINTENANCE-STREET	1,133,076.00	255,226.00	1,388,302.00	114,061.77	.00	147,738.12	1,240,563.88	11	68,329.30
Department 475 - MAINTENANCE-TRAFFIC SERV	.00	.00	.00	.00	.00	.00	.00	+++	.00
Department 478 - MAINT-FREEWAY LIGHTING	20,000.00	.00	20,000.00	1,599.10	.00	3,164.11	16,835.89	16	3,007.06
Department 479 - SNOW AND ICE REMOVAL	327,061.00	.00	327,061.00	27,255.00	.00	54,510.00	272,551.00	17	53,538.00
Department 483 - ADMIN, ENGIN RECORD KEEPI	138,700.00	.00	138,700.00	11,558.00	.00	23,116.00	115,584.00	17	24,534.00
Department 484 - FUND TRANSFERS	7,600,000.00	.00	7,600,000.00	633,333.00	.00	1,266,666.00	6,333,334.00	17	1,116,666.66
EXPENSE TOTALS	\$9,947,196.00	\$255,226.00	\$10,202,422.00	\$832,306.87	\$0.00	\$1,584,194.23	\$8,618,227.77	16%	\$1,345,409.02
Fund 202 - MAJOR STREET FUND Totals									
REVENUE TOTALS	9,344,198.00	.00	9,344,198.00	9,355.10	.00	24,216.81	9,319,981.19	0%	11,347.21
EXPENSE TOTALS	9,947,196.00	255,226.00	10,202,422.00	832,306.87	.00	1,584,194.23	8,618,227.77	16%	1,345,409.02
Fund 202 - MAJOR STREET FUND Totals	(\$602,998.00)	(\$255,226.00)	(\$858,224.00)	(\$822,951.77)	\$0.00	(\$1,559,977.42)	\$701,753.42		(\$1,334,061.81)



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 203 - LOCAL STREET FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	11,149,971.00	.00	11,149,971.00	637,264.65	.00	1,276,626.77	9,873,344.23	11	1,122,583.24
REVENUE TOTALS	\$11,149,971.00	\$0.00	\$11,149,971.00	\$637,264.65	\$0.00	\$1,276,626.77	\$9,873,344.23	11%	\$1,122,583.24
EXPENSE									
Department 448 - STREET LIGHTING	137,000.00	.00	137,000.00	11,416.00	.00	22,832.00	114,168.00	17	21,666.00
Department 451 - CONST-STREET AND BRIDGES	125,000.00	.00	125,000.00	.00	.00	.00	125,000.00	0	.00
Department 463 - MAINTENANCE-STREET	1,959,694.00	.00	1,959,694.00	146,119.00	.00	292,238.00	1,667,456.00	15	263,030.00
Department 475 - MAINTENANCE-TRAFFIC SERV	.00	.00	.00	.00	.00	.00	.00	+++	.00
Department 479 - SNOW AND ICE REMOVAL	450,169.00	.00	450,169.00	37,514.00	.00	75,028.00	375,141.00	17	74,860.00
Department 483 - ADMIN, ENGIN RECORD KEEPI	769,870.00	.00	769,870.00	64,154.00	.00	128,308.00	641,562.00	17	118,272.00
Department 484 - FUND TRANSFERS	7,800,000.00	.00	7,800,000.00	650,000.00	.00	1,300,000.00	6,500,000.00	17	1,191,666.00
EXPENSE TOTALS	\$11,241,733.00	\$0.00	\$11,241,733.00	\$909,203.00	\$0.00	\$1,818,406.00	\$9,423,327.00	16%	\$1,669,494.00
Fund 203 - LOCAL STREET FUND Totals									
REVENUE TOTALS	11,149,971.00	.00	11,149,971.00	637,264.65	.00	1,276,626.77	9,873,344.23	11%	1,122,583.24
EXPENSE TOTALS	11,241,733.00	.00	11,241,733.00	909,203.00	.00	1,818,406.00	9,423,327.00	16%	1,669,494.00
Fund 203 - LOCAL STREET FUND Totals	(\$91,762.00)	\$0.00	(\$91,762.00)	(\$271,938.35)	\$0.00	(\$541,779.23)	\$450,017.23		(\$546,910.76)



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Fund 204 - ROAD - SIDEWALK & TREE									
REVENUE									
Department 000 - ACCOUNT BALANCES	13,033,702.00	.00	13,033,702.00	666,309.61	.00	5,933,845.13	7,099,856.87	46	5,580,200.92
REVENUE TOTALS	\$13,033,702.00	\$0.00	\$13,033,702.00	\$666,309.61	\$0.00	\$5,933,845.13	\$7,099,856.87	46%	\$5,580,200.92
EXPENSE									
Department 441 - PUBLIC SERV ADMIN	33,338.00	.00	33,338.00	2,778.00	.00	5,556.00	27,782.00	17	5,160.00
Department 447 - ENGINEERING	2,700,196.00	90,366.00	2,790,562.00	196,674.62	.00	209,190.62	2,581,371.38	7	137,023.53
Department 463 - MAINTENANCE-STREET	10,880,000.00	78,480.00	10,958,480.00	.00	.00	.00	10,958,480.00	0	6,983.20
Department 530 - FORESTRY	150,000.00	9,855.00	159,855.00	.00	.00	.00	159,855.00	0	.00
EXPENSE TOTALS	\$13,763,534.00	\$178,701.00	\$13,942,235.00	\$199,452.62	\$0.00	\$214,746.62	\$13,727,488.38	2%	\$149,166.73
Fund 204 - ROAD - SIDEWALK & TREE Totals									
REVENUE TOTALS	13,033,702.00	.00	13,033,702.00	666,309.61	.00	5,933,845.13	7,099,856.87	46%	5,580,200.92
EXPENSE TOTALS	13,763,534.00	178,701.00	13,942,235.00	199,452.62	.00	214,746.62	13,727,488.38	2%	149,166.73
Fund 204 - ROAD - SIDEWALK & TREE Totals	(\$729,832.00)	(\$178,701.00)	(\$908,533.00)	\$466,856.99	\$0.00	\$5,719,098.51	(\$6,627,631.51)		\$5,431,034.19



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 208 - COMMUNITY RECREATION									
REVENUE									
Department 000 - ACCOUNT BALANCES	9,239,176.00	.00	9,239,176.00	378,764.93	.00	4,943,836.96	4,295,339.04	54	4,542,615.90
REVENUE TOTALS	\$9,239,176.00	\$0.00	\$9,239,176.00	\$378,764.93	\$0.00	\$4,943,836.96	\$4,295,339.04	54%	\$4,542,615.90
EXPENSE									
Department 755 - RECREATION CENTER	7,557,580.00	408,262.00	7,965,842.00	392,079.61	301,089.99	780,058.16	6,884,693.85	14	749,781.51
Department 756 - OTHER RECREATION	172,100.00	324,298.00	496,398.00	146.96	100,737.50	7,881.58	387,778.92	22	34,058.08
Department 757 - ICE RINK	390,446.00	.00	390,446.00	.00	.00	.00	390,446.00	0	.00
Department 776 - SPECIAL EVENTS	168,611.00	.00	168,611.00	7,099.13	.00	10,149.85	158,461.15	6	9,151.94
Department 795 - SWIMMING POOL - BOTSFORD	165,492.00	51,665.00	217,157.00	2,223.09	168.00	2,497.27	214,491.73	1	703.33
Department 796 - SWIMMING POOL - CLEMENT C	551,775.00	(55,000.00)	496,775.00	3,837.03	336.00	4,339.97	492,099.03	1	1,057.36
Department 797 - SWIMMING POOL - SHELDON	97,736.00	.00	97,736.00	181.37	168.00	339.51	97,228.49	1	287.63
EXPENSE TOTALS	\$9,103,740.00	\$729,225.00	\$9,832,965.00	\$405,567.19	\$402,499.49	\$805,266.34	\$8,625,199.17	12%	\$795,039.85
Fund 208 - COMMUNITY RECREATION Totals									
REVENUE TOTALS	9,239,176.00	.00	9,239,176.00	378,764.93	.00	4,943,836.96	4,295,339.04	54%	4,542,615.90
EXPENSE TOTALS	9,103,740.00	729,225.00	9,832,965.00	405,567.19	402,499.49	805,266.34	8,625,199.17	12%	795,039.85
Fund 208 - COMMUNITY RECREATION Totals	\$135,436.00	(\$729,225.00)	(\$593,789.00)	(\$26,802.26)	(\$402,499.49)	\$4,138,570.62	(\$4,329,860.13)		\$3,747,576.05



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Fund 211 - DESIGNATED PURPOSE									
REVENUE									
Department 000 - ACCOUNT BALANCES	150,000.00	.00	150,000.00	4,898.50	.00	16,995.25	133,004.75	11	16,730.26
REVENUE TOTALS	\$150,000.00	\$0.00	\$150,000.00	\$4,898.50	\$0.00	\$16,995.25	\$133,004.75	11%	\$16,730.26
EXPENSE									
Department 000 - ACCOUNT BALANCES	180,000.00	.00	180,000.00	2,924.31	.00	8,815.76	171,184.24	5	37,915.39
EXPENSE TOTALS	\$180,000.00	\$0.00	\$180,000.00	\$2,924.31	\$0.00	\$8,815.76	\$171,184.24	5%	\$37,915.39
Fund 211 - DESIGNATED PURPOSE Totals									
REVENUE TOTALS	150,000.00	.00	150,000.00	4,898.50	.00	16,995.25	133,004.75	11%	16,730.26
EXPENSE TOTALS	180,000.00	.00	180,000.00	2,924.31	.00	8,815.76	171,184.24	5%	37,915.39
Fund 211 - DESIGNATED PURPOSE Totals	(\$30,000.00)	\$0.00	(\$30,000.00)	\$1,974.19	\$0.00	\$8,179.49	(\$38,179.49)		(\$21,185.13)



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 219 - SP ASSESS-LIGHTING									
REVENUE									
Department 000 - ACCOUNT BALANCES	17,000.00	.00	17,000.00	2,902.53	.00	8,033.49	8,966.51	47	4,383.51
Department 457 - STREETLIGHTING	1,086,610.00	.00	1,086,610.00	.00	.00	1,086,651.52	(41.52)	100	1,154,117.51
REVENUE TOTALS	\$1,103,610.00	\$0.00	\$1,103,610.00	\$2,902.53	\$0.00	\$1,094,685.01	\$8,924.99	99%	\$1,158,501.02
EXPENSE									
Department 000 - ACCOUNT BALANCES	.00	.00	.00	.00	.00	.00	.00	+++	.00
Department 457 - STREETLIGHTING	1,158,452.00	.00	1,158,452.00	94,328.83	.00	198,186.37	960,265.63	17	190,182.76
EXPENSE TOTALS	\$1,158,452.00	\$0.00	\$1,158,452.00	\$94,328.83	\$0.00	\$198,186.37	\$960,265.63	17%	\$190,182.76
Fund 219 - SP ASSESS-LIGHTING Totals									
REVENUE TOTALS	1,103,610.00	.00	1,103,610.00	2,902.53	.00	1,094,685.01	8,924.99	99%	1,158,501.02
EXPENSE TOTALS	1,158,452.00	.00	1,158,452.00	94,328.83	.00	198,186.37	960,265.63	17%	190,182.76
Fund 219 - SP ASSESS-LIGHTING Totals	(\$54,842.00)	\$0.00	(\$54,842.00)	(\$91,426.30)	\$0.00	\$896,498.64	(\$951,340.64)		\$968,318.26



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 226 - MUNICIPAL REFUSE FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	14,062,303.00	.00	14,062,303.00	60,965.29	.00	12,616,515.49	1,445,787.51	90	11,901,537.99
REVENUE TOTALS	\$14,062,303.00	\$0.00	\$14,062,303.00	\$60,965.29	\$0.00	\$12,616,515.49	\$1,445,787.51	90%	\$11,901,537.99
EXPENSE									
Department 521 - SANITATION	1,452,031.00	.00	1,452,031.00	94,168.93	.00	206,224.62	1,245,806.38	14	192,095.68
Department 528 - PUBLIC SERVICE	14,524,078.00	355,217.00	14,879,295.00	1,089,790.87	.00	2,085,858.68	12,793,436.32	14	1,665,586.24
Department 529 - ANIMAL CONTROL	410,048.00	.00	410,048.00	20,934.52	.00	29,439.01	380,608.99	7	35,820.98
EXPENSE TOTALS	\$16,386,157.00	\$355,217.00	\$16,741,374.00	\$1,204,894.32	\$0.00	\$2,321,522.31	\$14,419,851.69	14%	\$1,893,502.90
Fund 226 - MUNICIPAL REFUSE FUND Totals									
REVENUE TOTALS	14,062,303.00	.00	14,062,303.00	60,965.29	.00	12,616,515.49	1,445,787.51	90%	11,901,537.99
EXPENSE TOTALS	16,386,157.00	355,217.00	16,741,374.00	1,204,894.32	.00	2,321,522.31	14,419,851.69	14%	1,893,502.90
Fund 226 - MUNICIPAL REFUSE FUND Totals	(\$2,323,854.00)	(\$355,217.00)	(\$2,679,071.00)	(\$1,143,929.03)	\$0.00	\$10,294,993.18	(\$12,974,064.18)		\$10,008,035.09



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Fund 242 - LIVONIA BROWNFIELD - LSRRF									
REVENUE									
Department 000 - ACCOUNT BALANCES	180,000.00	.00	180,000.00	1,993.92	.00	5,089.89	174,910.11	3	68,217.29
REVENUE TOTALS	\$180,000.00	\$0.00	\$180,000.00	\$1,993.92	\$0.00	\$5,089.89	\$174,910.11	3%	\$68,217.29
EXPENSE									
Department 000 - ACCOUNT BALANCES	38,300.00	.00	38,300.00	2,775.00	.00	5,550.00	32,750.00	14	5,280.00
EXPENSE TOTALS	\$38,300.00	\$0.00	\$38,300.00	\$2,775.00	\$0.00	\$5,550.00	\$32,750.00	14%	\$5,280.00
Fund 242 - LIVONIA BROWNFIELD - LSRRF Totals									
REVENUE TOTALS	180,000.00	.00	180,000.00	1,993.92	.00	5,089.89	174,910.11	3%	68,217.29
EXPENSE TOTALS	38,300.00	.00	38,300.00	2,775.00	.00	5,550.00	32,750.00	14%	5,280.00
Fund 242 - LIVONIA BROWNFIELD - LSRRF Totals	\$141,700.00	\$0.00	\$141,700.00	(\$781.08)	\$0.00	(\$460.11)	\$142,160.11		\$62,937.29



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 243 - LIVONIA BROWNFIELD REDEV AUTH									
REVENUE									
Department 000 - ACCOUNT BALANCES	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0	293,895.84
REVENUE TOTALS	\$1,170,000.00	\$0.00	\$1,170,000.00	\$0.00	\$0.00	\$0.00	\$1,170,000.00	0%	\$293,895.84
EXPENSE									
Department 000 - ACCOUNT BALANCES	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0	.00
EXPENSE TOTALS	\$1,170,000.00	\$0.00	\$1,170,000.00	\$0.00	\$0.00	\$0.00	\$1,170,000.00	0%	\$0.00
Fund 243 - LIVONIA BROWNFIELD REDEV AUTH Totals									
REVENUE TOTALS	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0%	293,895.84
EXPENSE TOTALS	1,170,000.00	.00	1,170,000.00	.00	.00	.00	1,170,000.00	0%	.00
Fund 243 - LIVONIA BROWNFIELD REDEV AUTH Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$293,895.84



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 244 - ECONOMIC DEVEL CORP									
REVENUE									
Department 000 - ACCOUNT BALANCES	1,000.00	.00	1,000.00	102.92	.00	261.95	738.05	26	149.73
REVENUE TOTALS	\$1,000.00	\$0.00	\$1,000.00	\$102.92	\$0.00	\$261.95	\$738.05	26%	\$149.73
EXPENSE									
Department 000 - ACCOUNT BALANCES	107.00	.00	107.00	.00	.00	.00	107.00	0	.00
EXPENSE TOTALS	\$107.00	\$0.00	\$107.00	\$0.00	\$0.00	\$0.00	\$107.00	0%	\$0.00
Fund 244 - ECONOMIC DEVEL CORP Totals									
REVENUE TOTALS	1,000.00	.00	1,000.00	102.92	.00	261.95	738.05	26%	149.73
EXPENSE TOTALS	107.00	.00	107.00	.00	.00	.00	107.00	0%	.00
Fund 244 - ECONOMIC DEVEL CORP Totals	\$893.00	\$0.00	\$893.00	\$102.92	\$0.00	\$261.95	\$631.05		\$149.73



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 248 - PLYMOUTH RD DEV AUTHORITY									
REVENUE									
Department 000 - ACCOUNT BALANCES	799,117.00	.00	799,117.00	414.34	.00	844.66	798,272.34	0	734.17
REVENUE TOTALS	\$799,117.00	\$0.00	\$799,117.00	\$414.34	\$0.00	\$844.66	\$798,272.34	0%	\$734.17
EXPENSE									
Department 000 - ACCOUNT BALANCES	842,524.00	.00	842,524.00	17,202.18	.00	17,227.18	825,296.82	2	15,990.05
EXPENSE TOTALS	\$842,524.00	\$0.00	\$842,524.00	\$17,202.18	\$0.00	\$17,227.18	\$825,296.82	2%	\$15,990.05
Fund 248 - PLYMOUTH RD DEV AUTHORITY Totals									
REVENUE TOTALS	799,117.00	.00	799,117.00	414.34	.00	844.66	798,272.34	0%	734.17
EXPENSE TOTALS	842,524.00	.00	842,524.00	17,202.18	.00	17,227.18	825,296.82	2%	15,990.05
Fund 248 - PLYMOUTH RD DEV AUTHORITY Totals	(\$43,407.00)	\$0.00	(\$43,407.00)	(\$16,787.84)	\$0.00	(\$16,382.52)	(\$27,024.48)		(\$15,255.88)



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 260 - MIDC GRANT									
REVENUE									
Department 000 - ACCOUNT BALANCES	362,299.00	.00	362,299.00	18,079.26	.00	259,543.80	102,755.20	72	418,643.64
REVENUE TOTALS	\$362,299.00	\$0.00	\$362,299.00	\$18,079.26	\$0.00	\$259,543.80	\$102,755.20	72%	\$418,643.64
EXPENSE									
Department 000 - ACCOUNT BALANCES	362,299.00	.00	362,299.00	19,068.00	.00	38,553.34	323,745.66	11	36,776.63
EXPENSE TOTALS	\$362,299.00	\$0.00	\$362,299.00	\$19,068.00	\$0.00	\$38,553.34	\$323,745.66	11%	\$36,776.63
Fund 260 - MIDC GRANT Totals									
REVENUE TOTALS	362,299.00	.00	362,299.00	18,079.26	.00	259,543.80	102,755.20	72%	418,643.64
EXPENSE TOTALS	362,299.00	.00	362,299.00	19,068.00	.00	38,553.34	323,745.66	11%	36,776.63
Fund 260 - MIDC GRANT Totals	\$0.00	\$0.00	\$0.00	(\$988.74)	\$0.00	\$220,990.46	(\$220,990.46)		\$381,867.01



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 261 - PUB. SAFETY COMMUNICATION									
REVENUE									
Department 000 - ACCOUNT BALANCES	623,000.00	.00	623,000.00	18,138.22	.00	263,115.03	359,884.97	42	248,120.19
REVENUE TOTALS	\$623,000.00	\$0.00	\$623,000.00	\$18,138.22	\$0.00	\$263,115.03	\$359,884.97	42%	\$248,120.19
EXPENSE									
Department 000 - ACCOUNT BALANCES	1,258,000.00	2,314,579.00	3,572,579.00	9,287.47	2,336,205.04	11,138.47	1,225,235.49	66	6,159.00
EXPENSE TOTALS	\$1,258,000.00	\$2,314,579.00	\$3,572,579.00	\$9,287.47	\$2,336,205.04	\$11,138.47	\$1,225,235.49	66%	\$6,159.00
Fund 261 - PUB. SAFETY COMMUNICATION Totals									
REVENUE TOTALS	623,000.00	.00	623,000.00	18,138.22	.00	263,115.03	359,884.97	42%	248,120.19
EXPENSE TOTALS	1,258,000.00	2,314,579.00	3,572,579.00	9,287.47	2,336,205.04	11,138.47	1,225,235.49	66%	6,159.00
Fund 261 - PUB. SAFETY COMMUNICATION Totals	(\$635,000.00)	(\$2,314,579.00)	(\$2,949,579.00)	\$8,850.75	(\$2,336,205.04)	\$251,976.56	(\$865,350.52)		\$241,961.19



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 262 - ADJUDICATED FORFEITURES									
REVENUE									
Department 000 - ACCOUNT BALANCES	297,500.00	.00	297,500.00	33,546.73	.00	56,020.50	241,479.50	19	23,808.05
REVENUE TOTALS	\$297,500.00	\$0.00	\$297,500.00	\$33,546.73	\$0.00	\$56,020.50	\$241,479.50	19%	\$23,808.05
EXPENSE									
Department 333 - STATE/LOCAL FORFEITURE EX	1,199,527.00	.00	1,199,527.00	11,703.78	.00	(16,390.22)	1,215,917.22	-1	12,815.62
Department 334 - FEDERAL FORFEITURE EXP	53,750.00	36,004.00	89,754.00	.00	36,004.00	.00	53,750.00	40	.00
Department 335 - CONTINUING CRIMINAL ENTERPRISE	212,500.00	.00	212,500.00	.00	.00	.00	212,500.00	0	.00
EXPENSE TOTALS	\$1,465,777.00	\$36,004.00	\$1,501,781.00	\$11,703.78	\$36,004.00	(\$16,390.22)	\$1,482,167.22	1%	\$12,815.62
Fund 262 - ADJUDICATED FORFEITURES Totals									
REVENUE TOTALS	297,500.00	.00	297,500.00	33,546.73	.00	56,020.50	241,479.50	19%	23,808.05
EXPENSE TOTALS	1,465,777.00	36,004.00	1,501,781.00	11,703.78	36,004.00	(16,390.22)	1,482,167.22	1%	12,815.62
Fund 262 - ADJUDICATED FORFEITURES Totals	(\$1,168,277.00)	(\$36,004.00)	(\$1,204,281.00)	\$21,842.95	(\$36,004.00)	\$72,410.72	(\$1,240,687.72)		\$10,992.43



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Fund 270 - HISTORICAL COMMISSION									
REVENUE									
Department 000 - ACCOUNT BALANCES	107,700.00	.00	107,700.00	6,482.18	.00	24,252.60	83,447.40	23	14,293.56
REVENUE TOTALS	\$107,700.00	\$0.00	\$107,700.00	\$6,482.18	\$0.00	\$24,252.60	\$83,447.40	23%	\$14,293.56
EXPENSE									
Department 000 - ACCOUNT BALANCES	106,000.00	.00	106,000.00	9,145.35	.00	11,035.38	94,964.62	10	16,542.35
EXPENSE TOTALS	\$106,000.00	\$0.00	\$106,000.00	\$9,145.35	\$0.00	\$11,035.38	\$94,964.62	10%	\$16,542.35
Fund 270 - HISTORICAL COMMISSION Totals									
REVENUE TOTALS	107,700.00	.00	107,700.00	6,482.18	.00	24,252.60	83,447.40	23%	14,293.56
EXPENSE TOTALS	106,000.00	.00	106,000.00	9,145.35	.00	11,035.38	94,964.62	10%	16,542.35
Fund 270 - HISTORICAL COMMISSION Totals	\$1,700.00	\$0.00	\$1,700.00	(\$2,663.17)	\$0.00	\$13,217.22	(\$11,517.22)		(\$2,248.79)



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Fund 271 - LIBRARY FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	5,028,550.00	.00	5,028,550.00	32,181.63	.00	4,301,372.56	727,177.44	86	4,063,215.38
REVENUE TOTALS	\$5,028,550.00	\$0.00	\$5,028,550.00	\$32,181.63	\$0.00	\$4,301,372.56	\$727,177.44	86%	\$4,063,215.38
EXPENSE									
Department 778 - CIVIC CENTER LIBRARY	4,427,071.00	1,380,836.00	5,807,907.00	253,056.26	5,250.00	422,951.07	5,379,705.93	7	428,205.32
Department 779 - NOBLE LIBRARY	15,000.00	(6,500.00)	8,500.00	596.17	.00	764.07	7,735.93	9	688.65
Department 780 - SANDBURG LIBRARY	1,055,083.00	33,091.00	1,088,174.00	51,250.25	871.70	97,109.92	990,192.38	9	111,912.10
EXPENSE TOTALS	\$5,497,154.00	\$1,407,427.00	\$6,904,581.00	\$304,902.68	\$6,121.70	\$520,825.06	\$6,377,634.24	8%	\$540,806.07
Fund 271 - LIBRARY FUND Totals									
REVENUE TOTALS	5,028,550.00	.00	5,028,550.00	32,181.63	.00	4,301,372.56	727,177.44	86%	4,063,215.38
EXPENSE TOTALS	5,497,154.00	1,407,427.00	6,904,581.00	304,902.68	6,121.70	520,825.06	6,377,634.24	8%	540,806.07
Fund 271 - LIBRARY FUND Totals	(\$468,604.00)	(\$1,407,427.00)	(\$1,876,031.00)	(\$272,721.05)	(\$6,121.70)	\$3,780,547.50	(\$5,650,456.80)		\$3,522,409.31



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 272 - ARTS COMMISSION FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	6,000.00	.00	6,000.00	346.16	.00	846.08	5,153.92	14	542.04
REVENUE TOTALS	\$6,000.00	\$0.00	\$6,000.00	\$346.16	\$0.00	\$846.08	\$5,153.92	14%	\$542.04
EXPENSE									
Department 000 - ACCOUNT BALANCES	17,700.00	.00	17,700.00	.00	.00	.00	17,700.00	0	.00
EXPENSE TOTALS	\$17,700.00	\$0.00	\$17,700.00	\$0.00	\$0.00	\$0.00	\$17,700.00	0%	\$0.00
Fund 272 - ARTS COMMISSION FUND Totals									
REVENUE TOTALS	6,000.00	.00	6,000.00	346.16	.00	846.08	5,153.92	14%	542.04
EXPENSE TOTALS	17,700.00	.00	17,700.00	.00	.00	.00	17,700.00	0%	.00
Fund 272 - ARTS COMMISSION FUND Totals	(\$11,700.00)	\$0.00	(\$11,700.00)	\$346.16	\$0.00	\$846.08	(\$12,546.08)		\$542.04



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Fund 284 - OPIOID SETTLEMENT FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	105,153.00	.00	105,153.00	1,491.72	.00	3,795.33	101,357.67	4	.00
REVENUE TOTALS	\$105,153.00	\$0.00	\$105,153.00	\$1,491.72	\$0.00	\$3,795.33	\$101,357.67	4%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	100,765.00	.00	100,765.00	8,690.80	.00	9,510.80	91,254.20	9	.00
EXPENSE TOTALS	\$100,765.00	\$0.00	\$100,765.00	\$8,690.80	\$0.00	\$9,510.80	\$91,254.20	9%	\$0.00
Fund 284 - OPIOID SETTLEMENT FUND Totals									
REVENUE TOTALS	105,153.00	.00	105,153.00	1,491.72	.00	3,795.33	101,357.67	4%	.00
EXPENSE TOTALS	100,765.00	.00	100,765.00	8,690.80	.00	9,510.80	91,254.20	9%	.00
Fund 284 - OPIOID SETTLEMENT FUND Totals	\$4,388.00	\$0.00	\$4,388.00	(\$7,199.08)	\$0.00	(\$5,715.47)	\$10,103.47		\$0.00



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 286 - TRANSIT & CAPITAL IMPR									
REVENUE									
Department 000 - ACCOUNT BALANCES	2,776,240.00	.00	2,776,240.00	.00	.00	2,585,710.86	190,529.14	93	2,445,027.00
REVENUE TOTALS	\$2,776,240.00	\$0.00	\$2,776,240.00	\$0.00	\$0.00	\$2,585,710.86	\$190,529.14	93%	\$2,445,027.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	2,776,240.00	.00	2,776,240.00	.00	.00	2,776,240.00	.00	100	2,608,950.00
EXPENSE TOTALS	\$2,776,240.00	\$0.00	\$2,776,240.00	\$0.00	\$0.00	\$2,776,240.00	\$0.00	100%	\$2,608,950.00
Fund 286 - TRANSIT & CAPITAL IMPR Totals									
REVENUE TOTALS	2,776,240.00	.00	2,776,240.00	.00	.00	2,585,710.86	190,529.14	93%	2,445,027.00
EXPENSE TOTALS	2,776,240.00	.00	2,776,240.00	.00	.00	2,776,240.00	.00	100%	2,608,950.00
Fund 286 - TRANSIT & CAPITAL IMPR Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	(\$190,529.14)	\$190,529.14		(\$163,923.00)



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 288 - COMMUNITY TRANSIT PROGRAM									
REVENUE									
Department 000 - ACCOUNT BALANCES	716,445.00	.00	716,445.00	9,114.03	.00	521,231.20	195,213.80	73	676,968.70
REVENUE TOTALS	\$716,445.00	\$0.00	\$716,445.00	\$9,114.03	\$0.00	\$521,231.20	\$195,213.80	73%	\$676,968.70
EXPENSE									
Department 606 - COMM TRANSIT DISPATCHERS	109,938.00	.00	109,938.00	7,810.17	.00	12,000.75	97,937.25	11	11,943.31
Department 607 - COMMUNITY TRANSIT ADMIN	166,398.00	50,400.00	216,798.00	10,506.04	.00	17,675.33	199,122.67	8	21,979.33
Department 608 - COMMUNITY TRANSIT	977,513.00	.00	977,513.00	41,377.73	.00	186,088.57	791,424.43	19	297,831.52
EXPENSE TOTALS	\$1,253,849.00	\$50,400.00	\$1,304,249.00	\$59,693.94	\$0.00	\$215,764.65	\$1,088,484.35	17%	\$331,754.16
Fund 288 - COMMUNITY TRANSIT PROGRAM Totals									
REVENUE TOTALS	716,445.00	.00	716,445.00	9,114.03	.00	521,231.20	195,213.80	73%	676,968.70
EXPENSE TOTALS	1,253,849.00	50,400.00	1,304,249.00	59,693.94	.00	215,764.65	1,088,484.35	17%	331,754.16
Fund 288 - COMMUNITY TRANSIT PROGRAM Totals	(\$537,404.00)	(\$50,400.00)	(\$587,804.00)	(\$50,579.91)	\$0.00	\$305,466.55	(\$893,270.55)		\$345,214.54



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Fund 297 - CABLE TELEVISION FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	378,200.00	.00	378,200.00	1,652.72	.00	4,561.92	373,638.08	1	23,744.15
REVENUE TOTALS	\$378,200.00	\$0.00	\$378,200.00	\$1,652.72	\$0.00	\$4,561.92	\$373,638.08	1%	\$23,744.15
EXPENSE									
Department 806 - CABLE TELEVISION	569,659.00	.00	569,659.00	34,832.67	.00	57,853.76	511,805.24	10	60,133.33
EXPENSE TOTALS	\$569,659.00	\$0.00	\$569,659.00	\$34,832.67	\$0.00	\$57,853.76	\$511,805.24	10%	\$60,133.33
Fund 297 - CABLE TELEVISION FUND Totals									
REVENUE TOTALS	378,200.00	.00	378,200.00	1,652.72	.00	4,561.92	373,638.08	1%	23,744.15
EXPENSE TOTALS	569,659.00	.00	569,659.00	34,832.67	.00	57,853.76	511,805.24	10%	60,133.33
Fund 297 - CABLE TELEVISION FUND Totals	(\$191,459.00)	\$0.00	(\$191,459.00)	(\$33,179.95)	\$0.00	(\$53,291.84)	(\$138,167.16)		(\$36,389.18)



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 372 - D/S 2015 MBA REFUNDING									
REVENUE									
Department 000 - ACCOUNT BALANCES	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0	.00
REVENUE TOTALS	\$181,984.00	\$0.00	\$181,984.00	\$0.00	\$0.00	\$0.00	\$181,984.00	0%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0	.00
EXPENSE TOTALS	\$181,984.00	\$0.00	\$181,984.00	\$0.00	\$0.00	\$0.00	\$181,984.00	0%	\$0.00
Fund 372 - D/S 2015 MBA REFUNDING Totals									
REVENUE TOTALS	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0%	.00
EXPENSE TOTALS	181,984.00	.00	181,984.00	.00	.00	.00	181,984.00	0%	.00
Fund 372 - D/S 2015 MBA REFUNDING Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00



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Fund 373 - D/S 2016 MBA REFUNDING									
REVENUE									
Department 000 - ACCOUNT BALANCES	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0	.00
REVENUE TOTALS	\$548,600.00	\$0.00	\$548,600.00	\$0.00	\$0.00	\$0.00	\$548,600.00	0%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0	.00
EXPENSE TOTALS	\$548,600.00	\$0.00	\$548,600.00	\$0.00	\$0.00	\$0.00	\$548,600.00	0%	\$0.00
Fund 373 - D/S 2016 MBA REFUNDING Totals									
REVENUE TOTALS	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0%	.00
EXPENSE TOTALS	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0%	.00
Fund 373 - D/S 2016 MBA REFUNDING Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 374 - D/S 2017 MBA REFUNDING									
REVENUE									
Department 000 - ACCOUNT BALANCES	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0	.00
REVENUE TOTALS	\$1,994,850.00	\$0.00	\$1,994,850.00	\$0.00	\$0.00	\$0.00	\$1,994,850.00	0%	\$0.00
EXPENSE									
Department 000 - ACCOUNT BALANCES	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0	.00
EXPENSE TOTALS	\$1,994,850.00	\$0.00	\$1,994,850.00	\$0.00	\$0.00	\$0.00	\$1,994,850.00	0%	\$0.00
Fund 374 - D/S 2017 MBA REFUNDING Totals									
REVENUE TOTALS	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0%	.00
EXPENSE TOTALS	1,994,850.00	.00	1,994,850.00	.00	.00	.00	1,994,850.00	0%	.00
Fund 374 - D/S 2017 MBA REFUNDING Totals	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		\$0.00



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 401 - CAPITAL PROJECTS									
REVENUE									
Department 000 - ACCOUNT BALANCES	2,672,240.00	.00	2,672,240.00	47,348.22	.00	2,403,138.06	269,101.94	90	2,615,881.74
REVENUE TOTALS	\$2,672,240.00	\$0.00	\$2,672,240.00	\$47,348.22	\$0.00	\$2,403,138.06	\$269,101.94	90%	\$2,615,881.74
EXPENSE									
Department 000 - ACCOUNT BALANCES	3,755,000.00	6,497,959.00	10,252,959.00	446,881.92	407,904.53	509,144.73	9,335,909.74	9	475,626.00
EXPENSE TOTALS	\$3,755,000.00	\$6,497,959.00	\$10,252,959.00	\$446,881.92	\$407,904.53	\$509,144.73	\$9,335,909.74	9%	\$475,626.00
Fund 401 - CAPITAL PROJECTS Totals									
REVENUE TOTALS	2,672,240.00	.00	2,672,240.00	47,348.22	.00	2,403,138.06	269,101.94	90%	2,615,881.74
EXPENSE TOTALS	3,755,000.00	6,497,959.00	10,252,959.00	446,881.92	407,904.53	509,144.73	9,335,909.74	9%	475,626.00
Fund 401 - CAPITAL PROJECTS Totals	(\$1,082,760.00)	(\$6,497,959.00)	(\$7,580,719.00)	(\$399,533.70)	(\$407,904.53)	\$1,893,993.33	(\$9,066,807.80)		\$2,140,255.74



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Fund 409 - GOLF COURSE CAPITAL IMPR									
REVENUE									
Department 000 - ACCOUNT BALANCES	461,000.00	.00	461,000.00	3,039.78	.00	183,404.05	277,595.95	40	(8,657.58)
REVENUE TOTALS	\$461,000.00	\$0.00	\$461,000.00	\$3,039.78	\$0.00	\$183,404.05	\$277,595.95	40%	(\$8,657.58)
EXPENSE									
Department 000 - ACCOUNT BALANCES	335,234.00	.00	335,234.00	1,500.00	100,000.00	1,500.00	233,734.00	30	3,980.00
EXPENSE TOTALS	\$335,234.00	\$0.00	\$335,234.00	\$1,500.00	\$100,000.00	\$1,500.00	\$233,734.00	30%	\$3,980.00
Fund 409 - GOLF COURSE CAPITAL IMPR Totals									
REVENUE TOTALS	461,000.00	.00	461,000.00	3,039.78	.00	183,404.05	277,595.95	40%	(8,657.58)
EXPENSE TOTALS	335,234.00	.00	335,234.00	1,500.00	100,000.00	1,500.00	233,734.00	30%	3,980.00
Fund 409 - GOLF COURSE CAPITAL IMPR Totals	\$125,766.00	\$0.00	\$125,766.00	\$1,539.78	(\$100,000.00)	\$181,904.05	\$43,861.95		(\$12,637.58)



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 418 - BUILDING IMPROVEMENT FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	330,000.00	.00	330,000.00	43,330.37	.00	110,398.51	219,601.49	33	56,511.17
REVENUE TOTALS	\$330,000.00	\$0.00	\$330,000.00	\$43,330.37	\$0.00	\$110,398.51	\$219,601.49	33%	\$56,511.17
EXPENSE									
Department 000 - ACCOUNT BALANCES	150,000.00	50,000.00	200,000.00	1,437.50	.00	1,437.50	198,562.50	1	.00
EXPENSE TOTALS	\$150,000.00	\$50,000.00	\$200,000.00	\$1,437.50	\$0.00	\$1,437.50	\$198,562.50	1%	\$0.00
Fund 418 - BUILDING IMPROVEMENT FUND Totals									
REVENUE TOTALS	330,000.00	.00	330,000.00	43,330.37	.00	110,398.51	219,601.49	33%	56,511.17
EXPENSE TOTALS	150,000.00	50,000.00	200,000.00	1,437.50	.00	1,437.50	198,562.50	1%	.00
Fund 418 - BUILDING IMPROVEMENT FUND Totals	\$180,000.00	(\$50,000.00)	\$130,000.00	\$41,892.87	\$0.00	\$108,961.01	\$21,038.99		\$56,511.17



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Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 419 - SENIOR CENTER CONSTRUCTION FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	140,000.00	.00	140,000.00	16,241.69	.00	41,374.31	98,625.69	30	24,063.75
REVENUE TOTALS	\$140,000.00	\$0.00	\$140,000.00	\$16,241.69	\$0.00	\$41,374.31	\$98,625.69	30%	\$24,063.75
EXPENSE									
Department 000 - ACCOUNT BALANCES	.00	629,337.00	629,337.00	.00	.00	16,587.05	612,749.95	3	2,134.40
EXPENSE TOTALS	\$0.00	\$629,337.00	\$629,337.00	\$0.00	\$0.00	\$16,587.05	\$612,749.95	3%	\$2,134.40
Fund 419 - SENIOR CENTER CONSTRUCTION FUND Totals									
REVENUE TOTALS	140,000.00	.00	140,000.00	16,241.69	.00	41,374.31	98,625.69	30%	24,063.75
EXPENSE TOTALS	.00	629,337.00	629,337.00	.00	.00	16,587.05	612,749.95	3%	2,134.40
Fund 419 - SENIOR CENTER CONSTRUCTION FUND Totals	\$140,000.00	(\$629,337.00)	(\$489,337.00)	\$16,241.69	\$0.00	\$24,787.26	(\$514,124.26)		\$21,929.35



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 470 - COURT BUILDING IMPROVEMENTS									
REVENUE									
Department 000 - ACCOUNT BALANCES	600,000.00	.00	600,000.00	54,697.55	.00	102,212.89	497,787.11	17	64,572.36
REVENUE TOTALS	\$600,000.00	\$0.00	\$600,000.00	\$54,697.55	\$0.00	\$102,212.89	\$497,787.11	17%	\$64,572.36
EXPENSE									
Department 000 - ACCOUNT BALANCES	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0	.00
EXPENSE TOTALS	\$548,600.00	\$0.00	\$548,600.00	\$0.00	\$0.00	\$0.00	\$548,600.00	0%	\$0.00
Fund 470 - COURT BUILDING IMPROVEMENTS Totals									
REVENUE TOTALS	600,000.00	.00	600,000.00	54,697.55	.00	102,212.89	497,787.11	17%	64,572.36
EXPENSE TOTALS	548,600.00	.00	548,600.00	.00	.00	.00	548,600.00	0%	.00
Fund 470 - COURT BUILDING IMPROVEMENTS Totals	\$51,400.00	\$0.00	\$51,400.00	\$54,697.55	\$0.00	\$102,212.89	(\$50,812.89)		\$64,572.36



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 536 - NEWBURGH VILLAGE									
REVENUE									
Department 000 - ACCOUNT BALANCES	900,200.00	.00	900,200.00	72,048.61	.00	148,018.26	752,181.74	16	147,419.52
REVENUE TOTALS	\$900,200.00	\$0.00	\$900,200.00	\$72,048.61	\$0.00	\$148,018.26	\$752,181.74	16%	\$147,419.52
EXPENSE									
Department 677 - NEWBURGH VILLAGE	1,101,864.00	183,143.00	1,285,007.00	254,415.52	20,675.00	285,161.24	979,170.76	24	84,663.31
EXPENSE TOTALS	\$1,101,864.00	\$183,143.00	\$1,285,007.00	\$254,415.52	\$20,675.00	\$285,161.24	\$979,170.76	24%	\$84,663.31
Fund 536 - NEWBURGH VILLAGE Totals									
REVENUE TOTALS	900,200.00	.00	900,200.00	72,048.61	.00	148,018.26	752,181.74	16%	147,419.52
EXPENSE TOTALS	1,101,864.00	183,143.00	1,285,007.00	254,415.52	20,675.00	285,161.24	979,170.76	24%	84,663.31
Fund 536 - NEWBURGH VILLAGE Totals	(\$201,664.00)	(\$183,143.00)	(\$384,807.00)	(\$182,366.91)	(\$20,675.00)	(\$137,142.98)	(\$226,989.02)		\$62,756.21



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 538 - SILVER VILLAGE FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	750,780.00	.00	750,780.00	64,296.20	.00	134,316.11	616,463.89	18	117,577.81
REVENUE TOTALS	\$750,780.00	\$0.00	\$750,780.00	\$64,296.20	\$0.00	\$134,316.11	\$616,463.89	18%	\$117,577.81
EXPENSE									
Department 676 - SILVER VILLAGE	724,020.00	104,516.00	828,536.00	36,383.24	.00	65,492.33	763,043.67	8	80,358.60
EXPENSE TOTALS	\$724,020.00	\$104,516.00	\$828,536.00	\$36,383.24	\$0.00	\$65,492.33	\$763,043.67	8%	\$80,358.60
Fund 538 - SILVER VILLAGE FUND Totals									
REVENUE TOTALS	750,780.00	.00	750,780.00	64,296.20	.00	134,316.11	616,463.89	18%	117,577.81
EXPENSE TOTALS	724,020.00	104,516.00	828,536.00	36,383.24	.00	65,492.33	763,043.67	8%	80,358.60
Fund 538 - SILVER VILLAGE FUND Totals	\$26,760.00	(\$104,516.00)	(\$77,756.00)	\$27,912.96	\$0.00	\$68,823.78	(\$146,579.78)		\$37,219.21



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 584 - GOLF COURSE FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	2,289,051.00	.00	2,289,051.00	18,206.32	.00	47,142.38	2,241,908.62	2	36,902.78
REVENUE TOTALS	\$2,289,051.00	\$0.00	\$2,289,051.00	\$18,206.32	\$0.00	\$47,142.38	\$2,241,908.62	2%	\$36,902.78
EXPENSE									
Department 000 - ACCOUNT BALANCES	250,000.00	.00	250,000.00	.00	.00	250,000.00	.00	100	.00
Department 773 - WHISPERING WILLOWS	790,311.00	.00	790,311.00	16,990.65	1,516.66	61,124.25	727,670.09	8	83,541.55
Department 774 - IDYL WYLD	645,211.00	.00	645,211.00	19,648.13	1,516.66	63,472.14	580,222.20	10	84,765.46
Department 775 - FOX CREEK	810,581.00	.00	810,581.00	26,288.59	8,168.68	62,537.81	739,874.51	9	85,111.39
EXPENSE TOTALS	\$2,496,103.00	\$0.00	\$2,496,103.00	\$62,927.37	\$11,202.00	\$437,134.20	\$2,047,766.80	18%	\$253,418.40
Fund 584 - GOLF COURSE FUND Totals									
REVENUE TOTALS	2,289,051.00	.00	2,289,051.00	18,206.32	.00	47,142.38	2,241,908.62	2%	36,902.78
EXPENSE TOTALS	2,496,103.00	.00	2,496,103.00	62,927.37	11,202.00	437,134.20	2,047,766.80	18%	253,418.40
Fund 584 - GOLF COURSE FUND Totals	(\$207,052.00)	\$0.00	(\$207,052.00)	(\$44,721.05)	(\$11,202.00)	(\$389,991.82)	\$194,141.82		(\$216,515.62)



BUDGET TO ACTUAL - COUNCIL SUMMARY - 1/31/2024

Through 01/31/24

Prior Fiscal Year Activity Included

Organization	Adopted Budget	Budget Amendments	Amended Budget	Current Month Transactions	YTD Encumbrances	YTD Transactions	Budget - YTD Transactions	% Used/ Rec'd	Prior Year YTD
Fund 592 - WATER AND SEWER FUND									
REVENUE									
Department 000 - ACCOUNT BALANCES	45,909,967.00	.00	45,909,967.00	3,495,172.20	.00	6,595,140.28	39,314,826.72	14	6,191,098.44
Department 558 - W & S FINANCIAL ADMIN	.00	.00	.00	.00	.00	.00	.00	+++	.00
REVENUE TOTALS	\$45,909,967.00	\$0.00	\$45,909,967.00	\$3,495,172.20	\$0.00	\$6,595,140.28	\$39,314,826.72	14%	\$6,191,098.44
EXPENSE									
Department 558 - W & S FINANCIAL ADMIN	35,408,704.00	.00	35,408,704.00	2,437,700.50	1,000.00	5,038,963.68	30,368,740.32	14	5,651,290.59
Department 559 - W & S FIELD OPERATIONS	9,236,819.00	1,900,243.00	11,137,062.00	534,503.50	191,352.25	885,677.36	10,060,032.39	10	694,667.28
EXPENSE TOTALS	\$44,645,523.00	\$1,900,243.00	\$46,545,766.00	\$2,972,204.00	\$192,352.25	\$5,924,641.04	\$40,428,772.71	13%	\$6,345,957.87
Fund 592 - WATER AND SEWER FUND Totals									
REVENUE TOTALS	45,909,967.00	.00	45,909,967.00	3,495,172.20	.00	6,595,140.28	39,314,826.72	14%	6,191,098.44
EXPENSE TOTALS	44,645,523.00	1,900,243.00	46,545,766.00	2,972,204.00	192,352.25	5,924,641.04	40,428,772.71	13%	6,345,957.87
Fund 592 - WATER AND SEWER FUND Totals	\$1,264,444.00	(\$1,900,243.00)	(\$635,799.00)	\$522,968.20	(\$192,352.25)	\$670,499.24	(\$1,113,945.99)		(\$154,859.43)
Grand Totals									
REVENUE TOTALS	198,934,308.00	.00	198,934,308.00	6,716,740.85	.00	87,035,139.29	111,899,168.71	44%	83,082,558.38
EXPENSE TOTALS	205,240,767.00	14,691,977.00	219,932,744.00	12,519,799.81	3,687,272.79	25,705,222.81	190,540,248.40	13%	24,172,085.81
Grand Totals	(\$6,306,459.00)	(\$14,691,977.00)	(\$20,998,436.00)	(\$5,803,058.96)	(\$3,687,272.79)	\$61,329,916.48	(\$78,641,079.69)		\$58,910,472.57



LETTER TO THE LIVONIA CITY COUNCIL

c.

Finance
March 26, 2024

MEETING DATE

R041524

PRESENTED BY

Michael Slater, Finance Director

AGENDA ITEM

c. Communication from the Department of Finance, dated March 26, 2024, re: forwarding Quarterly Investment Report for the City of Livonia for the quarter ending February 29, 2024.

BACKGROUND DETAILS

Public Act 213 of 2007 requires that a quarterly written report shall be provided to the governing body regarding the investment of public funds. Attached for Council's information is a summary of investments for the City of Livonia as of February 29, 2024. All investments are in compliance with the City's Investment Policy and Michigan Public Act 20.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

We respectfully request that City Council receive and file this report.

ATTACHMENTS

1. 2024 Quarterly Investments -1st Quarter

APPROVED BY

Michael Slater, Finance Director

Date: March 27, 2024

Maureen Miller Brosnan, Mayor

Date: March 28, 2024

**SCHEDULE OF POOLED CASH HELD
AS OF
February 29, 2024**

02/29/24	Comerica Bank	Money Mkt, Pooled, etc.	76,718,588.32
02/29/24	Flagstar	Money Market	88,707.58
02/29/24	GovMic	PFM Asset Management	13,694,527.94
			<u>90,501,823.84</u>

**SCHEDULE OF U.S. TREASURY AND AGENCY
SECURITIES HELD**

DATE OF PURCHASE	DESCRIPTION		MATURITY DATE	HISTORICAL COST
06/24/20	#266 - FHLMC	3134GVV96	06/24/24	675,000.00
07/08/20	#267 - FHLMC	3134GV4S4	07/08/24	600,000.00
08/13/20	#269 - FHLMC	3134GWHR0	05/13/24	1,000,000.00
08/26/20	#270 - FNMA	3136G4V75	02/24/25	1,298,781.25
09/17/20	#271 - FNMA	3135G0X24	01/07/25	1,422,117.00
12/16/20	#273 - FNMA	3135G06M0	12/16/24	1,300,000.00
01/28/21	#275 - FNMA	3135GACA7	04/15/25	1,124,212.50
04/30/21	#277 - USA Treasury	9128286R6	04/30/24	697,408.59
05/26/21	#279 - FHLB	3130AMK92	11/26/24	1,500,000.00
07/02/21	#280 - STATE OF MI	594612BD4	05/15/27	1,140,682.20
08/24/21	#281 - USA Treasury	912828YH7	09/30/24	1,135,664.06
03/25/22	#287 - USA Treasury	9128283D0	10/31/24	1,197,328.13
04/27/22	#288 - USA Treasury	9128284F4	03/31/25	996,097.10
06/30/22	#290 - USA Treasury	91282CEU1	06/15/25	1,088,616.97
09/09/22	#291 - USA Treasury	9128285J5	10/31/25	1,133,247.99
10/31/22	#292 - USA Treasury	91282CFA4	07/31/24	1,072,031.03
11/08/22	#293 - FHLB	3130AQBD4	12/30/24	923,319.00
11/16/22	#294 - FHLB	3130AJZ36	08/27/25	1,349,223.00
12/09/22	#295 - FHLB	3130ALGJ7	03/23/26	832,328.25
01/17/23	#296 - FFCB	3133EN6A3	01/13/26	659,615.22
02/23/23	#298 - FFCB	3133EPBJ3	02/23/26	1,123,526.25
03/10/23	#299 - USA Treasury	91282CGA3	12/15/25	1,026,879.28
05/02/23	#304 - USA Treasury	912828U24	11/15/26	1,083,429.63
05/16/23	#305 - FHLMC	3134GW5P7	10/27/25	1,056,676.35
06/30/23	#306 - USA Treasury	91282CEW7	06/30/27	1,160,066.52
10/27/23	#308 - FNMA	3135G05Y5	10/08/27	1,064,771.25
10/31/23	#309 - USA Treasury	91282CGP0	02/29/28	1,123,119.51
12/08/23	#310 - FFCB	3133EPK79	12/07/26	799,442.40
01/26/24	#311 - USA Treasury	91282CLN2	11/30/28	1,217,207.14
02/05/24	#312 - USA Treasury	91282CHQ7	07/31/28	1,153,867.13
02/29/24	SECURITIES - TOTAL			31,954,657.76
02/29/24	SECURITIES - POOLED FUND			71,182.92
				32,025,840.68

CERTIFICATES OF DEPOSIT & TERM SECURITIES HELD

**As of
February 29, 2024**

DATE OF PURCHASE	CERTIFICATE HELD AT	PRINCIPAL AMOUNT	DATE OF MATURITY
09/27/23	PFM GovMIC	1,000,000.00	03/05/24
10/11/23	PFM GovMIC	3,000,000.00	03/12/24
10/18/23	PFM GovMIC	2,000,000.00	03/19/24
10/25/23	PFM GovMIC	2,000,000.00	03/26/24
10/31/23	INDEPENDENT	1,000,000.00	04/02/24
11/01/23	PFM GovMIC	1,000,000.00	04/02/24
11/07/23	PFM GovMIC	3,000,000.00	04/09/24
11/14/23	PFM GovMIC	1,000,000.00	04/16/24
12/06/23	PFM GovMIC	1,000,000.00	04/23/24
12/13/23	PFM GovMIC	1,000,000.00	04/30/24
12/20/23	PFM GovMIC	2,000,000.00	05/07/24
12/28/23	PFM GovMIC	1,000,000.00	05/14/24
01/03/24	FLAGSTAR	2,000,000.00	05/21/24
01/03/24	PFM GovMIC	2,000,000.00	05/21/24
01/09/24	PFM GovMIC	1,000,000.00	05/28/24
01/16/24	PFM GovMIC	5,000,000.00	06/11/24
01/23/24	PFM GovMIC	1,000,000.00	06/04/24
01/30/24	FLAGSTAR	2,000,000.00	06/18/24
02/07/24	PFM GovMIC	6,000,000.00	06/25/24
02/14/24	PFM GovMIC	3,000,000.00	07/02/24
02/21/24	PFM GovMIC	1,000,000.00	07/02/24
02/28/24	PFM GovMIC	1,000,000.00	07/09/24

43,000,000.00



LETTER TO THE LIVONIA CITY COUNCIL

1.

Clerk
March 6, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Lori Miller, MiPMC, City Clerk,

AGENDA ITEM

REQUEST TO WAIVE THE CITY'S NOISE ORDINANCE: Karen Bonanno, re: to host a wedding reception with a DJ at the property located at 31025 Munger Drive, on Saturday, June 8, 2024, from 5:00 p.m. to 11:00 p.m.

BACKGROUND DETAILS

Request for noise ordinance waiver to host backyard wedding reception at home located on Munger with large tent and DJ music to be held Saturday, June 8, 2024 from 5:00 p.m. to 11:00 p.m. with approximately 200 guests attending.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

Approve request as submitted.

ATTACHMENTS

1. Munger Wedding Reception 06-08-24

APPROVED BY

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough. Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

1. REQUEST TO WAIVE THE CITY'S NOISE ORDINANCE: Karen Bonanno, re: to host a wedding reception with a DJ at the property located at 31025 Munger Drive, on Saturday, June 8, 2024, from 5:00 p.m. to 11:00 p.m.

Karen Bonanno, 31025 Munger, presented the request to Council.

Councilmember Jolly offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT

**REQUEST FOR NOISE WAIVER BLOCK PARTY and/or
BARRICADING OF CITY STREETS**

Send to: Livonia City Council, c/o City Clerk, 33000 Civic Center Drive, Livonia, MI 48154-3097
or hand deliver to the City Clerk's Office at least 8 weeks prior to the planned event

PLEASE PRINT

Date of Application: 3-4-2024 Date to appear at a Council Meeting: _____

Name of Neighborhood Representative: Karen Bonanno

Address (please include zip code): 31025 Munger Livonia 48154

Telephone Number with area code: Home: ⁷³⁴536-9372 Office: ⁷³⁴536-9372

Email: kvb22jul@gmail.com

Please circle what is being requested – ^{Wedding reception}
"BLOCK PARTY" and/or "STREET BARRICADING"

June 8, 2024 none 5:00 - 11:00 p.m

Date of Block Party
and/or Barricading

Rain Date

Start/end time of Block Party and/or Barricading
End time is no later than 10:00 p.m.

Location of Block Party and/or Barricading: (Be specific. Indicate which streets and between which boundaries).

Backyard of 31025 Munger. Munger is
a rural road-homes on at least one acre.
Large tent will be placed in yard. Off-site parking.

Type of Event: Briefly (Describe activities planned. Music, barbecue, games, etc.) music (DJ),

catered dinner, dancing

How many barricades are you requesting (max. 10)? none

Approximate Number Attending: 200

Date of Council Approval/Denial: _____

Council Resolution Number: _____

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

2. WAIVER PETITION: Planning Commission, re: Petition 2024-02-02-03 by Stonefield Engineering & Design on behalf of Haggerty Six Partners, LLC, seeking special waiver use approval for a Planned General Development consisting of eleven (11) buildings, including eight (8) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest ¼ of Section 7.

Mark Taormina, Planning and Economic Development Director, presented the request to Council.

President McCullough asked if the current packet includes the changes that have been requested by the Planning Commission.

Mr. Taormina said it does not.

Councilmember Donovic commended the Planning Department and the development group for a great replacement for the Comerica building. He clarified that there will be sidewalks along Haggerty Road. He would like to see a connection between Building A crosswalk all the way down to the sidewalk next to the main entrance where the signal is and between Building A and Building B.

Mr. Taormina said that's a great suggestion as adding another crosswalk would be beneficial.

Councilmember Donovic asked if there would be any vinyl siding and if there would be sufficient dumpster enclosures for all facilities.

Mr. Taormina said there would be no vinyl siding. The Planning Commission determined that a lot of the trash handling will be internal within the apartment complex. There is a trash compactor near the grocery store. The dumpster behind the gym would be able to handle the trash for Buildings F, G, and H. Planning didn't like the placement of the dumpster near the full-service restaurant in the front yard of Building D. He also indicated a provision of the Zoning Ordinance for mixed use developments requires 30% of the homes be under construction when occupancy permits are issued for the commercial parts of the development.

Councilmember Jolly asked to speak with the petitioner. He said this is an exciting opportunity for the city. He asked if there are any plans for the retention pond to be an attractive point on the property. He said we have many retention ponds in Livonia that are eye sores, and he would like to see this one have a fountain in the middle. He also asked about plans for bike racks through the area and for the development timeline.

Scott Bowers, Architect, said the retention pond will look pretty. They have to wait until storm water calculations are done so they know if a fence around the pond would be required.

There will be bike racks spread throughout the site. They plan to start the project right away and it will take a few years to complete.

Todd Zilincik, City Engineer, explained the calculations requiring a fence around the pond.

Councilmember Budzinski asked if it would be done in phases. She also asked if an underground walkway could be considered if the skywalk between parking garage and apartments wouldn't work. She said chairs around the retention pond and fountain would be nice.

Mr. Bowers said the project will start with the grocery store. The restaurant, bank and hotel will be done later. They do believe the skywalk between the parking garage and the apartments will work.

Vice President Ptashnik asked if there would be a need to widen or add a right turn lane on Haggerty or 6 Mile Road.

Mike Labadie, Traffic Engineer with Fishbeck, indicated they would add a new signal on Fox and one on Haggerty. They would also add a right turn lane to the new signal on Haggerty. The driveway on the west side of the street lines up and will become a full movement driveway.

Councilmember Morgan verified there would be another traffic light on Haggerty which would make a total of 6 traffic lights between 6 Mile Road and 7 Mile Road. He asked if this might bog up traffic.

Mr. Labadie said it would not bog up traffic if all lights are coordinated with the traffic capacity. It should be better as long as they are kept synchronized.

Councilmember Donovic asked if the existing retention pond will be moved and stated it already has bubbler fountain and sidewalks around it. He agreed it would be nice to add benches and enhance the retention area. He asked that they not use a traditional chain link fence if a fence is required. He also asked about shopping carts for the grocery store and if they will have any sort of shopping cart patrol, so they don't find them up and down Haggerty Road.

Eric Williams, Stonefield Civil Engineer, indicated they will reuse the location with some alterations.

Mr. Bowes said they will address the shopping cart issue.

Mr. Taormina said the pond and fountain, bike racks, benches and sidewalk suggestions will be incorporated into the new resolution.

President Mccullough asked if there is a sidewalk on the north side of the apartments. He wants to be sure the whole area is walkable. He also asked that EV chargers being put on the site.

Mr. Bowers said there is a sidewalk on the north side of the apartments, and they will have EV charges on the property.

Vice President Ptashnik asked if there would be sidewalks on Fox Drive. She also asked what businesses will be in the complex.

Mr. Bowers said there would be a sidewalk all the way down Fox Drive and the businesses will include a furniture store and restaurants.

Councilmember Donovic offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

2.

Planning
March 20, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Stephanie Reece, Program Supervisor,

AGENDA ITEM

WAIVER PETITION: Planning Commission, re: Petition 2024-02-02-03 by Stonefield Engineering & Design on behalf of Haggerty Six Partners, LLC, seeking special waiver use approval for a Planned General Development consisting of eleven (11) buildings, including eight (8) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest $\frac{1}{4}$ of Section 7.

BACKGROUND DETAILS

March 21, 2024

Honorable Members of the City Council
City of Livonia, Michigan

Re: Petition 2024-02-02-03 - Six Haggerty Partners, LLC

Dear Council Members:

At the 1,211th Public Hearings and Regular Meeting held by the City Planning Commission on March 19, 2024, the following resolution was adopted:

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

#03-10-2024 RESOLVED, That the City Planning Commission does hereby recommend to the City Council that Petition 2024-02-02-03 by Stonefield Engineering & Design on behalf of Haggerty Six Partners, LLC, seeking special waiver use approval under Section 5.02 of the Livonia Zoning Ordinance, as amended, for a Planned General Development consisting of eleven (11) buildings, including eight (8) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest $\frac{1}{4}$ of Section 7, be approved subject to the following conditions:

1. The Site Plan (Overall), Site Plan (North), and Site Plan (South) marked Drawings C-2, C-3, and C-4, respectively, all dated January 31, 2024, as revised, prepared by Stonefield Engineering &

Design, are hereby approved, and shall be adhered to; except as modified below.

2. Building D, Building E, and the Hotel are approved in concept only, and more detailed plans, including site, landscaping, floor, and elevations, shall return to the Planning Commission for further review and approval before any building permits are issued.

3. The Landscaping Plans marked Drawings C-7, C-8, C-9, C-10, C-11, and C-12, and the Landscaping Details marked Drawing C-13, all dated January 31, 2024, as revised, prepared by Stonefield Engineering & Design, are hereby approved, and shall be adhered to, except that two (2) additional full-size trees shall be added to the Six Mile Road frontage to meet the ordinance requirements, and modifications shall be made to the area between the grocery store and the apartment building to provide a better visual screen using full-size evergreen trees.

4. That the Exterior Elevations labeled Apartments (Sheets A-300 & A-301), Grocery (Sheet A-300), Retail Building A (Sheet A-300), Retail Building B (Sheets A-300 & A-301), Retail Building C-1 (Sheet A-300), Retail Building C-2 identified as Retail Drive Thru (Sheet A-300), Retail Building G (Sheet A-300) and Retail Building H (Sheet A-300), inclusive, all dated January 25, 2024, prepared by Bowers + Associates, Inc., are hereby approved and shall be adhered to.

5. The Exterior Elevations for Building F Proposed Gym dated February 25, 2024, prepared by Club Studio, is hereby approved and shall be adhered to.

6. This approval is subject to the Petitioner submitting a Development Agreement to be executed between the City and the Developer addressing items pertinent to the construction of the project as well as the long-term operation of the development, such as, but not limited to, divisions, leasing, and separation of ownership; parking; site design standards; permitted and prohibited uses; dimensional standards; and maintenance of utilities.

7. All rooftop mechanical equipment shall be concealed from public view on all sides by screening that shall be compatible with the material and color of other exterior materials on the buildings.

8. The walls of the trash/recycle enclosures shall be a minimum of six feet (6') in height and constructed out of the same masonry used in the construction of the buildings, or in the event a poured wall is substituted, the wall's design, texture and color shall match that of the buildings. The enclosure gates shall be solid steel or durable, long-lasting panel fiberglass.

9. This site shall meet the City of Livonia or the Wayne County Storm Water Management Ordinance, whichever applies, and secure any required permits, including soil erosion and sedimentation control permits.

10. All light fixtures shall not exceed a mounting height of thirty feet (30') and shall be aimed and shielded to minimize stray light trespassing across property lines and glaring into adjacent roadways.

11. The overall average illumination level for the parking lots shall be 1.0-foot candle as provided under Section 7.22 of the Zoning Ordinance.

12. Only conforming signage is approved with this petition, and any additional signage shall be

separately submitted for review and approval by the Zoning Board of Appeals.

13. That no LED light band or exposed neon shall be permitted on this site, including, but not limited to, the buildings or around the windows.

14. That the specific plans referenced in this approving resolution shall be submitted to the Inspection Department at the time the building permits are applied for and

15. Under Section 13.13 of the Livonia Zoning Ordinance, as amended, this approval is valid for one year only from the date of approval by the City Council. Unless a building permit is obtained, this approval shall be null and void at the expiration of said period.

FURTHER RESOLVED, That notice of the above hearing was given in accordance with the provisions of Section 13.13 of Livonia Zoning Ordinance, as amended.

ATTACHMENTS

1. 2024-02-02-03_E-COUNCIL Pkt

APPROVED BY



Mark Taormina, Planning and Economic Development Director

Date: March 22, 2024



Maureen Miller Brosnan, Mayor

Date: March 22, 2024

Petition 2024-02-02-03 Stonefield Engineering & Design, on behalf of Haggerty Six Partners, LLC,
seeking special waiver use approval under Section 5.02 of the Livonia Zoning Ordinance, as amended, for a Planned General Development consisting of eleven (11) buildings, including eight (8) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest ¼ of Section 7.

**CITY OF LIVONIA, MICHIGAN
APPLICATION FOR WAIVER USE APPROVAL**

All applications must be presented in triplicate to the City Clerk, 33000 Civic Center Drive, Livonia, MI 48154-3097. Applications must include property owner's name, address and notarized signature.

For filing fee see below for computation

Date Filed: _____ Petition _____
Site Address: 39200 Six Mile Rd Sidwell 46-027-99-0008-001 Zoning of Property C-4
Requesting Approval To Planned General Development
Applicant: Haggerty Six Partners LLC Business/Company: _____
Applicant's Address: 251 E Merrill St Suite 205 City: Birmingham State: MI Zip Code: 48009
Applicant's Phone # (248) 203-9090 Applicant's Email dmarkus@markusllc.com
Contact Person: Eric Williams Business/Company: Stonefield Engineering & Design
Contact's Address: 607 Shelby St City: Detroit State: MI Zip Code: 48226
Contact's Phone # (248) 247-1115 Contact's Email ewilliams@stonefieldeng.com

Please provide the following information:

- 1) **Site Plan** showing:
 - property dimensions, including road right-of-way & building setback lines
 - foot print of building(s), including dimensions & square footage
 - all easements, protective walls, sidewalks & existing trees
 - any significant topographic features (existing or proposed)
 - parking layout, including type of surface material, sizes of spaces & aisles
 - method used in calculating parking requirement
 - location of light standards servicing parking lot & cutout showing type & height
 - location of trash receptacle, including description of screening
 - location of signs
- 2) **Detailed Landscape Plan** including:
 - listing or labeling of all planted materials as to type and size
 - areas to be fully irrigated
 - percentage of landscaping provided (15% of total site required)
- 3) **Building Elevation Plan** depicting:
 - architectural quality
 - wall section & detail plan - exterior building materials must be labeled (i.e. brick, thin brick, E.F.I.S.)
 - all visible rooftop mechanical equipment and how they will be screened
- 4) **General Floor Plan** showing:
 - floor layout
 - entrances & exits
 - restaurants are required to illustrate seating arrangement & capacity
- 5) **One (1) set of reduced plans** (i.e. site, landscape, elevation, floor), a maximum 11" x 17" in size, or digital file in a .pdf format either on CD or emailed to planning@livonia.gov
- 6) **Legal Description** of the property to be considered (Clearly Printed)
- 7) Three (3) completed application forms & **three (3)** sets of full-size drawings

You are invited and encouraged to review your proposal with the Planning Department staff. Only one set of preliminary drawings will be necessary for this analysis.

FEE COMPUTATION	\$700.00 (\$400 publication fee plus \$300 base review fee) plus
<u>208,212</u> sq. ft. of new construction x \$20.00 per 1,000 sq. ft. plus \$30 per lot or unit for residential construction.	(NOTE: Round off to nearest 1,000) + 4,000
	Total Amount Due \$ <u>4,700</u>

Owner of Property: Haggerty Six Partners LLC
Owner's Address: 39200 Six Mile Rd City: Livonia State: MI Zip Code: 48152
Owner's Phone # (248) 203-9090 Owner's Email dmarkus@markusllc.com
Signature of Owner: [Signature] Print Name: DORAN MARKUS
Subscribed and sworn to before me, a Notary Public in and for the County of OAKLAND State of MI
on this 19th day of December 20 23
Signature of Notary [Signature] My commission expires 4/18/2024
Acting in the County of OAKLAND

NATASHA OURO
NOTARY PUBLIC, STATE OF MI
COUNTY OF OAKLAND
MY COMMISSION EXPIRES Apr 18, 2024
ACTING IN COUNTY OF OAKLAND

UNAPPROVED MINUTES

1

MINUTES OF THE 1,211th PUBLIC HEARINGS AND REGULAR MEETING HELD BY THE CITY PLANNING COMMISSION OF THE CITY OF LIVONIA

On Tuesday, March 19, 2024, the City Planning Commission of the City of Livonia held its 1,211th Public Hearing and Regular Meetings in the Livonia City Hall, 33000 Civic Center Drive, Livonia, Michigan.

Mr. Ian Wilshaw, Chairman, called the meeting to order at 7 p.m.

Members present: Sam Caramagno Glen Long Peter Ventura
 Ian Wilshaw

Members absent: David Bongero Wafa Dinaro

Mr. Mark Taormina, Planning Director, and Stephanie Reece, Program Supervisor, were also present.

Chairman Wilshaw informed the audience that if a petition on tonight's agenda involves a rezoning request, this Commission makes a recommendation to the City Council who, in turn, will hold its own public hearing and make the final determination as to whether a petition is approved or denied. The Planning Commission holds the only public hearing on a request for preliminary plat and/or vacating petition. The Commission's recommendation is forwarded to the City Council for the final determination as to whether a plat is accepted or rejected. If a petition requesting a waiver of use or site plan approval is denied tonight, the petitioner has ten days in which to appeal the decision, in writing, to the City Council. Resolutions adopted by the City Planning Commission become effective seven (7) days after the date of adoption. The Planning Commission and the professional staff have reviewed each of these petitions upon their filing. The staff has furnished the Commission with both approving and denying resolutions, which the Commission may, or may not, use depending on the outcome of the proceedings tonight.

ITEM #1 PETITION 2024-02-02-03 Six & Haggerty Development

Mr. Caramagno, Secretary, announced the first item on the agenda, Petition 2024-02-02-03 by Stonefield Engineering & Design on behalf of Haggerty Six Partners, LLC, seeking special waiver use approval under Section 5.02 of the Livonia Zoning Ordinance, as amended, for a Planned General Development consisting of eleven (11) buildings, including eight (8) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling

units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest ¼ of Section 7.

Mr. Taormina: Thank you, Mr. Chairman. The subject property consists of a single tax parcel, which is at the northeast corner of Haggerty and Six Mile Roads. The land area is 22.3 acres with 670 feet of frontage on Six Mile Road and 1,005 feet on Haggerty Road. The zoning of the property is C-4 (High Rise Commercial). The site was developed in 1986 by Manufacturers National Bank as an operations center and, over the years, following a merger with Comerica, was expanded to include over 360,000 square feet of office space and a 166,000 square-foot multi-level parking structure. Last year, Comerica announced the closure of the Livonia office and the consolidation of its operations into a new office in Farmington Hills. Haggerty Six Partners, LLC acquired the property with plans to demolish the office buildings and construct a new mixed-use center that will include a grocery store, a hotel, a fitness studio, multiple restaurants, retail spaces, and an apartment building. This application for Special Waiver Use approval for a Planned General Development under Section 5.02 covers all of the uses: retail, residential, and hospitality, and all of the associated site plan improvements. To the north of the property is College Park, a mixed-use development with several office buildings and restaurants. To the east, across Fox Drive, is a Residence Inn, Angel Gardens assisted living facility, and Buca Di Beppo restaurant. A gas station is at the northeast corner of Haggerty and Six Mile Roads, immediately abutting this site. At the north end of the property, the plan shows three buildings: a grocery store, a retail space attached to the grocery store labeled Building A, and a five-story, 170-unit apartment building. The grocery store is identified on the plans as Whole Foods, which would be 38,000 square feet. The store would be setback 270 feet from Haggerty Road, with parking for 197 vehicles shown in front of the store. There would be two customer entrances along the storefront. One is at the north end of the building, and the other is at the south end. The main entrance is at the north end to encourage customers to park at this end of the lot. All deliveries and trash recycling operations would be at the back of the building. Building A would be attached to the grocery store. This building measures roughly 6,100 square feet and would be divided into one or possibly two tenant spaces. The proposed apartment is in the northeast corner of the property. At its highest points, this building would be about 61-½ feet tall. The building's ground

floor area is about 45,000 square feet, with a gross floor area of about 225,000 square feet. The plans show 90 one-bedroom units, 75 two-bedroom units, and five three-bedroom units for a total of 170 apartments. In the center of the building is a landscaped open courtyard. Amenities include an outdoor pool, a spa, a lounge with a fire pit, a fitness room, a room with a golf simulator, a pet spa, a clubhouse, and community space. The building's main entrance and elevator lobby are in the southwest corner with easy access to the parking structure. Additional entry points are shown along the east and the north sides of the building. The exterior finishes of the apartment building would be brick, cast stone, E.I.F.S., and metal panels. Going from north to south along Haggerty Road, the plan shows three multi-tenant retail buildings identified as Building B, which is at the north end, Building C in the middle, and a Proposed Drive-Thru. All three buildings would be set back 50 feet from the right of way of Haggerty Road, with no parking between the front of the building and the road. Building B would have just under 16,000 square feet of gross leasable space. This building would be subdivided for multiple tenants, including restaurant endcaps. The next two buildings along Haggerty are Building C and the Drive-Thru. Building C measures 9,300 square feet with three potential tenants, including at least one restaurant. The Drive-Thru building is roughly 5,300 square feet with two tenants, both of which are identified as restaurants. Separating these two buildings, the plans show a 20-foot-wide shared dining patio. The pickup window for the Drive-Thru would be on the south side of the building with traffic circulating in a counterclockwise direction around the two buildings. The drive aisle, as you can see from this plan, commences on the north side of Building C and then loops around to the west side of both buildings before turning back east to the pickup window. It begins as a single lane and transitions to two lanes, about halfway between the buildings. Parking and customer entrances for both buildings would be on the east side. An enclosed trash compactor with a loading zone is shown on the south side of the drive aisle across from the pickup window. I'll note that this is a change to the plans from the discussion at the study session. The loading zone was added just south of the Drive-Thru building. The next group of buildings is at the south end of the property along Six Mile Road where the plan shows Building D, Building E, and a hotel. Building D is a 10,000-square-foot freestanding full-service restaurant. At its closest point, it would be set back about 41 feet from the right of way of Six Mile Road. An outdoor dining patio is depicted in the front yard between the building and the road. To the east is Building E, which is a freestanding

bank that would include drive-up services. At 2,500 square feet, Building E is the smallest of all the buildings. Three lanes for the drive-up window service are shown on the west side of this building. The hotel is identified as a Hyatt House. It would have a footprint area of 20,233 square feet and a gross floor area of roughly 80,900 square feet. This L-shaped building fronts Six Mile in the southeast corner adjacent to Fox Drive. The four-story structure would be positioned approximately 79 feet from the Six Mile Road right of way and 74 feet from the east property line. The hotel would have 107 rooms. Its main entrance and drop off is on the south side, facing Six Mile. The flat roof building would have a height of about 51 feet to the main parapet line and a maximum height of 63 feet to the top of the tower. Exterior finishes include brick veneer, cast stone, E.I.F.S., and metal. The next buildings are Building F, which is identified on the plans as a club studio; Building G, a retail space attached to the north end of the gym; and Building H, which is located adjacent to the parking structure. Club Studio is a brand owned by LA Fitness. The 35,000-square-foot facility will feature various fitness studios and other amenities commonly associated with a full-service gym. The main entrance is positioned near the middle of the west facade. The structure is one level with an average height of about 27 feet to the main parapet and 37 feet to the top of the tower above the store's main entrance. Building materials include various neutral tones of prefinished aluminum and painted precast panels. Building G is attached to the north end of the club's studio. This 5,860-square-foot retail space is shown as two units but could easily be for a single tenant. Building H is about 15,000 square feet and it's located immediately adjacent to the parking structure.

Parking is distributed across the site in five main locations. These five areas represent about 90% of the site's total parking. They include the parking lot in front of the grocery store, which has about 197 spaces; between the retail buildings on Haggerty Road and Buildings D, F, G, and H, where there are about 194 parking spaces; the parking structure, which has three levels and about 357 spaces; the area north of the hotel with 82 parking spots; and the area between the bank, the full-service restaurant and the gym, which contains roughly 71 parking spaces. All parking areas combined provide a total of approximately 1,000 parking spaces, which translates to a ratio of roughly one space for every 75 square feet for the full-service restaurant, one and a half spaces per apartment, 1.15 spaces per hotel room, and one space for every 270 square feet of

general retail space. Looking at the traffic and circulation, there would be multiple points of ingress and egress to the bordering thoroughfares. These include two driveways along Haggerty Road, which is on the west side of the property, one along Six Mile Road on the south side of the property, two on Fox Drive on the east side, and one on College Parkway, which is at the north end. All driveways currently exist except for the proposed new driveway at the north end of Fox Drive, which is just south of the apartment building. One existing driveway to the Comerica parking lot, which is on Haggerty Road just north of the gas station, would be removed. The site's main entrance and exit would be centrally located along Haggerty Road, and here, the plans show a new traffic signal. This 39-foot-wide road extends due east providing direct access to the parking structure as well as the parking lots on either side. The other driveway on Haggerty runs along the north side of the property directly to the grocery store, providing access to the back of the grocery store and to the apartment complex. The only driveway to the site from Six Mile Road runs north between the hotel and the bank building, connecting to the other drive aisles and parking areas, which are on the gym's east, west, and south sides. The plans show two connections to Fox Drive, which is under the jurisdiction of Schoolcraft College. The College is currently working with the city and several surrounding property owners, including Haggerty Six Partners, LLC, for the installation of a new traffic signal, which would be at Fox Drive, Six Mile Road, and Quakertown. The northernmost drive on Fox Drive is located just south of the apartment building and will offer convenient access to the parking structure. The southernmost drive on Fox Drive enters the site on the north side of the hotel. The submission documents include fully detailed landscaping and lighting plans. We note in our report and in the prepared approving resolution that some adjustments are needed on these plans to comply with the zoning requirements. Lastly, it is recommended that the city and the developer enter into a Development Agreement that will address items pertinent to the construction and the long-term operation of this development, such as land divisions, leasing, and separation of ownership, parking site design standards, permitted and prohibited uses, dimensional standards, and maintenance of utilities. With that, Mr. Chairman, there are several items of correspondence. Five departmental letters were received, including one from the Finance Department, the Inspection Department, the Police Department - Traffic Safety Bureau, the Fire Marshal, and the Engineering Division. Each of you should have copies of all the correspondence. With that, Mr.

UNAPPROVED MINUTES

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Chairman, I'll answer any questions that you might have at this time. Thank you.

Mr. Wilshaw: Thank you, Mr. Taormina, for a very detailed background report on this item. It's a big project and deserves the time that you're putting into it. Is there any questions for our planning staff? No questions for our planning staff. Mr. Ventura.

Mr. Ventura: Mr. Taormina, at our study session you made mention of the requirement that the apartment complex construction be started before a certain percentage of the retail was completed. Can you address that? Can you flush that out a little bit. Remind me of when exactly the requirement is that the apartment building construction begins.

Mr. Taormina: Thank you, Mr. Ventura. I don't want to misspeak. But I believe the requirement is that prior to the occupancy of any of the non-residential structures or uses on the property, construction must have commenced on at least 30% of any residential units that are part of the plan.

Mr. Ventura: That's clear. Thank you.

Mr. Taormina: I'll verify that I got those numbers right. That's correct. 30%.

Mr. Wilshaw: Okay, great. Thank you. Are there any other questions for our planning staff? If not, our petitioner is in the audience. Feel free to come forward to our podium, introduce yourself with your name and address and then we'll get started on your presentation. Good evening.

Doraid Markus, 251 East Merrill, Birmingham, Michigan 48009. I am one of the investors in Haggerty Six Partners. Thank you for your time today. Mr. Taormina, thank you for your presentation. You did a fine job in explaining what is happening at this fantastic corner in the City of Livonia. With me today I also have my architect on this, Scott Bowers, our engineer, Eric Williams from Stonefield and also Mike Labadee from Fischbeck who's our traffic engineer, should there be any questions for them. I want to start off by saying we understand this is a very ambitious project and this is very important to the City of Livonia as it is to us. We've taken a lot of time in formulating a plan that we think is deserving of this corner. We didn't just pop on buildings. We didn't just pop on parking lots. We actually put a lot of thought into this, as to what the needs are for the city. What would work here, what would not work here to make this a viable and

successful development. That being said, we were able to secure Whole Foods, which I think is a testament to the area and this corner. We were also able to successfully obtain Club Studios which is LA's fitness premier brand. They only have about eight in the country and only in major cities across the United States. And this was a pinpoint target for them once they heard Whole Foods was joining this development. We are working with other national retailers and other users that are very interested in this plot and development. We will get to the finish line with them as soon as we have a viable plan that's been approved by the city. We can speak to some of the uses. Thank you, Mr. Taormina: Along Haggerty Road, we have Starbucks that's taking the endcap drive thru use. Next to Starbucks, we have a quick service restaurant use. Next to them in the building called, I believe, C1, we have a 3,000 square foot user for a concept called Condado. You'll probably see them in Troy right now. They're off Big Beaver at Crooks in their City Center development. The upscale taco restaurant, very famous throughout the country when it comes to Mexican foods. On the other side of that building, those are the only restaurants proposed for C1 and C2. As you move along North there's Building B, and we purposely outlined two end caps with patios to service as restaurants. On the southern end cap is a concept called 2941 Mediterranean Street Food. 2941 Mediterranean Street Food happens to be our concept that we own, along with Joe Vaccari and our chef Jacques Van Statten, who's a Michelin star chef that is world renowned. It's his concept that he started and we are investors with him, and we have six locations currently and we're bringing one to this area. On the northern end cap of that same building is a concept called Snooze Breakfast Bar. It is very similar to something like First Watch that is up the road. It is a concept that's expanding rapidly throughout the United States. As you go across the interior into the bigger buildings, I believe we are slating that for a national furniture user. We are in discussions with them at the moment. Unfortunately, I'm under confidentiality agreements, and I really can't speak too much as to who they are and that's just how they operate, and I gotta abide by the confidentiality agreements. But the other building that's proposed there, which is building G is also another soft good user. So, I want the board to understand that in those buildings, you will not see restaurants, you will not see heavy intensive users and more of a soft good type user. Let me just mention also Building A is another user that's complementary to Whole Foods in terms of if you look at Whole Foods across the United States, there's always users that kind of herd around Whole Foods, whether

their outdoor furniture stores or whether their clothing stores, or whether there are other soft, good uses. But those are types of users that wonder heard, quote unquote, around Whole Foods. I know there was questions by this board as to can we reconfigure Whole Foods to a different way. When we first started this project, as we started laying out buildings, we asked Whole Foods of that, but when you put in their operations have their truck Well, the entrances, the access, their operations, the way they wanted to be presented with the investment that they're putting into the city, they needed to maximize the way their building sits and that's what we came up with. There is a building that sits behind the gas station, which is slated for a free-standing full-service upscale restaurant. There is a lot of interest from national users to come to the city. I know there's interest of other users who want to go across the highway. There are interests that want to come here. So, we're in talks with those restaurants. We have not finalized anything yet. But there will be something that's going to come to a head as we soon as we have a plan approved. The other building that Mark talked about is just going to be some type of financial institution, whether it's a bank, or something like a TD Ameritrade or some sort of that type of user, a financial user of that sort, but not a restaurant, not a intensive use. We are cognizant of the parking. As developers, we think through this thoroughly. We have our consultants to tell us what will work and what won't work. So, we have a whole bunch of cyclical uses here. There are times during the day when some buildings will be busy, other buildings will not be. There are times during the day when even though it's a 15,000 square foot building, you might have just a onesie twosie type customer, maybe five or six you will not have 50 or 60 customers at one time if it's a furniture store, so to speak. We understand the gym is busy. The gym is busy in the mornings and sometimes in the evenings. But that trails off on weekends when your full-service restaurant is busy on weekends. So, we're cognizant of the interplay between the parking and the buildings and how they interact with one another. So, we think we have a pretty good handle on the cyclical uses of all the users here. Your quick service restaurants that are along Haggerty Road are busy during lunchtime. They taper off in the evening and they taper off at night when the full-service restaurant really gets busy. The hotel we think it's kind of on its own little island there and it's an extended stay version. So, the parking intensity will not be as much as just a regular hotel where you sleep beds and heads. So, we also thought of that, and we, you know, with our traffic study, understand that there's ample parking supply to that hotel. The apartments with 170

units, our goal is to activate that parking structure for floors two and three, and the surrounding parking lot around the residences to park cars for all the residents of the apartment building. With the two stories on top, you have 238 parking spots in the deck. If you use a 1.5 ratio to a 1.6 ratio, I think you're right there. We might even have a surplus of seven to eight cars. To accommodate guests, the rule of thumb in our experience with the different professional advisors that advise us, you have about a 10% delta there that's satisfied because not everybody's home all the time, at the same time. So, we think that works just as well. We plan on activating the first floor also of that deck for the employees of this parking structure, excuse me of this development, excess parking for the fitness user, and we created walkways and pathways that lead directly from the parking deck to behind Buildings H, G, and the gym especially. We plan to have those very well lit, very well accessible with a lot of light and air, so that way, if you're working out at 6am in the morning and in the wintertime, and you have park in the deck, you can freely make it back to the gym and utilize the gym if the parking lot is full. We don't anticipate that the parking lot will ever be full, but we never know. We have enough studies to determine what parking will be, and we think that it suffices. Other than that, we're very excited about this project. We plan on breaking ground or putting demolition to this building in the second quarter or third quarter of this year. As soon as Comerica fully vacates, we'll be in with plans. As soon as we're fully approved, hopefully, with construction plans, and we're going to begin on the retail. I heard something today for the first time that there's a requirement that 30% of the apartment complex needs to be started when the retail...that's news to me, but I'd like to kind of talk about that and find out what everybody's feelings is and tell you what our thought process is as developers and how we activate and start that project. But this will all, you know, it is a two-year project to fully complete...two-to-three-year project to fully complete. With that, I'm here to take any questions.

Mr. Wilshaw: Thank you, Mr. Markus for your presentation. And we do understand that you do have confidentiality agreements as you work through some of your negotiations with potential tenants, but we do appreciate at least providing the information that you could provide tonight as to some of those tenants for this development. Is there any questions from any of our commissioners for our petitioner? I'm sure there are.

Mr. Caramagno: I'll take a couple. Some of the detailed questions I've got are on the compactor next to proposed Building C2. On the different drawings that I'm looking at, some show the compactor set further west, some show it further east. Some show some shrubbery behind it to the west. This particular picture shows it in a better position in my mind. When some of the other pictures show it further to the east your parking island will get in the way of getting that compactor picked up. So two different drawings. Which is it?

Mr. Markus: So, what you see there is our latest and greatest. We took the comments from the last meeting we had with you folks and tried to understand the issues and we came up with this solution to provide some loading for those buildings as well as hide the compactor from the middle of the parking lot where you have all your customers in. Our compactor collection will be controlled by the waste management company at specific times. So, it isn't just a free for all when they can come in and can't come in. We have loading in there so the waste hauler can pull in easily unload the compactor and load out. We also have that for deliveries for the users of the other buildings but that how you see is what we plan on building.

Mr. Caramagno: Okay, there's a different version of that there Mark. If you can just scroll just so we're clear. There's another version on another page down, I think.

Mr. Caramagno: This one. Okay, so it makes sure it gets setback furthest to the west as possible. Another thing, these are all leased properties from your group. Nobody's going to own their buildings. Are you going to lease all these properties to them?

Mr. Markus: The intention is to land lease buildings D as in David and the bank pad, but we would still retain ownership of the land underneath it. All the other buildings will be owned by us, correct. We will construct and we will build.

Mr. Caramagno: Okay, let's go to the apartments in the drawings. I thought I saw better drawing last week, maybe not...the overhangs, the porches on the upper levels...are they inset or outset from the from the apartments?

Mr. Markus: I believe those are inset. They are inset into the unit not overhanging over the sidewalk.

Mr. Caramagno: Will there be any overhanging? Or are all four sides in set like that?

Mr. Markus: All four sides are inset I believe, is that right? Scott? Yes.

Mr. Caramagno: I like that. What was their decision on the catwalk from the parking garage to the apartments?

Mr. Markus: We are pursuing it. We have to engage a few more engineers to make sure that we can build this safely and in a way that works for the parking deck without interfering with the structural integrity of the parking deck and also connecting to the apartments where we'd like to provide that amenity to our residences, and we're working on that. Our plan is to show it because we want to build it. If we get setbacks, we can't build it for some reason, that's just because it's impossible, we'll come back to the city and inform you of that.

Mr. Caramagno: Do you have an option in mind or thought in mind If the catwalk does not work out? How do you go from floor three down to the ground floor with perhaps your groceries and then come through...you carry it down steps? Is there an elevator in there? I don't know what's in there.

Mr. Markus: There are elevators in the parking deck.

Mr. Caramagno: Okay, so it is easy enough to get up and down.

Mr. Markus: And we provide...we would also provide not luggage carousels but what do they call those things that we...there you go package carts...that we would allow our residents to use. There would be a few in the parking deck and a few in the hotel. They'd rotate back and forth. And as we manage the hotel, we'd make sure they're in a spot where guests can easily access them.

Mr. Caramagno: Okay, my next question is when you come in the main entrance, main drag just to the south of the grocery store and Building A, I know we talked at the study session about traffic that comes up and then kind of finds themselves at the entry of the parking garage with their only option to go around the back of Whole Foods and their loading and service area. Is there any other thought, whether it's a sign or direction to tell people if you go straight, your only option really is to go on the parking garage and not go behind the Whole Foods, and the reason I asked that is because when you go anywhere else, you go to

Foodland, you go to Bush's Market, you go to Meijer, traffic's not directed behind those facilities when trucks are trying to unload. It's best just to keep that traffic away from that activity. Is there any thought to how you could control that?

Mr. Markus: We can control service vehicles only and no customer parking or no customer access. I don't think it's advisable or works well with Whole Foods and the other tenant to put in a gate of some sort to stop traffic, but I guess we can put in signage to say service vehicles only because you will get a smaller box truck that makes a delivery to Whole Foods, whether it's bread, whether it's you know, whatever it may be, they don't just get deliveries of semis. They obviously get multiple deliveries throughout the day of other users. So that access is there for those people to come in and park behind the Whole Foods and make those deliveries or whether it's you know, Whole Foods or building A. If the concern is a customer who's visiting the location happens to enter that area, they're going to learn quickly that they have no business there and they're going to circle around the building and get out again, and it may happen once, twice, three times, but there really is nothing there for a customer to go back there for. All the uses that they would potentially use are in the main portion of the property.

Mr. Caramagno: I understand. I run a trucking company and the reason I mentioned that is because if it's not clearly marked or designated, you have people that visit your facility, and they get involved in the truck lot. And you might have forklifts running back there. You might have semis backing up. You might have box trucks unloading. I think it's a terrible place for a person to go and kind of get lost in the back of a delivery area.

Mr. Markus: Your arguments adept. We have no problem putting service vehicles signage over there to indicate to somebody that there's nothing here for you, you know, turn around and go the other way.

Mr. Caramagno: I think that'd be important, and it would be good for a customer experience, because if you're not and you wind up back there, it's just not a good feeling I would imagine.

Mr. Markus: We have no objection to that.

Mr. Caramagno: The other question I have is on one of the drawings to the north of the grocery store. It looks like there's an overhang for all the

property on the north side of the grocery store. Is that for quick pick up?

Mr. Markus: That's for quick pick-up deliveries. Yes. And they have an elevation where it is a canopy that's over that parking area to protect from the elements and rain.

Mr. Caramagno: Is there any protection around that for...there's a little kink in the road there, you know, as you're traveling east or west it has a little kink in the road there. See, right there, Mark is a little kink in the road. Is there any protection to keep somebody driving through there from hitting that upright and taking that canopy down if they're not careful? Is there any bollard protection or anything there?

Mr. Markus: If you allow us to further develop that with Whole Foods and staff, I think we can do something to accommodate that. If it turns out to be a concern.

Mr. Caramagno: Probably is when you get that kink in the road, you know how people drive. You hit that upright, and that whole thing comes down. Or damages, it probably should be some sort of bollard action there.

Mr. Markus: So, it is curbed currently. And if the concern is that we can talk to Whole Foods about putting bollards there, and hopefully show that in our final plans to you.

Mr. Caramagno: I'm thinking something should be there. And then my last question for now would be trash for Buildings H, G and F.

Mr. Markus: Yes.

Mr. Caramagno: Where is the proposed trash location for those three buildings?

Mr. Markus: So, if you look behind F, excuse me, behind the gym, and the parking field by the hotel. That's a trash area. I want you folks to understand that this is not a heavy intensive use, like a grocery store where they're bringing out multiple trash runs on a daily basis. So, if it's a furniture store, and they're boxing their cardboard, they're gonna make a run once a day to take it there and throw out their trash. We plan on with our waste hauler to have this trash handled obviously with the needs that is required, whether it's every day, twice a day, every couple of days. We'll monitor that and see what the use is, but we'll make

sure that those cans, that dumpster corral, services the gym, Building, H and Building G sufficiently.

Mr. Caramagno: Can that location be moved toward the retention pond where that bigger tree is, it seems like a straighter shot a little closer to the buildings. So

Mr. Markus: So, that retention pond I know Wayne County and I'll have Eric speak to this. Wayne County has standards that we cannot touch. And we cannot encroach upon the retention pond, and we thought about adding some stuff there and how we access it but that means building access roads to that dumpster area and there's just things that we cannot touch. I believe, Eric, it was a 25-foot setback, correct from the buffer so we were limited in how many parking or, excuse me, where we can put the garbage cans and how we access them.

Mr. Caramagno: The way it's drawn here, and I know it is just a drawing but the angle on that dumpster location is bad. Right off the bat I can see that it's bad and you're gonna have trouble there that when it will get driven over, it'll be a problem. So...

Mr. Markus: Are you referring to the dumpster pad behind the gym?

Mr. Caramagno: Yeah.

Mr. Markus: So, our thought that a trash hauler would drive straight in.

Mr. Wilshaw: I think the diagram that we have in our packet, Mark, is different than the one that you're showing on the screen.

Mr. Markus: Yeah, that's the correct one up there. There was a different one once before that. We corrected it. That's the latest and greatest.

Mr. Taormina: So, what are we talking about? The placement of the trash receptacles?

Mr. Caramagno: Yeah. Can you blow that up, Mark?

Mr. Taormina: This is the current plan, which I received today. I was under the impression that this matched the black-and-white version that is in your packets.

Mr. Caramagno: Can you zoom in on it a little bit?

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Mr. Wilshaw: Our color plan shows the dumpster kind of in the middle of a parking aisle.

Mr. Markus: Yeah, we changed that.

Mr. Wilshaw: Okay.

Mr. Caramagno: That satisfies the concern I had. Thank you. That is much better. Way better than what I see here.

Mr. Wilshaw: Okay, good. We want to make sure we keep Mr. Caramagno happy. He's our expert on this stuff. All right. Any other questions?

Mr. Caramagno: Not now. Thank you.

Mr. Wilshaw: Okay. Other questions from commissioners? Mr. Long.

Mr. Long: The parking deck is the one existing structure that you're going to maintain. You're going to keep, right?

Mr. Markus: Correct.

Mr. Long: Okay. How old is that parking deck, do we know?

Mr. Markus: I do have that answer somewhere. But I think it was...I believe it was early 90s or late 80s, but I don't have the exact answer. But we have done our study on it. We have had people on there and it's in tip top shape, Comerica has spared no expense and keeping the upkeep on that parking deck.

Mr. Long: Are you leaving it as is? Are you gonna have to resurface it? Repaint it? Restriping or anything like that?

Mr. Markus: Surprisingly, it's in very good shape. It has red doors, which do not match our theme. And we'll be changing that color. Okay. There, I do take it back, we are popping out a door next to the big patio that you see between Building G and Building H. So there's a second form of egress for customers who park can walk out of the back of that structure. So we are we are putting in access way over there.

Mr. Long: The traffic study, I noticed that that was you know, in the packet and I was looking through that and because this is a public hearing and it's good to have it on the on the record. What's the

two-minute summary of the parking study? Maybe the parking guy can...

Mr. Markus: I'll have my person who studied and does this for a living.

Mr. Long: You brought him out, we may as well let them talk, right

Michael Labadee, Traffic Engineer, works with Fishbeck. The question is about parking or traffic?

Mr. Long: So, what's the executive summary on the parking study? I'm sorry, I said parking, on traffic. What is this going to add to the area in peak times?

Mr. Labadee: You want the total number of, new cars and stuff? Something like that?

Mr. Long: Sure. Let's try like...I brought the report with me on a computer because it's like 400 pages.

Mr. Long: Yeah, I know. It keeps crashing my iPad.

Mr. Labadee: Let's see. You gotta hang with me a little bit, because that wasn't ready for you.

Mr. Long: And while you're pulling that up, there is intention to add a signal?

Mr. Labadee: Yes. Correct. On Six Mile at the new entrance way that lines up with

Mr. Long: Quakertown?

Mr. Labadee: No. Oh, I'm sorry, on Six Mile? Yes, that's not our's. It's just the developers participating in that. That was coming along with some with another development. On Haggerty, the new one that's going to go ahead and Haggerty is going to line up with the development driveway that's over there. So, both will get ingress and egress with that. We're working on getting that ready to go. Wayne County has already said ok to it. So, we're working on it. A couple of things that I didn't want to...if you look on page 15 of the study, then maybe you just want to look at this later or something like that, if you can look at page 15, there's a table there that has a lot of numbers in it again. Some of the uses, and are get something like internal capture, like you would go there for one thing and you would move to another like

you'd go to the gym and then maybe you go to a restaurant or you go to the gym and something else. And so those are called internal capture trips. There's a lot of adjustments if you look in that table for internal capture trips and pass by trips. So, an internal capture trip is kind of a trip reduction and pass by trips are trips that are interrupted like, say you're gonna...you're headed to your office. It's up at Eight Mile Road. You're going northbound on Haggerty you pull in to get a coffee and you keep on going after that, that would be a pass by trip. So, it's a trip that's already on the road, but it interrupts itself to go to the site. So, all those adjustments that you see in there that goes on, but for the most part, the new trips you'll see in in the morning peak hour, about 468, and then the afternoon peak hour about 483 with the adjustments that's distributed over all those driveways.

Mr. Long: And there's probably no way for you to know this, but that's compared to what we see now, correct? Not compared to when that Comerica complex was working?

Mr. Labadee: Yeah, we didn't deduct anything for Comerica, if that's what you mean? No, we didn't do that. That comparison...we could do that, but no one asked for it. So, we didn't know.

Mr. Long: You know, again, I think that the, the uses here, and...there's excellent staggering of the uses here, and, you know, so that you won't have a rush where everybody's trying to park or trying to drive there at the same time for the same purposes and I think that's excellent. I just think this is kind of important data. And I think it's important that we highlight here.

Mr. Labadee: Well, I have a couple of things to at this site...that you have residential on the site. So, the residential is leaving in the morning and coming back in the afternoon, kind of an opposite of what typically happens on a development like this, right? So, there's a lot of subtle things that happened like that, that will make it quite a bit more tolerable than it would look like on the surface. The levels of service are all what they are today or within what would be required as far as accepted practice. I don't know if you understand that, what level of service means? That A through F thing? A being great, and F being not so great, and D being acceptable, that kind of thing. So, we've gone through all that exercise, and it's works, and it's going to help the project down the left side of Haggerty too.

- Mr. Long: Sure. Appreciate that. Okay, again, I appreciate your time coming up. I just wanted to kind of make sure we discuss these things on the record.
- Mr. Labadee: Oh, sure.
- Mr. Long: Appreciate it, and then my last question for right now, Mr. Chairman, is just out of curiosity, what's the surface on the putting green at the apartment complex?
- Mr. Markus: Oh, it's artificial grass. It's funny. I just put one in my house for my kids, and it feels just like a real green. I can't make those shots. So, I know, it's like a real green. So, we researched this a lot, and we deal with consultants all day when it comes to multifamily, and there's some great products out there that looks and feels and just gives you the feeling like you're putting. It's not your typical putt-putt golf type of situation.
- Mr. Long: Great. Thank you.
- Mr. Wilshaw: Thank you, Mr. Long. And thank you, Mr. Labadee for coming forward and talking about the traffic. Is there any other questions from any of our commissioners? Mr. Ventura,
- Mr. Ventura: I apologize. But I do have a couple of questions.
- Mr. Markus: You give us the hardest questions. I don't want your questions.
- Mr. Ventura: So, I didn't hear the answer and maybe I missed it, but what's the net increase in traffic as a result of this development coming over? How many more cars are going to be at the Six Mile and Newburgh intersection that are not there today?
- Mr. Wilshaw: Mr. Labadee, do you want to come over to the microphone so that way our vast TV audience can hear you talk.
- Mr. Labadee: A couple of things, when? Did you mean per day? per hour? It's kind of a hard question.
- Mr. Ventura: Let's just say on the average day, between business hours.
- Mr. Labadee: If you go back to that table, that's on page 13 there's something I should have mentioned and I didn't. So it's probably a good thing. Let me back up here. On the table you'll see at the far right of the table, it says weekday that shows 11,300 cars on a weekday. So the trips, those are...half of those are in and half of

those are out and it's over a 24 hour period. So, that's the number per day.

Mr. Ventura: That's a net increase?

Mr. Labadee: No, no. I don't have a net increase because I don't know what the Comerica number was. We didn't figure that out.

Mr. Ventura: So, you haven't gone back to any records that...

Mr. Labadee: No, no. it's a net increase over existing traffic counts, but we don't have a net increase and figuring out what it was for Comerica. Nobody asked me that. That would have been a good thing to bring here. I didn't think you were going to ask me that. But I

Mr. Ventura: I apologize.

Mr. Labadee: I suppose if you could give me a little bit of time, I can figure it out yet tonight, but no, I guess I can't because I know really how big that building is.

Mr. Ventura: From a point of interest, you're a traffic engineer, so if you add that light at Six Mile at Fox Drive, there'll be six traffic lights between Newburgh Road, and Haggerty road on Six Mile.

Mr. Labadee: I don't know that for sure.

Mr. Ventura: I can tell you that there is going to be six traffic lights in a span of of two miles, mile and a half. How do you time those lights so you don't end up with a bunch of frustrated people trying to try to get to your new brand new development and, you know, stopping every 500 feet or so?

Mr. Labadee: Well, it's not quite 500. It's shorter than that, but traffic signals can be coordinated a couple of ways. One, they...

Mr. Ventura: Will you be able to control them? Will you be able to do that?

Mr. Labadee: No, that'd be Wayne County.

Mr. Ventura: Would you be able to petition Wayne County to come up with a plan that provides traffic that moves traffic through there as efficiently as possible?

Mr. Labadee: Part of the study, if you kind of go through it, the reason it's so thick, is there's a lot of information in it from output from something called, a program called Synchro. And from Synchro, you have in order to get the thing to work, right, a lot of times these networks, it's a simulation of the network, but it also has the ability to figure out what the timing and the based on the space and the speed and the demand, what the timing would need to be set at in order to be able to get them coordinated. So this study along with the one that went in for Fox will, and I don't know how far to the east, the Fox study went, but Wayne County will take that information, and they go out and they adjust the signals and they coordinate them. As long as they're interconnected. If they're not interconnected, then they have these controllers that are timed to set it up so they can change green when they should. They also change timing during the day. They reapportion the green time and the red time. Whether Wayne County gets out there right away to do that, I don't know. It's not necessarily our obligation. They do that on their own. That's why they asked for these studies when they end up with a project like this size, or even the one that was the size of Fox. For them to approve a signal they think about that. They don't want to put them 500 feet apart, because you cannot coordinate them very well. So, it's Wayne County's thing. They'll do it when we get our signal, ready to finalize it, and we're looking for a little bit more information for that. That same thing is going to happen on Haggerty and Wayne County talks about that. When the thing all gets constructed, that's when the action happens, and the controllers go in and the timing goes in.

Mr. Ventura: I think that's a good answer. Thank you very much.

Mr. Labadee: (Speaking to someone in his group) They're all that way though, right now. But some of the ones farther east? I don't know.

Mr. Labadee: So, I know that if they're older, and they've been there a while, it's gonna take some doing to get them to work the way you're talking about.

Mr. Ventura: The study is going to provide the information to Wayne County to allow them to optimize this.

Mr. Labadee: Yes.

Mr. Ventura: Great. Yeah. It was a good, that's a good answer. Thank you very much.

- Mr. Wilshaw: Any other questions? Mr. Ventura.
- Mr. Ventura: A couple more. Chairman, if I may. Mr. Markus, we talked during the study session about increasing the landscaping behind the grocery store so that there's a screen between the apartments and the loading area, right at the rear of the presumptive Whole Foods Market. What have you been able to accomplish without regard?
- Mr. Markus: We're kind of constrained with the layout. Obviously, there's that curb there that we're going to try to landscape. I know the concern is that the western facade of the apartment complex is going to look at the roof top and the loading area of Whole Foods. I understand that. Speaking to and I took that comment to heart last time I spoke to our consultants I say hey, I have a whole side here that commissioners say looks over a Whole Foods and you know some of the banter back and forth. Well, you go to downtown, and you're looking directly into a neighbor's, you know, apartment complex when you're in a high rise. So, I understand that. The issue is mitigated by the amenities that we provide. This is mitigated by that site has a fewest number of apartments, and the issue is mitigated, just in the location of how far it is, from Whole Foods. Although it seems on paper on black and white, you're on top of them. But there is space and distance away. In terms of landscaping, we're limited by that curb, we can add the trees, we can add bushes, we can try to screen off as much as we can. But we're limited in how this is set up and the portion of boundary lines between Whole Foods and the apartment complex. I know it's not the ideal answer. And I wish I could give you a better answer.
- Mr. Ventura: But the landscape plan that we looked at during the study session, had a juniper which are lower shrubs. Are you planning on putting some taller trees in there at this point?
- Mr. Markus: Let me get my engineer here. Can we put higher trees in there to accommodate what...
- Mr. Wilshaw: You'll have to come forward, so we know who we're talking to. Good evening.
- Eric Williams, Stonefield Engineers. Yes. So, Mr. Ventura, we did look at it. You know, I think that landscape Island is six to eight feet wide at most. So, it's rather tight. I think Mr. Caramagno could appreciate the distance needed to get trucks through this area,

right? That was kind of the pinch point. Dre and I talked about it. So can we squeeze some additional space out of the Whole Foods piece. When you look at the size of the tractor trailer and then maneuvering through the rear it's not tight at this point, but any tighter I think it would be, you know, a problem. So, we can definitely look at some larger shrubs. But I think when you think about evergreen trees, right, those are going to provide the best screening in terms of visual screening. The six-foot islands are just not going to be sustainable for them long term between snow, salt, and then obviously the vehicles parking adjacent. So you know, at this point, we did select a lower rung shrub, easier to maintain, can handle a little bit more of the vehicles directly adjacent to it, but we can look at a larger shrub, I just don't think we're gonna ever get to something like an Arbor Vitae, you know, that would get to 30 or 40 feet high.

Mr. Ventura: Okay. Thank you. That's a detailed answer.

Mr. Ventura: So. according to the site plan, as I look at Buildings, A, B, C, G, and H and D, you've got 60 some thousand square feet of retail space, ballpark.

Mr. Markus: I'm gonna trust your math.

Mr. Ventura: In round numbers. Have you got hard commitments for any of those spaces? In regard to tenancy?

Mr. Markus: Yes, absolutely. So, we'll start with...

Mr. Ventura: Roughly, are you roughly half leased at this point? Or 40%? Or 70%? Just just a ballpark?

Mr. Markus: I have commitments for all the lease space. I have commitments...if I had more square footage I could put more tenants in here.

Mr. Ventura: Great. That's exciting.

Mr. Markus: But yeah, but no and some of it I just can't get to the finish line because I don't have a product to provide them to say yes, I can give you the space. That's part of the difficulty. Once we get through City Council if we are lucky enough to get to that point. I can say yes, I can deliver this pad to you or I can deliver this building to you let's finish up and get to lease. A lot of these tenants won't entertain that until I can assure them a delivery of some space.

- Mr. Ventura: Right. Thank you. You did a good job of explaining the various busy times of the mix of tenancy so that the parking load doesn't overwhelm the available parking. One of the things we talked about at the study session was deliveries and the fact that the delivery trucks, because you don't have any...there's really no back to many of these buildings. There's no delivery aisle. They're going to be delivering through the front door and blocking the traffic aisles. My question is, can you regulate in your leases the delivery times that are available to the tenants there so that you don't have a bunch of deliveries in the middle of the day and trucks blocking the drive?
- Mr. Markus: Very good question. So, the probably busiest deliveries, the most in and out, are going to be buildings, B and C. And so, we added that loading zone there on the south side of Starbucks to alleviate that congestion because those 10 tenants shown are gonna have constant in and out daily and probably few times a day. So, we alleviate that issue by doing a loading zone there. In terms of the Building H, Building A, the grocery store, those are going to be using the back of house and the drive aisle that Mr. Caramagno was telling us to have service vehicles, and let them walk over what they need to walk over. If it's a furniture store, they're going to come with a semi unload. They will have a showroom and it's a delivery once every so often, because they deliver from their warehouses, obviously. The gin really is a one and done type of issue. If it's building G, if it's a national perfumery, let's say they're going to...that truck is going to park that box truck and is going to either park behind the Whole Food service area or park behind Building F they're going to park where they're going to want to park obviously, but they will not be in the main body of the parking field. The hotel, negligible, I think you would agree. The Building D, the big user, we will work with them to regulate when they get deliveries. And they usually say where are my deliveries coming in from? And what time can I get them in? And so we will work with them in their leases to do that. So, the opportunities where we do,...excuse me, the uses that need implementation in their lease for when we can control them, we'll definitely do that. The other ones are kind of self-controlled with how the site plan is laid out. Right.
- Mr. Ventura: So, you'll have the latitude, great, thank you. My last observation was there was some concern about the size of the walkway between the parking deck and the back of Building H, and you're going to expand that or do something to make that a little more pedestrian friendly.

- Mr. Markus: Six-foot sidewalk, well lit, it's again, we're constrained by delivering space that's suitable for a tenant for furniture user, because they can't just have a skinny bowling alley, obviously, and providing enough walkway. And you know, we, I want you to also consider that we have two sets of doors. So, there's a set of doors right at the end where that triangle patio is. So, somebody is parked in that structure, they can exit immediately to the right, there'll be a door popped over there.
- Mr. Ventura: You're adding a door?
- Mr. Markus: Yes, we're adding a door there. So really, that walkway is a service walkway for the users here to throw out garbage, but if a pedestrian does happen to come through there, they could still come in. But we're going to point our pedestrians and our users to use that other door that we're putting in.
- Mr. Ventura: We also talked about creating some recreational areas public areas.
- Mr. Labadee: Yes.
- Mr. Ventura: Along the I guess it would be southeast wall of the parking deck adjacent to the pickleball courts, if that were possible. Have you been able to determine that you can do something there?
- Mr. Markus: So again, we're constrained by Wayne County. Are you talking about the area behind the current structure.
- Mr. Ventura: The dark green.
- Mr. Markus: Yes. This is a conversation we have to have with Wayne County because we are under their jurisdiction when it comes...so the plan is, if we can get into Wayne County, show them maybe a walkway around the entire perimeter of the detention pond without interfering with the privacy of the residences because we don't want just anybody being able to walk into the residences, provide a fence and a walkway area there. We will have that conversation with Wayne County, but we are limited in scope of what we can and can't touch there. So, if they do allow us we're more than happy to put it in.
- Mr. Ventura: Okay, Mr. Markus, thank you very much. You have been very cooperative. Thank you.

Mr. Wilshaw: Thank you, Mr. Ventura. Any other questions for petitioner. Mr. Caramagno.

Mr. Caramagno: Just some clarity on the apartments and a little bit about the rate for the apartments, the size of the apartment units. Where do you tend to draw people from for these apartments and who's going to manage the property?

Mr. Markus: So few things. Let me just kind of talk about the amenities in the apartment. You've seen the amenities, pickleball court, tennis court, dog wash, golf simulator, golf putting. We plan on putting stainless steel appliances throughout our kitchens, granite quartz countertops throughout, engineered wood or porcelain floors, Eurostyle cabinetry. So, we are going to deliver the best-in-class when it comes to residences in Livonia. And we have probably best-in-class grocers. We have best-in-class gyms. So, we wanted to take that theme out with the best-in-class apartment complex that we offer here. We want to draw professionals. We want to draw people who work in this area that live in this area. Northville, Western Livonia area. We are looking for stable families that come in here. So, it's really professionals that want to live and be in this area that would visit this type of development. That would you know, utilize this development. Price points would probably be on the high side of the market to be quite honest with you just with all the amenities that we're offering. Obviously, we need a return on our investment and it's gonna have to be a price point that makes that return on investment with all the amenities we're offering and the upscale amenities that we're giving and the add ons to the type of apartments that we're building.

Mr. Caramagno: Okay, who's gonna manage that property?

Mr. Markus: We are talking to several...our consultant currently is Friedman, which manages over I think, 18,000 apartments in the metro Detroit area, they do a fine job. They were our consultants when it came to planning and planning out the amenity space, the size of the rooms, the number of ones and twos, our parking calculations. And we've been working diligently with them. And that's who we plan on having manage it at this point.

Mr. Caramagno: Will there be an office on site where someone's there all the time?

Mr. Markus: Yes, there'll be an office on site. Security on site manager. On site 24 Hour Emergency Service, obviously. So, we'll always

have...it will not be just abandoned and lock the doors and let residents to fend for themselves. We will have some eyes and ears on this at all times.

Mr. Caramagno: And Friedman is the management company.

Mr. Markus: Yes.

Mr. Caramagno: Okay. Thank you.

Mr. Wilshaw: Any other questions?

Mr. Caramagno: No, I'm done. Thank you.

Mr. Wilshaw: All right. Very good. Thank you, Mr. Long.

Mr. Long: Mr. Chair. Thank you. Just one follow up thing. I know with the traffic study we talked about, and you said you didn't have the comparison for Comerica. Should you advance after tonight and you go to City Council, I think it would be a good idea to have that comparison when you go there.

Mr. Markus: Thank you. Mr. Long, just so I'm clear, you want to...the board would like to know if Comerica was operating at full capacity, the number of cars they were at versus what I'm bringing to the table?

Mr. Long: Yeah, in its heyday, right? Because that traffic around there is challenging to begin with. So how, what are we adding to it? What are we doing here, and it's, you know, it's different now than it was when Comerica was in its heyday there, and so I want to compare apples to apples.

Mr. Labadee: Just with the conversations that I've had with Mr. Labadee and his group, I think at the end of the day, we make this a safer environment by adding that traffic light on Haggerty, because now you're controlling ins and outs, with two major shopping centers on both sides of Haggerty. They are both very, very busy and now you've put in a traffic control device to make sure that cars leave and are not trying to zoom out before the next car comes and you can actually leave at a traffic control signal. So, I think at the end of the day, this is a much safer option that we're providing to this to this area.

Mr. Long: I agree with you on that. I just, you know, I'm worried about volume and I'm just making sure that people can get where they're going to.

Mr. Markus: Understood. Thank you.

Mr. Wilshaw: Thank you, Mr. Long. That's actually a very good point. Because I know back in Comerica's prime, when they were a very busy operation, we had heard numerous complaints about people not being able to get out of there, you know, when the mad rush is over, you know, everyone's trying to leave it's very difficult to get out of that property sometimes. So, these lights definitely would help so, but I agree with the thought process that it'd be nice to have a sense of what kind of traffic impact this is going to be in comparison to Comerica when it was at its prime. It's a different animal. You know, you're talking about an office building where people sit for eight hours a day versus people a little bit more transient coming in and going into retail development, but you also have a residential component and other things that, you know, will soften the impact on the traffic. So, if there's no other questions at this time, I do have a few questions. I'm going to ask you. A sort of high-level questions, Mr. Markus, because I don't want to get too deep into questioning as the chairman but I just want to understand a little bit about your background in terms of...we haven't worked with you before on developments in the city. So, what is your wheelhouse? This is a mixed-use development. Are you more into the residential side? More on the commercial side? Where do you come from?

Mr. Markus: Well, I'll tell you a little story. I am an attorney by trade. Went to college at Wayne State University. Went to Wayne State Law. Graduated Wayne State Law in the year 2000 and worked as an Assistant Oakland County prosecutor for seven years. I left there and did criminal defense and I got burned out doing criminal defense. I said I gotta find something else to do, and I knew some wealthy people. I said, what are these people doing? I realized they do real estate, and I went down the road and I bought my first shopping center in 2006. I believe it was a little 8,000 square foot shopping center in Berkeley. It was very interesting to say, Okay, you collect this much in rent, you send this much back to the bank, and you have this much left over and I didn't work for it. It was an amazing concept. So, I got the real estate bug so to speak. The recession, the great recession hit and I was lucky enough to partner with some partners who were very liquid who had faith in me and I was blessed and we bought a lot of real estate during that time because we're able to

buy cheap. We turned those whether they were raw land value added shopping centers today over a million square feet in real estate that we control in our portfolio. We have four projects under construction right now. We are doing a 120,000 square foot building in Birmingham, downtown Birmingham, five stories with retail, office, residential. We are doing 100,000 square foot shopping center in Grand Blanc, Michigan with retail. We just completed a 25,000 square foot commercial development in Rochester Hills, along with another 100,000 square foot shopping center in Rochester Hills that we are in the midst of remodeling and re-tenanting. And my second shopping center ever that I bought just down the street in Rochester Hills from these other two projects, a 30,000 square foot shopping center. That is what I was told the most expensive piece of real estate and all of Rochester Hills. So, we take pride in what we do. We don't just buy things to buy things. We really think it through. To me, it's like when I was a kid, I build Lego. It's like putting Lego pieces together and what can you create. So, I put a lot of input in terms of what the architecture looks like, what the spacing looks like, and Scott and Eric will tell you that I've taken plans and ripped them up and said let's start over because these don't work. So, we take a lot of pride and put a lot of effort into our development. So, we take all our expertise from our past experiences of what we built and done and put it out into this. That's why I said this is probably taking the most time I've ever taken in any shopping center development that we've had with what we've done with them with my consultants here. So I really want to stress how much thought we put into this to make a quality development to this corner. And that's our background and our partners, our real estate investors. Tom Scheff who's sitting next to me, as a builder builds custom homes. He will be building the residences. His portfolio...the lowest house he's ever built by \$4 million as high as \$25 million in the State of Michigan. I think Mark has seen pictures of the homes that Tommy's built. So, he brings that expertise. He brings that touch to this as well. So a good, good partnership. We've been very successful, and we hope to continue.

Mr. Wilshaw: I appreciate that. So, you do have a good mix of both retail and residential experience. And because this is a mixed use development, you need to have those areas of expertise. So, I appreciate that. In terms of the investment that you're making into this property, what type of project are we looking at in terms of dollars?

- Mr. Markus: A lot. It's in high eight figures, probably at the end of the day if it doesn't reach nine. Once you include everything.
- Mr. Wilshaw: And you're looking at about a two to three year timeline on the development.
- Mr. Markus: Yes.
- Mr. Markus: And, you know, if I can ask a question, I know there was a proposal to say and I just want to flush that out a little bit because I don't like to go into things unknown a little bit. So I heard a proposal that 30% of the apartment needs to be built or started, I wasn't sure exactly if that was kind of...it went quickly. I didn't catch it. Can someone expound on that a little bit for me, please?
- Mr. Wilshaw: I'm sure Mr. Taormina can. I think I would just say that the...I think the general intent of the zoning ordinance or the planned use development part of the ordinances is to ensure that the residential components, when they're in these mixed use type developments are started and developed and that it just doesn't become a retail development. Is that correct? In my assumption, Mr. Taormina?
- Mr. Taormina: That is accurate. The intent is to develop a unified plan involving the residential and commercial components with them coming together simultaneously. The 30% was somewhat of an arbitrary standard that was adopted as part of the ordinance with the understanding that planned development projects would ultimately be under the guidance of an agreement and that some items could be negotiated. Should the developer present a case that varies this standard, the Council can make adjustments that would be embodied in the development agreement. It is a guideline, as part of the ordinance, but is something that the City views as important in terms of developing a unified plan.
- Mr. Wilshaw: Right. So, Mr. Markus, just so you understand, we're at the point that the Planning Commission is going to make a recommendation to City Council, you're gonna go on to City Council have a public hearing and an approval of that process as well. And they will have the ability to negotiate some of those terms of that process.
- Mr. Markus: I guess what I'm not clear upon is, once they start the development, let's say we build all these buildings, the Whole

Foods, Buildings A,B,C,D,E, F and G. Are you saying at that point, once those buildings are built, you need to be starting on the apartment complex? Is that my understanding? I guess I'm just trying to just seek clarification of is there a start stop that must happen on the apartment complex?

Mr. Wilshaw: I'll let Mr. Taormina speak.

Mr. Taormina: I'll just point out an example. And we've only had one similar case. The Haggerty Center project, where the retail phase started first, and as they approached their point of occupancy, we determined that because they had begun construction on at least one of the apartment buildings, they met that requirement. Thus, the apartments were not ready for occupancy at the time the retail phase was up and running, but the City was satisfied knowing that it was well underway and there was going to be a commitment towards the completion of the residential phase of the development. It was within approximately eight months to a year, maybe, when the first apartment dwellings were ready for occupancy following the completion of the retail.

Mr. Markus: So, I would just like to make this point. There's nobody in this room that wants to finish this project faster than I do. And let me just run through a scenario for you folks. So you understand just from a developer's side, how things may or may not occur. I build all these buildings. And then at that point, I'll get a notice to say, hey, you have to start an apartment complex. Well, what if at that point, there is a major catastrophe or the financial market meltdown, there is no liquidity, we're in a recession, we're in a depression, whatever. We're in COVID and there is no financing to start apartments. There's no construction work to start apartments. There's so many factors that I cannot account for to say, no, you must start because you finish these buildings. I think that's a slippery slope in terms of forcing a developer and say you must start now that you finished this. Inherently it's kind of self-policing because nobody wants to sit on empty land. The developer wants to finish this and get it off the ground. But if there are, you know, circumstances that are beyond my control, How is one supposed to account for this? And I just want to leave that with the notion as we go to City Council.

Mr. Wilshaw: Yeah, that's definitely a conversation that I think would be best served at the City Council level. Understand that we don't have the ability to negotiate the terms of that at this stage of the game. It's probably a little premature, but I understand your thoughts, and hopefully, you understand the city's intent, as

well, that we don't want someone to, you know, basically just skip out on part of their promise of what they want, they're going to develop at the site, as well. So, it's a bit there's a balance understood. So the other question I had for you is, I don't know if you, if this is something that you're going to care to answer or not, but hypothetically, if you get ran into a situation, as you're developing this property, because you are developing it sort of phases, you get to a point where you've, you've built out some of the...you've built out the Whole Foods, of course, you've built out some of the other retail and hopefully built out some of the...and are starting to think about the apartments and you get to a situation where you realize that there's not enough parking at the site, or the plan isn't going to work as you originally proposed it. Is there something that can...that you would give up on this site?

Mr. Markus: You know, I think, as a prudent developer, we need to have that answer. We need to have that answer before we start. We're too late in the game, if I'm worrying about that, at that point. So, we better have our uses intact. we better understand what our uses are, be comfortable with our traffic study and our consultancy, that will still work. So, I think that's a situation that we will have answered way before we start and I would leave it at that. In terms of giving things up, you know, I need more retail. Right? Yeah, there's more demand. And I have space here. So it's really hard to give up when, you know, and that's a testament to this location in your city. You know, and that's a good thing. So we will have the parking situation figured out. And you know, and we think we're there, there's always some tweaks, and there's always, you know, we are always studying this and always taking a second look at things, but I think we're there in terms of parking, especially with that deck.

Mr. Wilshaw: Okay, great. And I do want to point out that we discussed at our study, the flow of pedestrians around the property, some of the walkways that exist, and even the fact that you have access to the bike path along I-275, and Six Mile, which is very close to this property, because you do have residential on site. You may have some fitness minded residents living there that would like to make use of those amenities. So, I'm glad that you've thought about some of those things and you're going to incorporate those into the design. Because we just came from the State of the City presentation earlier today and the Mayor reminded us that we do have a bike walk plan here in the city, and that, you know, we are always looking for opportunities to enhance physical fitness and biking and walking pedestrian friendly

connections as well. So, thank you for trying to incorporate some of those into your development. Thank you. With that, if there's no other questions right now, from any of my fellow Commissioners, I want to look and see if there's anyone in our audience wishing to speak for against this item. Feel free to come forward. We'd like to hear your comments. Good evening, sir.

Jim Crowley 16106 Blue Skies Drive, Livonia, MI. I've been a resident there for a number of years. I've owned the house for a number of years and I'm also a real estate investor and I have a number of properties within the City of Livonia. You know, I'm happy to see this redevelopment. I think they've done a pretty nice job bringing some high-end retail stores, Whole Foods, Starbucks and so on. 2941 all places that I go to. LA Fitness belong as a member. My concern is I feel like we're playing Tetris here. Just too tight. On Saturday morning, when I leave to go out to whether it be Home Depot or I get on the freeway because I can't turn right at Six Mile and Haggerty it's just too congested. It's too backed up. It's just too tight. I get on the freeway and get off at Seven Mile. I cannot make that turn. I'd sit and wait. You're blocked up. I'm coming back from Home Depot. Unfortunately I have to cut through Quakertown because the line is backed up to turn left on to Six Mile. I do this every weekend. This is on Saturday. So, it's just too tight. I'm concerned about that. I think we need to eliminate...the impact is too high. It's too crowded. There's not enough green space. I don't want to see them go away. I think they've got some great...I'd love to see Comerica I think it's been an eyesore jutting out almost out on to Six Mile. I don't know how that ever got passed. It's horrible. Love to see new development. This is an opportunity to really think about it. I see one of the great features of a pond and I get it, it's near the apartment building but you go to every other city and they've got a beautiful green space with a water feature out toward the front of the development. This is hidden back on Fox Drive. I'd like to see that move forward. I think Whole Foods is great, except we have Cantoro's and Trader Joe's and a number of them. I'd like to see a commitment before we vote yes for this from these retailers because, you know, this is what makes this development is having these high end developments, you know, you know, here in Livonia, like some other higher end communities. So, I love that but I want to make sure that those are the...those are the retailers that are coming in and not switched out halfway through making, you know, so we don't need another random supermarket. We don't need another random fitness center. You

know, we've got a Planet Fitness on every corner. I just don't think we're ready yet. I like we're, you know, we're diverse here. We're multi-use. It's concrete. Looks like a concrete jungle to me. We need to...we've got far too much here. I can't imagine what that corner would be like with that much traffic. Like I said, I drive it every day, and it's impossible. Before we vote yes on this, why don't we go back to the drawing board. Also, other communities are starting just trying to see what the stores are coming forward. So you'll see the face fronting store with parking behind it. I'd love to see Whole Foods brought forward or turned sideways. So, it's facing Haggerty Road. Another hotel, I think that's too much. I mean, we're talking about a lot of traffic here. And we don't have that answer yet. There's too many unanswered questions. I think we need to come back and address some of these questions such as green space. I think Mr. Caramagno brought up, you know, navigating the trucks through that. I mean, you need a shoehorn to get through this development. We haven't seen it yet. But it's just it's too tight. It's too much here. I think we need to, you know, we need to lose something here and put some more green space in it. This is a big corner. And it's the gateway into Livonia. I mean, we're at Northfield, Plymouth right on the corner here. Let's really, let's dress up Livonia, I mean, I think we're there with some of the retailers they're bringing in, but we don't need another hotel of that impact and we don't need more parking, you know, to drive into the city and you see parking, parking lots and cars, let's have some green space and really talk about that landscaping and apartment dwellers that are paying that kind of money, they really don't want to look at the top of air conditioners. I mean, it's too much. So, I'm going to ask you to, please, you know, necessarily vote no, but either, you know, adjourn this and come back with some of these questions that are answered. So, we have definitive so we have commitments from retailers. We have some green space. Let's really make this a sharp plan before we move forward.

Mr. Wilshaw: Thank you for your comments. Mr. Crowley. Appreciate that. Anyone else in our audience wishing to speak on this item?

Mr. Wilshaw: Good evening, sir. Hello,

Andrew Mytys, 34008, Fairfax Drive, Livonia, MI. I just want to mention a few things about the traffic because I'm also concerned. I didn't hear any specifics from their traffic engineer, but I can give you some specifics. I just walked in here today I was just interested in what kind of stores were there and I can tell you that the

distance from like Six Mile Road to the first light north of there, which is college drive, I believe, is 1,400 feet. The second light which is crossroad where the church is, right, is 2,200 feet, so it's another 800 feet from there. If you're going to put in a light that's south of college drive, the left hand turn lane as you're going south to get onto Six Mile often backs up 10 cars at least 15. Sometimes more in the in the wintertime when it's holiday shopping time, right? So, you got a lot of traffic from REI, Kroger, etc. So, if you're talking even 10 vehicles, let's just say 20 feet per vehicle. F-150's are 20 feet long, five feet between each vehicle. You're talking 250 feet, right? And that's just 10 cars. It's not a lot and then, you know, 250 feet, subtract that off the 1,400 feet, you're getting, and then you know you want to traffic light between 1,400 feet. So let's say you put at 700 feet, right? So 700 feet minus 250 feet, you got like, you know, 450 feet there, that's not a lot for somebody to make a left hand turn and cause another traffic jam. What are you going to do with the timing of the lights? If the lights are timed the same, you're really not getting the benefit of that light. If they're timed differently, you're causing more jams. So, you know, I got an issue with adding a light on Haggerty. And I would say, you know, maybe if you do add a light, it's right hand only. And I think that the right thing to do is perhaps look at Fox drive and expand the size of that. Maybe you want it to be wider. Yeah, that's a difficult thing. You know, yeah, it's real difficult intersection. And I also want to point out that, you know, it's not Livonia on the other side. Haggerty, it's Northville. So, you know, you kind of want to be good neighbors, you don't want to cause congestion, for them, a potential for more traffic accidents, and everything like that. So that's all I wanted to point out was, was that, um, I also want to mention in terms of apartments, and people looking down and air conditioners and everything. That's my feeling, too, but I look at Costco, and that apartment complex there, that place is booked, you know, they got all kinds of people. So people like living in apartments, you know, and having gyms and having an easy life not having to maintain the grass and, and this and that. And they don't seem to mind looking down at the air conditioning units. So I wish the project luck. I just wish that, you know, we're really cognizant about the traffic that's already there. Maybe not put an extra light, maybe limited to a right hand, turn only. And then maybe until we know exactly what's going on with the traffic because we don't have specifics, don't allow those restaurants to be drive-thru's right off the bat. You can always put in an underground conduit. You can put in, you know, just so when it comes time, if a drive thru was okay, you can put the electricity in a lot faster. But off the get go to prove a

drive-in with traffic being unknown. I think it's too much. Thank you.

Mr. Wilshaw: Thank you, Mr. Mytys, for your comments. We appreciate that. And for anyone else in the audience on this item, our petitioner is taking notes and keep track of these comments. So hopefully they'll be incorporating those as well. Is there anyone else in our audience wishing to speak on this item? I don't see anyone else coming forward. Mr. Markus, is there anything else that you'd like to say? Based on comments that you've heard? Further? Thank you. All right. Thank you, sir. If there's no other comments, is there any other questions from any of our commissioners for our petitioner before we close the public hearing? I don't see any other questions from any of our commissioners. So, I will close the public hearing at this time, and a motion is in order.

On a motion by Ventura, seconded by Long, and unanimously adopted, it was

#03-10-2024 **RESOLVED**, That the City Planning Commission does hereby recommend to the City Council that Petition 2024-02-02-03 by Stonefield Engineering & Design on behalf of Haggerty Six Partners, LLC, seeking special waiver use approval under Section 5.02 of the Livonia Zoning Ordinance, as amended, for a Planned General Development consisting of eleven (11) buildings, including eight (8) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest $\frac{1}{4}$ of Section 7, be approved subject to the following conditions:

1. The Site Plan (Overall), Site Plan (North), and Site Plan (South) marked Drawings C-2, C-3, and C-4, respectively, all dated January 31, 2024, as revised, prepared by Stonefield Engineering & Design, are hereby approved, and shall be adhered to; except as modified below.
2. Building D, Building E, and the Hotel are approved in concept only, and more detailed plans, including site, landscaping, floor, and elevations, shall return to the Planning Commission for further review and approval before any building permits are issued.

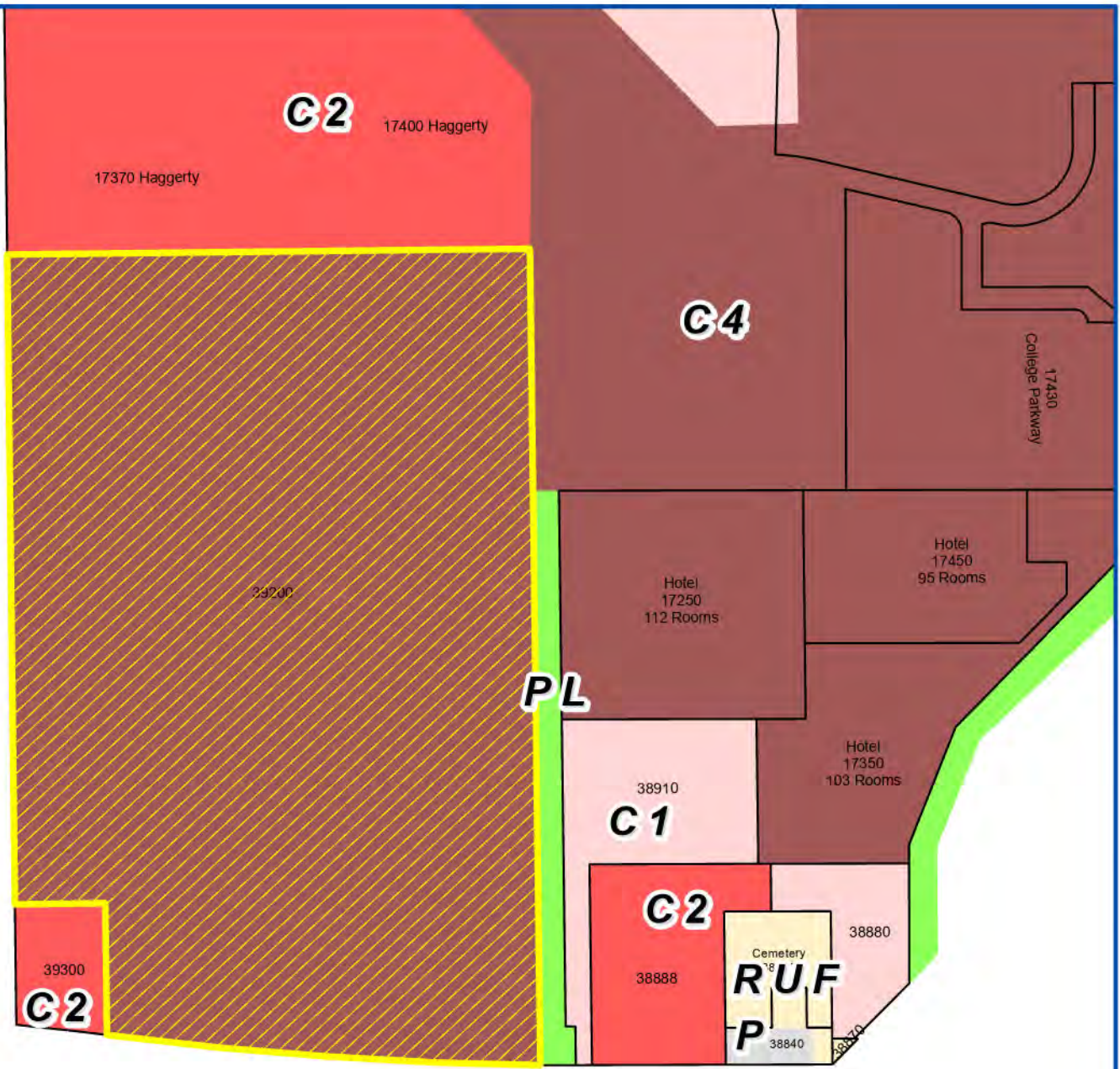
3. The Landscaping Plans marked Drawings C-7, C-8, C-9, C-10, C-11, and C-12, and the Landscaping Details marked Drawing C-13, all dated January 31, 2024, as revised, prepared by Stonefield Engineering & Design, are hereby approved, and shall be adhered to, except that two (2) additional full-size trees shall be added to the Six Mile Road frontage to meet the ordinance requirements, and modifications shall be made to the area between the grocery store and the apartment building to provide a better visual screen using full-size evergreen trees.
4. That the Exterior Elevations labeled Apartments (Sheets A-300 & A-301), Grocery (Sheet A-300), Retail Building A (Sheet A-300), Retail Building B (Sheets A-300 & A-301), Retail Building C-1 (Sheet A-300), Retail Building C-2 identified as Retail Drive Thru (Sheet A-300), Retail Building G (Sheet A-300) and Retail Building H (Sheet A-300), inclusive, all dated January 25, 2024, prepared by Bowers + Associates, Inc., are hereby approved and shall be adhered to.
5. The Exterior Elevations for Building F Proposed Gym dated February 25, 2024, prepared by Club Studio, is hereby approved and shall be adhered to.
6. This approval is subject to the Petitioner submitting a Development Agreement to be executed between the City and the Developer addressing items pertinent to the construction of the project as well as the long-term operation of the development, such as, but not limited to, divisions, leasing, and separation of ownership; parking; site design standards; permitted and prohibited uses; dimensional standards; and maintenance of utilities.
7. All rooftop mechanical equipment shall be concealed from public view on all sides by screening that shall be compatible with the material and color of other exterior materials on the buildings.
8. The walls of the trash/recycle enclosures shall be a minimum of six feet (6') in height and constructed out of the same masonry used in the construction of the buildings, or in the event a poured wall is substituted, the wall's design, texture and color shall match that of the buildings. The enclosure gates shall be solid steel or durable, long-lasting panel fiberglass.

9. This site shall meet the City of Livonia or the Wayne County Storm Water Management Ordinance, whichever applies, and secure any required permits, including soil erosion and sedimentation control permits.
10. All light fixtures shall not exceed a mounting height of thirty feet (30') and shall be aimed and shielded to minimize stray light trespassing across property lines and glaring into adjacent roadways.
11. The overall average illumination level for the parking lots shall be 1.0-foot candle as provided under Section 7.22 of the Zoning Ordinance.
12. Only conforming signage is approved with this petition, and any additional signage shall be separately submitted for review and approval by the Zoning Board of Appeals.
13. That no LED light band or exposed neon shall be permitted on this site, including, but not limited to, the buildings or around the windows.
14. That the specific plans referenced in this approving resolution shall be submitted to the Inspection Department at the time the building permits are applied for and
15. Under Section 13.13 of the Livonia Zoning Ordinance, as amended, this approval is valid for one year only from the date of approval by the City Council. Unless a building permit is obtained, this approval shall be null and void at the expiration of said period.

FURTHER RESOLVED, That notice of the above hearing was given in accordance with the provisions of Section 13.13 of Livonia Zoning Ordinance, as amended.

Mr. Wilshaw: Is there any discussion?

Mr. Wilshaw, Chairman, declared the motion is carried and the foregoing resolution adopted. It will go on to the City Council with an approving resolution.



Address & Zoning Map

Petition 2024-02-02-03

39200 6 Mile Rd.

**Mixed Use Redevelopment
Planned General Development**



Not to Scale



City of Livonia
Planning Department

HAGGERTY ROAD

SIX MILE ROAD



Aerial Map

Petition 2024-02-02-03
39200 6 Mile Rd.
Mixed Use Redevelopment
Planned General Development



Not to Scale



City of Livonia
Planning Department

PLANNING COMMISSION STAFF NOTES

PUBLIC HEARING

ITEM 1

Petition 2024-02-02-03 by Stonefield Engineering & Design on behalf of Haggerty Six Partners, LLC, seeking special waiver use approval under Section 5.02 of the Livonia Zoning Ordinance, as amended, for a Planned General Development consisting of eleven (11) buildings, including eight (8) with approximately 143,000 square feet of retail/commercial space, a 4-story hotel with 101 rooms, a 5-story apartment building with 170 dwelling units, and an existing multi-level parking garage, located at 39200 Six Mile Road, on the north side of Six Mile Road between Haggerty Road and Fox Drive in the Southwest ¼ of Section 7.

March 12, 2024, Study Meeting:

This petition represents the largest redevelopment project since 2008, when the former Livonia Mall property, located on approximately 40 acres, was transformed into Livonia Marketplace—a Planned General Development consisting of seven (7) new buildings with over 320,000 square feet of retail space. Haggerty Six Partners, LLC is the new property owner at the northeast corner of Haggerty and Six Mile Roads. This 22.3-acre parcel was initially developed in 1986 by Manufacturers National Bank as an operations center. Over the years, following a merger with Comerica, the site was expanded to include over 360,000 square feet of office space and a 166,000-square-foot multi-level parking structure.

Last year, Comerica announced the closure of the Livonia office and consolidation of its operations into a new office in Farmington Hills. Haggerty Six Partners, LLC., an affiliate of Markus Management Group, acquired the property in late 2023 with plans to demolish the office buildings and construct a new mixed-use center with top-of-the-line tenants, including a Whole Foods grocery store, a Hyatt hotel, a Club Studio gym, a Starbucks, a full-service restaurant, and apartments. This application for Special Waiver Use approval for a Planned General Development under Section 5.02 covers all the proposed uses—retail, residential, and hospitality—and the associated site plan improvements.

The site consists of a single tax parcel located adjacent to the northeast corner of Haggerty and Six Mile Roads. The parcel area is 22.3 acres and includes roughly 670 feet of frontage along Six Mile Road and 1,005 feet along Haggerty Road. The current zoning is C-4, High Rise Commercial. In 1984, on a request by a former property owner, Raymond Kalinowski of Kal and Company, the City changed the zoning from C-2, General Business, to PO, Professional Office. Then, in 2020, with the adoption of the Livonia Vision 21 Zoning Ordinance, all PO-zoned properties, including this one, were changed to the C-4 District.

Bordering the site to the north and northeast is College Park: a mix of retail and office uses, including a multi-tenant building called the Marketplace, several freestanding restaurants (Flemings, Mitchell's, Bravo, and HopCat), and offices for Trinity Health (St. Joe's), Masco, and the former TCF regional headquarters. Immediately adjacent to the site, across Fox Drive, is a large stormwater detention pond created for College Park. Also bordering the site to the east, across Fox Drive and south of the pond, are a Residence Inn Hotel, Angel Gardens Assisted Living, and Buca di Beppo restaurant. A gas station is at the northeast corner of Haggerty and Six Mile Roads.

Overall Site Plan

Sheet C-2 illustrates the location of all the buildings that would make up the development. At the north end of the property, the plan shows three (3) buildings: 1) a grocery store measuring **38,020** square feet, 2) a retail space attached to the grocery store labeled as Building A that would be **6,003** square feet, and 3) a 5-story apartment building with a footprint area of approximately **44,998** square feet and a corresponding gross floor area (GFA) estimated to be **224,990** square feet. To the south, between the grocery store and the apartment building, is an existing 3-story, 357-space parking structure with a footprint area of approximately **55,355** square feet and GFA of roughly **166,065** square feet. Going from north to south along Haggerty Road, the plan shows three (3) multi-tenant buildings identified on the plans as Building B, Building C (C.1), and Drive-Thru (C.2), measuring **15,942** square feet, **9,357** square feet, and **5,295** square feet, respectively. Proposed Buildings D, E, and the Hotel (4 stories) extend from west to east along Six Mile Road. Building D is shown as a freestanding, full-service restaurant measuring **10,018** square feet. Building E would potentially be a freestanding bank with drive-up services measuring **2,500** square feet. The hotel would have a footprint area of about **20,233** square feet and a corresponding GFA of **80,932** square feet. North of the hotel and bank are Proposed Buildings F and G. Building F is a gym totaling **34,924** square feet, and Building G, designed to have either 1 or 2 tenant spaces, would measure **5,889** square feet. Lastly, lying immediately adjacent to the parking structure is a **14,995**-square-foot multi-tenant building identified on the plan as Proposed Buildings H.

Total building ground coverage, including the parking structure, equals approximately **263,529** square feet, or roughly **27.1%** of the site. Other than the parking deck, the only multi-level structures would be the apartment building and the hotel. Adding each floor of the apartment building and hotel to the total square footage but subtracting the area of the parking structure results in a total GFA of **448,865** square feet, which—as a percentage of land area—equals about **46.2%**. This is commonly expressed as the Floor Area Ratio, or FAR, which would be 0.46.

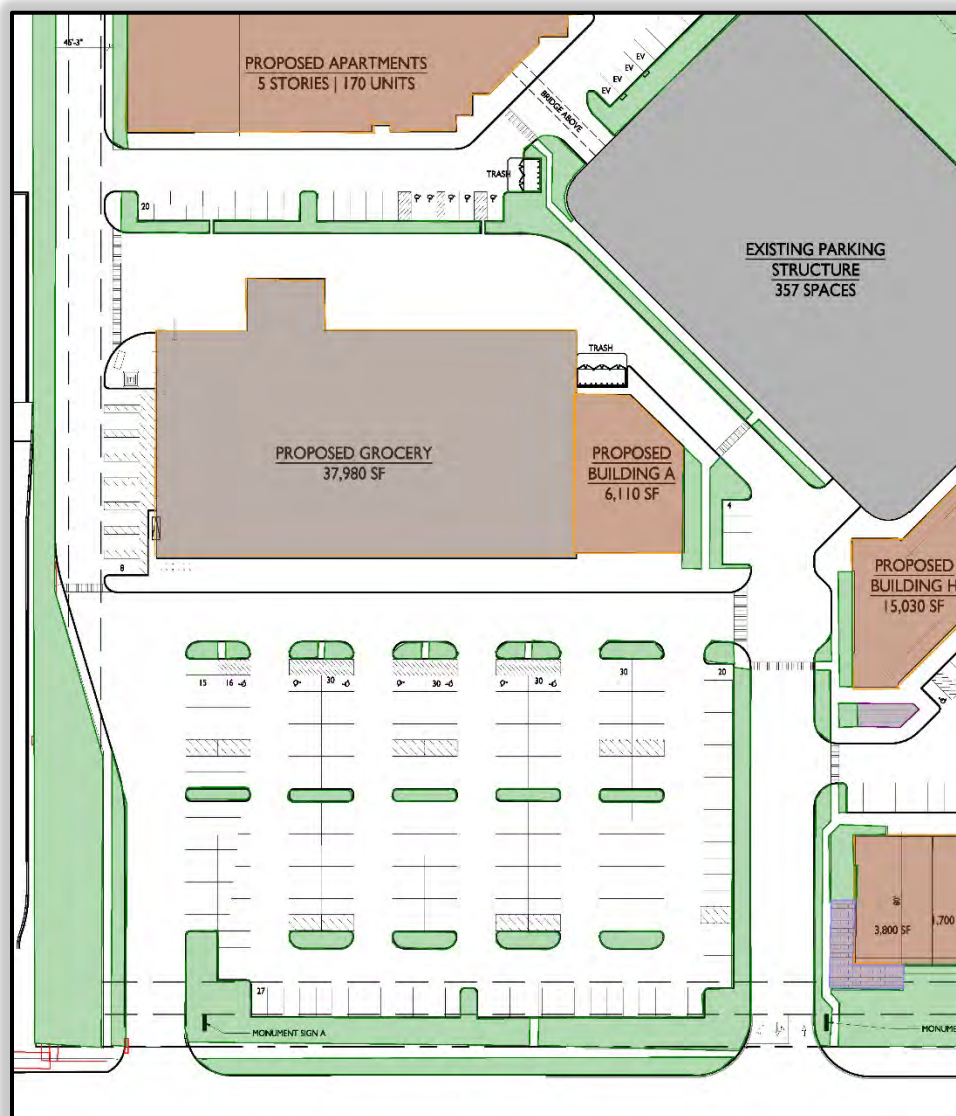
Section 5.02 – Special Waiver Use Standards for Planned Developments, including Planned Residential Developments and Planned General Developments.

A Planned Development is deemed a Planned General Development when it contains commercial and/or office structures and uses exclusively or when it includes residential structures or dwelling units in a unified plan with commercial and/or office structures and uses. The intent of Section 5.02 is to provide flexibility in the placement, bulk, and interrelationship of buildings and uses and the implementation of new design concepts to encourage a more efficient use of land. In the case of a Planned General Development, modifications of the provisions of the zoning ordinance are allowed, including lot sizes and yard requirements, as well as the allowance of uses that would not otherwise be permitted in the zoning district where the Planned Development is located. Subject to the Special Waiver Use standards of Section 5.02, the city can allow commercial and residential uses within a commercial zoning district, provided the development is accomplished under a unified plan. This proposed mixed-use project contains multiple land uses under a single unified plan, including retail, hospitality, and housing. Below is a general description of each of the components of the project and site plan considerations.

Grocery Store and Proposed Building A

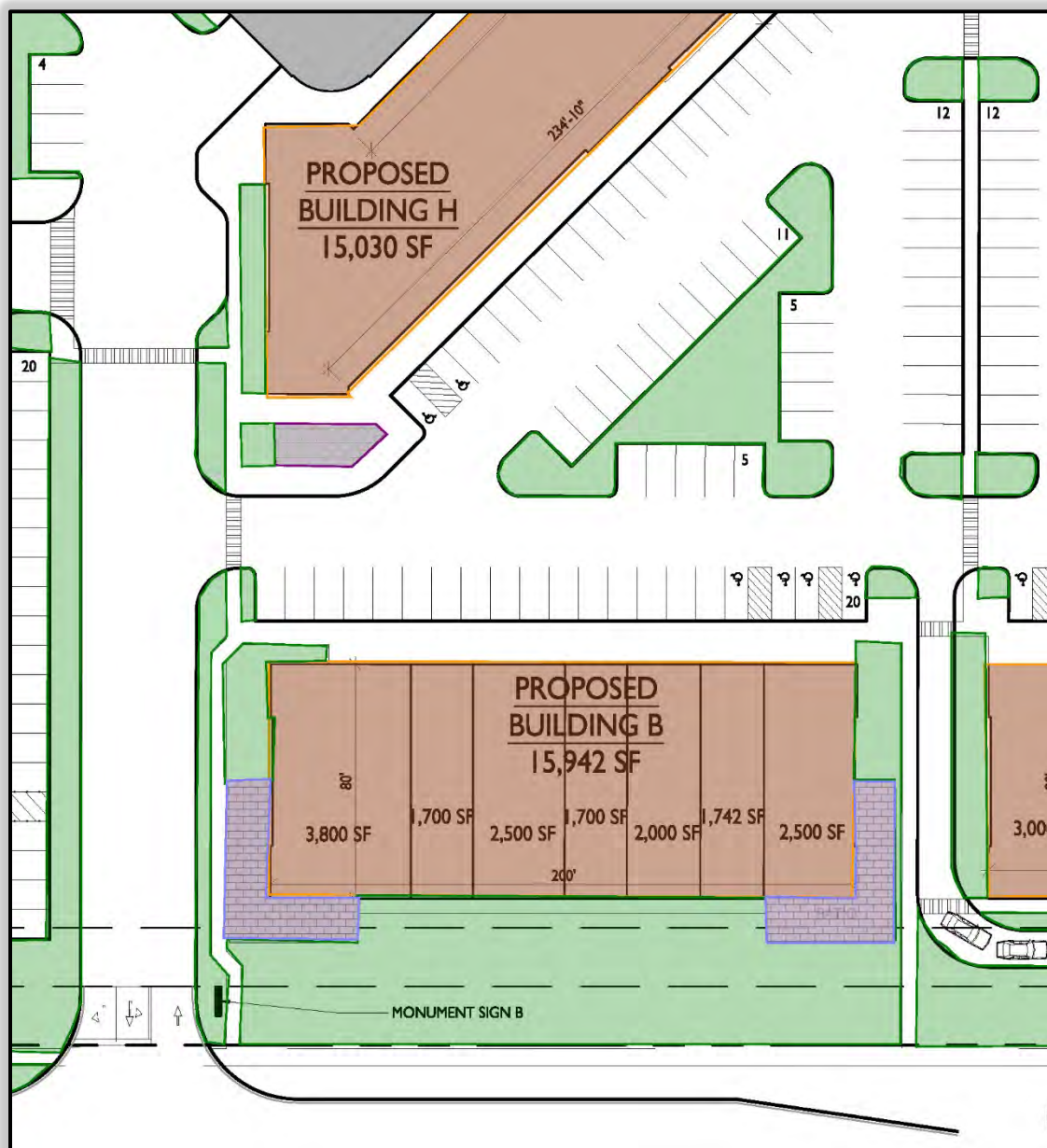
The Proposed Grocery is identified on the plans as Whole Foods. The front of the store would be set back approximately 270 feet from the Haggerty Road right-of-way, about one-third of the depth of the property. Most parking, about 197 spaces, is shown in front of the store. As expected, customer entrances would be along the storefront, at both the north and south ends, with all deliveries and trash and recycling operations at the rear. The main entrance has been positioned at the north end of the building to encourage customers to park at this end of the lot. Exterior building materials for the grocery store are not provided on the plans.

Building A would be attached to the grocery store at its south end. Building A's exterior finishes include a combination of stone, brick, metal, and fiber cement panels (Nichiha rough-sawn wood). The building's parapets would extend 20 - 24 feet above the finish floor elevation, with the highest point being a decorative accent trellis near the center of the façade, reaching a height of about 29 feet.



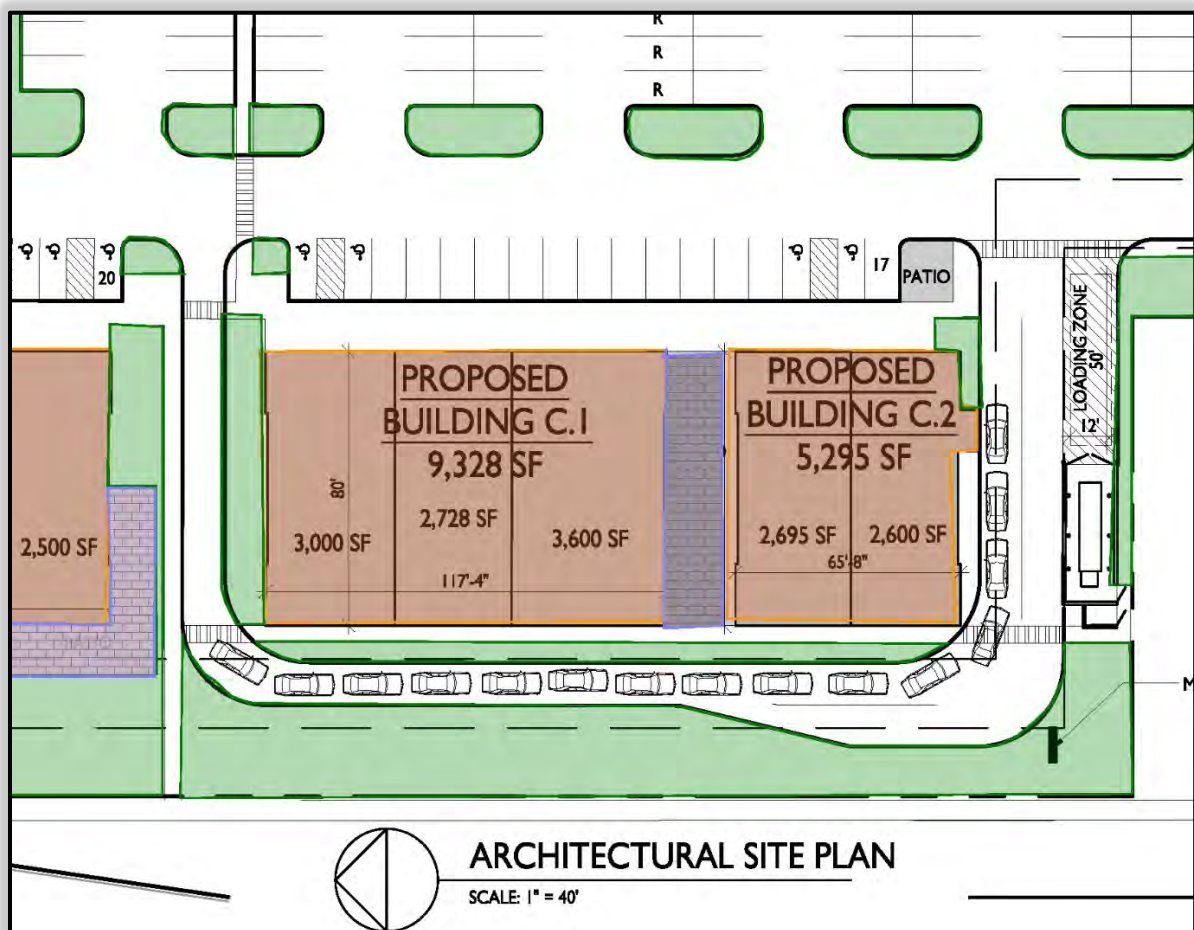
Proposed Building B

Building B is a multi-tenant building containing just under 16,000 square feet of gross leasable retail space. The architectural plans show the building subdivided into two (2) equal-sized spaces, each measuring 7,625 square feet; however, the building could easily be demised for several more tenants. This building, and the two (2) other buildings along Haggerty Road to the south, would be set back approximately 50 feet from Haggerty Road. No parking would be provided along the west side of the building, facing Haggerty. Instead, all parking and the main customer entrances would be along the east side. The exterior finishes for Building B are the same as those for Building A: stone, brick, metal, fiber, and cement panels. The main parapets would be slightly taller, extending between 24 - 27 feet above the finish floor of the building, with the highest point being a decorative accent trellis near the center of the façade, reaching a height of about 29 feet.



Proposed Building C and the Proposed Drive-Thru

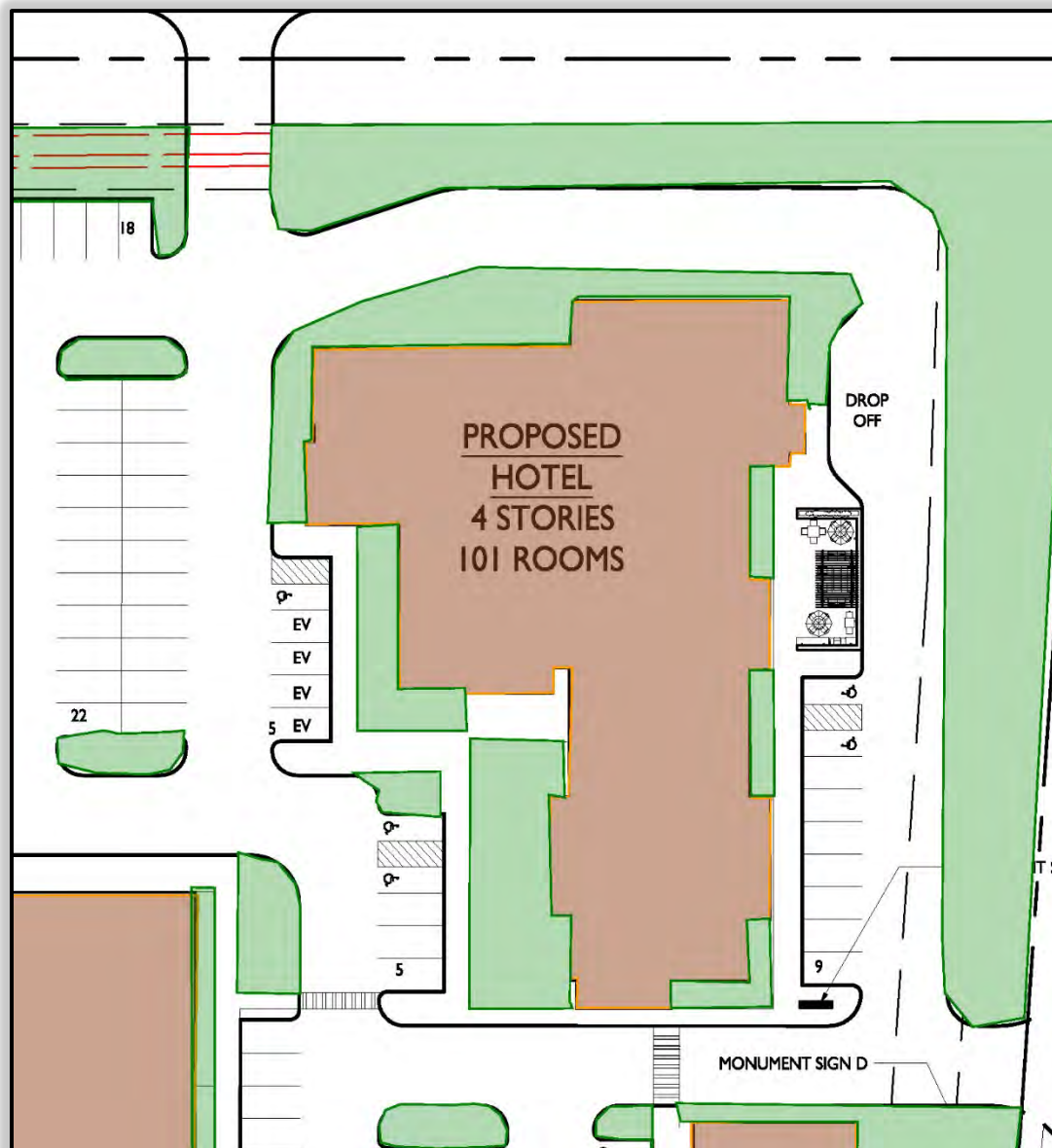
These next two (2) buildings along Haggerty Road are Building C and the Proposed Drive-Thru. Both buildings have similar setbacks of about 50 feet, consistent with Building B to the north. Building C measures 117.3 feet in length by 80 feet in depth. The architectural floor plan for Building C (identified on the architectural plans as Building “C.1”) shows four (4) units. One or more restaurants would likely be tenants, as the plan offers an outdoor dining patio extending the entire building along its west side. The plan shows a shared patio with the adjacent Drive-Thru building on the south side. The two (2) buildings would be twenty (20) feet apart. The pick-up window for drive-thru is on the south side of the Drive-Thru building, with traffic circulating in a counterclockwise direction. The drive aisle serving the pick-up window commences on the north side of Building C and extends south along the west sides of both buildings before turning east along the south side of the Drive-Thru. The drive aisle begins as a single lane and then transitions to two (2) lanes halfway between the buildings. The floor plan for the Drive-Thru (Building “C.2”) shows the building divided into two (2) tenants, each measuring 2,800 square feet. Parking for Building C and the Drive-Thru would be in a shared lot on the east side of the buildings adjacent to Buildings F and G. An enclosed trash compactor is shown on the south side of the drive-aisle, across from the pick-up window. Building materials are not identified on the plans. The exterior finishes and heights of Building C and the Drive-Thru are like those of Buildings A and B; however, the elevation plan for Building C does not show the addition of an accent trellis.



ITEM 1 Petition 2024-02-02-03 – PGD - 39200 Six Mile Road

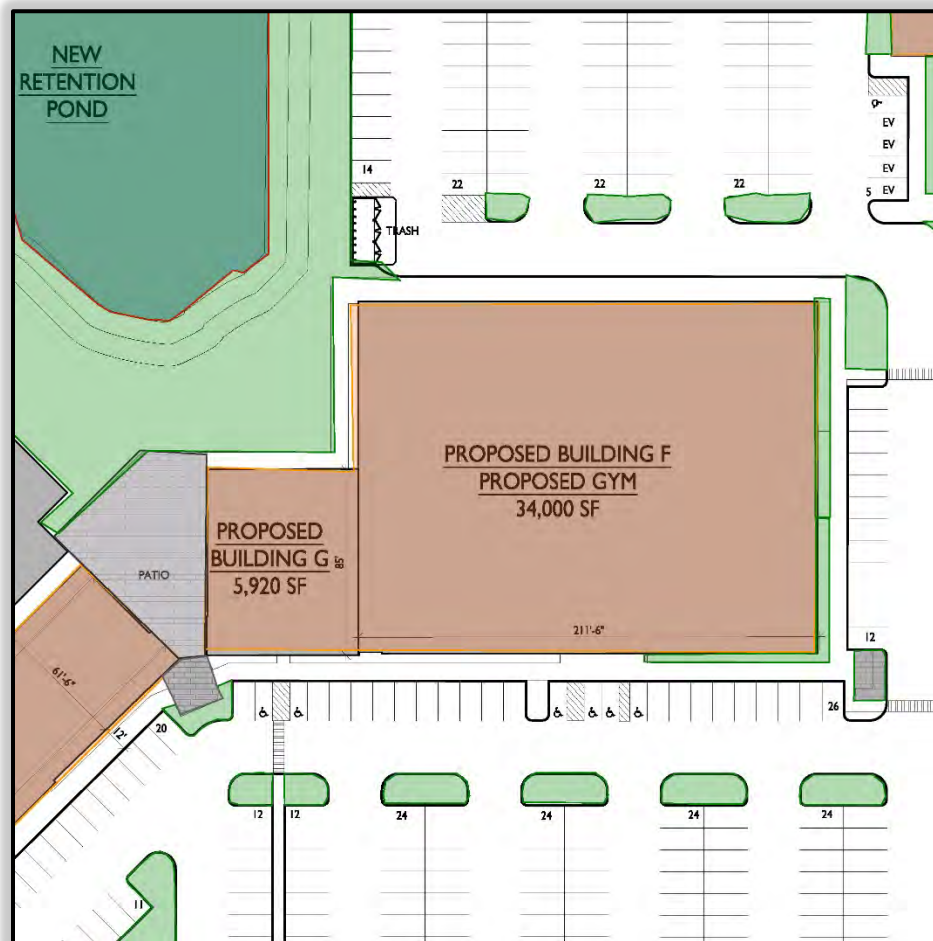
Hotel

The hotel is identified as a Hyatt House, a “flag” geared more towards extended stays. The “L-shaped” building fronts on Six Mile Road in the southeast corner of the property adjacent to Fox Drive. Fox Drive is part of Schoolcraft College. The 4-story structure would be positioned approximately 79 feet from the right-of-way of Six Mile Road and 74 feet from the east property line, which is coterminous with the west curb line of Fox Drive. Each level would measure approximately 20,233 square feet for a gross floor area of roughly 80,932 square feet. The hotel would have a total of 107 “keys” or rooms. Amenities include an indoor swimming pool, exercise room, bar and dining area, coffee station, guest kitchen, and meeting rooms. The hotel’s main entrance would face Six Mile Road. No receiving area or trash enclosure is identified on the plans. The flat-roofed building would have a general height of about 51 feet to the main parapet line and a maximum height of 63 feet to the top of the tower. Exterior finishes include brick veneer, cast stone, EIFS, and metal.



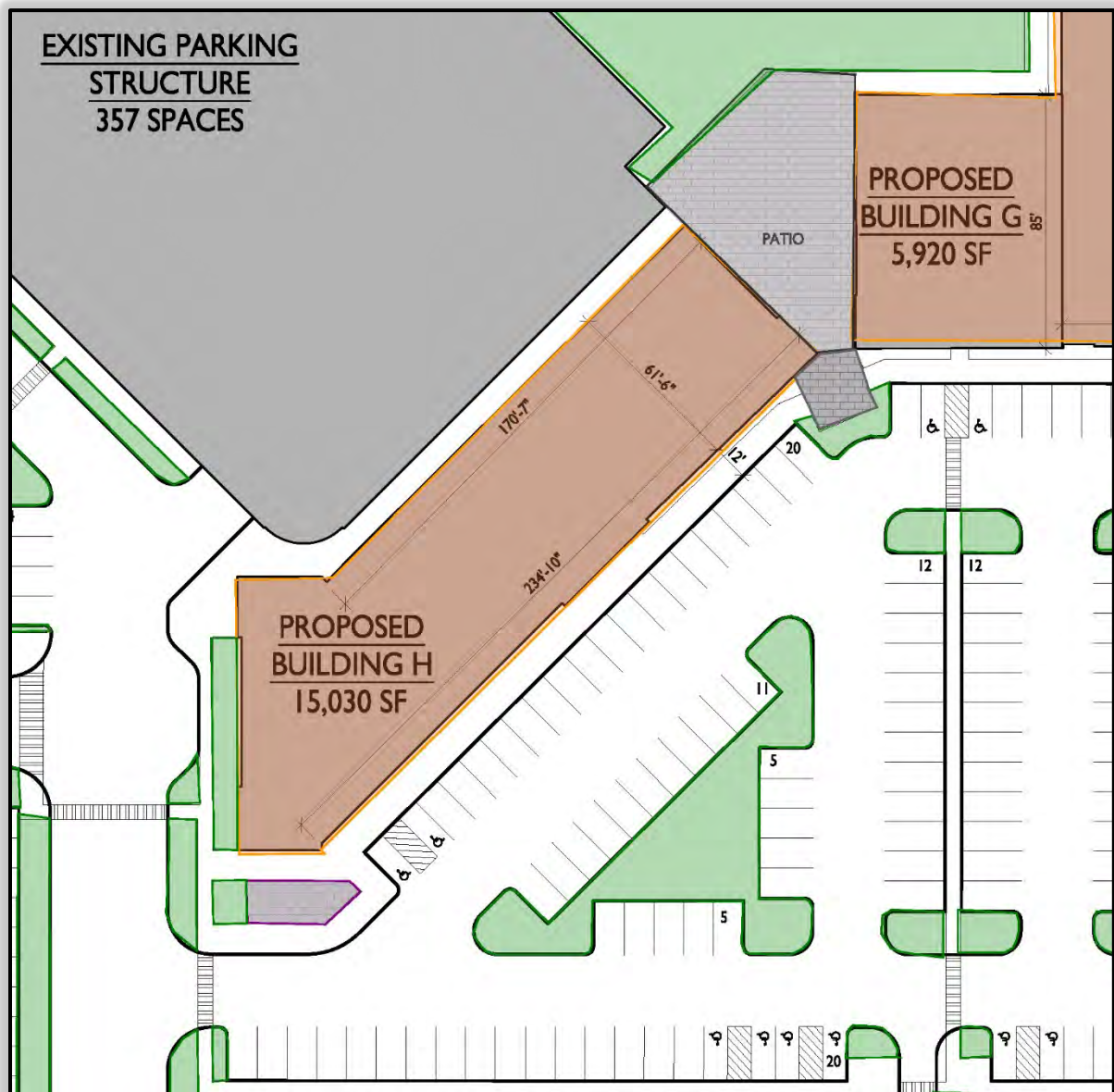
Page 8

Building G is attached to the north end of the Club Studio. This 5,860-square-foot retail space would have a storefront measuring roughly 69 feet by a depth of 85 feet. The elevation plan shows the potential for two (2) units, but the structure could easily be modified to accommodate a single tenant. The distance between the northwest corner of Building G and the southwest corner of the adjacent building to the north, Building H, is only 11.5 feet. A walkway runs between the two (2) buildings, leading to a plaza with seating for approximately 36 people. The design and exterior finishes for Building G are consistent with those of other general retail buildings.



Building H

Building H's unique shape is intended to maximize the gross leasable space that can be achieved around the adjacent angular spaces created by the parking structure and other retail buildings. The floor plan shows two (2) retail spaces: one at the south end, measuring only 2,400 square feet, and the remaining 12,500 square feet at the north end, which is believed to be a furniture store. The east side of Building H runs parallel and only about 7-8 feet from the west wall of the parking garage, separated only by an open walkway. The main entrance tower containing an accent trellis above is centrally located along Building H's storefront. These features would be 26'-4" and 31'-0" tall, respectively. At the north end of the building, the top of the parapet is 24'-4", with a series of large display windows extending from the ground to the upper part of the façade. It is uncertain whether some of these windows would double as the store's shipping and receiving area. Again, the exterior finishes of Building H are consistent with those of the other retail buildings.

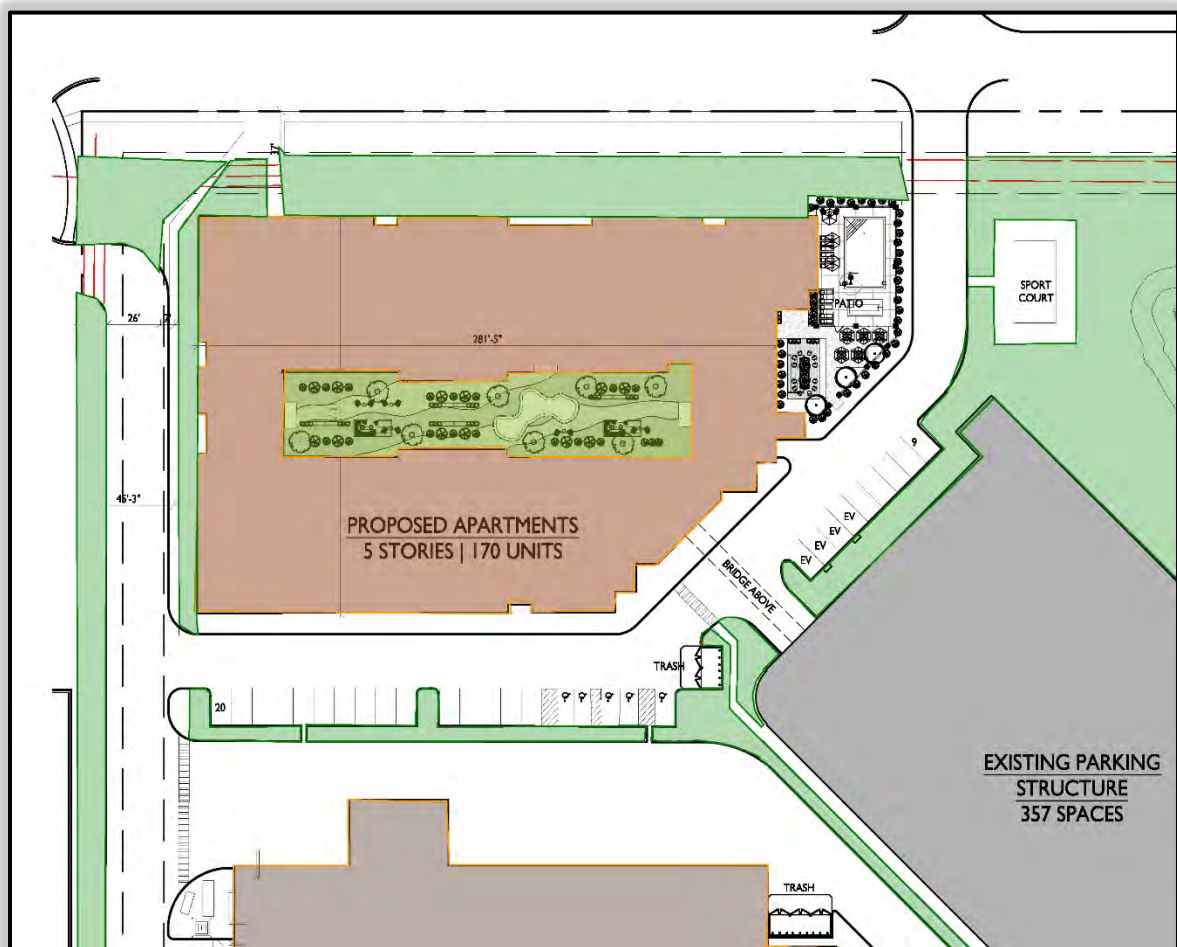


Apartments

The proposed apartment building is situated in the northeast corner of the property. The structure is five (5) stories tall, reaching 61'-6" at its highest points, which are the cornice features at the corners and the midpoints of the building. The building would have a landscaped open courtyard in the center with a putting green and several seating areas. Additional resident amenities located on the south end of the building include an outdoor pool, spa, and seating areas with a large firepit. Inside the building, on the first level, the plan shows a fitness room, a room containing a golf simulator, a pet spa, and a clubhouse/community space. The apartment building would include 90 one-bedroom units, 75 two-bedroom units, and five three-bedroom units, for a total of 170.

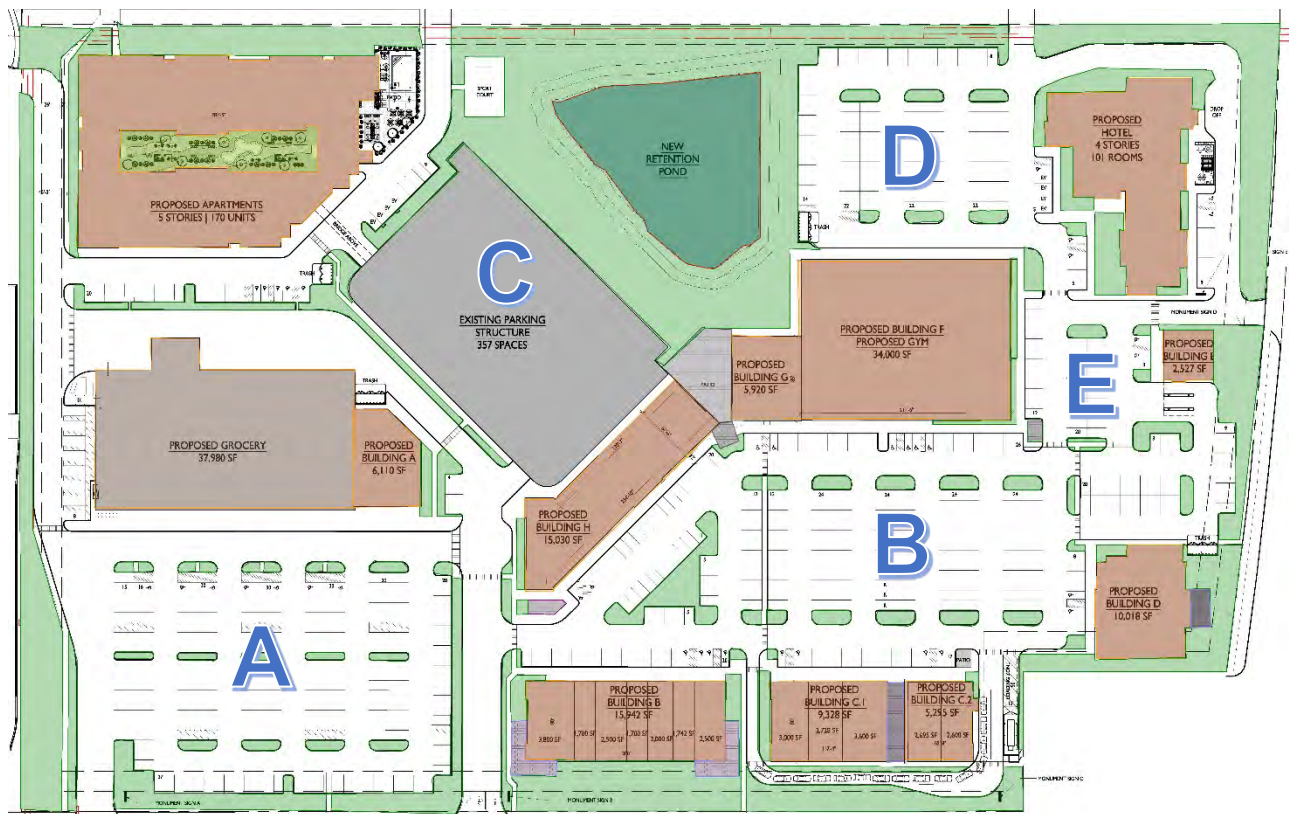
Except for the first level, which has multiple common-area rooms, the upper floors of the building would have the same mix of apartments: 19 one-bedroom units, 15 two-bedroom units, and one three-bedroom unit. A trash room would be provided on each level, as well as a lobby with seating.

The building's main entrance and elevator lobby would be in the southwest corner, providing convenient access to the parking structure. Additional entry points and stairwells are positioned along the east and north sides of the building. The building's exterior would be finished with a combination of brick, cast stone, EIFS, and metal panels.



Parking

Parking is distributed across the site in multiple areas, with the five (5) largest parking lots representing about 90% of the site's total parking. These areas include A) in front of the grocery store (197 spaces), B) between the retail buildings on Haggerty Road and Buildings D, F, G, and H (194 spaces), C) the parking structure (357 spaces), D) the area north of the hotel (82 spaces), and E) the lots created in the spaces between the bank, the full-service restaurant, and the gym (71 spaces). All parking spaces shown on the plan are ten (10) feet wide. The parking structure has three (3) levels. The upper level would be devoted entirely to residents of the apartment building. The first and second levels would be available to apartment residents and shoppers.



The Petitioner hired Fishbeck to complete a study that analyzes the site's overall parking needs based on various sources and standards, including the parking rates applied to each use according to the Zoning Ordinance and recommendations from studies conducted by the Institute of Traffic Engineers (ITE) and Urban Land Institute (ULI). The Zoning Ordinance considers the efficiencies of shared parking within planned commercial shopping centers. Rather than computing the parking requirements for individual uses, Section 9.03 allows the City Council to modify the numerical requirements for off-street parking based on evidence that another standard would be more reasonable. The Ordinance states: *"In determining whether to permit fewer parking spaces, the City Council and Planning Department shall consult the most recent edition of Parking Generation, published by the Institute of Traffic Engineers (ITE), or another acceptable standard."*

Table 1 in the report compares the three (3) methodologies for both weekday and weekend traffic. The total required parking using the rates in the Zoning Ordinance for each use is 1,290 spaces. In contrast, recommended peak parking demands based on the ITE and ULI studies are 806 and 953, respectively. The site plan shows 987 total parking spaces, resulting in a deficit of 303 spaces or a surplus of between 34 and 181 spaces, depending on which source is considered.

Table 1 – Parking Generation

Source	Number of Parking Spaces	
	Weekday	Weekend
City of Livonia Ordinance	1,290 Required Parking Spaces	
ITE <i>Parking Generation Manual</i>	763 Parking Space Demand	806 Parking Space Demand
ULI <i>Shared Parking</i>	953 Required Parking Spaces	860 Required Parking Spaces

Another approach is to calculate the parking for the retail and restaurants according to the standards applicable to planned commercial shopping centers under Section 9.05 and then add the hotel and apartments as separate uses according to ITE's standards. Using this "hybrid" approach results in an overall parking requirement of 988 parking spaces, which is only one more space than the plan shows. The breakdown is as follows: 1) 665 parking spaces for the retail and restaurants (132,925 square feet), resulting in a ratio of 5.0 spaces per 1,000 square feet of gross floor area; 2) 116 parking spaces for the hotel, equal to 1.15 spaces per room, and 3) 207 parking spaces for the multifamily housing or 1.22 spaces per apartment. ITE's average rates for multifamily housing range between 1.22 spaces/unit for Saturday parking, 1.31 spaces/unit for weekday parking, and 2.05 spaces/unit for Sunday parking. Thus, the 1.22 spaces/unit is at the low end of the range, suggesting the likelihood of the site being under-parked on the weekends, especially when the retail and restaurants are at peak demand.

Traffic and Circulation

The site plan shows multiple points of ingress and egress to the bordering thoroughfares, including two (2) driveways on Haggerty Road, one (1) on Six Mile Road, two (2) on Fox Drive, and one (1) on College Parkway. All these driveways currently exist except for a proposed new driveway at the north end of Fox Drive just south of the apartment building. One (1) existing driveway on Haggerty Road, just north of the gas station, would be removed. The site's main entrance and exit would be centrally located along Haggerty Road. The plans show a new traffic signal, as the Fishbeck report recommends. This 39-foot-wide road extends east onto the site, providing direct access to the parking structure and other drive aisles and parking areas, including the front and back sides of the grocery store, the apartment building, and the main parking lot for the retail buildings, gym, and restaurants.

The other drive approach from Haggerty Road runs along the development's north side, providing direct access to the front and back of the grocery store and to the apartment building. This drive continues east, connecting with College Parkway in the site's northeast corner. The only driveway to the site from Six Mile Road runs north between the hotel and the bank building, connecting to other drive aisles and parking areas on the gym's east, west, and south sides.

All the internal roads, drives, maneuvering aisles, and parking lots within the development would be interconnected. Except for the drive-thru service lane, all other driveways and interior maneuvering aisles measure between 24 and 30 feet in width. Access to the drive-thru would be from a 12-wide one-way lane that commences in the parking lot between Buildings B and C and loops back around to the same parking lot. Most cars exiting the drive-thru would likely travel north on the adjacent drive aisle past Buildings C and B to access the main signalized driveway. Alternatively, they could navigate through the parking aisles between Buildings D, E, and F to the driveway on Six Mile Road.

The plan shows two (2) internal roads connecting to Fox Drive. Fox Drive is under the jurisdiction of Schoolcraft College, which is currently working with the City and several surrounding landowners, including Haggerty-Six Partners, LLC, to fund the construction of a new traffic signal at Fox Drive, Six Mile Road, and Quakertown. The northernmost drive into the site from Fox Drive is located just south of the apartment building and will offer convenient access to the parking structure. The southernmost drive runs along the north side of the hotel.

Sheets C-15 and C-16 identify the circulation routes of large trucks and firefighting equipment.

Landscaping

The landscape plans, Sheets C-7 through C-13, provide information on the types, quantities, locations, and sizes of all planted materials. Sheet C-7 includes the overall Plant Schedule and a table that outlines the Landscaping and Buffer Requirements according to Section 10.03 of the Zoning Ordinance. Section 10.03 sets the dimensional standards and minimum numbers of required trees and shrubs according to the length of road frontage, parking lot size, and greenbelt buffering adjacent to property lines. Throughout the site, the landscape plan proposes 104 full-size deciduous trees, 69 evergreen trees, 36 ornamental trees, and 768 shrubs.

The largest open space area on the site is the existing stormwater detention pond located behind the parking structure adjacent to Fox Drive. This approximately one-acre pond is fenced and would not be altered.

Site Lighting

Site photometrics are represented on Sheets C-5 and C-6, with additional construction details provided on C-14. The Lighting Requirements table on Sheet C-5 compares the proposed lighting plan with the Ordinance standards of Section 7.22. According to this table, the proposed lighting exceeds the maximum average illumination levels of Section 7.22. Most of the parking lot areas and driveways would be illuminated with 30,000-lumen LED pole-mounted light fixtures at heights of 25 and 30 feet. Because of this and the spacing and distribution of the light poles, the average illumination level for the parking areas is 4.27-foot candles. Section 7.22 limits the average illumination level for parking areas to 1.0 foot-candle. Typically, pole-mounted light fixtures are limited to a height of twenty (20) feet; however, for large-scale commercial developments, lighting fixtures up to a maximum height of thirty-five (35) feet may be allowed if there are no adverse impacts on the surrounding land uses and the natural environment.

Refuse Collection

The site plan shows four (4) trash/recycle enclosures and two (2) trash compactors. The trash/recycle enclosures are located 1) behind Building A, 2) between the grocery store and the apartment building, 3) behind Building F, the proposed gym, and 4) at the southeast corner of Building D, the proposed full-service restaurant, adjacent to Six Mile Road. The two (2) trash compactors are shown 1) at the rear of the grocery store and 2) on the south side of the Proposed Drive-Thru pick-up window, across from the service and bypass lanes. Sheet C-14 provides a Trash/Recycle Enclosure Detail, which shows 6'-0" tall split-face block enclosure walls and gates made of galvanized steel posts and vinyl PVC-coated steel fencing.

Stormwater Management

The plans identify the location and configuration of a new retention pond along the east-central part of the site in the vicinity of an existing pond, which currently does not have an outlet and is used primarily for irrigation. This pond will be re-engineered and reconfigured to meet current stormwater regulations. It will remain an open basin with fencing around its perimeter for protection and safety, due to the steeper side slopes.

Development Agreement

To ensure that unified plans approved as Planned General Developments under Section 5.02 proceed through construction with both the commercial and residential phases of the project, Section 5.02(5)G) requires the following: *No structure designed or intended to be used in part or in whole for commercial purposes shall be constructed prior to the construction of not less than thirty percent (30%) of the dwelling units, if any, proposed for the development.* To address this and several other aspects of the project, such as divisions, leasing and separation of ownership, parking, site design standards, permitted and prohibited uses, dimensional standards, and maintenance of utilities, it is recommended that the City and the Developer enter into a Development Agreement. For previous PGD projects, approval of the Development Agreement came after the approval of the waiver use and site.

March 19, 2024, Public Hearing:

Discussion at the Study Meeting focused on several issues, including 1) parking, 2) phasing of the development, 3) landscaping and buffering, 4) loading/unloading, 5) pedestrian circulation, and 6) stormwater management.

The Petitioner indicated that the tenant mix will be carefully considered regarding its impact on parking. Quick Service Restaurants (QSRs) make up most of the end-cap food-service establishments in the retail buildings along Haggerty Road (Buildings B, C, and the Drive-Thru), and these businesses' peak parking demands will not coincide with the peak parking for the full-service restaurant or the gym. It was suggested that a tenant plan be provided to identify the known users to understand these parking relationships better. The latest site plan shows a total of 1,003 parking spaces, which translates into the following parking ratios for each of the major use groups: 1 space for every 75 square feet for the full-service restaurant, 1-½ spaces per apartment, 1.15 spaces per hotel room, and 1 space for every 270 square feet of general retail space and quick service restaurant.

Phase 1 of the project will likely include the grocery store and the Haggerty Road retail buildings, followed by the gym (Building F) since most of the tenants for these buildings have been identified. The full-service restaurant (Building D), the bank (Building E), and the Hotel are still being worked on and will most likely be developed as part of a second phase. For this reason, it was suggested that these buildings be approved only in concept and that a more detailed review occur when the final plans are developed.

Concern was expressed about the separation between the apartments and the back of the grocery store. The distance between these structures is less than 100 feet at the closest point. The plan shows only a narrow landscape island that would be planted with low-growing juniper shrubs. In discussing this with the Project Engineer, an attempt will be made to increase the island's width to accommodate full-size evergreen trees.

The issue of loading and unloading mostly centers around the how and where, especially for Buildings B, C, and the Drive-Thru. The absence of dedicated spaces where deliveries can be easily unloaded, or vice versa, means that trucks and other vehicles will have to rely on the drive aisles and parking spaces closest to the business. Depending on the frequency and times of day when these activities occur, they can result in congestion and customer inconvenience.

Regarding pedestrian circulation, the Petitioner pointed out that the plan shows several walkways and crossings but agreed to look at other areas where adjustments can be made, or sidewalks and other pedestrian amenities can be added.

A revised architectural site plan updates the building sizes and shows minor adjustments, mostly related to the Drive-Thru, including a loading space in front of the trash compactor, the addition of a small patio in the southeast corner, and changes to the configuration of the drive-thru service lane. According to the architect, the latest parking count is 1,003, slightly above the 987 spaces shown in the previous plan.

Approving Resolution: The request to develop a Planned General Development consisting of eight (8) retail/commercial buildings, a 4-story hotel, a 5-story apartment building, and an existing multi-level parking garage at 39200 Six Mile Road is hereby approved, subject to City Council approval and the following conditions:

1. The Site Plan (Overall), Site Plan (North), and Site Plan (South) marked Drawings C-2, C-3, and C-4, respectively, all dated January 31, 2024, as revised, prepared by Stonefield Engineering & Design, are hereby approved, and shall be adhered to; except as modified below.
2. Building D, Building E, and the Hotel are approved in concept only, and more detailed plans, including site, landscaping, floor, and elevations, shall return to the Planning Commission for further review and approval before any building permits are issued.
3. The Landscaping Plans marked Drawings C-7, C-8, C-9, C-10, C-11, and C-12, and the Landscaping Details marked Drawing C-13, all dated January 31, 2024,

as revised, prepared by Stonefield Engineering & Design, are hereby approved, and shall be adhered to, except that two (2) additional full-size trees shall be added to the Six Mile Road frontage to meet the ordinance requirements, and modifications shall be made to the area between the grocery store and the apartment building to provide a better visual screen using full-size evergreen trees.

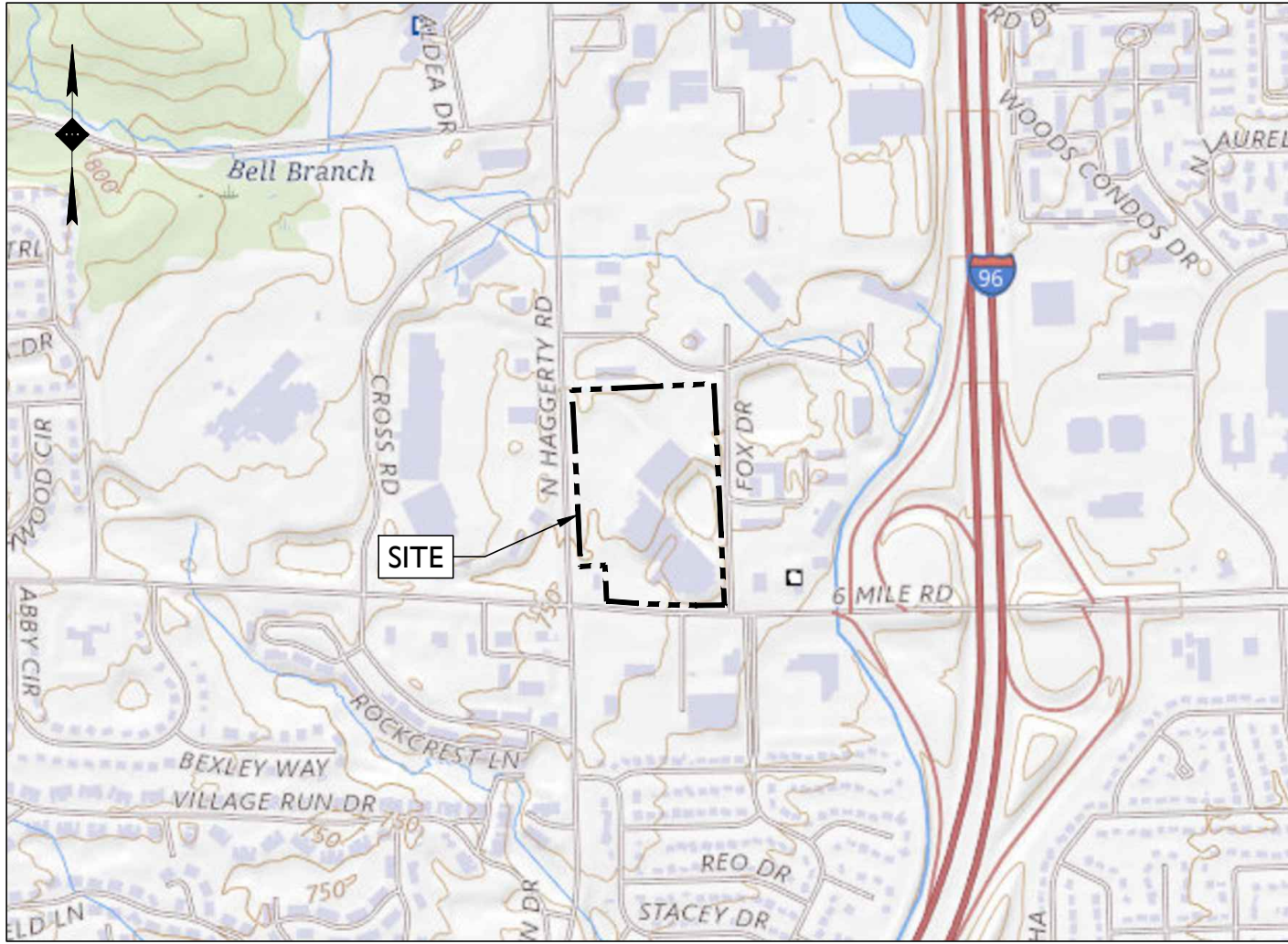
4. That the Exterior Elevations labeled Apartments (Sheets A-300 & A-301), Grocery (Sheet A-300), Retail Building A (Sheet A-300), Retail Building B (Sheets A-300 & A-301), Retail Building C-1 (Sheet A-300), Retail Building C-2 identified as Retail Drive Thru (Sheet A-300), Retail Building G (Sheet A-300) and Retail Building H (Sheet A-300), inclusive, all dated January 25, 2024, prepared by Bowers + Associates, Inc., are hereby approved and shall be adhered to.
5. The Exterior Elevations for Building F Proposed Gym dated February 25, 2024, prepared by Club Studio, is hereby approved and shall be adhered to.
6. This approval is subject to the Petitioner submitting a Development Agreement to be executed between the City and the Developer addressing items pertinent to the construction of the project as well as the long-term operation of the development, such as, but not limited to, divisions, leasing, and separation of ownership; parking; site design standards; permitted and prohibited uses; dimensional standards; and maintenance of utilities.
7. All rooftop mechanical equipment shall be concealed from public view on all sides by screening that shall be compatible with the material and color of other exterior materials on the buildings.
8. The walls of the trash/recycle enclosures shall be a minimum of six feet (6') in height and constructed out of the same masonry used in the construction of the buildings, or in the event a poured wall is substituted, the wall's design, texture and color shall match that of the buildings. The enclosure gates shall be solid steel or durable, long-lasting panel fiberglass.
9. This site shall meet the City of Livonia or the Wayne County Storm Water Management Ordinance, whichever applies, and secure any required permits, including soil erosion and sedimentation control permits.
10. All light fixtures shall not exceed a mounting height of thirty feet (30') and shall be aimed and shielded to minimize stray light trespassing across property lines and glaring into adjacent roadways.
11. The overall average illumination level for the parking lots shall be 1.0-foot candle as provided under Section 7.22 of the Zoning Ordinance.

PUBLIC HEARING

ITEM 1 Petition 2024-02-02-03 – PGD - 39200 Six Mile Road

Page 17

12. Only conforming signage is approved with this petition, and any additional signage shall be separately submitted for review and approval by the Zoning Board of Appeals.
13. That no LED light band or exposed neon shall be permitted on this site, including, but not limited to, the buildings or around the windows.
14. That the specific plans referenced in this approving resolution shall be submitted to the Inspection Department at the time the building permits are applied for and
15. Under Section 13.13 of the Livonia Zoning Ordinance, as amended, this approval is valid for one year only from the date of approval by the City Council. Unless a building permit is obtained, this approval shall be null and void at the expiration of said period.



SOURCE: USGS TOPOGRAPHICAL MAPS, DATE RETRIEVED 11/17/2023

LOCATION MAP

SCALE: 1" = 1000'±



SOURCE: NEARMAPS ONLINE MAPPING SYSTEM, DATE RETRIEVED 11/17/2023

AERIAL MAP

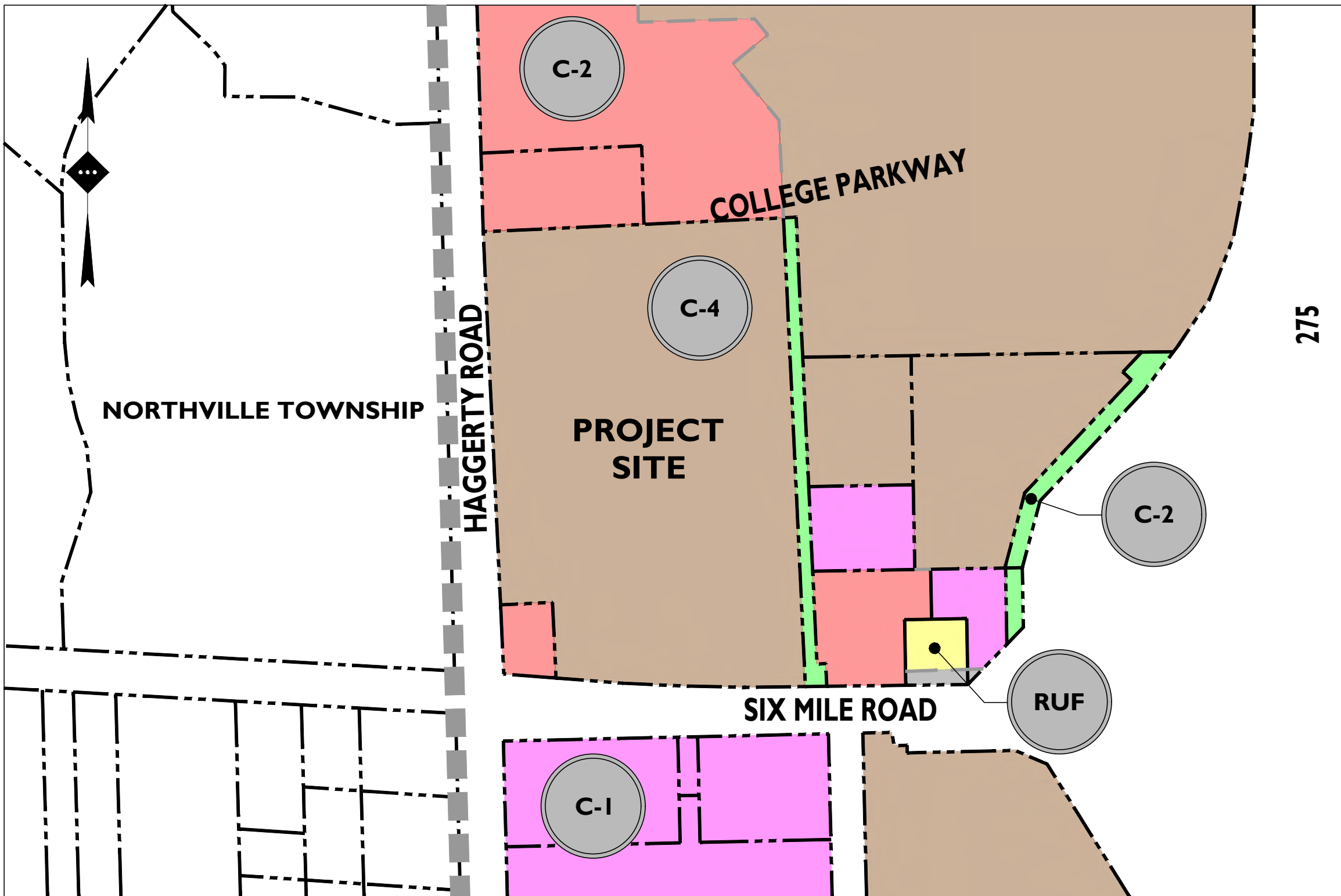
SCALE: 1" = 300'±

SITE DEVELOPMENT PLANS
FOR
39200 SIX MILE ROAD
PROPOSED MIXED USED
DEVELOPMENT

PID: 46-027-99-0008-001

39200 SIX MILE ROAD

CITY OF LIVONIA, WAYNE COUNTY, MICHIGAN

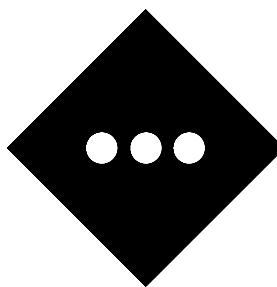


SOURCE: CITY OF LIVONIA ZONING MAP, DATE RETRIEVED 11/17/2023

ZONING MAP

SCALE: 1" = 300'±

PLANS PREPARED BY:



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www.stonefieldeng.com

607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

PLAN REFERENCE MATERIALS:

1. THIS PLAN SET REFERENCES THE FOLLOWING DOCUMENTS INCLUDING, BUT NOT LIMITED TO:
 - SURVEY PREPARED BY NOWAK & FRAUS ENGINEERS, DATED 06/15/2023
 - AERIAL MAP PROVIDED BY NEARMAPS ONLINE MAPPING SYSTEM, DATE RETRIEVED 11/17/2023
 - LOCATION MAP PROVIDED BY USGS TOPOGRAPHICAL MAPS, DATE RETRIEVED 11/17/2023
 - TRAFFIC IMPACT STUDY PREPARED BY FISHBECK, DATED 08/16/2023
2. ALL REFERENCE MATERIAL LISTED ABOVE SHALL BE CONSIDERED A PART OF THIS PLAN SET AND ALL INFORMATION CONTAINED WITHIN THESE MATERIALS SHALL BE UTILIZED IN CONJUNCTION WITH THIS PLAN SET. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN A COPY OF EACH REFERENCE AND REVIEW IT THOROUGHLY PRIOR TO THE START OF CONSTRUCTION.

SHEET INDEX

DRAWING TITLE	SHEET #
COVER SHEET	C-1
OVERALL SITE PLAN	C-2
SITE PLAN	C-3 & C-4
LIGHTING PLAN	C-5 & C-6
LANDSCAPING PLAN	C-7 TO C-13
CONSTRUCTION DETAILS	C-14
WB-67 TRUCK CIRCULATION	C-15
FIRE TRUCK CIRCULATION	C-16

ADDITIONAL SHEETS

DRAWING TITLE	SHEET #
ALTA SURVEY	2 OF 2



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SITE DEVELOPMENT PLANS

39200 6 MILE ROAD
PROPOSED MIXED USE
DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN



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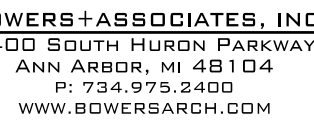
SCALE: AS SHOWN PROJECT ID: DET-230128

TITLE:

COVER SHEET

DRAWING:

C-1



CONSULTANT + NAME

PROJECT + INFORMATION

SHOPPES AT
COLLEGE PARK

FOX DRIVE
EVANSTON, IL

PROJECT + NUMBER

23-211

SUE + DATE

SEPT 2023	REVIEW
JAN 2024	REV
FEB 2024	REV
MAR 2024	REV
MAR 2024	REV
MAR 2024	REV

HEET + TITLE

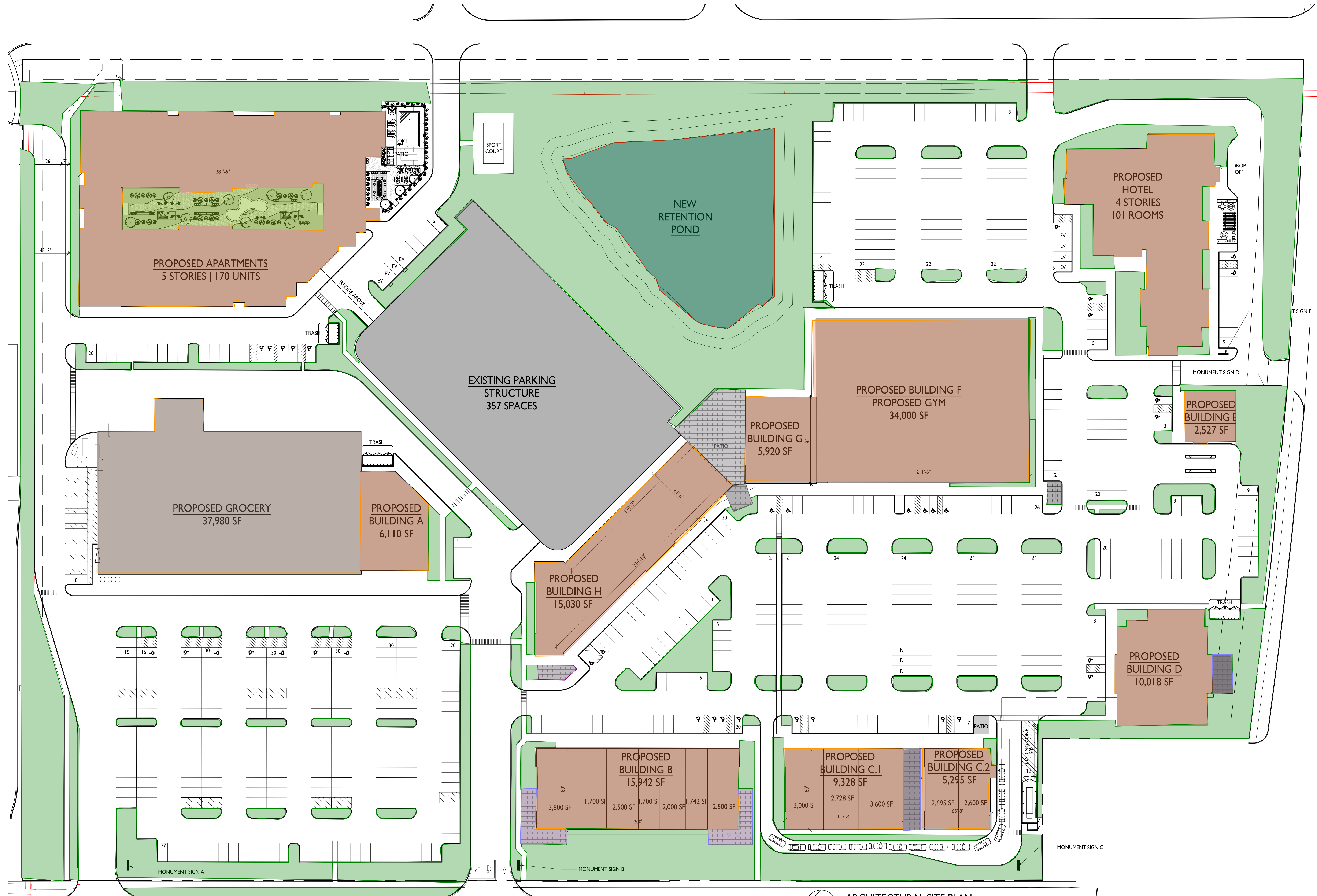
CHITECTURAL

SITE PLAN

3211z100.dwg

ET + NUMBER

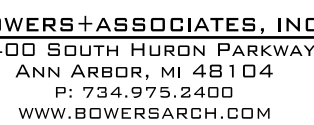
A-001



ARCHITECTURAL SITE PLAN

SCALE: 1" = 40'

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CONSULTANT + NAME

PROJECT + INFORMATION

SHOPPES AT
COLLEGE PARK
FOX DRIVE

PROJECT + NUMBER

23-211

SUE + DATE

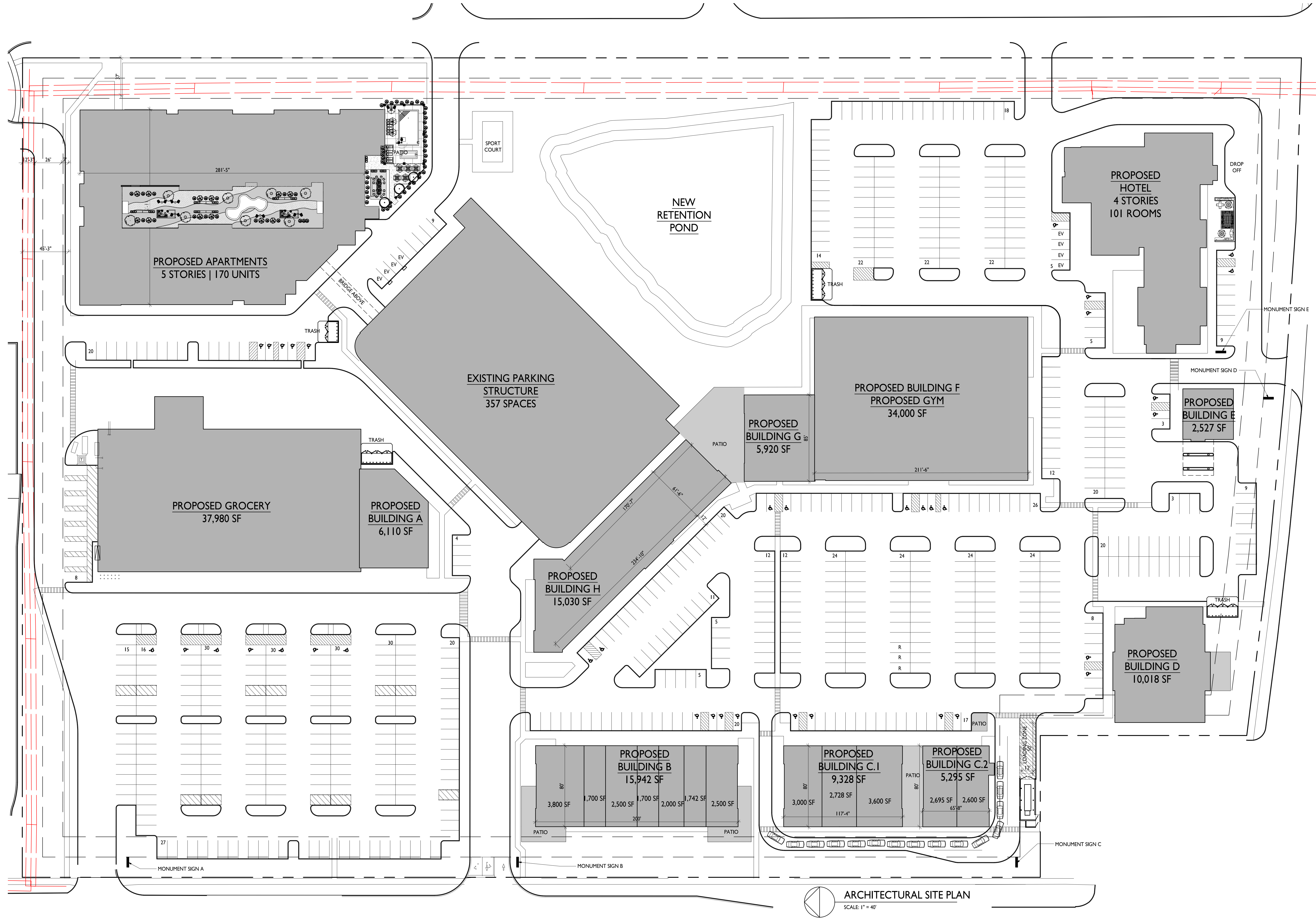
SEPT 2023	REVIEW
JAN 2024	REV
FEB 2024	REV
MAR 2024	REV
MAR 2024	REV
MAR 2024	REV

ARCHITECTURAL
SITE PLAN

3211z100.dwg

ET + NUMBER

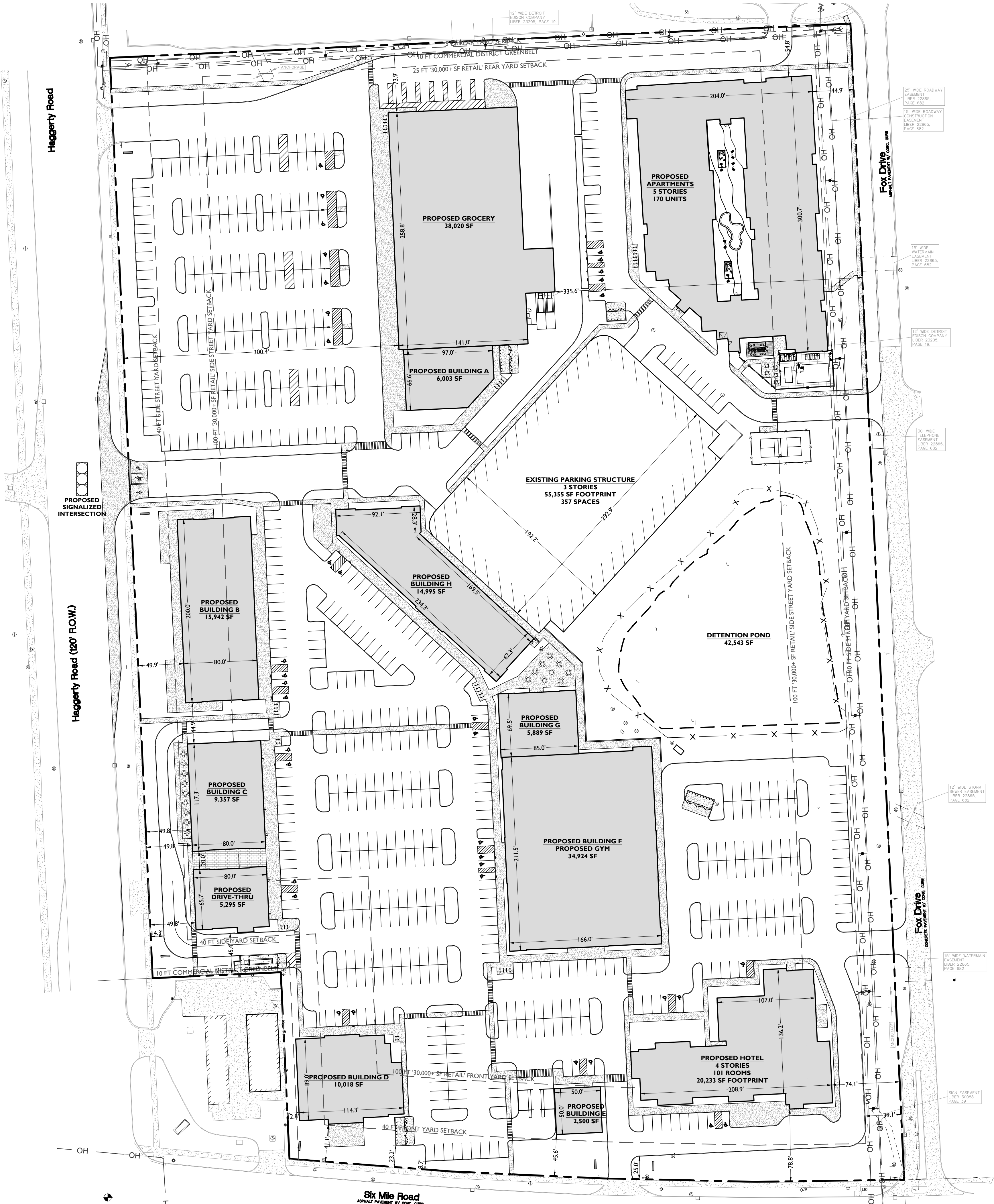
A-001



ARCHITECTURAL SITE PLAN

SCALE: 1" = 40'

NOT TO SCALE. DETAIL 23018-001. HARRIS MANAGEMENT GROUP 1900 SIX MILE ROAD, LIVONIA, MI 48150. DET-23018-001. 11.16.2018



LAND USE AND ZONING		
PID: 46-027-99-0008-001		
PLANNED GENERAL DEVELOPMENT		
UNDERLYING ZONING: HIGH RISE COMMERCIAL (C-4)		
PROPOSED USE		
RESTAURANT WITH DRIVE-THRU	NON-PERMITTED USE (D)	
RETAIL	PERMITTED USE	
RETAIL (> 30,000 SF)	WAIVER USE	
OFFICE	PERMITTED USE	
APARTMENTS	WAIVER USE	
HOTEL	PERMITTED USE	
PARKING GARAGE	EXISTING USE	
ZONING REQUIREMENT	REQUIRED	PROPOSED
MINIMUM LOT AREA	4,000 SF	971,527 SF (22.3 AC)
MAXIMUM BUILDING COVERAGE	20% (194,305 SF)	27.1% (263,567 SF) (D)
MAXIMUM BUILDING HEIGHT	4 STORIES	5 STORIES (D)
MINIMUM FRONT YARD SETBACK	40 FT	41.1 FT (D)
MINIMUM SIDE YARD SETBACK (ONE)	40 FT	12.8 FT (D)
MINIMUM SIDE YARD SETBACK (TOTAL)	80 FT	55.0 FT (D)
MINIMUM REAR YARD SETBACK	5 FT	57.6 FT
MINIMUM FRONT YARD SETBACK (> 30,000 SF RETAIL)	100 FT	889.2 FT
MINIMUM INTERIOR SIDE YARD SETBACK (> 30,000 SF RETAIL)	20 FT	N/A
MINIMUM REAR YARD SETBACK (> 30,000 SF RETAIL)	25 FT	73.9 FT
MINIMUM COMMON RECREATION AREA (MULTI-FAMILY)	4,250 SF ⁽¹⁾	8,426 FT
MINIMUM COMMERCIAL DISTRICT GREENBELT	10 FT	10.5 FT

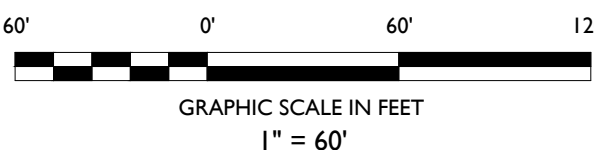
- (D) DEVIATION
- (1) MULTI-FAMILY PROJECTS COMPRISING OF 2.0 AC OR GREATER REQUIRE 25 SF OF RECREATION AREA PER DWELLING UNIT

OFF-STREET PARKING REQUIREMENTS		
CODE SECTION	REQUIRED	PROPOSED
§ 9.05	RETAIL: 1 SPACE PER 150 SF OF FLOOR AREA (52,186 SF)(1 SPACE / 150 SF) = 348 SPACES PLANNED SHOPPING CENTER (> 30,000 SF): 1 SPACE PER 250 SF OF FLOOR AREA (38,020 SF)(1 SPACE / 250 SF) = 152 SPACES RESTAURANT WITH DRIVE-THRU: 1 SPACE PER 125 SF OF FLOOR AREA 1 SPACE PER 3 OUTDOOR SEATS 1 SPACE PER EMPLOYEE (5,295 SF)(1 SPACE / 125 SF) = 42 SPACES (40 SEATS)(1 SPACE / 3 SEATS) = 13 SPACES (6 EMPLOYEES)(1 SPACE / EMPLOYEE) = 6 SPACES RESTAURANT: 1 SPACE PER 2 INTERIOR SEATS 1 SPACE PER 3 EXTERIOR SEATS 1 SPACE PER EMPLOYEE (40 INTERIOR SEATS)(1 SPACE / 2 SEATS) = 20 SPACES (15 EXTERIOR SEATS)(1 SPACE / 3 SEATS) = 5 SPACES (8 EMPLOYEES)(1 SPACE / EMPLOYEE) = 8 SPACES BANK: 1 SPACE PER 150 SF OF FLOOR AREA 1 SPACE PER EMPLOYEE (2,500 SF)(1 SPACE / 150 SF) = 17 SPACES (8 EMPLOYEES)(1 SPACE / EMPLOYEE) = 8 SPACES MULTI-FAMILY RESIDENTIAL: 2 SPACES PER UNIT (1 OR 2 BEDROOM) 2.5 SPACES PER UNIT (3+ BEDROOM) (100 UNITS)(2 SPACES / UNIT) = 200 SPACES (70 UNITS)(2.5 SPACES / UNIT) = 175 SPACES HOTEL: 1 SPACE PER GUEST ROOM 1 SPACE PER EMPLOYEE (101 ROOMS)(1 SPACE / ROOM) = 101 SPACES (20 EMPLOYEES)(1 SPACE / EMPLOYEE) = 20 SPACES INDOOR RECREATIONAL: 1 SPACE PER 200 SF OF FLOOR AREA (34,924 SF)(1 SPACE / 200 SF) = 175 SPACES TOTAL: 348 + 152 + 42 + 13 + 6 + 20 + 5 + 8 + 17 + 8 + 200 + 175 + 101 + 10 + 175 = 1,280 SPACES	987 SPACES (D) ⁽¹⁾
§ 9.04	90° PARKING: 10 FT X 20 FT WITH 24 FT AISLE	10 FT X 18 FT ⁽¹⁾ WITH 24 FT AISLE
§ 9.08	LOADING: 10 FT X 50 FT, 1 SPACE REQUIRED (1,401 SF - 20,000 SF) 10 FT X 50 FT, 2 SPACES REQUIRED (20,000+ SF)	PROVIDED

- (1) REFER TO THE PARKING ANALYSIS WITHIN THE PROVIDED TRAFFIC IMPACT STUDY
- (2) PARKING SPACES MAY BE REDUCED UP TO 2 FT WHEN ABUTTING 8 FT SIDEWALK OR LANDSCAPING
- (D) DEVIATION

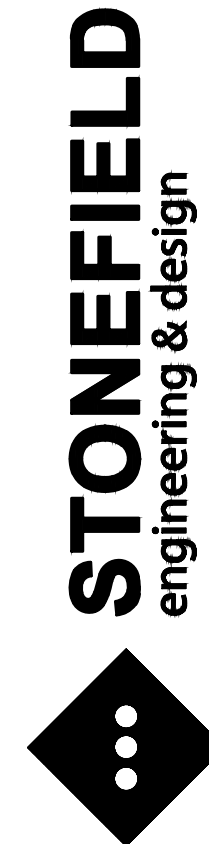
SYMBOL	DESCRIPTION
---	PROPERTY LINE
- - - - -	SETBACK LINE
=====	PROPOSED CURB AND GUTTER
■	PROPOSED BUILDING
□	PROPOSED CONCRETE

- GENERAL NOTES**
- THE CONTRACTOR SHALL VERIFY AND FAMILIARIZE THEMSELVES WITH THE EXISTING SITE CONDITIONS AND THE PROPOSED SCOPE OF WORK (INCLUDING DIMENSIONS, LAYOUT, ETC.) PRIOR TO INITIATING THE IMPROVEMENTS IDENTIFIED WITHIN THESE DOCUMENTS. SHOULD ANY DISCREPANCY BE FOUND BETWEEN THE EXISTING SITE CONDITIONS AND THE PROPOSED WORK, THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC PRIOR TO THE START OF CONSTRUCTION.
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 - THE CONTRACTOR SHALL NOT DEVIATE FROM THE PROPOSED IMPROVEMENTS IDENTIFIED WITHIN THIS PLAN SET UNLESS APPROVAL IS PROVIDED IN WRITING BY STONEFIELD ENGINEERING & DESIGN, LLC.
 - THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
 - THE CONTRACTOR SHALL NOT PERFORM ANY WORK OR CAUSE DISTURBANCE ON A PRIVATE PROPERTY NOT CONTROLLED BY THE PERSON OR ENTITY WHO HAS AUTHORIZED THE WORK WITHOUT PRIOR WRITTEN CONSENT FROM THE OWNER OF THE PRIVATE PROPERTY.
 - THE CONTRACTOR IS RESPONSIBLE TO RESTORE ANY DAMAGED OR UNDERMINED STRUCTURE OR SITE FEATURE THAT IS IDENTIFIED TO REMAIN ON THE PLAN SET. ALL REPAIRS SHALL USE NEW MATERIALS TO RESTORE THE FEATURE TO ITS EXISTING CONDITION AT THE CONTRACTOR'S EXPENSE.
 - CONTRACTOR IS RESPONSIBLE TO PROVIDE THE APPROPRIATE SHOP DRAWINGS, PRODUCT DATA, AND OTHER REQUIRED SUBMITTALS FOR REVIEW. STONEFIELD ENGINEERING & DESIGN, LLC, WILL REVIEW THE SUBMITTALS IN ACCORDANCE WITH THE DESIGN INTENT AS REFLECTED WITHIN THE PLAN SET.
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 - THE CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN THE PUBLIC RIGHT-OF-WAY IN ACCORDANCE WITH THE APPROPRIATE GOVERNING AUTHORITY AND SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF STREET OPENING PERMITS.
 - THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
 - SHOULD AN EMPLOYEE OF STONEFIELD ENGINEERING & DESIGN, LLC, BE PRESENT ON SITE AT ANY TIME DURING CONSTRUCTION, IT DOES NOT RELIEVE THE CONTRACTOR OF ANY OF THE RESPONSIBILITIES AND REQUIREMENTS LISTED IN THE NOTES WITHIN THIS PLAN SET.



FOR SITE PLAN APPROVAL				DESCRIPTION
		NB	BY	
		01/17/2024		
I			DATE	ISSUE

NOT APPROVED FOR CONSTRUCTION



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Phone 248.247.1115

SITE DEVELOPMENT PLANS

39200 6 MILE ROAD
PROPOSED MIXED USE DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN



SCALE: 1" = 60' PROJECT ID: DET-230128

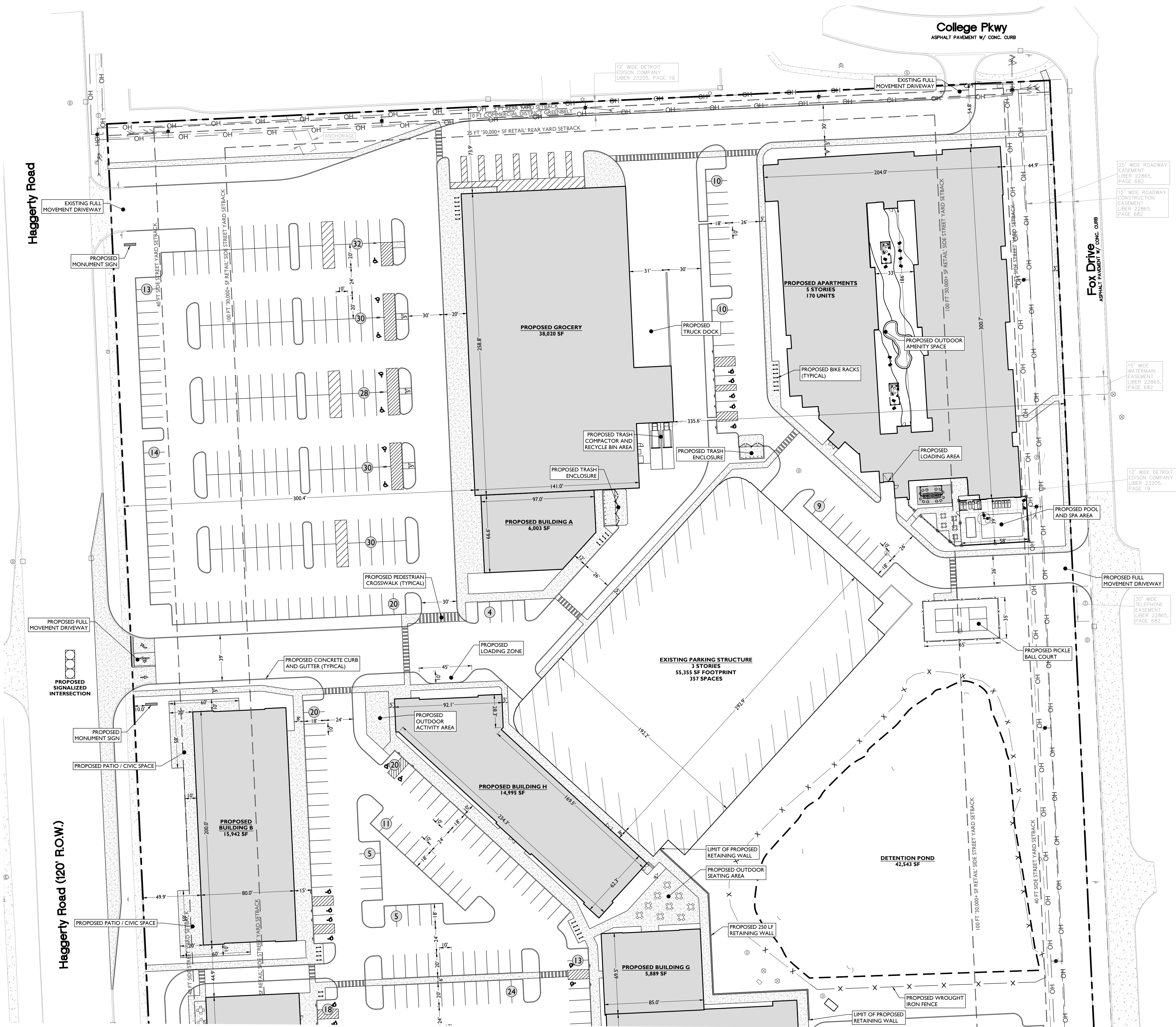
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SITE PLAN (OVERALL)

DRAWING:

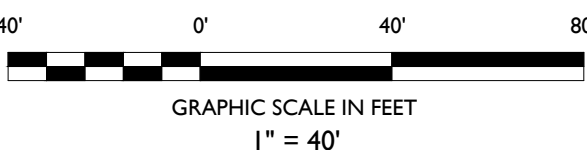
C-2

V:\072023\DET-23018-3\HARRIS MANAGEMENT GROUP\3920 6 MILE ROAD LIVONIA, MICHIGAN\DET-23018-3\16 SITE PLAN.dwg



SYMBOL	DESCRIPTION
	PROPERTY LINE
	SETBACK LINE
	PROPOSED CURB AND GUTTER
	PROPOSED BUILDING
	PROPOSED CONCRETE

- GENERAL NOTES**
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SITE DEVELOPMENT PLANS

39200 6 MILE ROAD

PROPOSED MIXED USE DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN

STATE OF MICHIGAN
JONATHAN TREIB
LICENSED PROFESSIONAL ENGINEER
MICHIGAN LICENSE #000009428

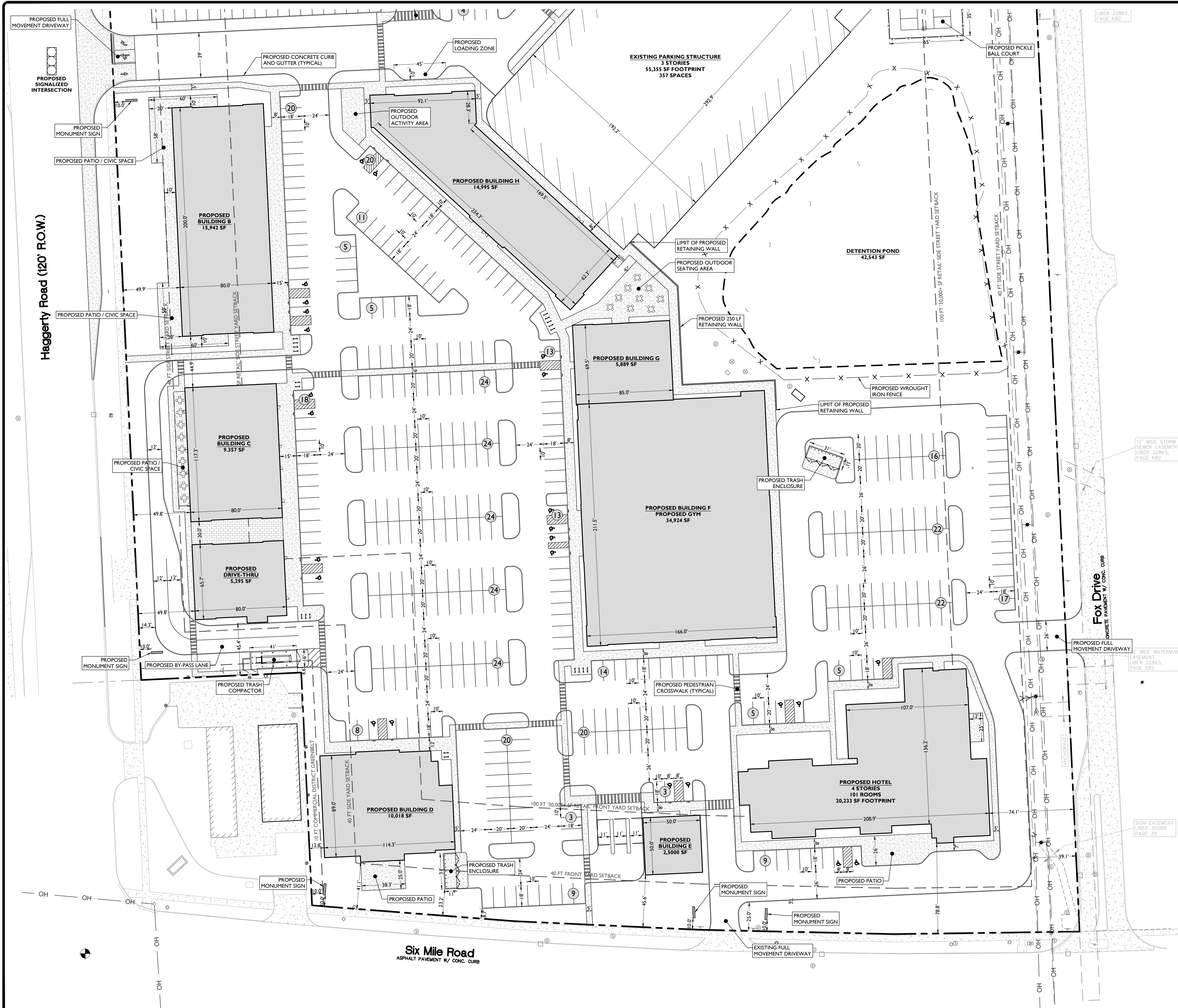
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SCALE:	1" = 40'	PROJECT ID:	DET-230128
TITLE:	SITE PLAN (NORTH)		
DRAWING:	C-3		

FOR SITE PLAN APPROVAL		DESCRIPTION	
	NB	BY	
	01/17/2024		
1		DATE	ISSUE

NOT APPROVED FOR CONSTRUCTION

V:\071021\DET230128\HARRIS MANAGEMENT GROUP\39200 SIX MILE ROAD LIVONIA, MI\CDOT\DET230128\15.16 SITE PLAN.dwg



SYMBOL	DESCRIPTION
	PROPERTY LINE
	SETBACK LINE
	PROPOSED CURB AND GUTTER
	PROPOSED BUILDING
	PROPOSED CONCRETE

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 - THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
 - THE CONTRACTOR SHALL NOT PERFORM ANY WORK OR CAUSE DISTURBANCE ON A PRIVATE PROPERTY NOT CONTROLLED BY THE PERSON OR ENTITY WHO HAS AUTHORIZED THE WORK WITHOUT PRIOR WRITTEN CONSENT FROM THE OWNER OF THE PRIVATE PROPERTY.
 - THE CONTRACTOR IS RESPONSIBLE TO RESTORE ANY DAMAGED OR UNDERMINED STRUCTURE OR SITE FEATURE THAT IS IDENTIFIED TO REMAIN ON THE PLAN SET. ALL REPAIRS SHALL USE NEW MATERIALS TO RESTORE THE FEATURE TO ITS EXISTING CONDITION AT THE CONTRACTOR'S EXPENSE.
 - CONTRACTOR IS RESPONSIBLE TO PROVIDE THE APPROPRIATE SHOP DRAWINGS, PRODUCT DATA, AND OTHER REQUIRED SUBMITTALS FOR REVIEW. STONEFIELD ENGINEERING & DESIGN, LLC, WILL REVIEW THE SUBMITTALS IN ACCORDANCE WITH THE DESIGN INTENT AS REFLECTED WITHIN THE PLAN SET.
 - THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
 - THE CONTRACTOR IS REQUIRED TO PERFORM ALL WORK IN THE PUBLIC RIGHT-OF-WAY IN ACCORDANCE WITH THE APPROPRIATE GOVERNING AUTHORITY AND SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF STREET OPENING PERMITS.
 - THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
 - SHOULD AN EMPLOYEE OF STONEFIELD ENGINEERING & DESIGN, LLC, BE PRESENT ON SITE AT ANY TIME DURING CONSTRUCTION, IT DOES NOT RELIEVE THE CONTRACTOR OF ANY OF THE RESPONSIBILITIES AND REQUIREMENTS LISTED IN THE NOTES WITHIN THIS PLAN SET.

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Phone 248.247.1115

SITE DEVELOPMENT PLANS

39200 6 MILE ROAD

PROPOSED MIXED USE DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN

STATE OF MICHIGAN
JONATHAN W. REIN
PROFESSIONAL ENGINEER
MICHIGAN LICENSE #009428
MICHIGAN PROFESSIONAL ENGINEER

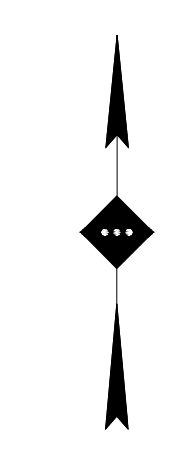
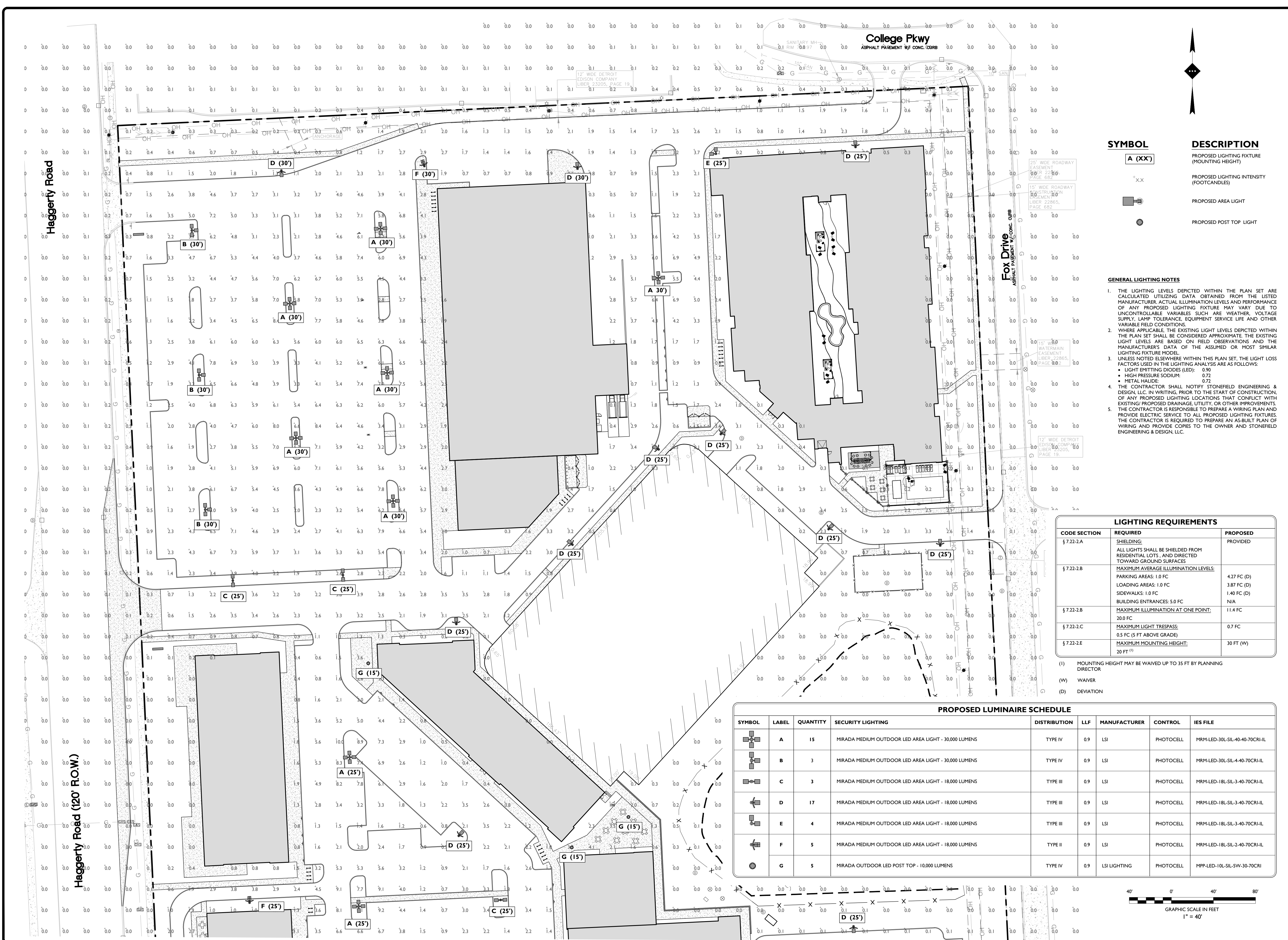
STONEFIELD
engineering & design

SCALE: 1" = 40' PROJECT ID: DET-230128

DRAWING: C-4

FOR SITE PLAN APPROVAL		DESCRIPTION	
NB	BY	DATE	ISSUE
1	01/17/2024		

NOT TO SCALE. THIS DRAWING IS A PRELIMINARY DESIGN. IT IS THE RESPONSIBILITY OF THE CLIENT TO VERIFY THE ACCURACY OF THE DATA PROVIDED. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.



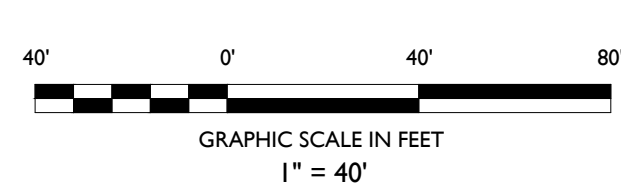
SYMBOL	DESCRIPTION
A (XX')	PROPOSED LIGHTING FIXTURE (MOUNTING HEIGHT)
XX	PROPOSED LIGHTING INTENSITY (FOOTCANDLES)
[Symbol]	PROPOSED AREA LIGHT
[Symbol]	PROPOSED POST TOP LIGHT

- GENERAL LIGHTING NOTES**
- THE LIGHTING LEVELS DEPICTED WITHIN THE PLAN SET ARE CALCULATED UTILIZING DATA OBTAINED FROM THE LISTED MANUFACTURER. ACTUAL ILLUMINATION LEVELS AND PERFORMANCE OF ANY PROPOSED LIGHTING FIXTURE MAY VARY DUE TO UNCONTROLLABLE VARIABLES SUCH AS WEATHER, VOLTAGE SUPPLY, LAMP TOLERANCE, EQUIPMENT SERVICE LIFE AND OTHER VARIABLE FIELD CONDITIONS.
 - WHERE APPLICABLE, THE EXISTING LIGHT LEVELS DEPICTED WITHIN THE PLAN SET SHALL BE CONSIDERED APPROXIMATE. THE EXISTING LIGHT LEVELS ARE BASED ON FIELD OBSERVATIONS AND THE MANUFACTURER'S DATA OF THE ASSUMED OR MOST SIMILAR LIGHTING FIXTURE MODEL.
 - UNLESS NOTED ELSEWHERE WITHIN THIS PLAN SET, THE LIGHT LOSS FACTORS USED IN THE LIGHTING ANALYSIS ARE AS FOLLOWS:
 - LIGHT EMITTING DIODES (LED): 0.90
 - HIGH PRESSURE SODIUM: 0.72
 - METAL HALIDE: 0.72
 - THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IN WRITING, PRIOR TO THE START OF CONSTRUCTION, OF ANY PROPOSED LIGHTING LOCATIONS THAT CONFLICT WITH EXISTING PROPOSED DRAINAGE, UTILITY, OR OTHER IMPROVEMENTS. THE CONTRACTOR IS RESPONSIBLE TO PREPARE A WIRING PLAN AND PROVIDE ELECTRIC SERVICE TO ALL PROPOSED LIGHTING FIXTURES. THE CONTRACTOR IS REQUIRED TO PREPARE AN AS-BUILT PLAN OF WIRING AND PROVIDE COPIES TO THE OWNER AND STONEFIELD ENGINEERING & DESIGN, LLC.
 -

LIGHTING REQUIREMENTS		
CODE SECTION	REQUIRED	PROPOSED
§ 7.22-2-A	SHIELDING: ALL LIGHTS SHALL BE SHIELDED FROM RESIDENTIAL LOTS, AND DIRECTED TOWARD GROUND SURFACES.	PROVIDED
§ 7.22-2-B	MAXIMUM AVERAGE ILLUMINATION LEVELS: PARKING AREAS: 1.0 FC LOADING AREAS: 1.0 FC SIDEWALKS: 1.0 FC BUILDING ENTRANCES: 5.0 FC	4.27 FC (D) 3.87 FC (D) 1.40 FC (D) N/A
§ 7.22-2-B	MAXIMUM ILLUMINATION AT ONE POINT: 20.0 FC	11.4 FC
§ 7.22-2-C	MAXIMUM LIGHT TRESPASS: 0.5 FC (5 FT ABOVE GRADE)	0.7 FC
§ 7.22-2-E	MAXIMUM MOUNTING HEIGHT: 20 FT (1)	30 FT (W)

- (1) MOUNTING HEIGHT MAY BE WAIVED UP TO 35 FT BY PLANNING DIRECTOR
(W) WAIVER
(D) DEVIATION

PROPOSED LUMINAIRE SCHEDULE							
SYMBOL	LABEL	QUANTITY	SECURITY LIGHTING	DISTRIBUTION	LLF	MANUFACTURER	CONTROL
[Symbol]	A	15	MIRADA MEDIUM OUTDOOR LED AREA LIGHT - 30,000 LUMENS	TYPE IV	0.9	LSI	PHOTOCELL
[Symbol]	B	3	MIRADA MEDIUM OUTDOOR LED AREA LIGHT - 30,000 LUMENS	TYPE IV	0.9	LSI	PHOTOCELL
[Symbol]	C	3	MIRADA MEDIUM OUTDOOR LED AREA LIGHT - 18,000 LUMENS	TYPE III	0.9	LSI	PHOTOCELL
[Symbol]	D	17	MIRADA MEDIUM OUTDOOR LED AREA LIGHT - 18,000 LUMENS	TYPE III	0.9	LSI	PHOTOCELL
[Symbol]	E	4	MIRADA MEDIUM OUTDOOR LED AREA LIGHT - 18,000 LUMENS	TYPE III	0.9	LSI	PHOTOCELL
[Symbol]	F	5	MIRADA MEDIUM OUTDOOR LED AREA LIGHT - 18,000 LUMENS	TYPE II	0.9	LSI	PHOTOCELL
[Symbol]	G	5	MIRADA OUTDOOR LED POST TOP - 10,000 LUMENS	TYPE IV	0.9	LSI LIGHTING	PHOTOCELL



FOR SITE PLAN APPROVAL

DESCRIPTION

NB

BY

01/17/2024

DATE

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SITE DEVELOPMENT PLANS

39200 6 MILE ROAD

PROPOSED MIXED USE DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN

STATE OF MICHIGAN
JONATHAN REIN
LICENSED PROFESSIONAL ENGINEER
MICHIGAN LICENSE #0009428

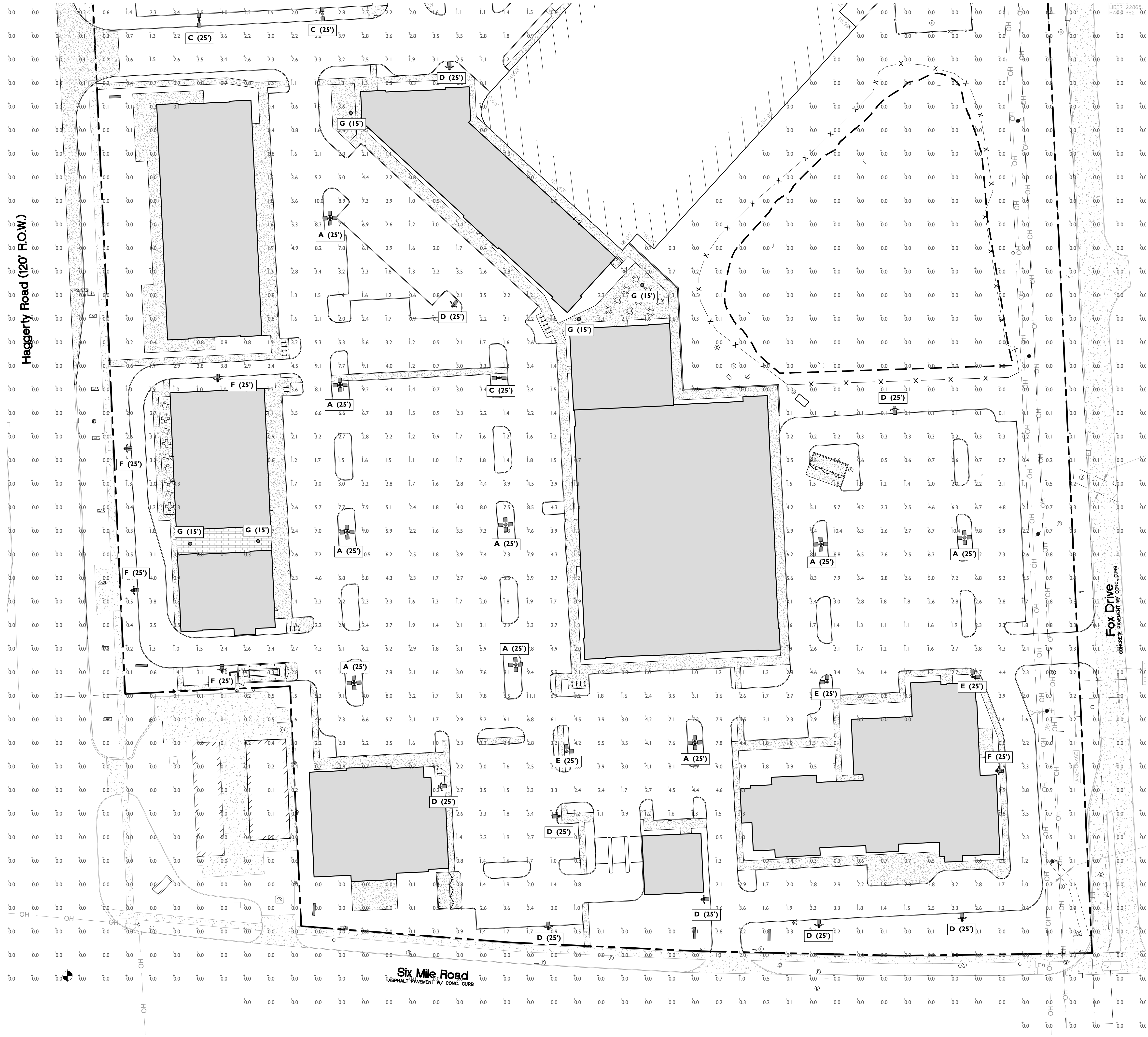
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SCALE: 1" = 40' PROJECT ID: DET-230128

TITLE: LIGHTING PLAN (NORTH)

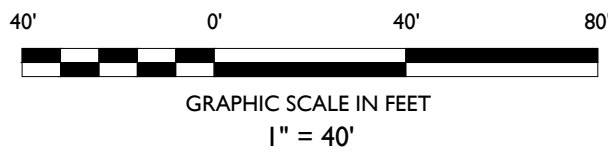
DRAWING: C-5

NOTED: SEE DET-230128-PAVING MANAGEMENT GROUP 1908 SIX MILE ROAD, LIVONIA, MICHIGAN LOT 98 & 99 LIGHTING



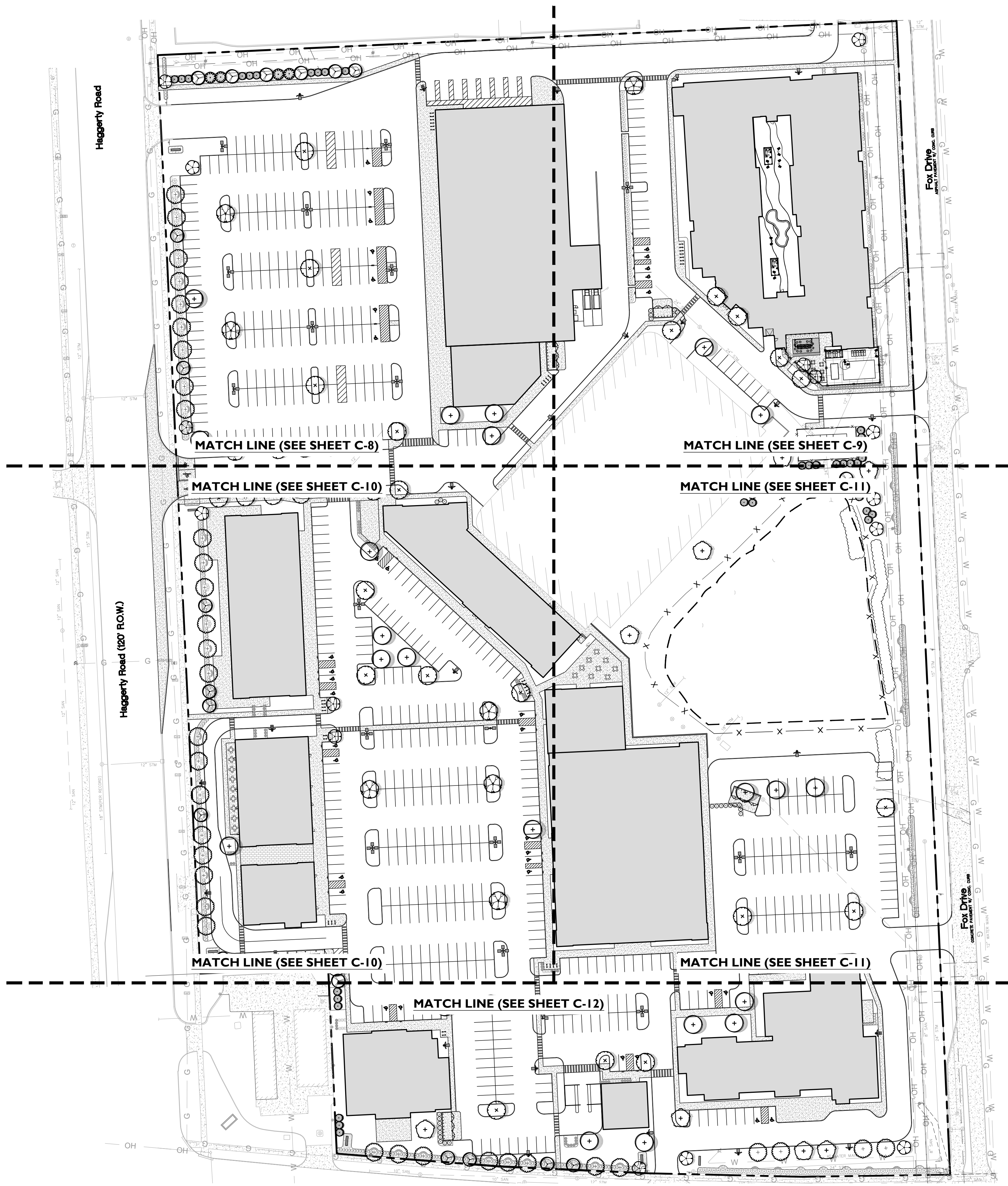
SYMBOL	DESCRIPTION
A (XX')	PROPOSED LIGHTING FIXTURE (MOUNTING HEIGHT)
+XX	PROPOSED LIGHTING INTENSITY (FOOTCANDLES)
[Symbol]	PROPOSED AREA LIGHT
[Symbol]	PROPOSED POST TOP LIGHT

- GENERAL LIGHTING NOTES**
- THE LIGHTING LEVELS DEPICTED WITHIN THE PLAN SET ARE CALCULATED UTILIZING DATA OBTAINED FROM THE LISTED MANUFACTURER. ACTUAL ILLUMINATION LEVELS AND PERFORMANCE OF ANY PROPOSED LIGHTING FIXTURE MAY VARY DUE TO UNCONTROLLABLE VARIABLES SUCH AS WEATHER, VOLTAGE SUPPLY, LAMP TOLERANCE, EQUIPMENT SERVICE LIFE AND OTHER VARIABLE FIELD CONDITIONS.
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 - UNLESS NOTED ELSEWHERE WITHIN THIS PLAN SET, THE LIGHT LOSS FACTORS USED IN THE LIGHTING ANALYSIS ARE AS FOLLOWS:
 - LIGHT EMITTING DIODES (LED): 0.90
 - HIGH PRESSURE SODIUM: 0.72
 - METAL HALIDE: 0.72
 - THE CONTRACTOR SHALL NOTIFY STONEFIELD ENGINEERING & DESIGN, LLC IN WRITING, PRIOR TO THE START OF CONSTRUCTION, OF ANY PROPOSED LIGHTING LOCATIONS THAT CONFLICT WITH EXISTING PROPOSED DRAINAGE, UTILITY, OR OTHER IMPROVEMENTS.
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FOR SITE PLAN APPROVAL		DESCRIPTION	
	NB	BY	
	01/17/2024	DATE	
I		ISSUE	
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SITE DEVELOPMENT PLANS			
39200 6 MILE ROAD			
PROPOSED MIXED USE DEVELOPMENT			
PID: 46-027-99-0008-001 39200 6 MILE ROAD CITY OF LIVONIA WAYNE COUNTY, MICHIGAN			
SCALE: 1" = 40' PROJECT ID: DET-230128			
TITLE: LIGHTING PLAN (SOUTH)			
DRAWING: C-6			

NOTED: DET-230128-PAVING MANAGEMENT GROUP 39200 SIX MILE ROAD, LIVONIA, MICHIGAN 48150-1100



LANDSCAPING AND BUFFER REQUIREMENTS		
CODE SECTION	REQUIRED	PROPOSED
§ 10.03.(1)	STREET TREES 1 DECIDUOUS TREE FOR EVERY 40 LF OF FRONTAGE 1 ORNAMENTAL TREE FOR EVERY 100 LF OF FRONTAGE 8 SHRUBS FOR EVERY 40 LF OF FRONTAGE SIX MILE ROAD: 637 FT (637 FT) * (1 TREE / 40 FT FRONTAGE) = 16 TREES (637 FT) * (1 TREE / 100 FT FRONTAGE) = 7 TREES (637 FT) * (8 SHRUBS / 40 FT FRONTAGE) = 128 SHRUBS HAGGERTY ROAD: 916 FT (916 FT) * (1 TREE / 40 FT FRONTAGE) = 23 TREES (916 FT) * (1 TREE / 100 FT FRONTAGE) = 10 TREES (916 FT) * (8 SHRUBS / 40 FT FRONTAGE) = 184 SHRUBS	16 TREES
		7 TREES
		128 SHRUBS
		23 TREES
		10 TREES
		184 SHRUBS
§ 10.03.(2)(A) § 10.03.(2)(A)(i)	PARKING LOT SCREENING LANDSCAPING REQUIRED BETWEEN PARKING AREAS AND THE R.O.W. WITHIN 10 FT OF PARKING LANDSCAPING WIDTH: 5 FT OPAQUE LANDSCAPING SCREEN REQUIRED MINIMUM HEIGHT: 3 FT MINIMUM VEHICLE OVERHANG: 2 FT	PROVIDED
		18.00 FT
		PROVIDED 3 FT 2 FT
§ 10.03.(2)(B)(i) § 10.03.(2)(B)(ii)	PARKING LOT LANDSCAPING 5% OF PARKING AREA SHALL BE LANDSCAPED (367,705 SF) * (0.05) = 18,385 SF MINIMUM AREA: 300 SF MINIMUM WIDTH: 10 FT 1 TREE FOR EVERY 300 SF OF LANDSCAPING (18,385 SF) * (1 TREE / 300 SF) = 62 TREES TERMINAL ISLANDS REQUIRED, NO MORE THAN 20 SPACES IN A SINGLE ROW	28,250 SF (7.6%) 300 SF 10 FT
		62 TREES COMPLIES
§ 10.03.(5)(a)	BUFFER AREA REQUIREMENTS MINIMUM WIDTH: 10 FT 1 TREE FOR EVERY 30 LF OF BUFFER NORTH: 783 FT (783 FT) * (1 TREE / 30 FT BUFFER) = 27 TREES EAST: 1,198 FT (1,198 FT) * (1 TREE / 30 FT BUFFER) = 40 TREES SOUTH: 140 FT (140 FT) * (1 TREE / 30 FT BUFFER) = 5 TREES WEST: 204 FT (204 FT) * (1 TREE / 30 FT BUFFER) = 7 TREES	NORTH: 11.36 FT EAST: 42.73 FT SOUTH: 19.91 FT WEST: 10.55 FT
		20 TREES (W) 15 EXISTING TREES 25 TREES PROPOSED (1)
		5 TREES 7 TREES
§ 10.03.(6)	OPEN SPACE LANDSCAPING ALL REMAINING OPEN AREAS ON SITE THAT ARE NOT REQUIRED LANDSCAPING AREAS SHALL BE PLANTED WITH 1 TREE FOR EVERY 3,000 SF OF OPEN AREA (26,479 SF) * (1 TREE / 3,000 SF) = 9 TREES ALL OPEN SPACE AREAS SHALL BE PLANTED WITH GRASS OR GROUND COVER	9 TREES COMPLIES
§ 10.03.(10)	R.O.W. AND EASEMENT LANDSCAPING ANY PUBLIC R.O.W. AND ACCESS EASEMENT AREAS ADJACENT TO REQUIRED LANDSCAPED AREAS SHALL BE PLANTED WITH GRASS OR OTHER SUITABLE GROUND COVER	COMPLIES

(W) WAIVER
(1) DUE TO LOCATION OF EXISTING UTILITIES/EASEMENTS AND PROPOSED SNOW STORAGE AREAS, TREES ARE CLUSTERED WHERE AVAILABLE PLANTING SPACE IS AVAILABLE.

PLANT SCHEDULE						
SYMBOL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
DECIDUOUS TREES						
	CEL	35	CELTIS OCCIDENTALIS	COMMON HACKBERRY	3" - 3.5" CAL	B&B
	GLE	9	GLEDTISIA TRIACANTHOS INERMIS	SHADEMASTER HONEY LOCUST	3" - 3.5" CAL	B&B
	SUN	28	GLEDTISIA TRIACANTHOS INERMIS 'SUNCOLE'	SUNBURST® HONEY LOCUST	3" - 3.5" CAL	B&B
	QUE	8	QUERCUS RUBRA	RED OAK	3" - 3.5" CAL	B&B
	TIL	24	TILIA AMERICANA	AMERICAN LINDEN	3" - 3.5" CAL	B&B
EVERGREEN TREES						
	JUN	40	JUNIPERUS VIRGINIANA	EASTERN REDCEDAR	8" - 10" HT	B&B
	VIR	25	JUNIPERUS VIRGINIANA 'J.N. SELECT GREEN'	EMERALD FEATHER™ EASTERN REDCEDAR	5' - 6' HT	B&B
	PIC	4	PICEA GLAUCA	WHITE SPRUCE	8" - 10" HT	B&B
ORNAMENTAL TREES						
	AME	20	AMELANCHIER LAEVIS	ALLEGHENY SERVICEBERRY	2" - 2.5" CAL	B&B
	CER	16	CERCIS CANADENSIS	EASTERN REDBUD MULTI-TRUNK	2" - 2.5" CAL	B&B
SHRUBS						
	HYD	42	HYDRANGEA ARBORESCENS 'ANNABELLE'	ANNABELLE HYDRANGEA	36" - 42"	POT
	ROS	111	ROSA X 'DOUBLE KNOCKOUT'	ROSE	36" - 42"	POT
EVERGREEN SHRUBS						
	BUX	89	BUXUS X 'GREEN MOUNTAIN'	GREEN MOUNTAIN BOXWOOD	36" - 42"	B&B
	SEA	219	JUNIPERUS X PFITZERIANA 'SEA GREEN'	SEA GREEN PFITZER JUNIPER	36" - 42"	B&B
	TAX	307	TAXUS X MEDIA 'DENSIFLORA'	DENSE ANGLO-JAPANESE YEW	36" - 42"	B&B
GRASSES						
	CAL	195	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	1 GAL.	POT
PERENNIALS AND GRASSES						
	ASC	491	ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	18" o.c.	1 GAL. POT
	CAR	123	CAREX MORROWII 'ICE DANCE'	ICE DANCE JAPANESE SEDGE	18" o.c.	1 GAL. POT
	RUD	703	RUDBECKIA HIRTA	BLACK-EYED SUSAN	18" o.c.	1 GAL. POT

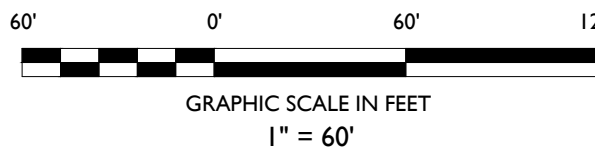
NOTE: IF ANY DISCREPANCIES OCCUR BETWEEN AMOUNTS SHOWN ON THE LANDSCAPE PLAN AND WITHIN THE PLANT LIST, THE PLAN SHALL DICTATE.



Know what's below
Call before you dig.

IRRIGATION NOTE:
IRRIGATION CONTRACTOR TO PROVIDE A DESIGN FOR AN IRRIGATION SYSTEM SEPARATING PLANTING BEDS FROM LAWN AREA. PRIOR TO CONSTRUCTION, DESIGN IS TO BE SUBMITTED TO THE PROJECT LANDSCAPE DESIGNER FOR REVIEW AND APPROVAL. WHERE POSSIBLE, DRIP IRRIGATION AND OTHER WATER CONSERVATION TECHNIQUES SUCH AS RAIN SENSORS SHALL BE IMPLEMENTED. CONTRACTOR TO VERIFY MAXIMUM ON SITE DYNAMIC WATER PRESSURE AVAILABLE MEASURED IN PSI. PRESSURE REDUCING DEVICES OR BOOSTER PUMPS SHALL BE PROVIDED TO MEET SYSTEM PRESSURE REQUIREMENTS. DESIGN TO SHOW ALL VALVES, PIPING, HEADS, BACKFLOW PREVENTION, METERS, CONTROLLERS, AND SLEEVES WITHIN HARDSCAPE AREAS.

LANDSCAPING NOTES
1. THE CONTRACTOR SHALL RESTORE ALL DISTURBED GRASS AND LANDSCAPED AREAS TO MATCH EXISTING CONDITIONS UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
2. THE CONTRACTOR SHALL RESTORE ALL DISTURBED LAWN AREAS WITH A MINIMUM 4 INCH LAYER OF TOPSOIL AND SEED.
3. THE CONTRACTOR SHALL RESTORE MULCH AREAS WITH A MINIMUM 3 INCH LAYER OF MULCH.
4. THE MAXIMUM SLOPE ALLOWABLE IN LANDSCAPE RESTORATION AREAS SHALL BE 3 FEET HORIZONTAL TO 1 FOOT VERTICAL (3:1 SLOPE) UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
5. THE CONTRACTOR IS REQUIRED TO LOCATE ALL SPRINKLER HEADS IN AREA OF LANDSCAPING DISTURBANCE PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL RELOCATE SPRINKLER HEADS AND LINES IN ACCORDANCE WITH OWNER'S DIRECTION WITHIN AREAS OF DISTURBANCE.
6. THE CONTRACTOR SHALL ENSURE THAT ALL DISTURBED LANDSCAPED AREAS ARE GRADED TO MEET FLUSH AT THE ELEVATION OF WALKWAYS AND TOP OF CURB ELEVATIONS EXCEPT UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET. NO ABRUPT CHANGES IN GRADE ARE PERMITTED IN DISTURBED LANDSCAPING AREAS.



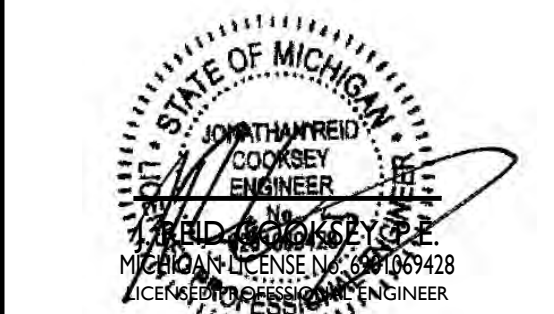
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Phone 248.247.1115

39200 6 MILE ROAD
PROPOSED MIXED USE DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN



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SCALE: 1" = 60' PROJECT ID: DET-230128

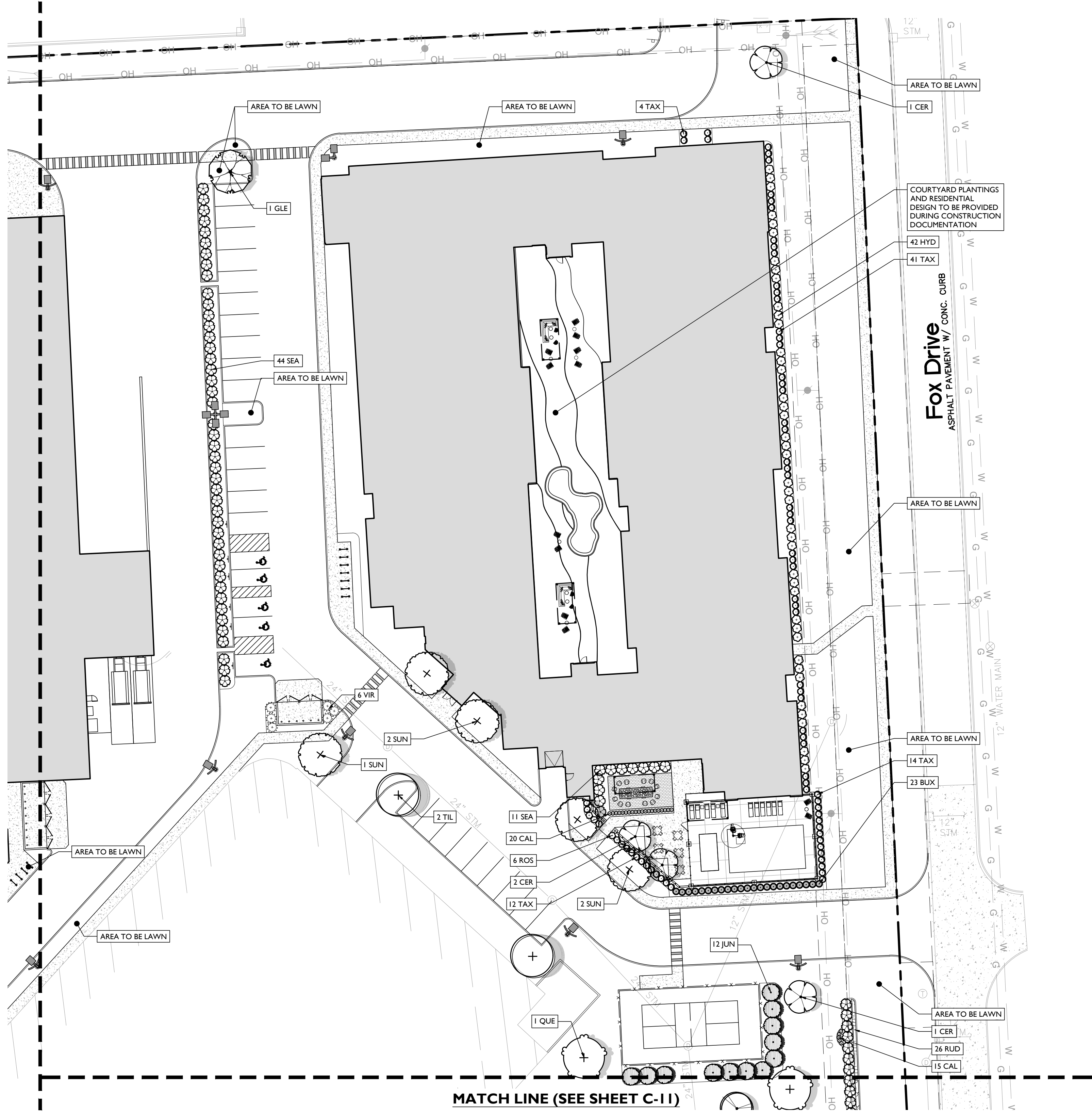
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LANDSCAPING PLAN (OVERALL)

DRAWING:

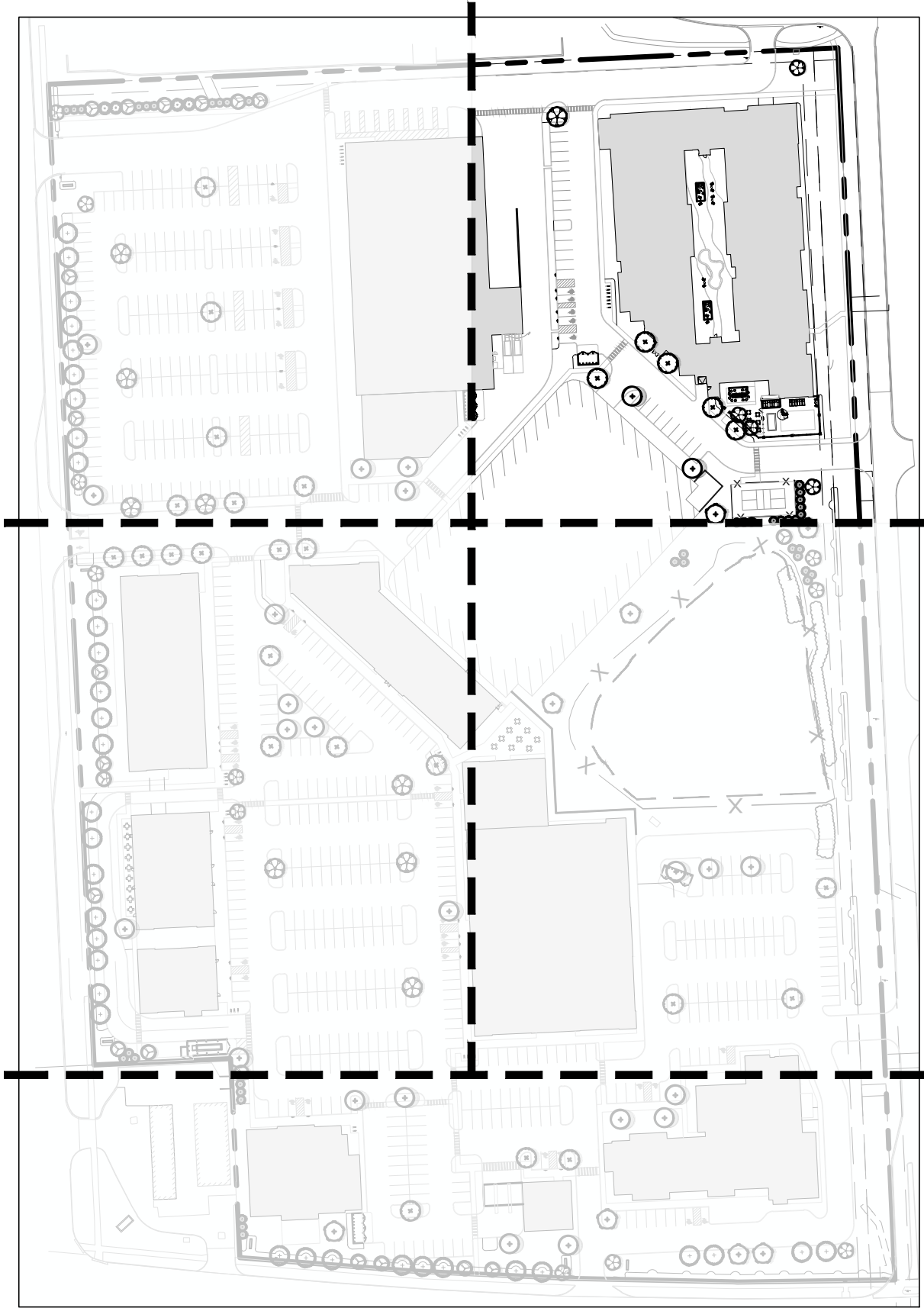
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V:\DET230128\DET230128-PAVING MANAGEMENT\GROUP 39200 SIX MILE ROAD LIVONIA, MICHIGAN\DET230128-PAVING\LANDSCAPING

MATCH LINE (SEE SHEET C-8)



MATCH LINE (SEE SHEET C-11)



LOCATION MAP

SCALE: 1" = 150'

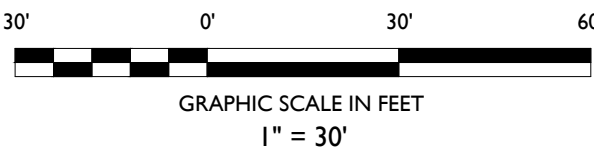


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LANDSCAPING NOTES

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SITE DEVELOPMENT PLANS

39200 6 MILE ROAD
PROPOSED MIXED USE
DEVELOPMENT

PID: 46-0272-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN



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SCALE: 1" = 30' PROJECT ID: DET-230128

TITLE:

LANDSCAPING PLAN

DRAWING:

C-9

NOT APPROVED FOR CONSTRUCTION

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DESCRIPTION

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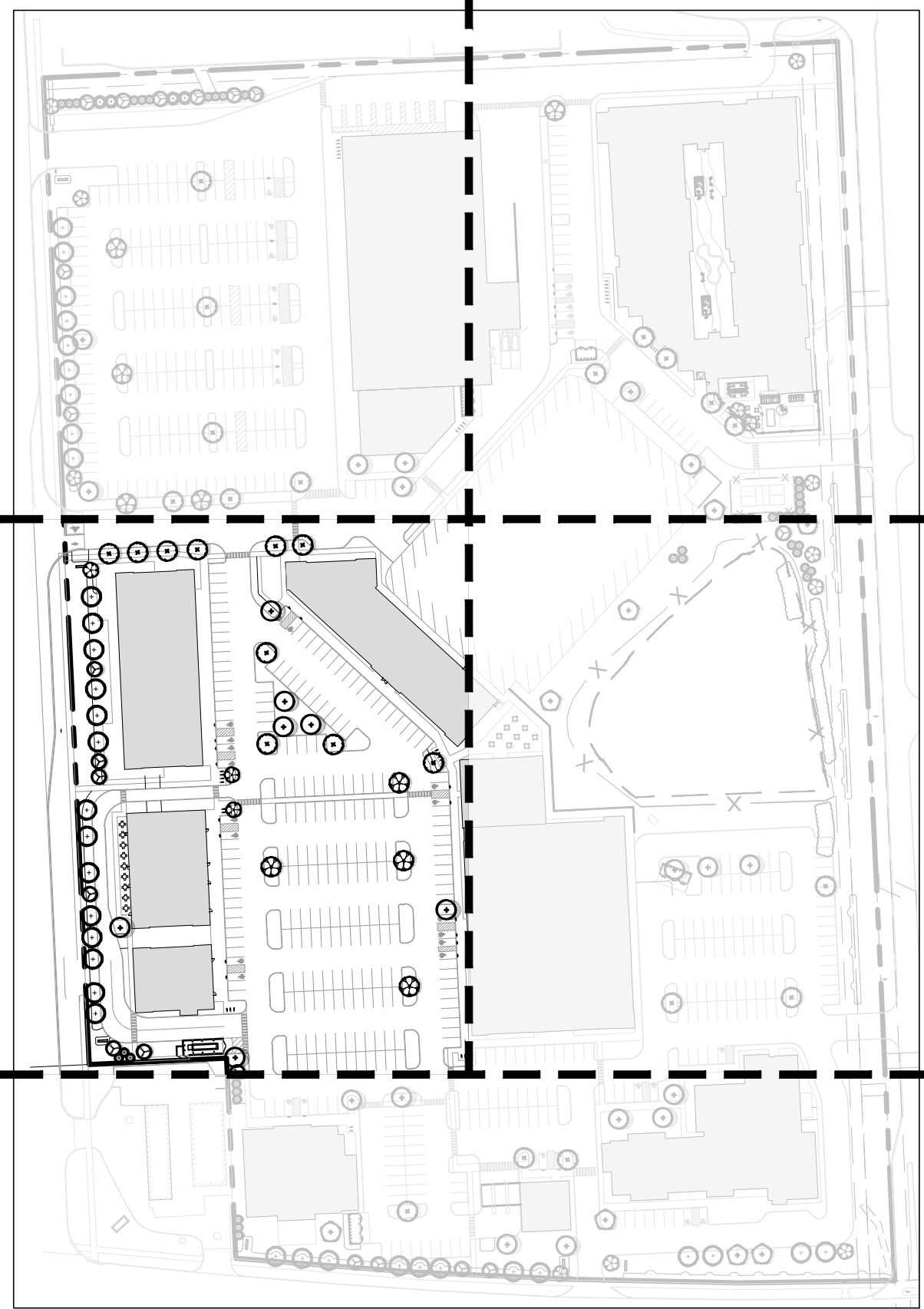
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01/17/2024

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FOR SITE PLAN APPROVAL



SCALE: 1" = 150'

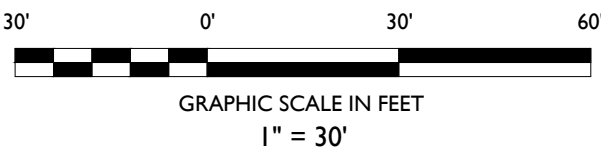


IRRIGATION NOTE:

IRRIGATION CONTRACTOR TO PROVIDE A DESIGN FOR AN IRRIGATION SYSTEM SEPARATING PLANTING BEDS FROM LAWN AREA. PRIOR TO CONSTRUCTION, DESIGN IS TO BE SUBMITTED TO THE PROJECT LANDSCAPE DESIGNER FOR REVIEW AND APPROVAL, WHERE POSSIBLE. PROVIDE IRRIGATION AND OTHER WATER CONSERVATION TECHNIQUES SUCH AS: DROPPED SPACERS, DROPPED SPRINKLERS, DROPPED TRACTOR TIRE, MAXIMUM OF SITE DYNAMIC WATER PRESSURE AVAILABLE MEASURED IN PSI, PRESSURE REDUCING DEVICES OR BOOSTER PUMPS SHALL BE PROVIDED TO MEET SYSTEM PRESSURE REQUIREMENTS. DESIGN TO SHOW ALL VALVES, PIPING, HEADS, BACKFLOW PREVENTION, METERS, CONTROLLERS, AND SLEEVES WITHIN HARDSCAPE AREAS.

LANDSCAPING NOTES

1. THE CONTRACTOR SHALL RESTORE ALL DISTURBED GRASS AND LANDSCAPED AREAS TO MATCH EXISTING CONDITIONS UNLESS OTHERWISE INDICATED OTHERWISE WITHIN THE PLAN SET.
2. THE CONTRACTOR SHALL RESTORE ALL DISTURBED LAWN AREAS WITH A MINIMUM 4 INCH LAYER OF TOPSOIL AND SEED.
3. THE CONTRACTOR SHALL RESTORE MULCH AREAS WITH A MINIMUM 2 INCH LAYER OF MULCH.
4. THE MAXIMUM SLOPE ALLOWABLE IN LANDSCAPE RESTORATION AREAS SHALL BE 3 FEET HORIZONTAL TO 1 FOOT VERTICAL (3:1 SLOPE) UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
5. THE CONTRACTOR IS REQUIRED TO LOCATE ALL EXISTING HEADS AND LINES OF SPRINKLER SYSTEMS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL RELOCATE SPRINKLER HEADS AND LINES IN ACCORDANCE WITH OWNER'S DIRECTION WITHIN THE DISTURBED AREAS.
6. THE CONTRACTOR SHALL ENSURE THAT ALL DISTURBED LANDSCAPED AREAS ARE GRADED TO MEET FLUSH AT THE ELEVATION OF WALKWAYS AND TOP OF CURB ELEVATIONS EXCEPT UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET. NO ABRUPT CHANGES IN GRADE ARE PERMITTED IN DISTURBED LANDSCAPED AREAS.

[illegible]

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SITE DEVELOPMENT PLANS

39200 6 MILE ROAD

PROPOSED MIXED USE DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN



SCALE: 1" = 30' | PROJECT ID: DET-230128

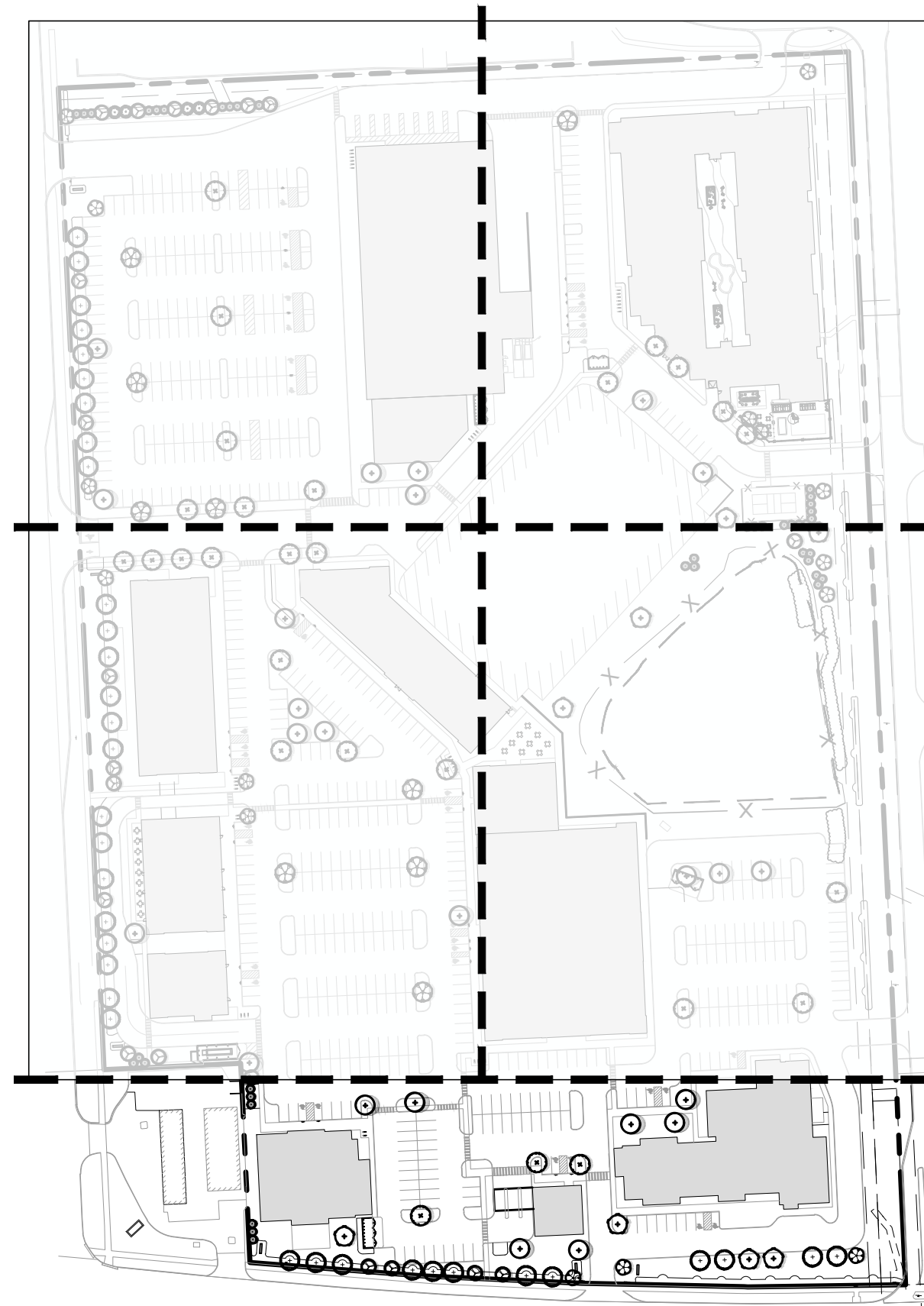
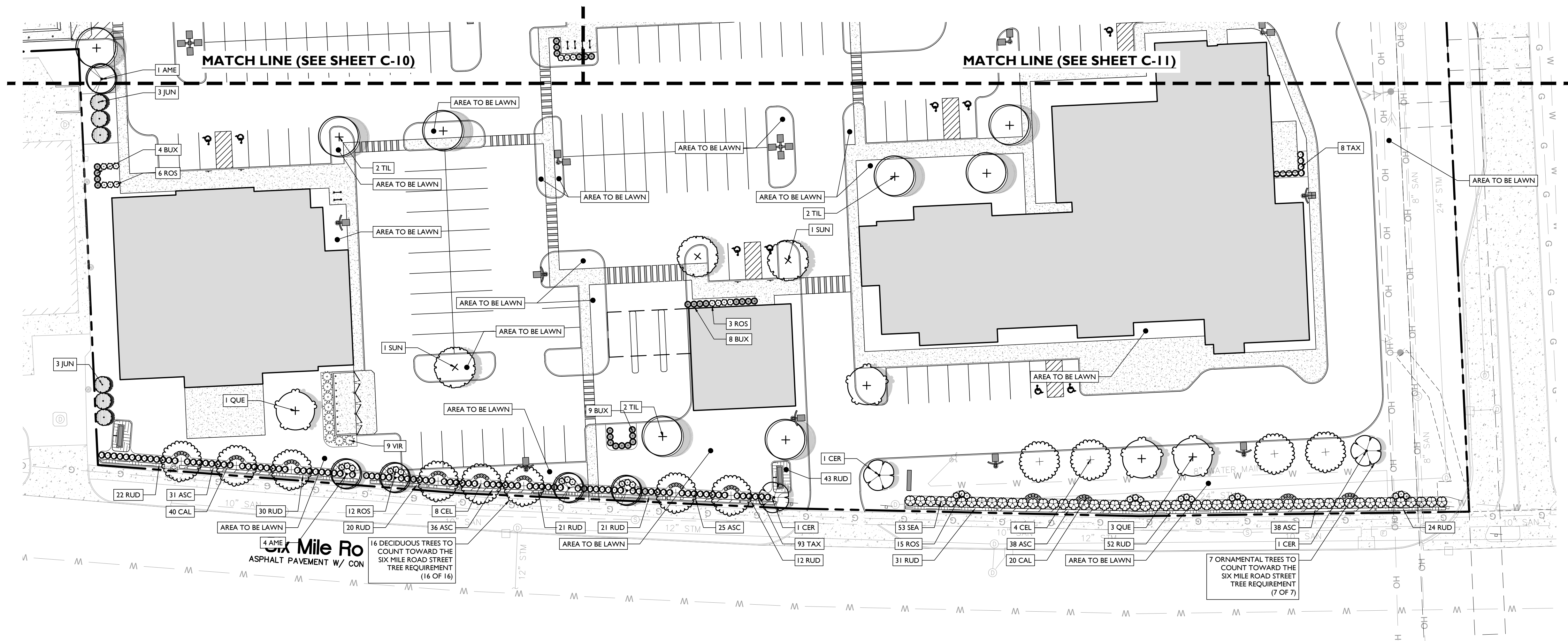
TITLE:

LANDSCAPING PLAN

DRAWING

C-10

\\007\003\DET230128-PAVING MANAGEMENT\GROUP\39200 SIX MILE ROAD LIVONIA, MICH\DET230128-PAVING



LOCATION MAP

SCALE: 1" = 150'



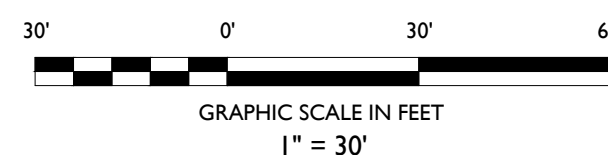
Know what's below
Call before you dig.

IRRIGATION NOTE:

IRRIGATION CONTRACTOR TO PROVIDE A DESIGN FOR AN IRRIGATION SYSTEM SEPARATING PLANTING BEDS FROM LAWN AREA. PRIOR TO CONSTRUCTION, DESIGN IS TO BE SUBMITTED TO THE PROJECT LANDSCAPE DESIGNER FOR REVIEW AND APPROVAL. WHERE POSSIBLE, DRIP IRRIGATION AND OTHER WATER CONSERVATION TECHNIQUES SUCH AS RAIN SENSORS SHALL BE IMPLEMENTED. CONTRACTOR TO VERIFY MAXIMUM ON SITE DYNAMIC WATER PRESSURE AVAILABLE MEASURED IN PSI. PRESSURE REDUCING DEVICES OR BOOSTER PUMPS SHALL BE PROVIDED TO MEET SYSTEM PRESSURE REQUIREMENTS. DESIGN TO SHOW ALL VALVES, PIPING, HEADS, BACKFLOW PREVENTION, METERS, CONTROLLERS, AND SLEEVES WITHIN HARDSCAPE AREAS.

LANDSCAPING NOTES

- THE CONTRACTOR SHALL RESTORE ALL DISTURBED GRASS AND LANDSCAPED AREAS TO MATCH EXISTING CONDITIONS UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
- THE CONTRACTOR SHALL RESTORE ALL DISTURBED LAWN AREAS WITH A MINIMUM 4 INCH LAYER OF TOPSOIL AND SEED.
- THE CONTRACTOR SHALL RESTORE MULCH AREAS WITH A MINIMUM 3 INCH LAYER OF MULCH.
- THE MAXIMUM SLOPE ALLOWABLE IN LANDSCAPE RESTORATION AREAS SHALL BE 3 FEET HORIZONTAL TO 1 FOOT VERTICAL (3:1 SLOPE) UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET.
- THE CONTRACTOR IS REQUIRED TO LOCATE ALL SPRINKLER HEADS IN AREA OF LANDSCAPING DISTURBANCE PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL RELOCATE SPRINKLER HEADS AND LINES IN ACCORDANCE WITH OWNER'S DIRECTION WITHIN AREAS OF DISTURBANCE.
- THE CONTRACTOR SHALL ENSURE THAT ALL DISTURBED LANDSCAPED AREAS ARE GRADED TO MEET FLUSH AT THE ELEVATION OF WALKWAYS AND TOP OF CURB ELEVATIONS EXCEPT UNLESS INDICATED OTHERWISE WITHIN THE PLAN SET. NO ABRUPT CHANGES IN GRADE ARE PERMITTED IN DISTURBED LANDSCAPING AREAS.



FOR SITE PLAN APPROVAL		DESCRIPTION
	NB	BY
	01/17/2024	DATE
1		ISSUE

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SITE DEVELOPMENT PLANS

39200 6 MILE ROAD

**PROPOSED MIXED USE
DEVELOPMENT**

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN



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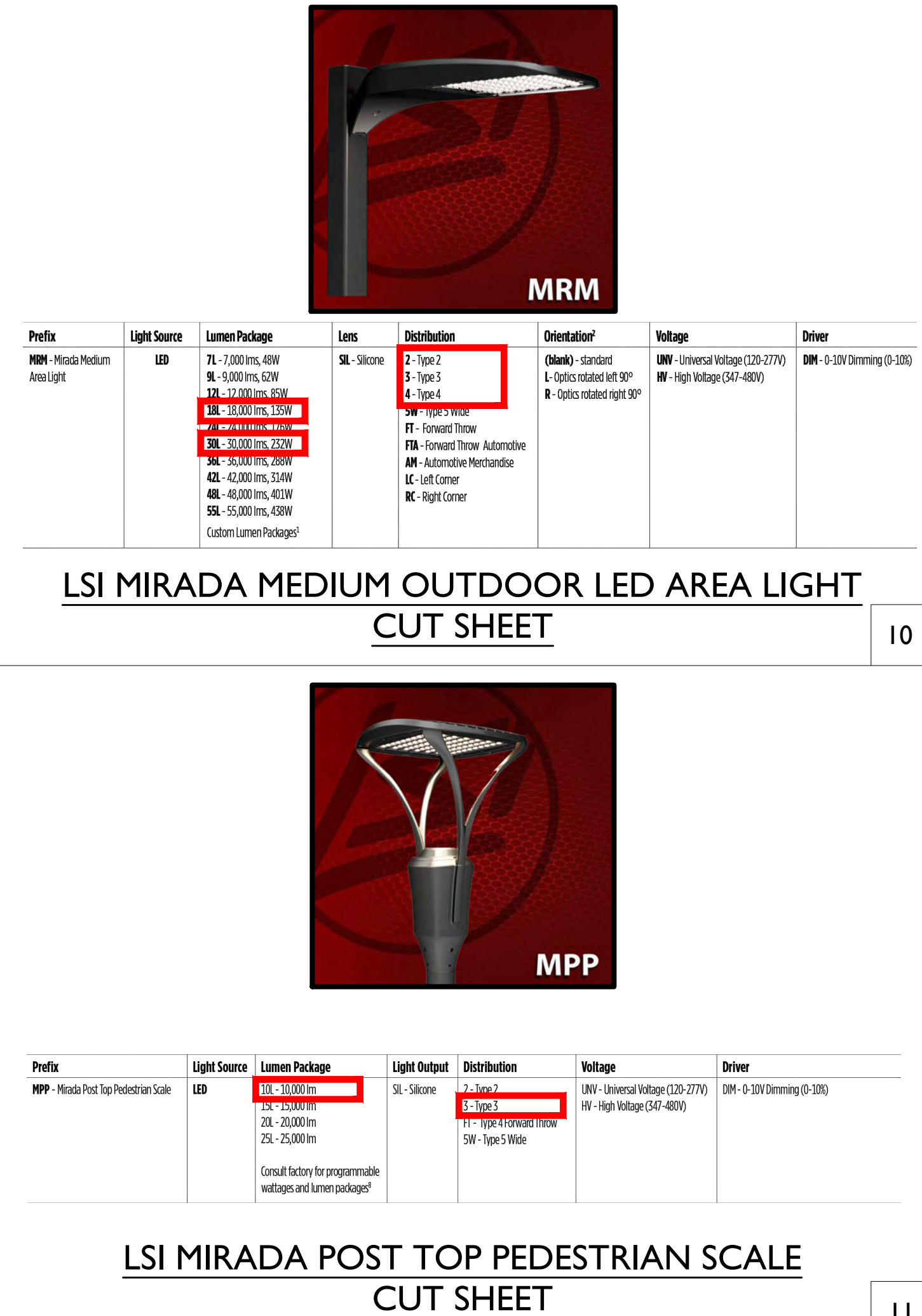
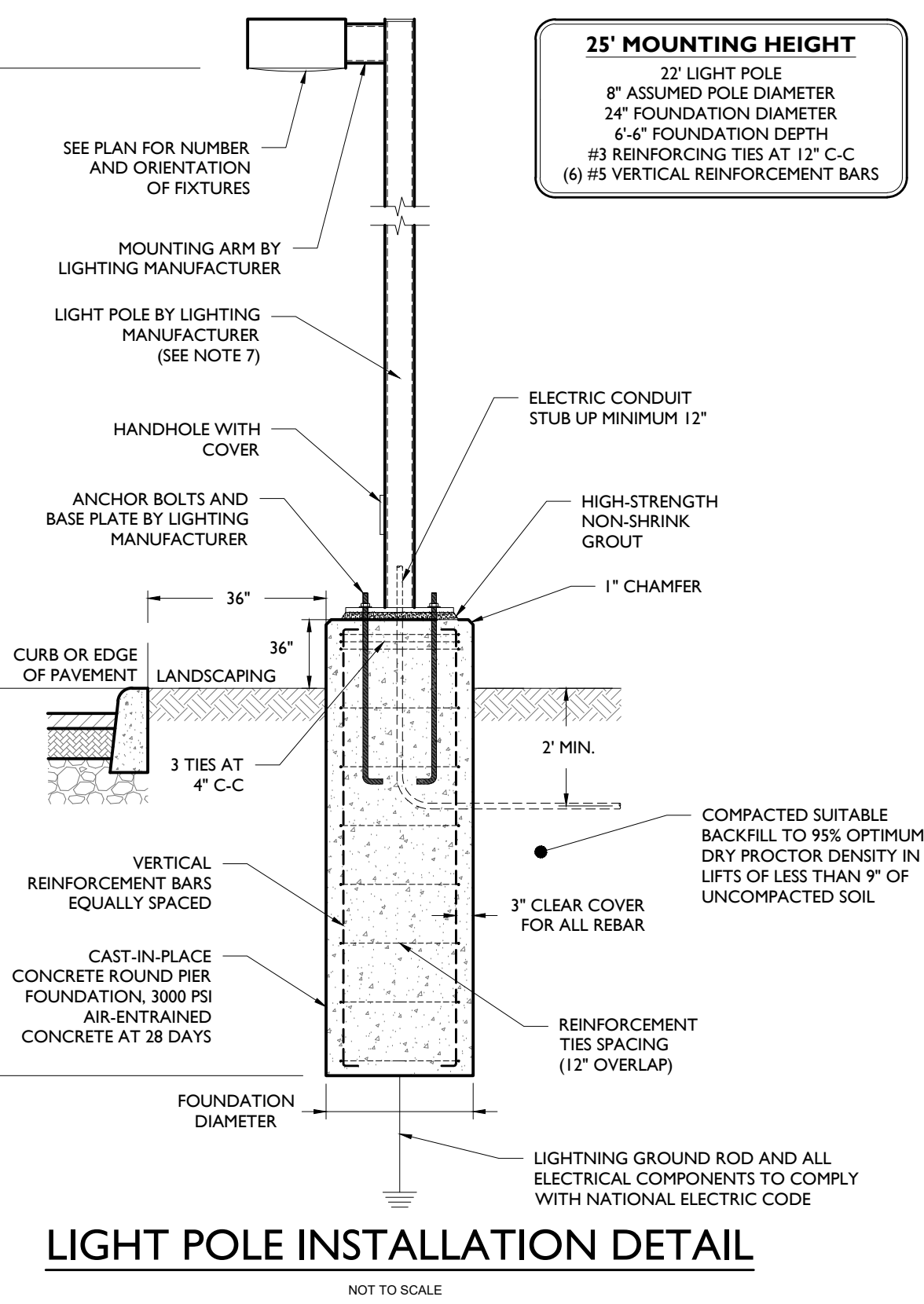
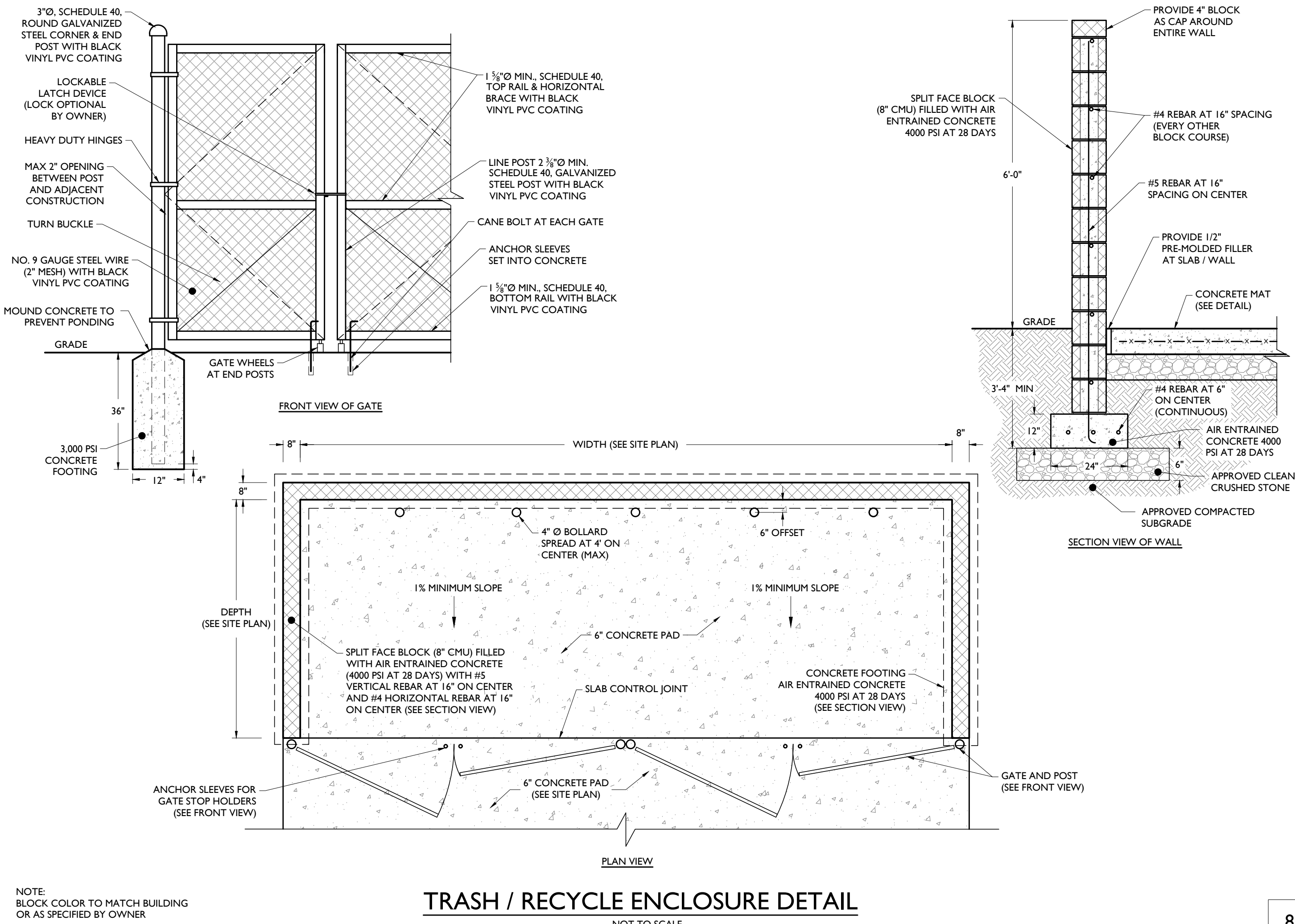
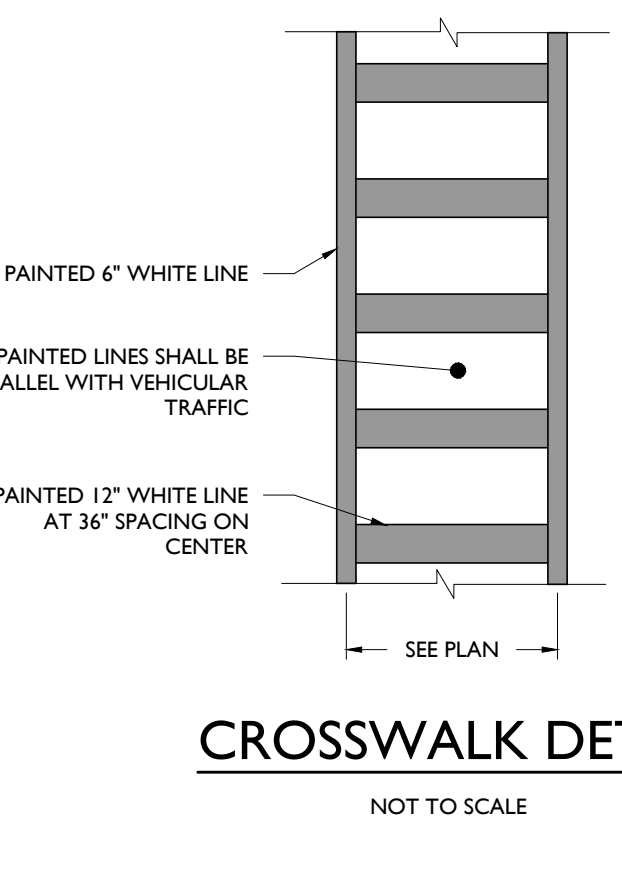
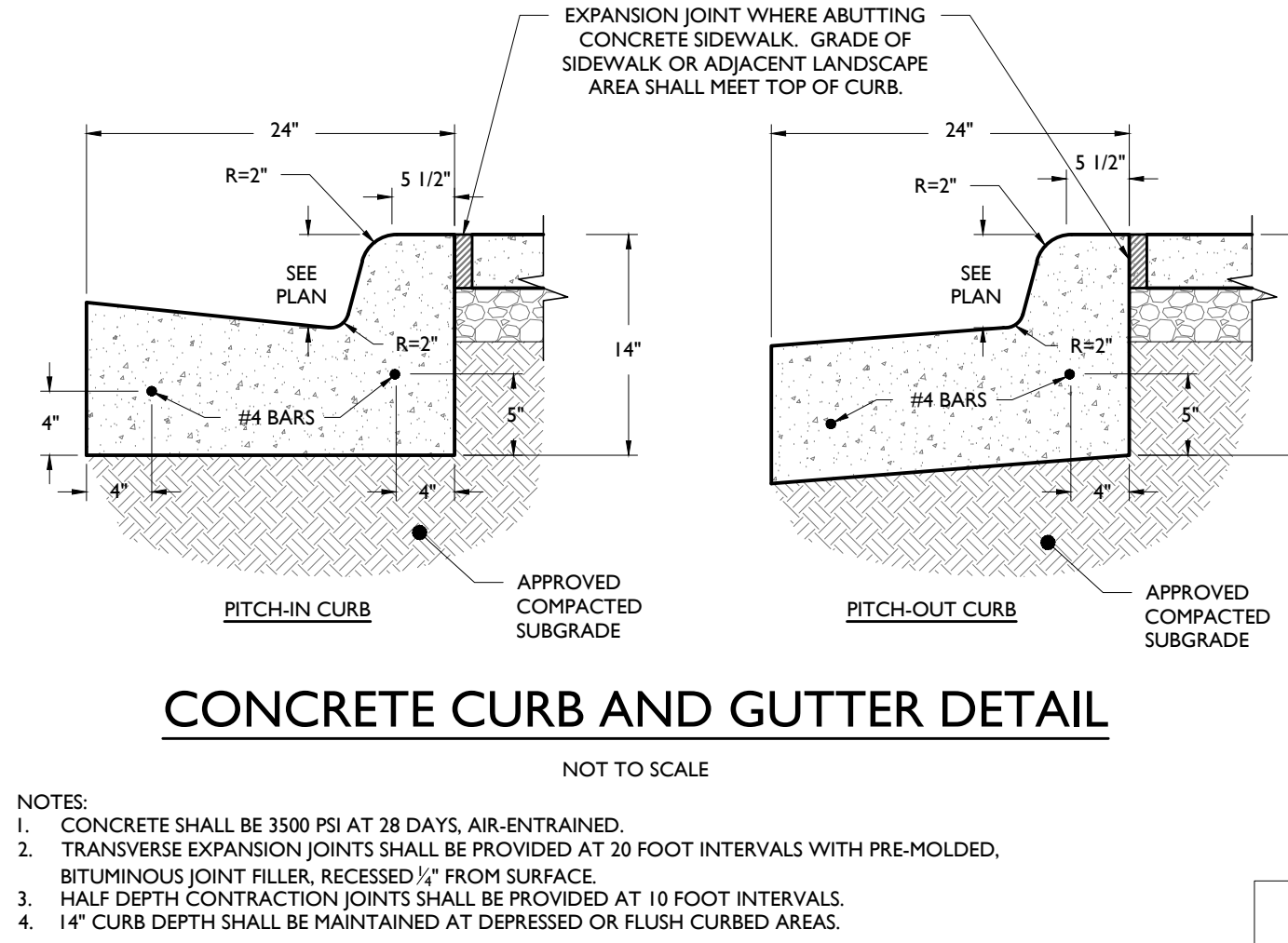
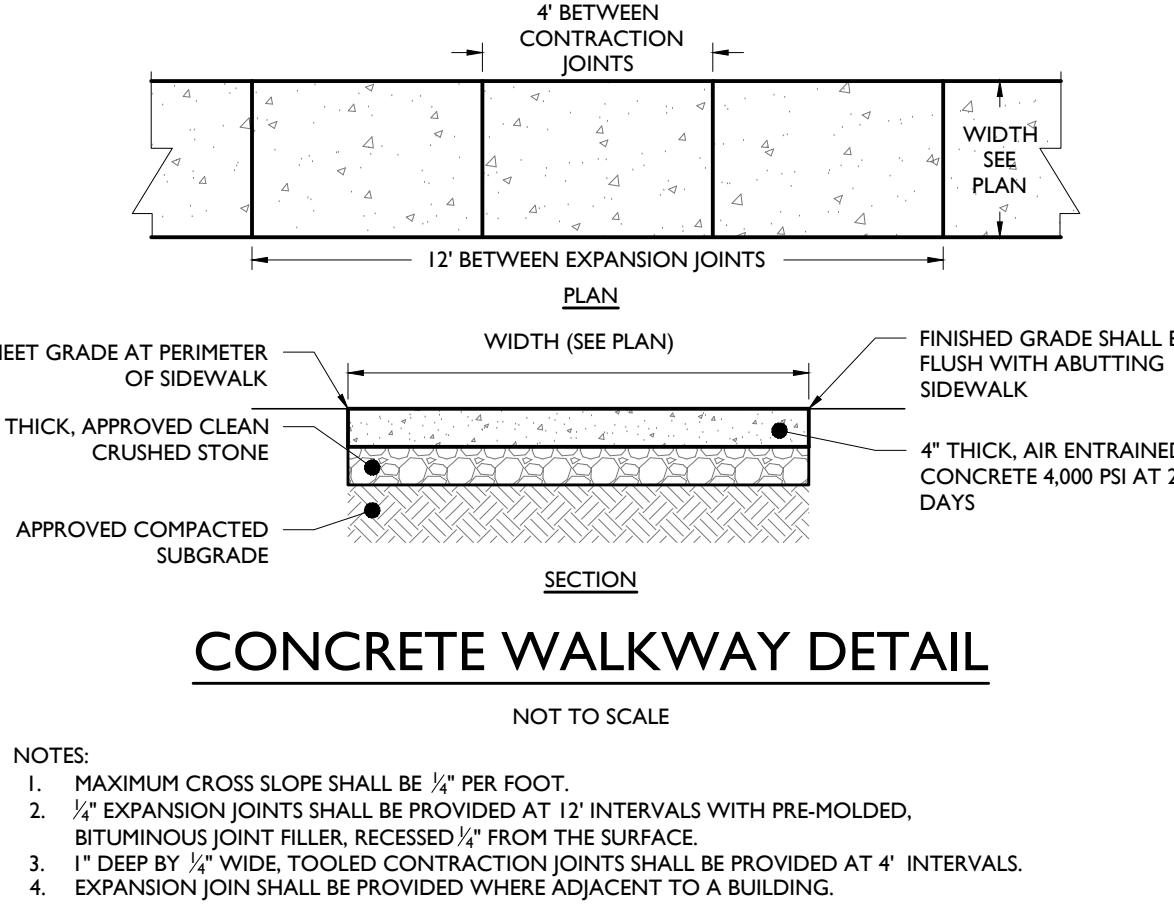
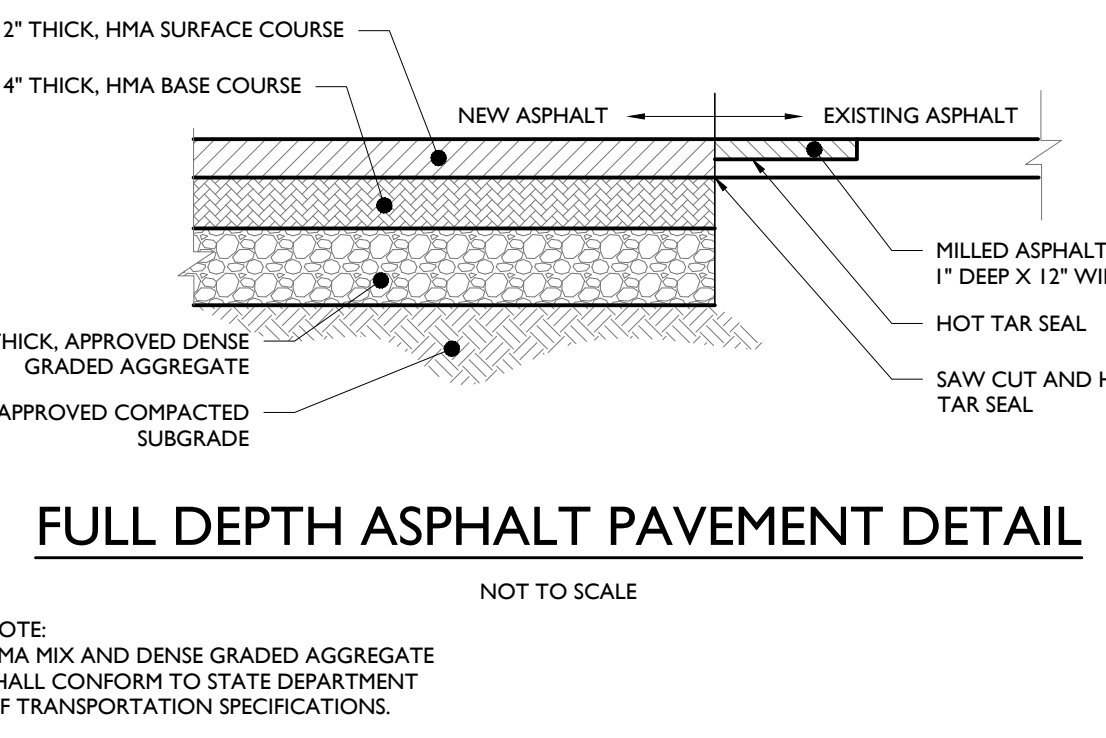
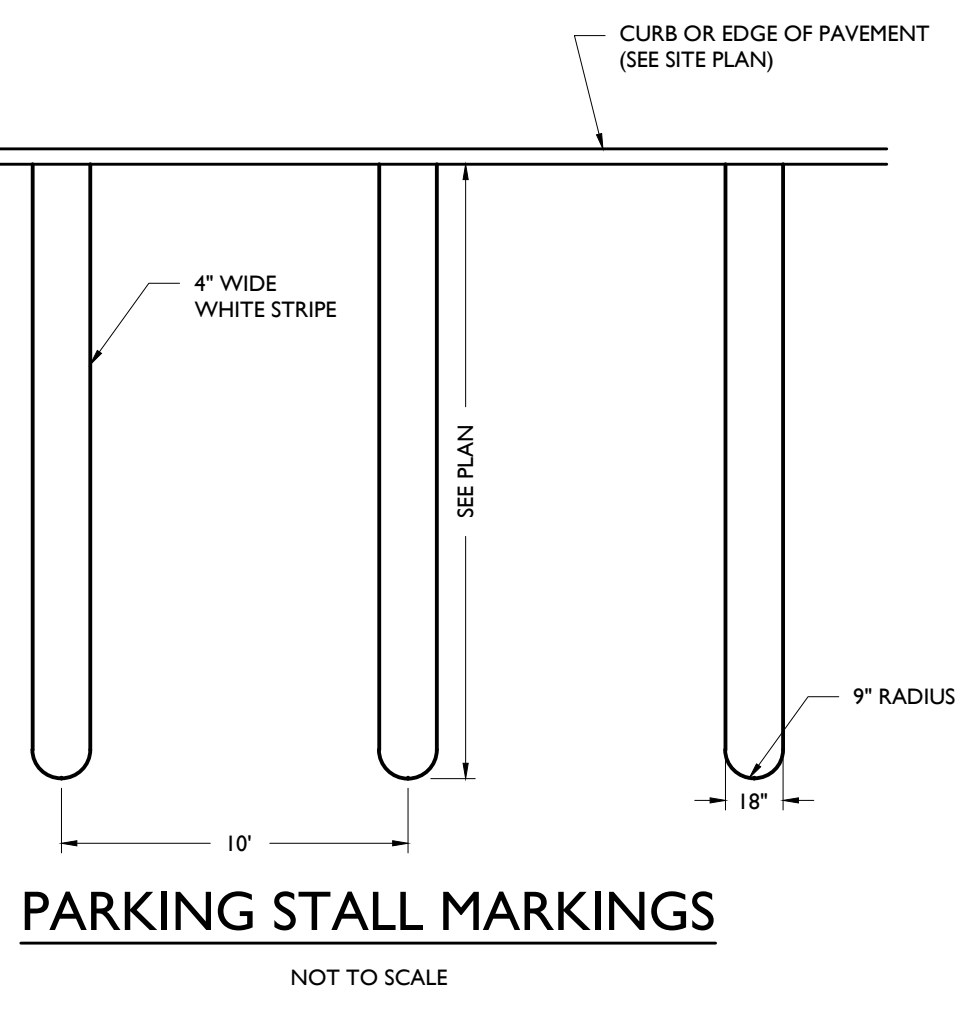
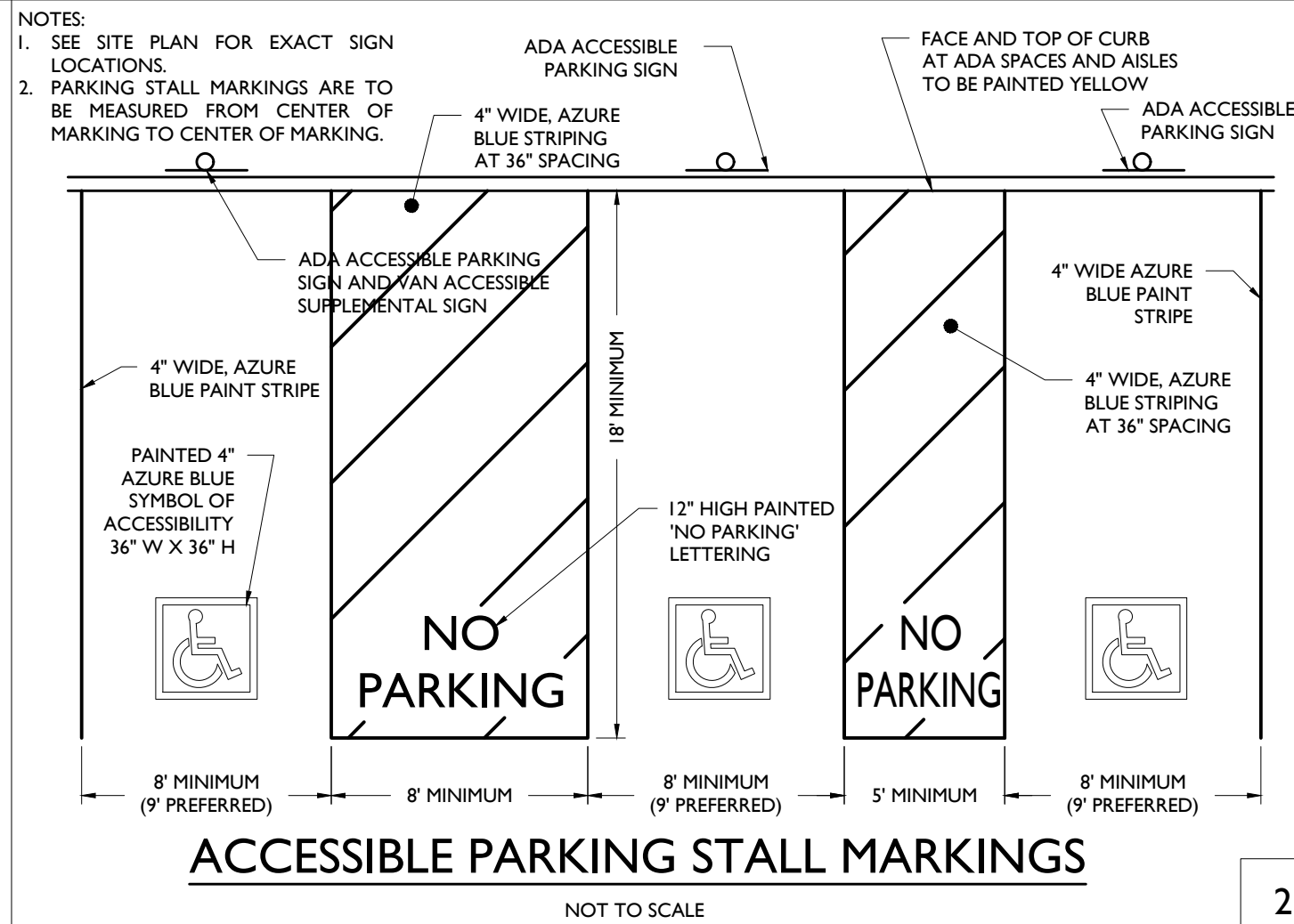
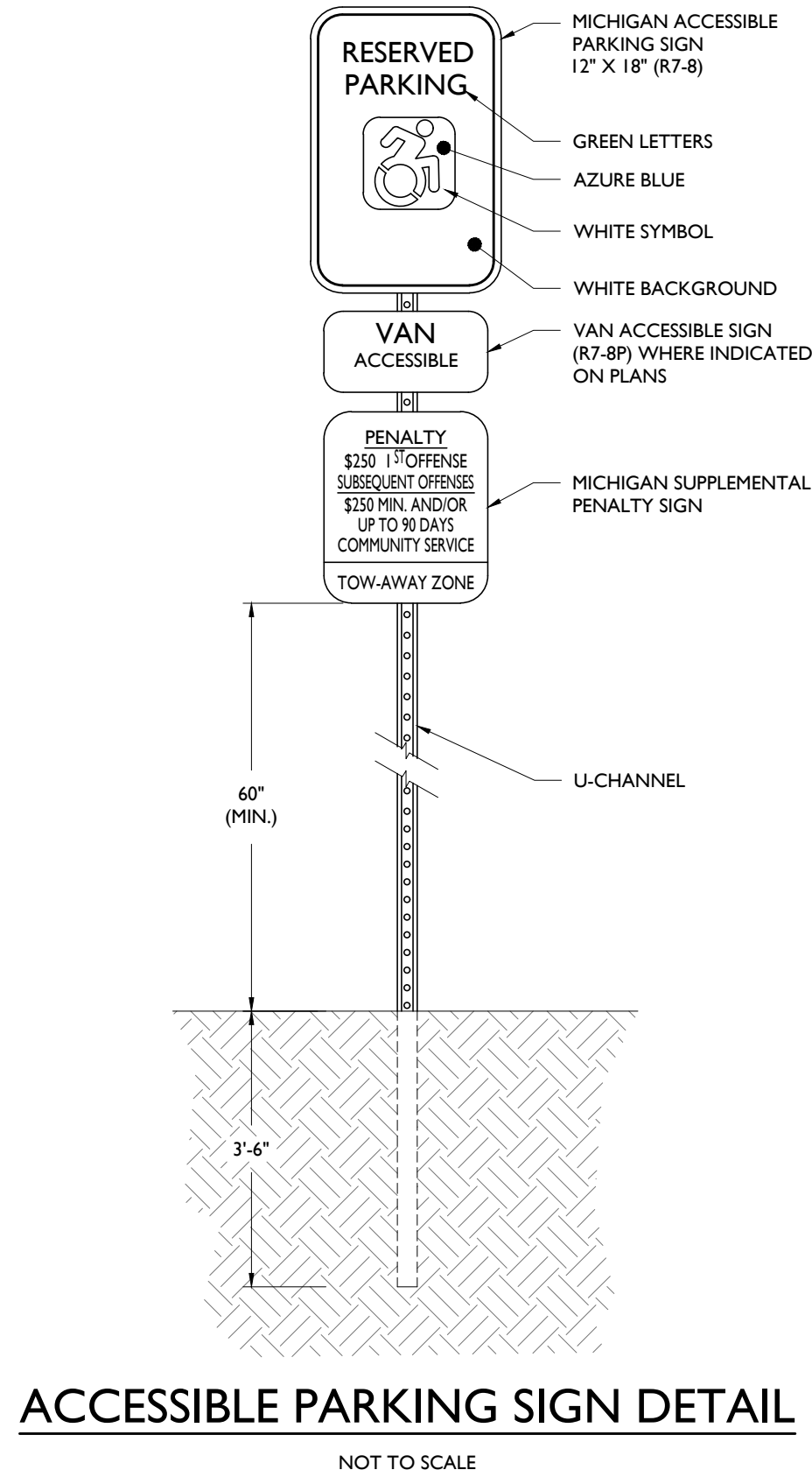
SCALE: 1" = 30' PROJECT ID: DET-230128

TITLE:

LANDSCAPING PLAN

DRAWING:

C-12



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SITE DEVELOPMENT PLANS

39200 6 MILE ROAD

PROPOSED MIXED USE DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN

STATE OF MICHIGAN
JONATHAN TREIB
COCKEY
ENGINEER
MICHIGAN LICENSE NO. 009428
LICENSED PROFESSIONAL ENGINEER

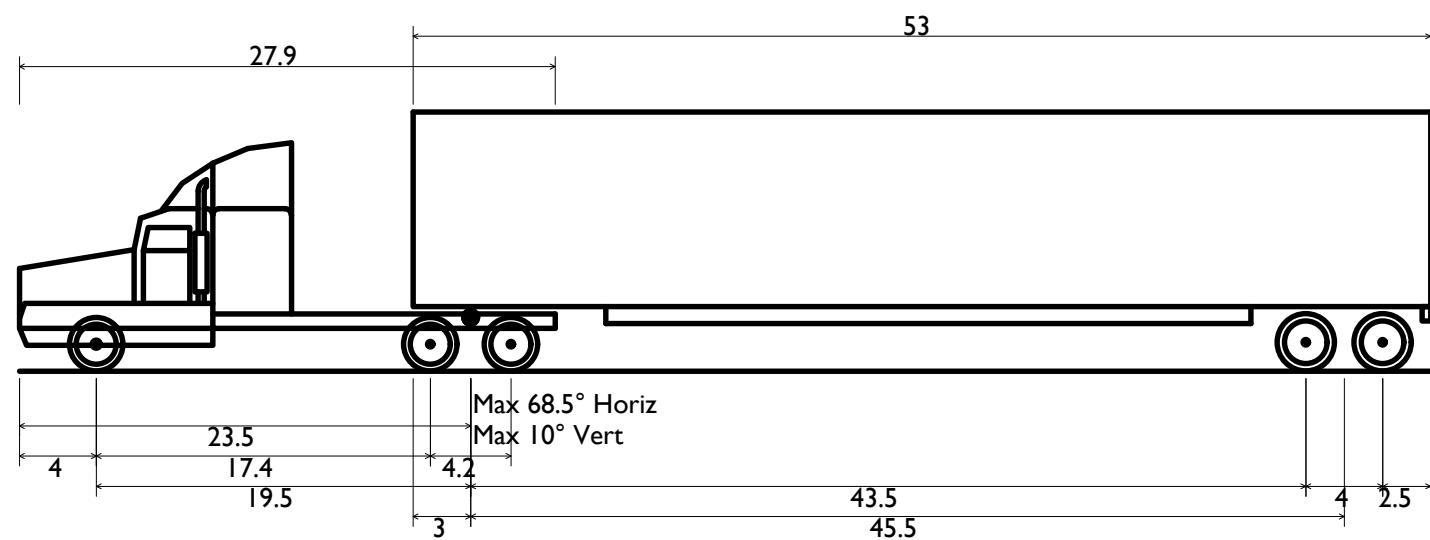
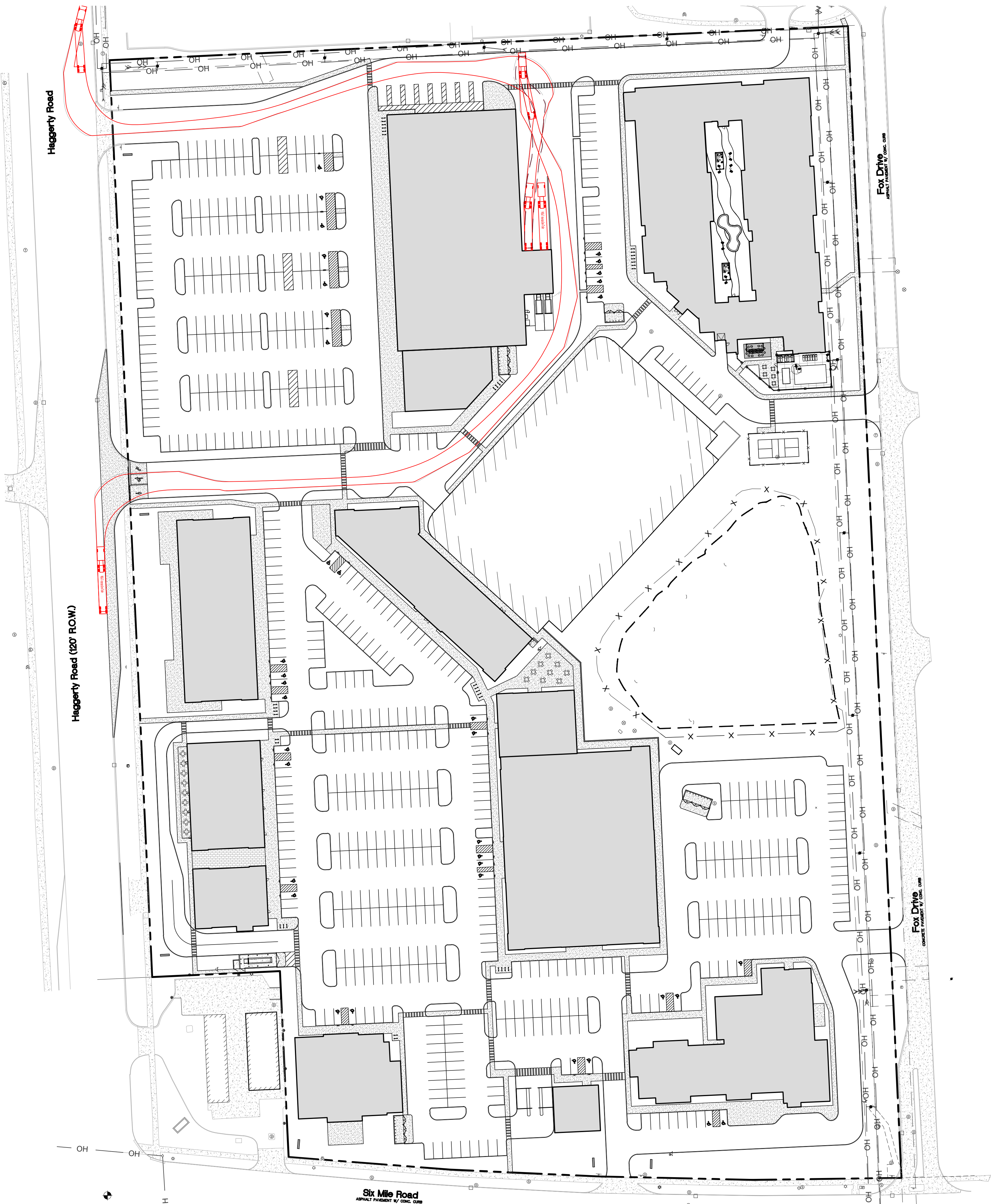
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SCALE: AS SHOWN PROJECT ID: DET-230128

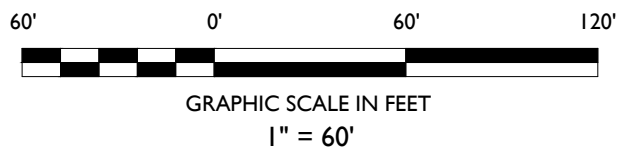
TITLE: CONSTRUCTION DETAILS

DRAWING: C-14

V:\017020\DET230128-PARKUS MANAGEMENT\GROUP 39200 SIX MILE ROAD, LIVONIA, MICHIGAN\LOT 98-A\2014-11-16 SITE PLAN.dwg



WB-67 - Interstate Semi-Trailer
Overall Length 73.50 ft
Overall Width 8.50 ft
Overall Body Height 13.50 ft
Min Body Ground Clearance 1.33 ft
Max Track Width 8.50 ft
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 28.40°



SITE DEVELOPMENT PLANS

39200 6 MILE ROAD
PROPOSED MIXED USE
DEVELOPMENT

PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN



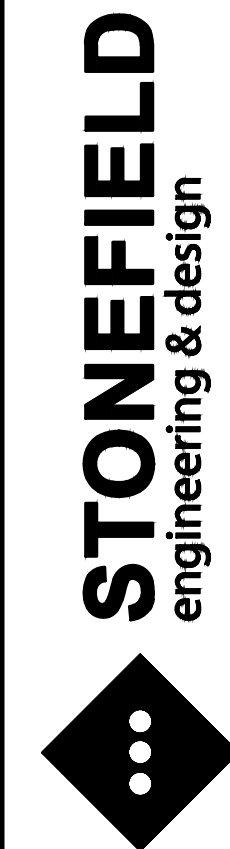
SCALE: 1" = 60' PROJECT ID: DET-230128

TITLE:

WB-67 CIRCULATION

DRAWING:

C-15

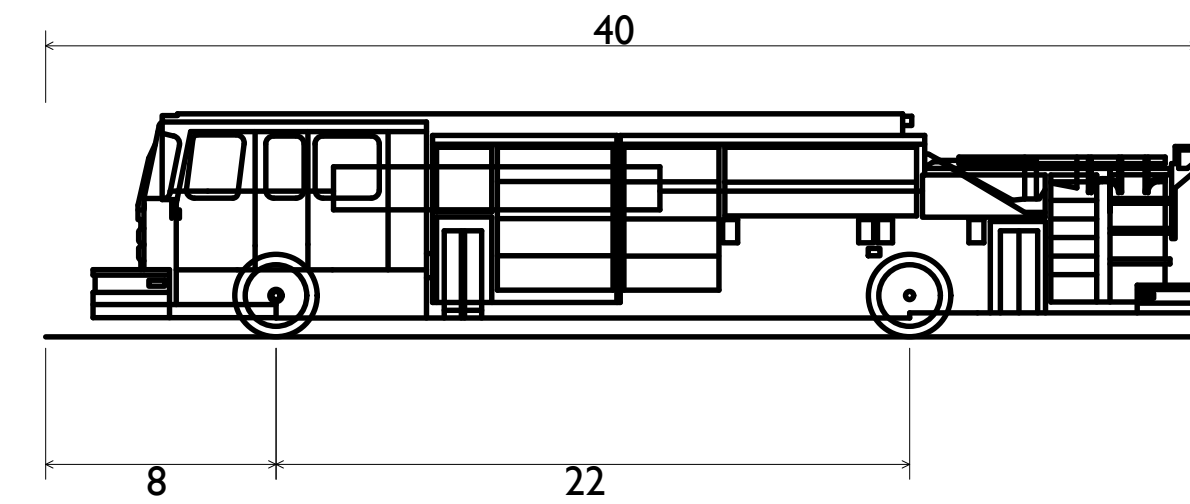


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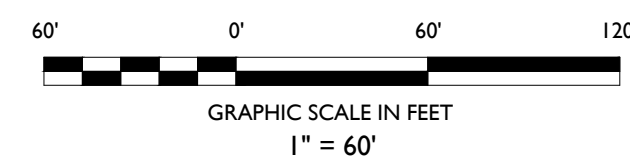
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Phone 248.247.1115

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ISSUE	DATE	BY	DESCRIPTION
1	01/17/2024	NB	FOR SITE PLAN APPROVAL



Pumper Fire Truck	
Overall Length	40.000ft
Overall Width	8.167ft
Overall Body Height	7.745ft
Min Body Ground Clearance	0.656ft
Track Width	8.167ft
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°



SITE DEVELOPMENT PLANS

39200 6 MILE ROAD

PROPOSED MIXED USE DEVELOPMENT

**PID: 46-027-99-0008-001
39200 6 MILE ROAD
CITY OF LIVONIA
WAYNE COUNTY, MICHIGAN**

J. REID COOKSEY, P.E.
MICHIGAN LICENSE No. 6201069428
LICENSED PROFESSIONAL ENGINEER



SCALE:	1" = 60'	PROJECT ID: DET-230128
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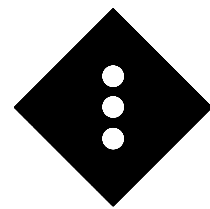
TITLE:

FIRE TRUCK CIRCULATION

DRAWING:

C-16

NOT APPROVED FOR CONSTRUCTION



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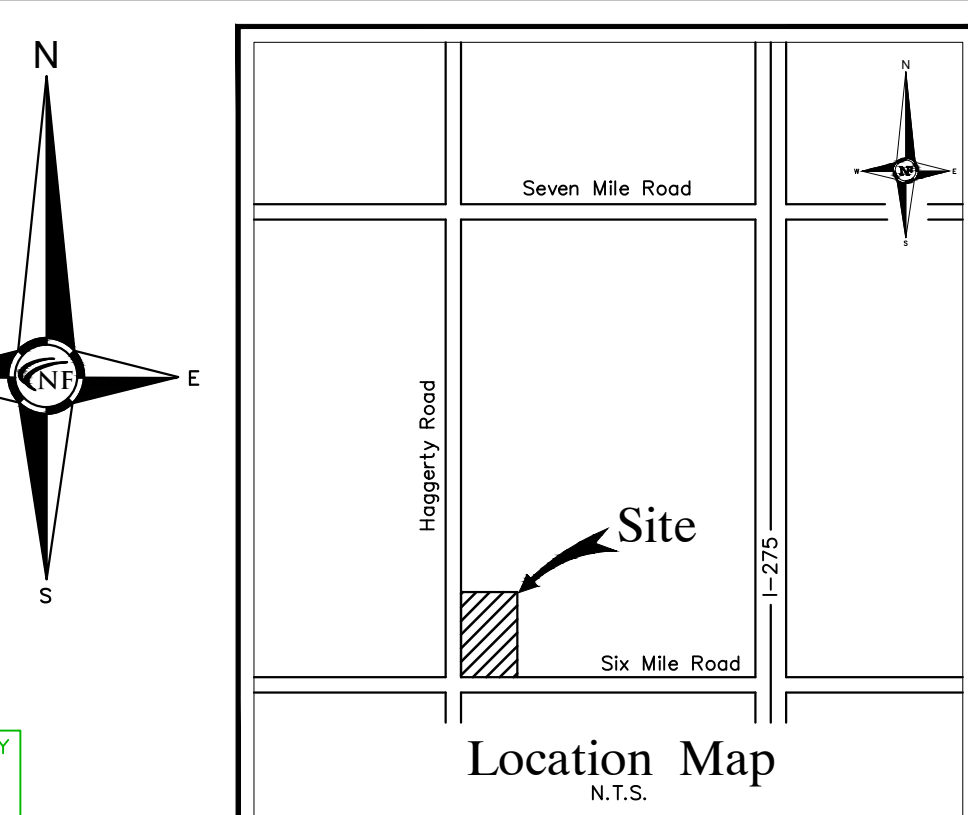
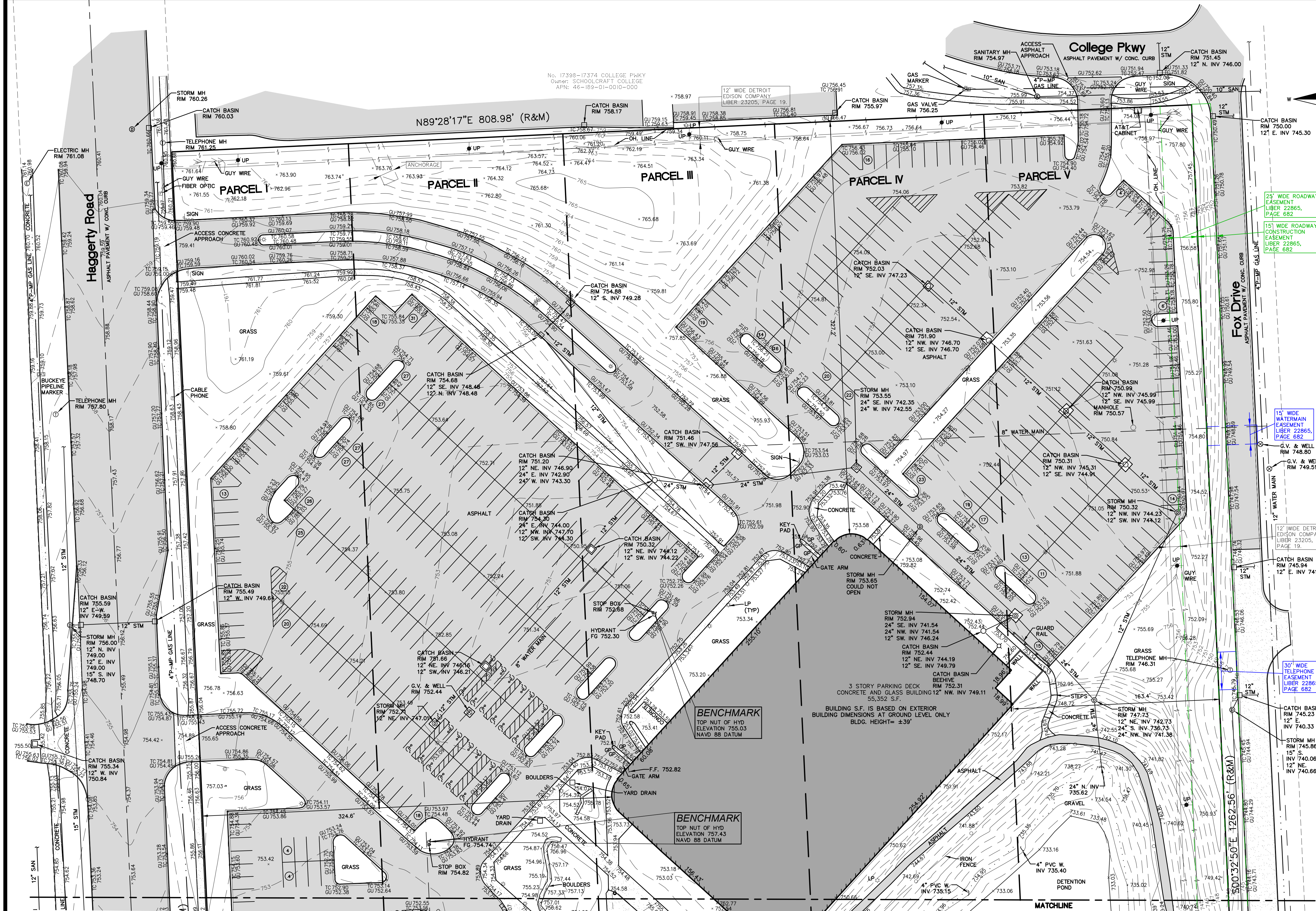
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LEGAL DESCRIPTION

LAND IN THE CITY OF LIVONIA, WAYNE COUNTY, MI, DESCRIBED AS FOLLOWS:

PARCEL I:
THAT PART OF THE SOUTHWEST 1/4 OF SECTION 7 DESCRIBED AS BEGINNING AT A POINT ON THE WEST SECTION LINE DISTANT NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 309.91 FEET FROM THE SOUTHWEST CORNER OF SECTION 7 AND PRECEDING THENCE NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST ALONG SAID WEST LINE 1005.21 FEET; THENCE NORTH 89 DEGREES 27 MINUTES 10 SECONDS EAST, 200 FEET; THENCE SOUTH 00 DEGREES 32 MINUTES 50 SECONDS EAST, 1005.21 FEET; THENCE SOUTH 89 DEGREES 27 MINUTES 10 SECONDS WEST 200 FEET TO THE PLACE OF BEGINNING, EXCEPT THE WEST 60 FEET THEREOF.

PARCEL II:
LAND IN THE WEST 1/2 OF THE SOUTHWEST 1/4 OF SECTION 7, TOWN 1 SOUTH, RANGE 9 EAST, LIVONIA TOWNSHIP, WAYNE COUNTY, MICHIGAN AND MORE PARTICULARLY DESCRIBED AS BEGINNING AT A POINT WHICH IS DUE EAST MEASURED ON THE SOUTH LINE OF SECTION 7, 200 FEET AND NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 47.55 FEET FROM THE SOUTHWEST CORNER OF SECTION 7, THENCE NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 1299.48 FEET TO A POINT IN THE CENTER OF SIX MILE ROAD; THENCE NORTH 83 DEGREES 26 MINUTES 30 SECONDS WEST ALONG CENTER OF SIX MILE ROAD 1711.33 FEET TO THE PLACE OF BEGINNING, THE SOUTH 60 FEET OF THE ABOVE DESCRIPTION IS TO BE USED FOR ROAD PURPOSES, BUT EXCLUDING THE SOUTH 300 FEET THEREOF AS MEASURED FROM THE NORTH ROAD LINE.

PARCEL III:
LAND IN THE WEST 1/2 OF THE SOUTHWEST 1/4 OF SECTION 7, TOWN 1 SOUTH, RANGE 9 EAST, LIVONIA TOWNSHIP, WAYNE COUNTY, MICHIGAN AND MORE PARTICULARLY DESCRIBED AS BEGINNING AT A POINT WHICH IS DUE EAST MEASURED ON THE SOUTH LINE OF SECTION 7, 370.17 FEET AND NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 27.97 FEET FROM THE SOUTHWEST CORNER OF SECTION 7, THENCE NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 1290.69 FEET TO A POINT; THENCE NORTH 89 DEGREES 27 MINUTES 10 SECONDS EAST 167.90 FEET TO A POINT; THENCE SOUTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 168.45 FEET TO A POINT IN THE CENTER OF SIX MILE ROAD; THENCE NORTH 85 DEGREES 13 MINUTES 50 SECONDS WEST ALONG CENTER OF SIX MILE ROAD 168.45 FEET TO THE POINT OF BEGINNING, EXCEPT ANY PART OF THE ABOVE DESCRIBED LAND TAKEN, USED OR DEEDED FOR STREET, ROAD OR HIGHWAY PURPOSES, BUT EXCLUDING THE SOUTH 300 FEET THEREOF AS MEASURED FROM THE NORTH ROAD LINE.

PARCEL IV:
LAND IN THE WEST 1/2 OF THE SOUTHWEST 1/4 OF SECTION 7, TOWN 1 SOUTH, RANGE 9 EAST, DESCRIBED AS: BEGINNING AT A POINT WHICH IS DUE EAST MEASURED ON THE SOUTH LINE OF SECTION 7, 538.07 FEET AND NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 13.96 FEET FROM THE SOUTHWEST CORNER OF SECTION 7, THENCE NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 1306.31 FEET TO A POINT; THENCE NORTH 89 DEGREES 27 MINUTES 10 SECONDS EAST 166.00 FEET TO A POINT; THENCE SOUTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 1317.25 FEET TO A POINT IN THE CENTER OF SIX MILE ROAD; THENCE NORTH 86 DEGREES 48 MINUTES 40 SECONDS WEST 166.00 FEET TO THE POINT OF BEGINNING, EXCEPT THE SOUTH 60.00 FEET OF THE ABOVE DESCRIPTION, USED FOR HIGHWAY AND ROAD PURPOSES, BUT EXCLUDING THE SOUTH 300 FEET THEREOF AS MEASURED FROM THE

PARCEL V:
THAT PART OF THE SOUTHWEST 1/4 OF SECTION 7, TOWN 1 SOUTH, RANGE 9 EAST, DESCRIBED AS: BEGINNING AT A POINT DISTANT DUE EAST ALONG THE SOUTH SECTION LINE 704.07 FEET AND NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 4.26 FEET FROM THE SOUTHWEST CORNER OF SECTION 7 AND PRECEDING THENCE NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 1317.25 FEET; THENCE NORTH 89 DEGREES 27 MINUTES 10 SECONDS EAST 164.91 FEET; THENCE SOUTH 00 DEGREES 32 MINUTES 50 SECONDS EAST 1323.68 FEET TO THE CENTER LINE OF SIX MILE ROAD; THENCE WESTERLY ALONG SAID CENTER LINE 165.05 FEET TO THE POINT OF BEGINNING, EXCEPT THE SOUTH 60 FEET THEREOF TO BE USED FOR ROAD PURPOSES.

PARCELS I THROUGH V TOGETHER DESCRIBED AS:
PART OF THE SOUTHWEST 1/4 OF SECTION 7, TOWN 1 SOUTH, RANGE 9 EAST, CITY OF LIVONIA, WAYNE COUNTY, MICHIGAN DESCRIBED AS BEGINNING AT A POINT, SAID POINT BEING DISTANT NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 309.91 FEET ALONG THE WEST LINE OF SAID SECTION 7 AND NORTH 00 DEGREES 32 MINUTES 50 SECONDS EAST 60.00 FEET FROM THE SOUTHWEST CORNER OF SAID SECTION 7; THENCE NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 1005.01 FEET ALONG THE EASTERLY RIGHT OF WAY LINE OF SAID SECTION 7, THENCE NORTH 89 DEGREES 28 MINUTES 10 SECONDS EAST 808.98 FEET; THENCE SOUTH 00 DEGREES 32 MINUTES 50 SECONDS EAST 1262.56 FEET; THENCE ALONG THE NORTHERLY RIGHT OF WAY LINE OF SIX MILE ROAD NORTH 89 DEGREES 28 MINUTES 57 SECONDS WEST 161.70 FEET AND NORTH 86 DEGREES 39 MINUTES 29 SECONDS WEST 3.31 FEET; THENCE NORTH 86 DEGREES 37 MINUTES 07 SECONDS WEST 168.19 FEET; THENCE NORTH 85 DEGREES 14 MINUTES 04 SECONDS WEST 162.37 FEET AND NORTH 83 DEGREES 26 MINUTES 39 SECONDS WEST 177.75 FEET; THENCE NORTH 00 DEGREES 32 MINUTES 50 SECONDS WEST 203.82 FEET; THENCE SOUTH 89 DEGREES 27 MINUTES 10 SECONDS WEST 140.00 FEET TO THE POINT OF BEGINNING.

PROPERTY ADDRESS: 39200 SIX MILE, LIVONIA, MI 48152
TAX ITEM NO. 027-99-0008-001

TOPOGRAPHIC SURVEY NOTES

ALL ELEVATIONS ARE EXISTING ELEVATIONS, UNLESS OTHERWISE NOTED.
UTILITY LOCATIONS WERE OBTAINED FROM MUNICIPAL OFFICIALS AND RECORDS OF UTILITY COMPANIES, AND NO GUARANTEE CAN BE MADE TO THE COMPLETENESS, OR EXACTNESS OF LOCATION.
THIS SURVEY MAY NOT SHOW ALL EASEMENTS OF RECORD UNLESS AN UPDATED TITLE POLICY IS FURNISHED TO THE SURVEYOR BY THE OWNER.

FLOOD HAZARD NOTE

THE PROPERTY DESCRIBED ON THIS SURVEY DOES NOT LIE WITHIN A SPECIAL FLOOD HAZARD AREA AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY. THE PROPERTY LIES WITHIN ZONE X OF THE CURRENT AVAILABLE FLOOD INSURANCE RATE MAP IDENTIFIED AS MAP NO. 26163C0049E BEARING AN EFFECTIVE DATE OF 02-02-2012.

CEMETERY NOTE

THERE WAS NO OBSERVABLE EVIDENCE OF CEMETERIES OR BURIAL GROUNDS WITHIN THE SUBJECT PROPERTY.

UTILITY NOTE

ALL UTILITIES ARE UNDERGROUND UNLESS OTHERWISE NOTED.

THE UTILITIES SHOWN ON THIS SURVEY WERE DETERMINED BY FIELD OBSERVATION. ALL LOCATIONS ARE APPROXIMATE. THE LOCATION OF ANY OTHER UNDERGROUND SERVICES WHICH MAY EXIST CAN ONLY BE DETERMINED IF A UTILITY PLAN IS FURNISHED TO THE SURVEYOR.

NOTE: DTE HAS NEW REGULATIONS THAT MAY IMPACT DEVELOPMENT OUTSIDE THEIR EASEMENT OR THE PUBLIC RIGHT OF WAY. CLIENT SHALL CONTACT DTE TO DETERMINE THE NEW STRUCTURES AND POWER LINE REQUIREMENTS AS THEY MAY APPLY TO ANY FUTURE BUILDING OR RENOVATION OF A STRUCTURE. DTE ENERGY CAN BE CONTACTED AT 800-477-4747

LEGEND

MANHOLE	EXISTING SANITARY SEWER
HYDRANT	EXISTING SAN. CLEAN OUT
MANHOLE	EXISTING WATER MAIN
MANHOLE	EXISTING STORM SEWER
UTILITY POLE	EX. R.Y. CATCH BASIN
GUY POLE	EXISTING BURIED CABLES
GUY WIRE	OVERHEAD LINES
	LIGHT POLE
	SIGN
	EXISTING GAS MAIN

TITLE NOTES
SUBJECT TO:
3- EASEMENTS, ENCUMBRANCES, OR CLAIMS THEREOF, NOT SHOWN BY THE PUBLIC RECORDS.
8- COVENANTS, CONDITIONS, RESTRICTIONS AND OTHER PROVISIONS, IF ANY, BASED ON RACE, COLOR, RELIGION, SEX, HANDICAP, FAMILY STATUS OR NATIONAL ORIGIN AS CONTAINED IN INSTRUMENT RECORDED IN LIBER 7690, PAGE 385. [DOCUMENT DOES NOT DESCRIBE ANY PLOTTABLE EASEMENTS, RESTRICTIONS ARE FOR RESIDENTIAL, AND THEIR LOCATIONS ARE SHOWN].
9- TERMS AND CONDITIONS CONTAINED IN AGREEMENT FOR CONSTRUCTION MAINTENANCE AND USE OF ROADWAY AND FOR SANITARY SEWER, STORM SEWER, WATER MAIN AND TELEPHONE CABLE EASEMENT AS DISCLOSED BY INSTRUMENT RECORDED IN LIBER 22865, PAGE 682. [ROADWAY EASEMENT IS WITHIN THE SURVEYED LAND AND ITS LOCATION IS SHOWN]. [ALL OTHER EASEMENTS ARE NOT WITHIN AND DO TOUCH THE SURVEYED LAND AND THEIR LOCATIONS ARE SHOWN].
10- OVERHEAD RIGHT OF WAY AGREEMENT IN FAVOR OF THE DETROIT EDISON COMPANY AND THE COVENANTS, CONDITIONS AND RESTRICTIONS CONTAINED IN INSTRUMENT RECORDED IN LIBER 23205, PAGE 19. [EASEMENT IS WITHIN THE SURVEYED LAND AND ITS LOCATION IS SHOWN].
11- TERMS AND CONDITIONS CONTAINED IN WATER LINE EASEMENT AS DISCLOSED BY INSTRUMENT RECORDED IN LIBER 25344, PAGE 515. [EASEMENT IS WITHIN THE SURVEYED LAND AND ITS LOCATION IS SHOWN].
12- TERMS AND CONDITIONS CONTAINED IN SIGN EASEMENT AGREEMENT AS DISCLOSED BY INSTRUMENT RECORDED IN LIBER 30088, PAGE 39. [EASEMENT IS WITHIN THE SURVEYED LAND AND ITS LOCATION IS SHOWN].
13- ANY RIGHTS, TITLE INTEREST OR CLAIM THEREOF TO THAT PORTION OF THE LAND TAKEN, USED OR GRANTED FOR STREETS, ROADS OR HIGHWAYS.
14- INTEREST OF OTHERS IN OIL, GAS AND MINERAL RIGHTS, IF ANY, WHETHER OR NOT RECORDED IN THE PUBLIC RECORDS.
15- INTEREST, IF ANY, OF THE UNITED STATES, STATE OF MICHIGAN, OR ANY POLITICAL SUBDIVISION THEREOF, IN THE OIL, GAS AND MINERALS IN AND UNDER AND THAT MAY BE PRODUCED FROM THE CAPTIONED LAND.
ALL EXCEPTIONS SHOWN OR NOTED ON THIS SURVEY WERE OBTAINED FROM TITLE COMMITMENT NO. 977152, WITH AN EFFECTIVE DATE AUGUST 23, 2022, BY FIRST AMERICAN TITLE INSURANCE COMPANY.

TABLE A NOTES
2. STREET ADDRESS IS 39200 SIX MILE, LIVONIA, MI 48152
11(B): A MISS DIG TICKET NUMBER 202305201881, PURSUANT TO MICHIGAN PUBLIC ACT 174 WAS ENTERED FOR THE SURVEYED PROPERTY. DUE TO THE EXTENDED REPORTING PERIOD FOR UNDERGROUND FACILITY OWNERS TO PROVIDE THEIR RECORDS, THE SURVEY MAY NOT REFLECT ALL THE UTILITIES AT THE TIME THE SURVEY WAS ISSUED ON 06-15-2023. THE SURVEY ONLY REFLECTS THOSE UTILITIES WHICH COULD BE OBSERVED BY THE SURVEYOR IN THE FIELD OR AS DEPICTED BY THE UTILITY COMPANY RECORDS FURNISH PRIOR TO THE DATE THIS SURVEY WAS ISSUED. THE CLIENT AND/OR THEIR AUTHORIZED AGENT SHALL VERIFY WITH THE FACILITY OWNERS AND/OR THEIR AUTHORIZED AGENTS, THE COMPLETENESS AND EXACTNESS OF THE UTILITIES LOCATION.
14. THE S.E. CORNER OF THE SUBJECT LAND LIES AT THE INTERSECTION OF THE NORTH RIGHT OF WAY OF SIX MILE ROAD AND THE WEST RIGHT OF WAY LINE OF FOX DRIVE.
16: THERE WAS NO OBSERVABLE EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
17: THERE ARE NO KNOWN PROPOSED CHANGES IN STREET RIGHT-OF-WAY LINES AVAILABLE FROM THE CONTROLLING JURISDICTION.
17: THERE WAS NO OBSERVABLE EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
18: IMPROVEMENTS WITHIN OFFSITE EASEMENTS OR SERVITUDES AS PROVIDED BY THE TITLE COMPANY ARE SHOWN WITHIN 25 FEET OF THE SUBJECT LAND ONLY.
OFFSITE IMPROVEMENTS FALL WITHIN OFFSITE EASEMENTS UNLESS OTHERWISE DEPICTED HEREON.

ACCESS NOTE
THE SUBJECT LAND HAS DIRECT VEHICLE AND PEDESTRIAN ACCESS TO HAGGERTY ROAD, SIX MILE ROAD, COLLEGE PARKWAY AND FOX DRIVE ALL BEING A PUBLICLY DEDICATED RIGHT OF WAY.

SITE DATA
GROSS LAND AREA: 971,527 S.F. OR 22.303 ACRES.
ZONED: C-4 HIGH REUSE COMMERCIAL
BUILDING SETBACKS:
FRONT: 40'
SIDES: 40'/TOTAL 80'
REAR: 40'
MAX. BUILDING HEIGHT PERMITTED: (g)
TOTAL STRIPPED PARKING: 763 STRIPED SPACES INCLUDING 55 BARRIER PARKED (HANDICAP) SPACES.
THE ABOVE ZONING AND ZONING REQUIREMENTS WERE OBTAINED FROM THE CITY OF LIVONIA ONLINE ZONING MAP AND ZONING ORDINANCE.
ZONED: THE SETBACKS & HEIGHT RESTRICTIONS NOTED ABOVE ARE FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION AND SHOULD NOT BE USED TO DETERMINE COMPLIANCE. A SURVEYOR CANNOT MAKE A OF ANOTHER PARTY. A ZONING ENDORSEMENT LETTER SHOULD BE OBTAINED FROM CITY OF LIVONIA TO INSURE CONFORMITY AS WELL AS MAKE A FINAL DETERMINATION OF THE REQUIRED BUILDING SETBACK & HEIGHT REQUIREMENTS.

SURVEYORS CERTIFICATION
TO:
COMERICA BANK FORMERLY KNOWN AS MANUFACTURERS NATIONAL BANK OF DETROIT, A NATIONAL BANKING ASSOCIATION
A NATURAL PERSON OR LEGAL ENTITY TO BE DETERMINED FIRST AMERICAN TITLE INSURANCE COMPANY
THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 6(A), 7(A), 7(B)(1), 7(C), 8, 9, 11(A), 11(B), 13, AND 18 OF TABLE A THEREOF.
THE FIELD WORK WAS COMPLETED ON 06-08-2023.
KEVIN CHRISTOPHER NAVAROLI, P.S.
NO. 4001053503
DATE: 06-15-2023
REVISED: 10-04-2023

SEAL

PROJECT
39200 Six Mile Road
City of Livonia

CLIENT
Markus Management
Group

PROJECT LOCATION
Part of the SW 1/4
of Section 7
T.1S, R.9E
City of Livonia,
Wayne County, Michigan

SHEET
Boundary/Topographic/
ALTA/NSPS
Land Title Survey

811
Know what's below
Call before you dig.

DATE ISSUED/REVISED
06-15-2023 ORIGINAL SURVEY
10-04-2023 ADDITIONAL TOPO

DRAWN BY:
D. McConkey

DESIGNED BY:

APPROVED BY:
B. Fraus/K.N.

EMAIL CONTACT:
bfraus@nfe-engr.com

DATE:
06-15-2023

SCALE: 1" = 40'

NFE JOB NO. SHEET NO.
E936-03 1 of 2



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CONSULTANT + NAME

PROJECT + INFORMATION

APARTMENTS

FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-01

ISSUE + DATE

25 JAN 2024

SITE

SHEET + TITLE

PRELIMINARY FIRST
FLOOR PLAN

2321101mast.dwg

SHEET + NUMBER

A-100

PRELIMINARY FIRST
FLOOR PLAN

SCALE: 3/32" = 1'-0"

RESIDENT UNIT MATRIX						
	FLOOR 1	FLOOR 2	FLOOR 3	FLOOR 4	FLOOR 5	TOTAL
1 BED 1 BATH	14	19	19	19	19	90
2 BED 2 BATH	15	15	15	15	15	75
3 BED 2 BATH	1	1	1	1	1	5
TOTAL	30	35	35	35	35	170



PRELIMINARY UPPER
FLOOR PLAN
SCALE: 1/32" = 30'

RESIDENT UNIT MATRIX						
	FLOOR 1	FLOOR 2	FLOOR 3	FLOOR 4	FLOOR 5	TOTAL
1 BED 1 BATH	14	19	19	19	19	90
2 BED 2 BATH	15	15	15	15	15	75
3 BED 2 BATH	1	1	1	1	1	5
TOTAL	30	35	35	35	35	170



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PRELIMINARY UPPER
FLOOR PLAN

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SHEET + NUMBER

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EXTERIOR
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"



EXTERIOR
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"

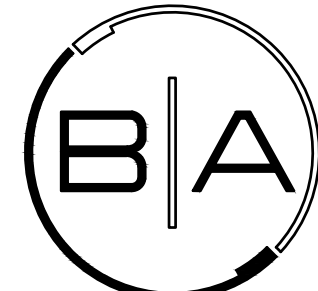
EXTERIOR FINISH LEGEND

TAG	MATERIAL	MANUF/STYLE	COLOR
A	BRICK	TBD	TAN
B	BRICK	TBD	DARK GRAY
C	CAST STONE	ROCKCAST	BUFFSTONE
D	EIFS	TBD	TAN
E	METAL PANELS	ATAS VERTICAL RIBBED	DARK GRAY
F	METAL PANELS	ATAS COMPOSITE	CLEAR ANOD ALUM
G	METAL FRAMES	TBD	CLEAR ANOD ALUM
H	METAL CORING	TBD	MATCH ADJACENT
J	METAL RAILINGS	TBD	DARK GRAY
K	METAL RAILINGS	TBD	CLEAR ANOD ALUM



EXTERIOR
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"



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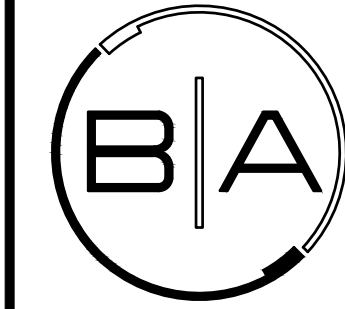
SITE

SHEET + TITLE
EXTERIOR
ELEVATIONS

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SHEET + NUMBER

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SHEET + TITLE
EXTERIOR
ELEVATIONS

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SHEET + NUMBER

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EXTERIOR ELEVATION

SCALE: $\frac{3}{32}" = 1'-0"$



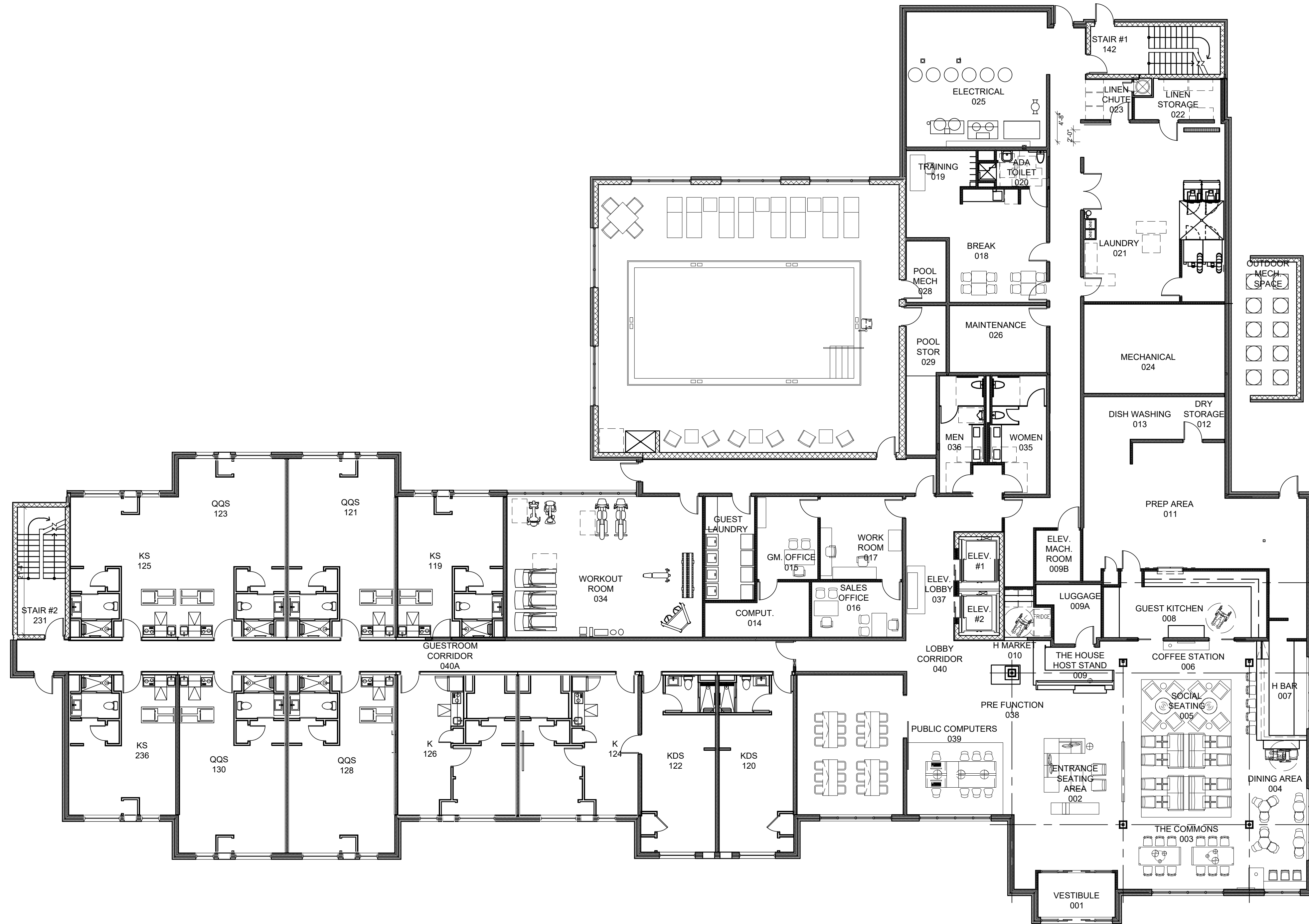
EXTERIOR ELEVATION

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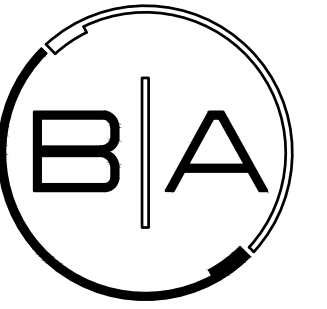


EXTERIOR ELEVATION

SCALE: $\frac{3}{32}" = 1'-0"$



FIRST FLOOR PLAN
SCALE: 3/32" = 1'-0"



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ISSUE + DATE

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SHEET + TITLE

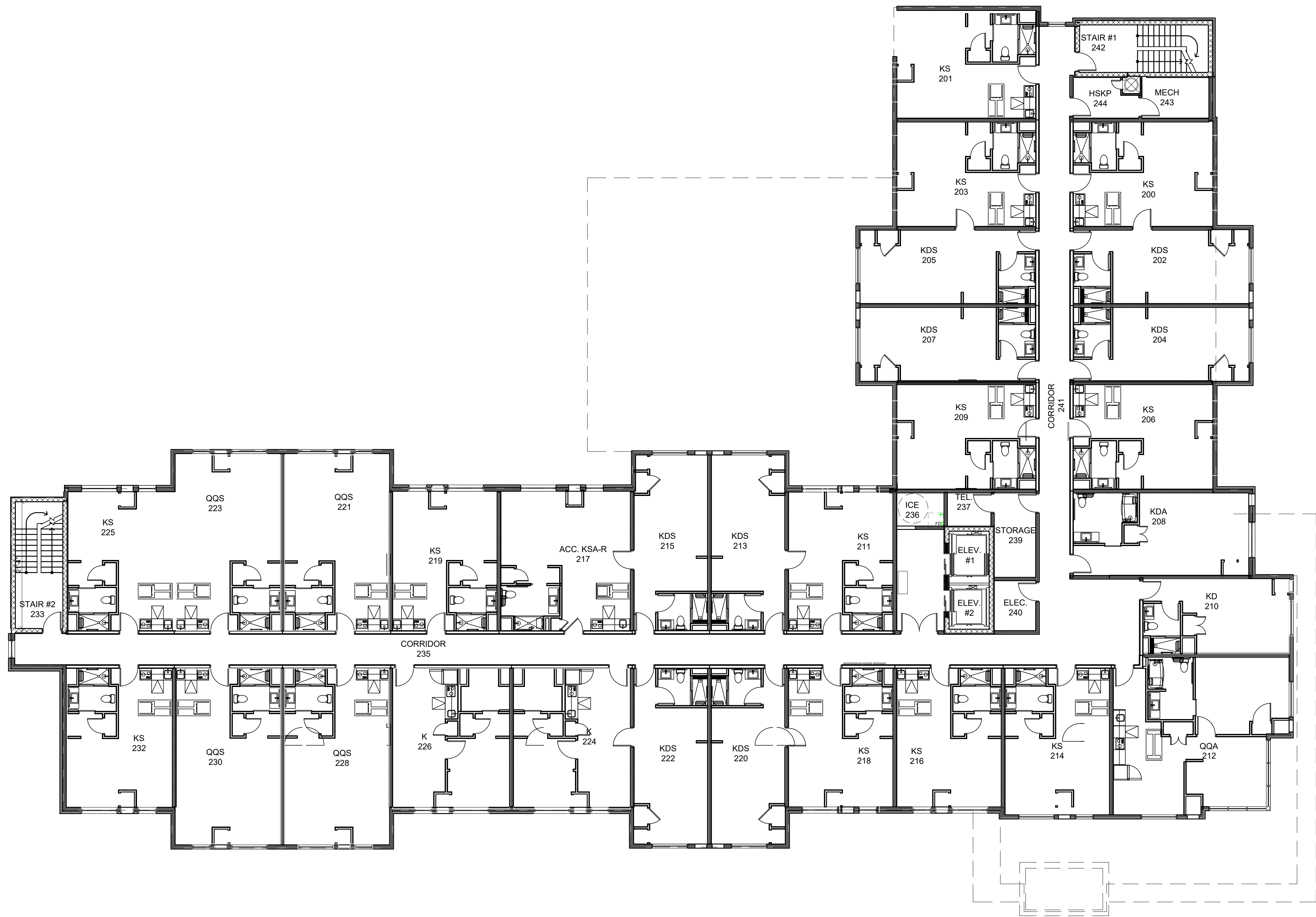
FIRST FLOOR PLAN

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SHEET + NUMBER

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GUESTROOM MATRIX						
	FLOOR 1	FLOOR 2	FLOOR 3	FLOOR 4	TOTAL	RATIO
HOTEL						
K KING 1 BEDRM (SHOWER)	2	2	2	2	8	7%
KD KING DEN (SHOWER)	0	1	1	1	3	3%
KDA KING DEN ACC (TUB)	0	1	1	1	3	3%
KDS KING DEN SUITE	2	4	4	4	14	13%
KS KING STUDIO (SHOWER)	2	13	13	13	41	38%
KSA KING STUDIO ACC (TUB)	0	0	1	0	1	1%
KSA-R KING STUDIO ACC (ROLL-IN-SHOWER)	0	1	0	0	1	1%
KW KING 1 BEDRM WIDE (SHOWER)	0	0	0	1	1	1%
QQA QUEEN 1 BEDRM ACC (TUB)	0	1	1	0	2	2%
QQC QUEEN 1 BEDRM CORNER (SHOWER)	0	0	0	1	1	1%
QQS QUEEN STUDIO (SHOWER)	8	8	8	8	32	30%
TOTAL	14	31	31	31	107	100%

PRELIMINARY
UPPER FLOOR PLAN
SCALE: 3/32" = 1'-0"



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LIVONIA, MI

PROJECT + NUMBER
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SITE

SHEET + TITLE
UPPER FLOOR PLAN
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EAST
ELEVATION

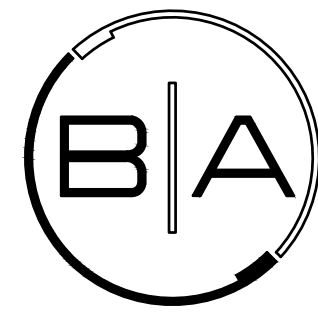
SCALE: $\frac{3}{32}$ " = 1'-0"

EXTERIOR FINISH LEGEND				
TAG	MATERIAL	MANUF	STYLE	COLOR
A	BRICK VENEER	BELDON BRICK	SEMI SMOOTH FACE BRICK	BLACK DIAMOND VELOUR
B	BRICK VENEER	BELDON BRICK	FACE BRICK	TO MATCH COLOR C
C	EIFS	STO	LIMESTONE	10308 PEARL 86
D	EIFS	STO	LIMESTONE	TO MATCH COLOR A
E	CAST STONE	ROCKCAST	SMOOTH	
F	METAL COPING	ATAS OR EQUAL	PREFINISHED	TO MATCH ADJACENT
G	ANOD. ALUM. FRAME	TO BID	PREFINISHED	CLEAR ANODIZED
H	METAL LOUVER	TO BID	PREFINISHED	TO MATCH ADJACENT
J	METAL PANELS	TBD	TBD	CLEAR ANODIZED



NORTH
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"



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EXTERIOR
ELEVATIONS

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SHEET + NUMBER

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WEST
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"

EXTERIOR FINISH LEGEND				
TAG	MATERIAL	MANUF	STYLE	COLOR
A	BRICK VENEER	BELDON BRICK	SEMI SMOOTH FACE BRICK	BLACK DIAMOND VELOUR
B	BRICK VENEER	BELDON BRICK	FACE BRICK	TO MATCH COLOR C
C	EIFS	STO	LIMESTONE	10308 PEARL 86
D	EIFS	STO	LIMESTONE	TO MATCH COLOR A
E	CAST STONE	ROCKCAST	SMOOTH	
F	METAL COPING	ATAS OR EQUAL	PREFINISHED	TO MATCH ADJACENT
G	ANOD. ALUM. FRAME	TO BID	PREFINISHED	CLEAR ANODIZED
H	METAL LOUVER	TO BID	PREFINISHED	TO MATCH ADJACENT
J	METAL PANELS	TBD	TBD	CLEAR ANODIZED



NORTH
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"



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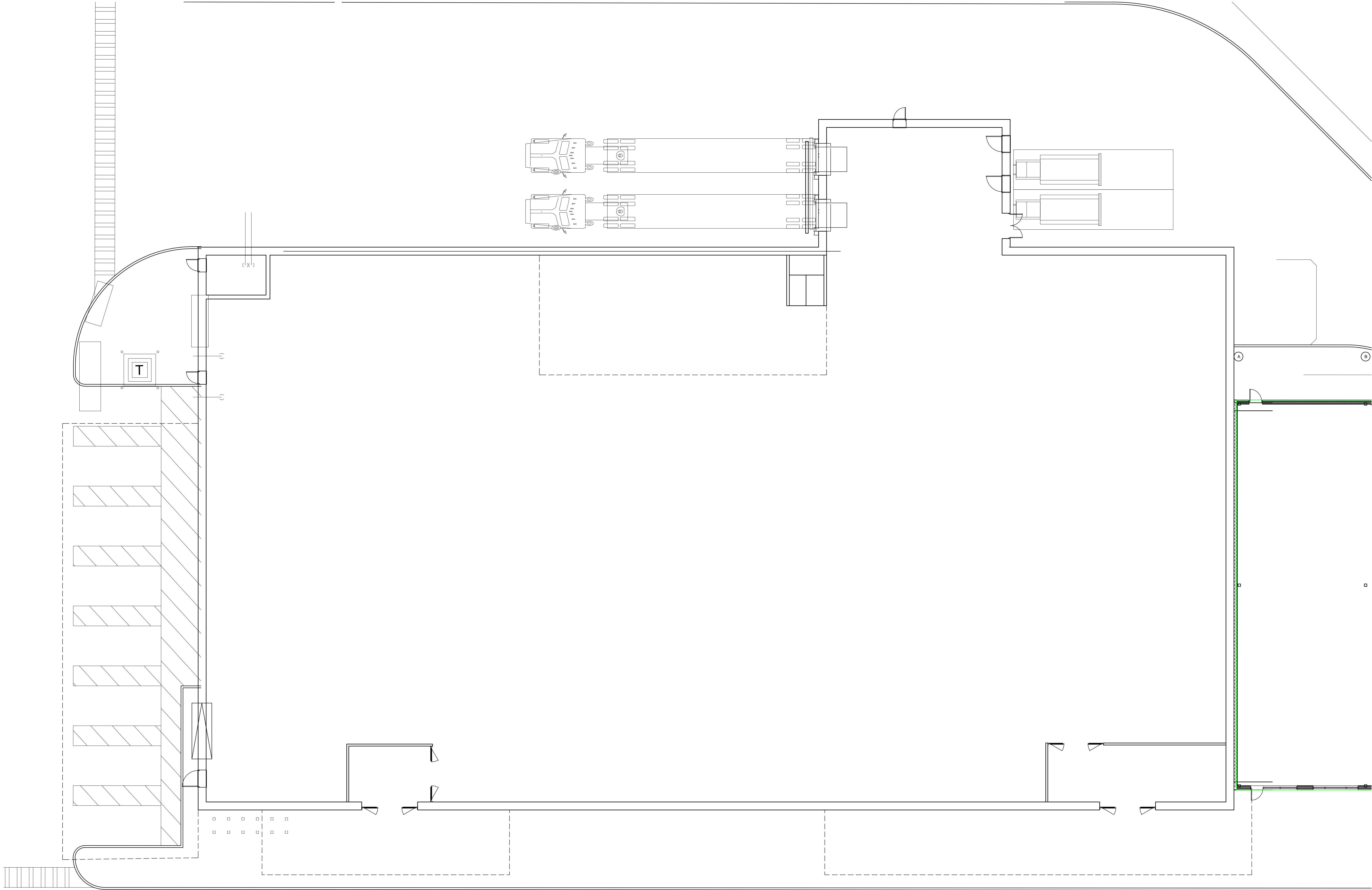
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EXTERIOR
ELEVATIONS

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WHOLE FOODS

FOX DRIVE

LIVONIA, MI

PROJECT + NUMBER

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SITE

SHEET + TITLE

PRELIMINARY

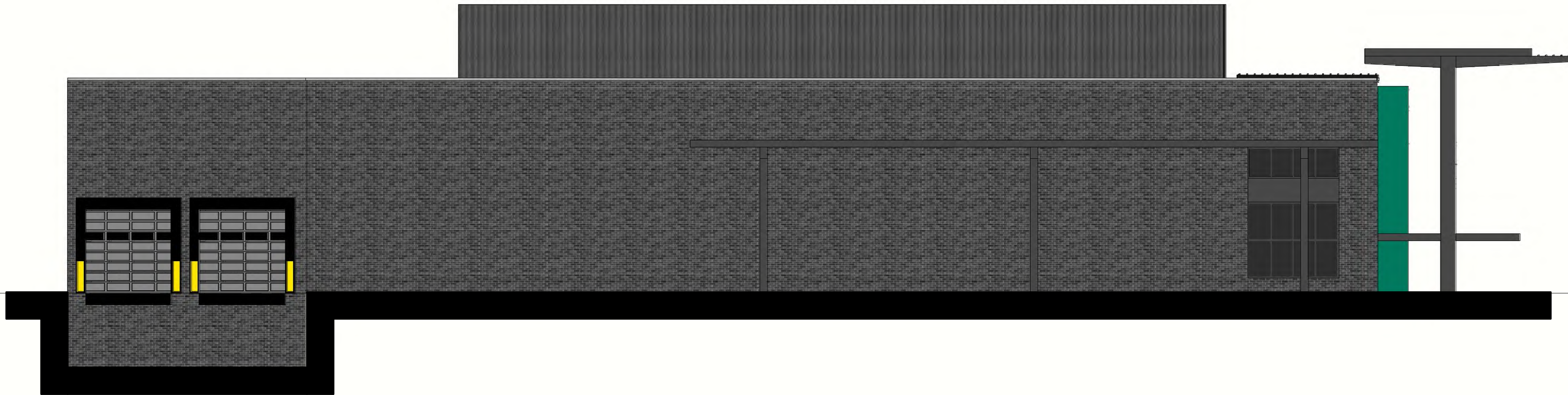
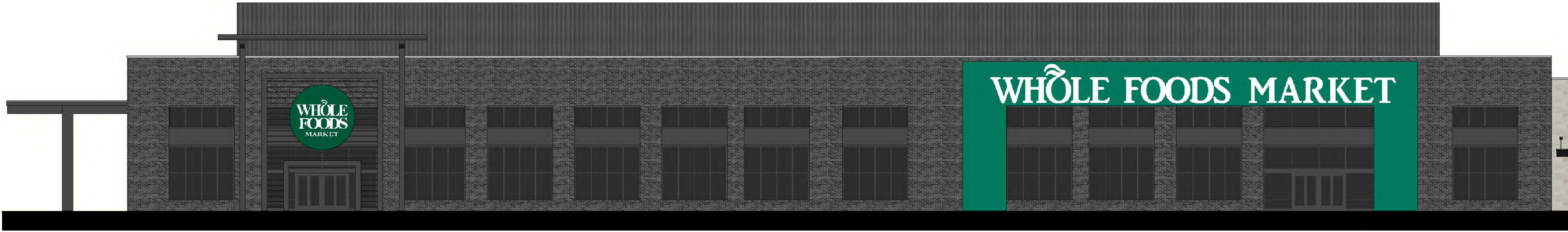
ARCHITECTURAL

SITE PLAN

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SHEET + NUMBER

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BIA

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SITE

SHEET + TITLE

EXTERIOR

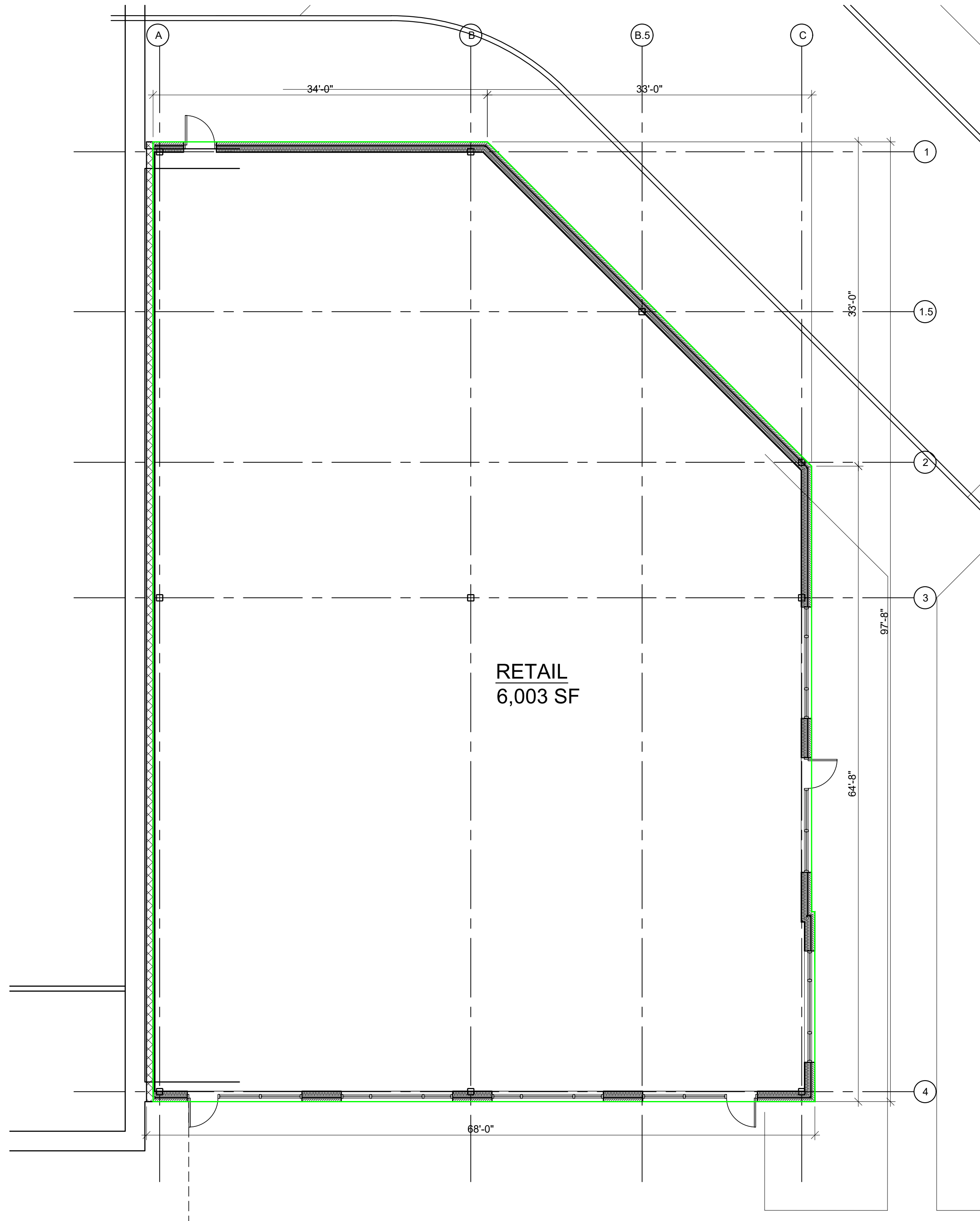
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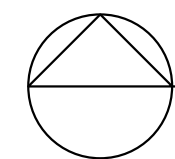
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 **BUILDING 'A'**
SCALE: $\frac{1}{4}" = 1'-0"$



EAST ELEVATION

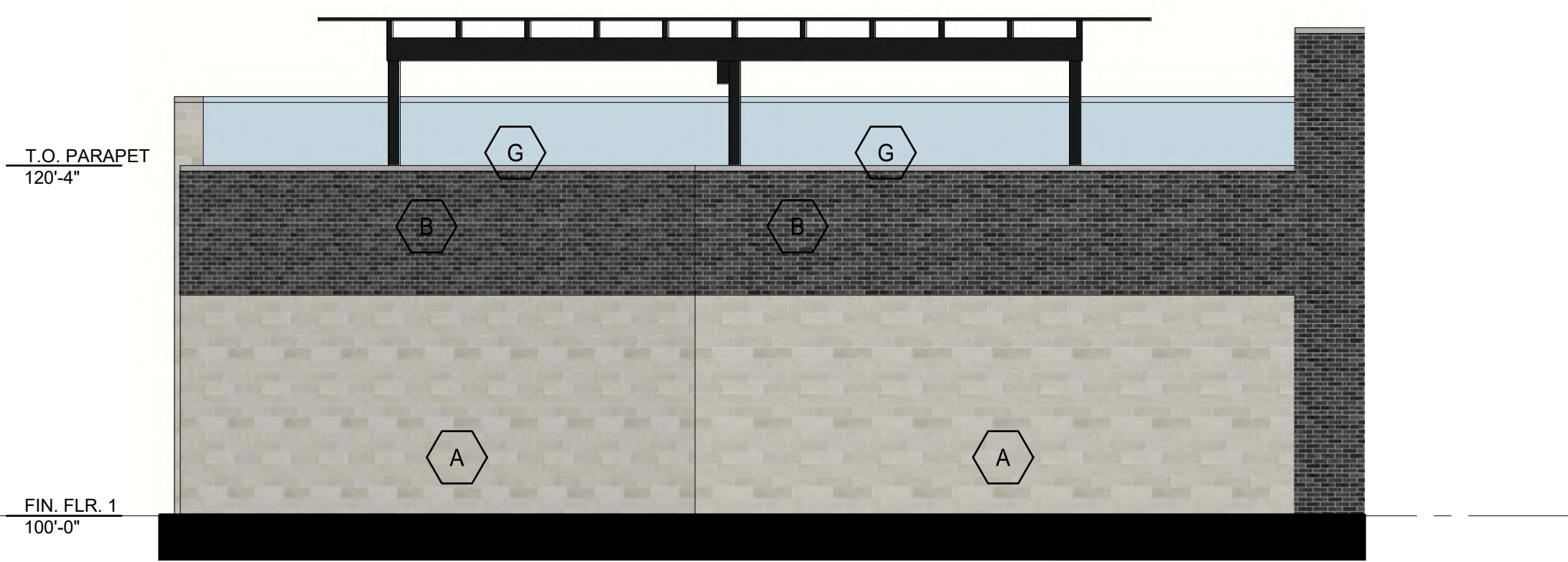
SCALE: 1/8" = 1'-0"

EXTERIOR FINISH LEGEND			
TAG	MATERIAL		COLOR
A	STONE MASONRY	ROCKCAST	BUFFSTONE
B	BRICK	BELDEN BRICK	DARK BRICK
C	METAL PANELS	ATAS VERTICAL RIBBED	GRAY
D	METAL FRAMES	TBD	
E	METAL CANOPY	TBD	
F	METAL PAINTED	TBD	
G	METAL CORING	TBD	
H	FIBER CEMENT PANEL	NICHIHA ROUGHSAWN WOOD LOOK	



SOUTH ELEVATION

SCALE: 1/8" = 1'-0"



NORTH ELEVATION

SCALE: 1/8" = 1'-0"



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CONSULTANT + NAME

PROJECT + INFORMATION
RETAIL BUILDING A
FOX DRIVE
LIVONIA, MI

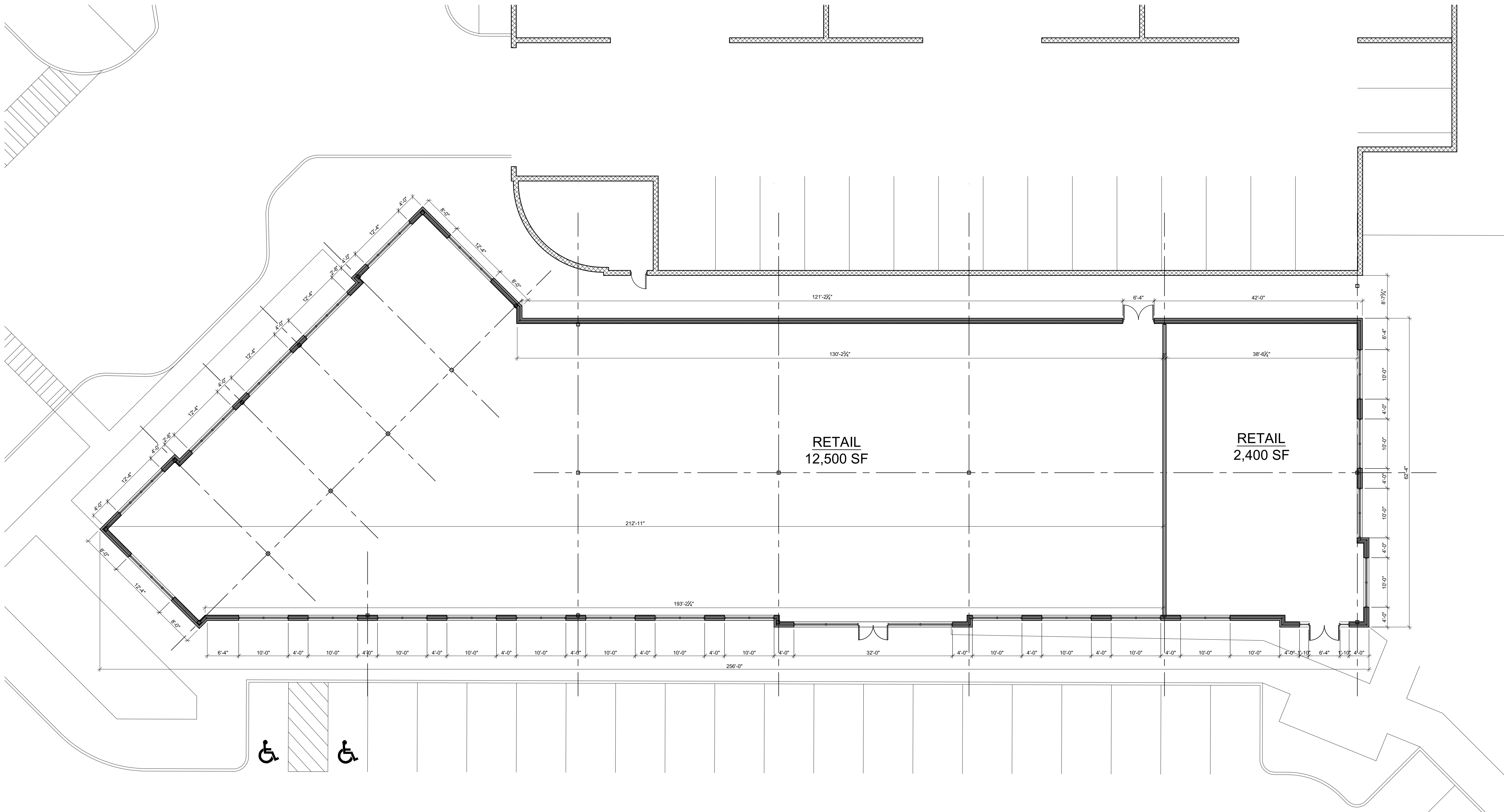
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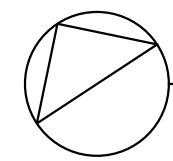
ISSUE + DATE
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SHEET + TITLE
EXTERIOR ELEVATIONS
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 **BUILDING 'H'**
SCALE: $\frac{1}{8}" = 1'-0"$



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PROJECT + INFORMATION

RETAIL BUILDING H
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-07

ISSUE + DATE

25 JAN 2024 SITE

SHEET + TITLE

FLOOR PLAN

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SHEET + NUMBER

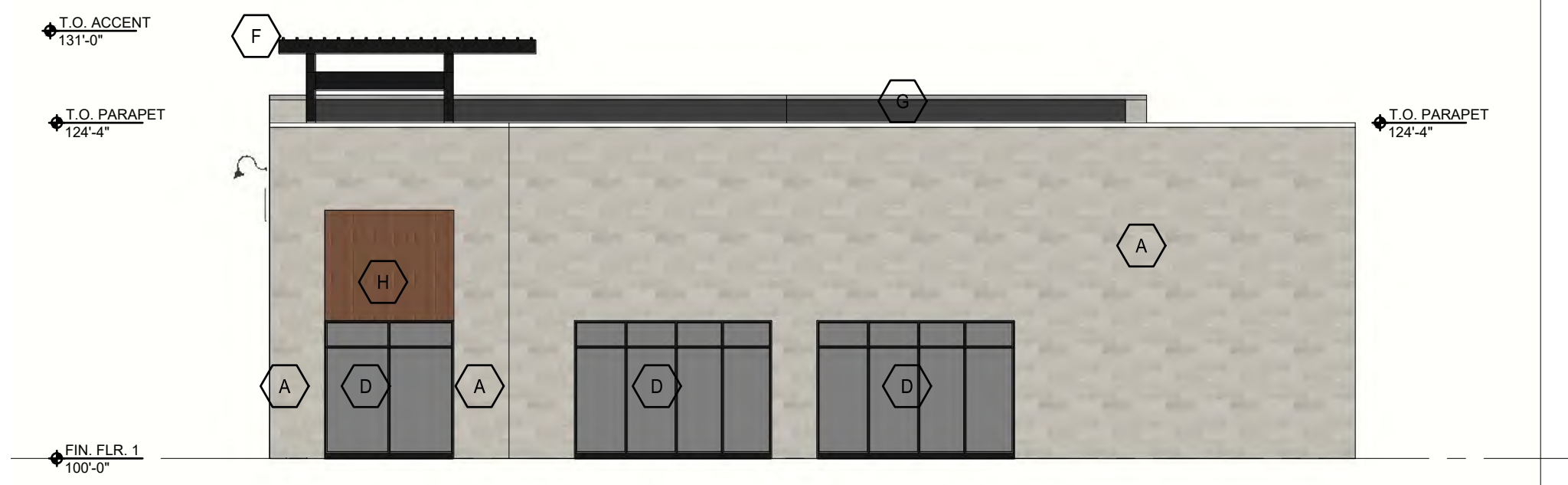
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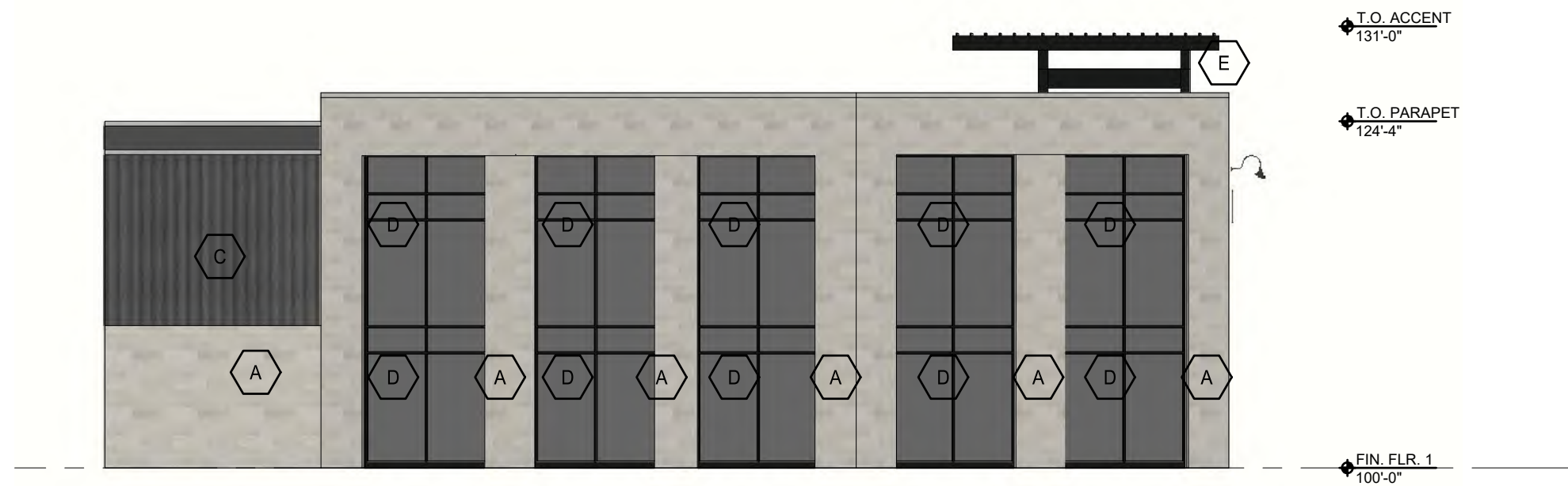
SOUTH
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"



EAST
ELEVATION

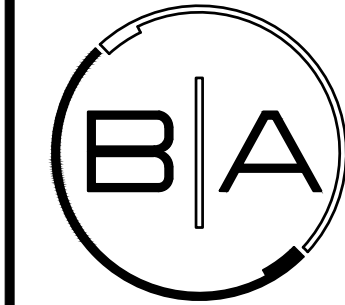
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WEST
ELEVATION

SCALE: $\frac{3}{32}$ " = 1'-0"

EXTERIOR FINISH LEGEND		
TAG	MATERIAL	MANUF/STYLE
A	STONE MASONRY	ROCKCAST
B	BRICK	BELDEN BRICK
C	METAL PANELS	ATAS VERTICAL RIBBED
D	METAL FRAMES	TBD
E	METAL CANOPY	TBD
F	METAL PAINTED	TBD
G	METAL CORING	TBD
H	FIBER CEMENT PANEL	NICHII-HA ROUGHSAWN WOOD LOOK



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BUILDING H
FOX DRIVE
LIVONIA, MI

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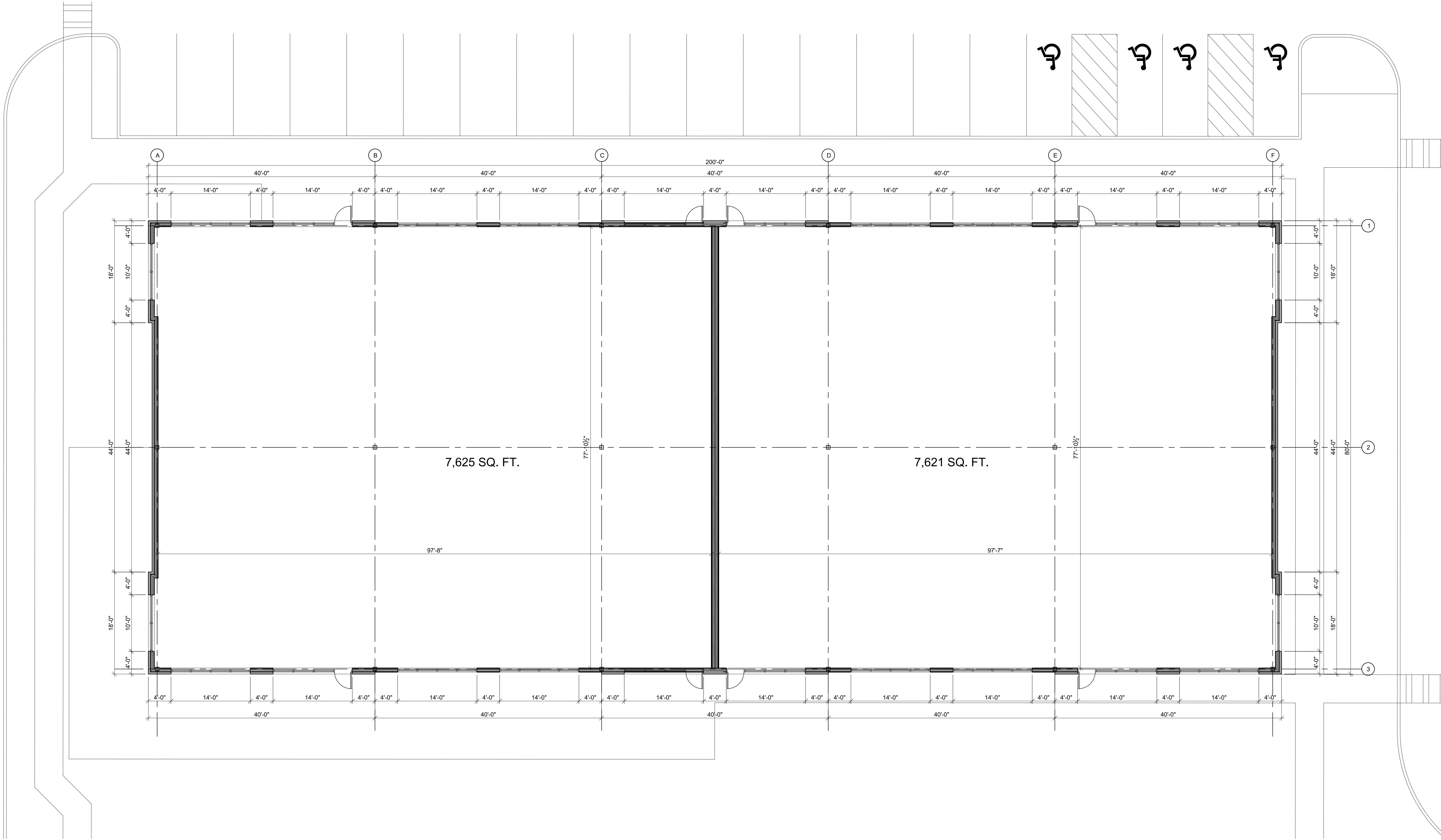
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EXTERIOR
ELEVATIONS

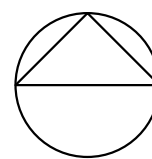
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 **BUILDING 'B'**
SCALE: $\frac{1}{8}" = 1'-0"$



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PROJECT + INFORMATION

RETAIL BUILDING B
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LIVONIA, MI

PROJECT + NUMBER

23-211-08

ISSUE + DATE

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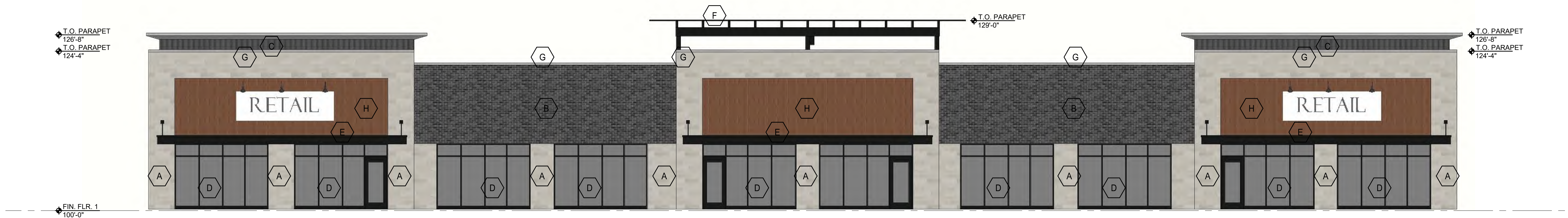
SHEET + TITLE

BUILDING 'B'

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SHEET + NUMBER

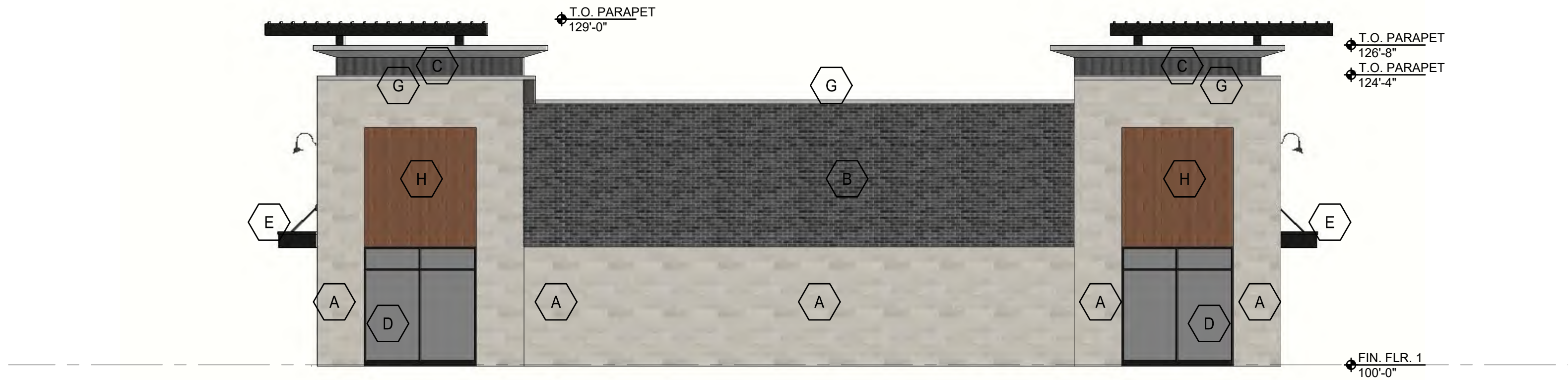
A-100



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}$ " = 1'-0"

EXTERIOR FINISH LEGEND			
TAG	MATERIAL	MANUF/STYLE	COLOR
A	STONE MASONRY	ROCKCAST	BUFFSTONE
B	BRICK	BELDEN BRICK	DARK BRICK
C	METAL PANELS	TBD	
D	METAL FRAMES	TBD	
E	METAL CANOPY	TBD	
F	METAL PAINTED	TBD	
G	METAL COPING	TBD	
H	FIBER CEMENT PANEL	NICHIHA ROUGHSAWN WOOD LOOK	



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}$ " = 1'-0"



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PROJECT + NUMBER

23-211-08

ISSUE + DATE

25 JAN 2024 SITE

SHEET + TITLE
EXTERIOR
ELEVATIONS

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SHEET + NUMBER

A-300



CONSULTANT + NAME

PROJECT + INFORMATION
RETAIL
BUILDING B
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-08

ISSUE + DATE

25 JAN 2024

SIT

SHEET + TITLE

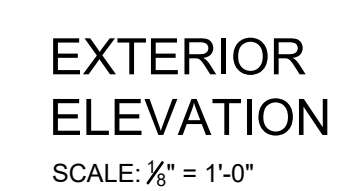
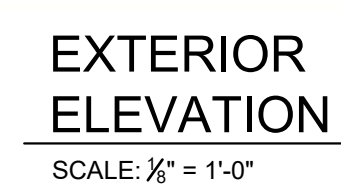
EXTERIOR
ELEVATIONS

2321108a300.dwg

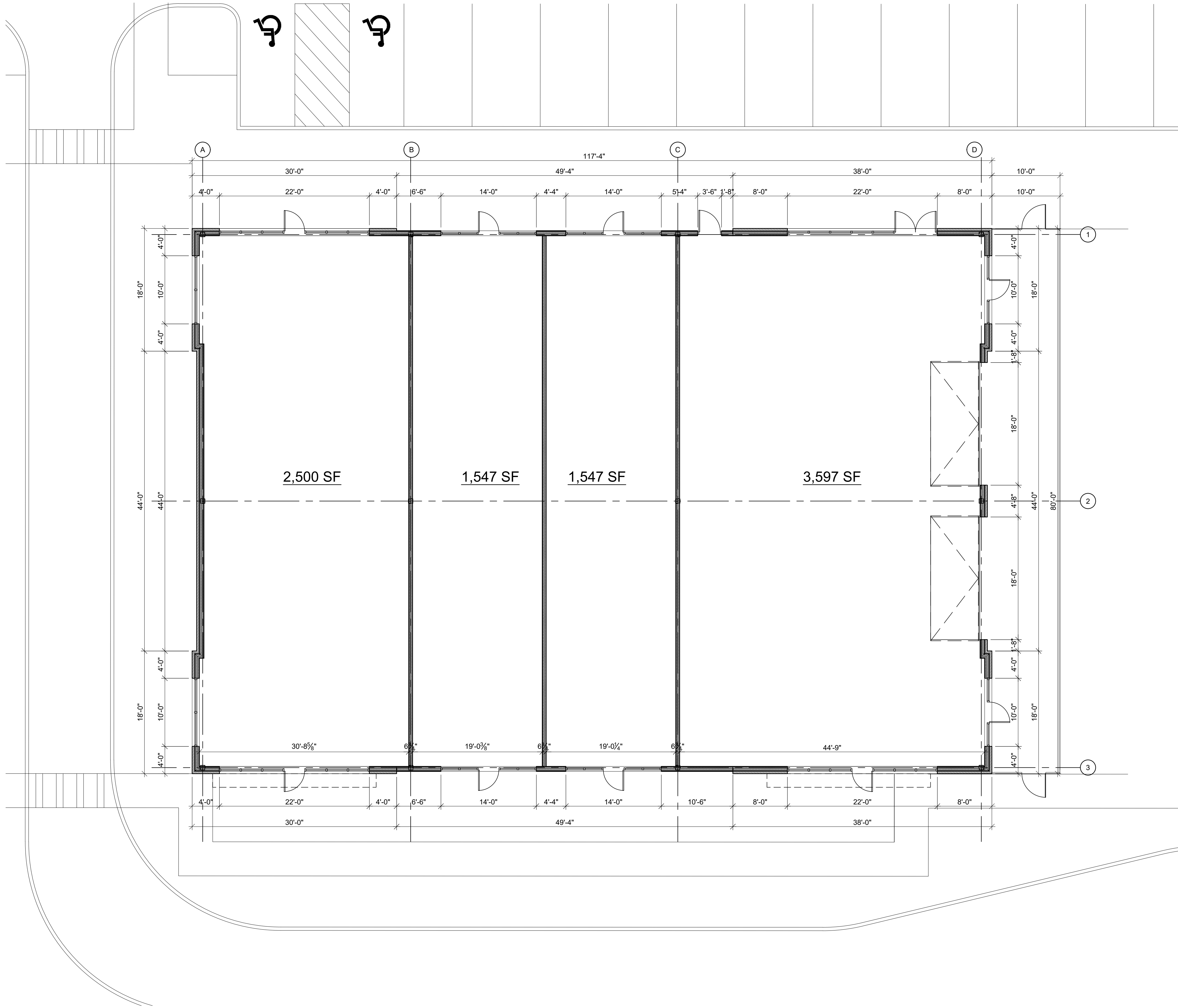
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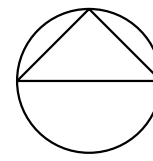
A-301

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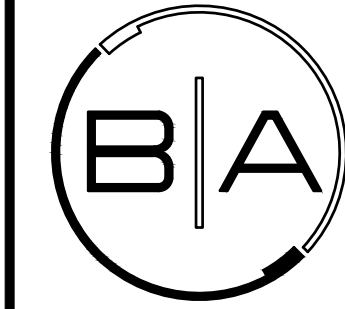
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 **BUILDING 'C.1'**
SCALE: $\frac{1}{8}" = 1'-0"$

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CONSULTANT + NAME
PROJECT + INFORMATION RETAIL BUILDING C.1 FOX DRIVE LIVONIA, MI
PROJECT + NUMBER 23-211-09
ISSUE + DATE 25 JAN 2024 SITE
SHEET + TITLE BUILDING 'C' 2321109mast.dwg
SHEET + NUMBER A-100

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CONSULTANT + NAME

PROJECT + INFORMATION
RETAIL
BUILDING C.1
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-09

ISSUE + DATE
25 JAN 2024 SITE

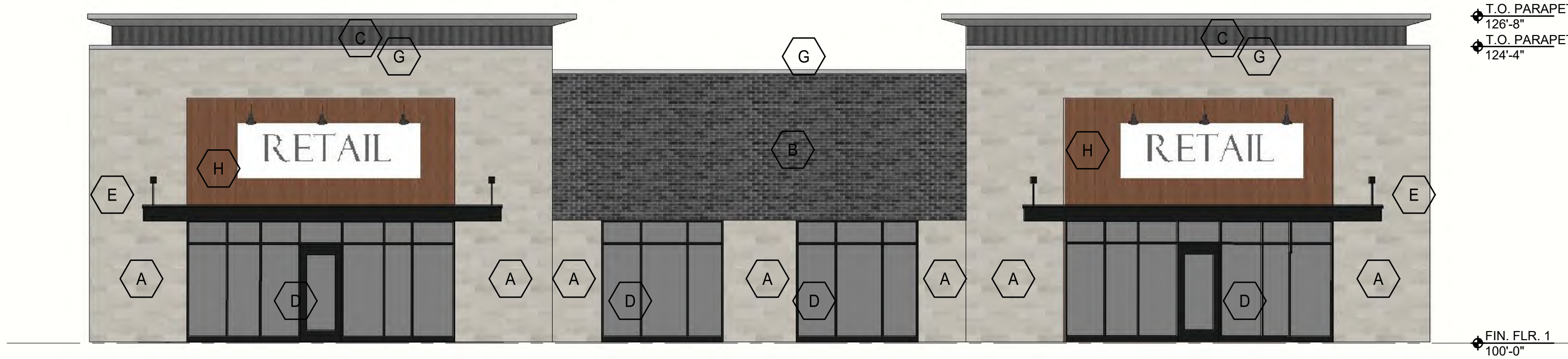
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EXTERIOR
ELEVATIONS

2321109a300.dwg

SHEET + NUMBER

A-300

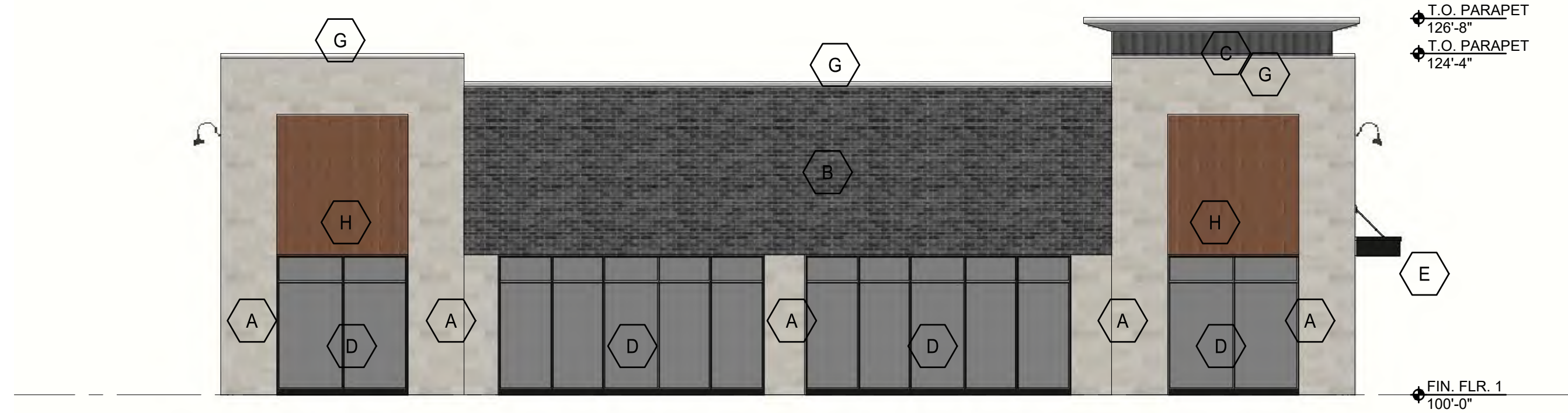
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EXTERIOR ELEVATION

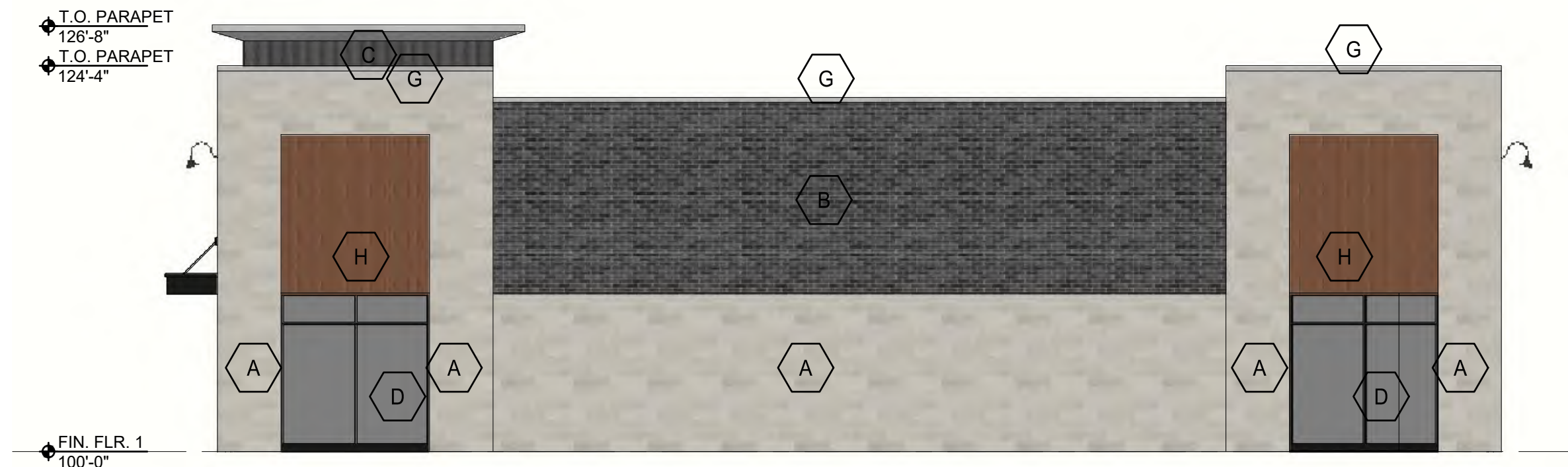
SCALE: $\frac{1}{8}$ " = 1'-0"

EXTERIOR FINISH LEGEND		
TAG	MATERIAL	MANUF/STYLE
A	STONE MASONRY	ROCKCAST
B	BRICK	BELDEN BRICK
C	METAL PANELS	TBD
D	METAL FRAMES	TBD
E	METAL CANOPY	TBD
F	METAL PAINTED	TBD
G	METAL COPING	TBD
H	FIBER CEMENT PANEL	NICHIHA ROUGHSAWN WOOD LOOK



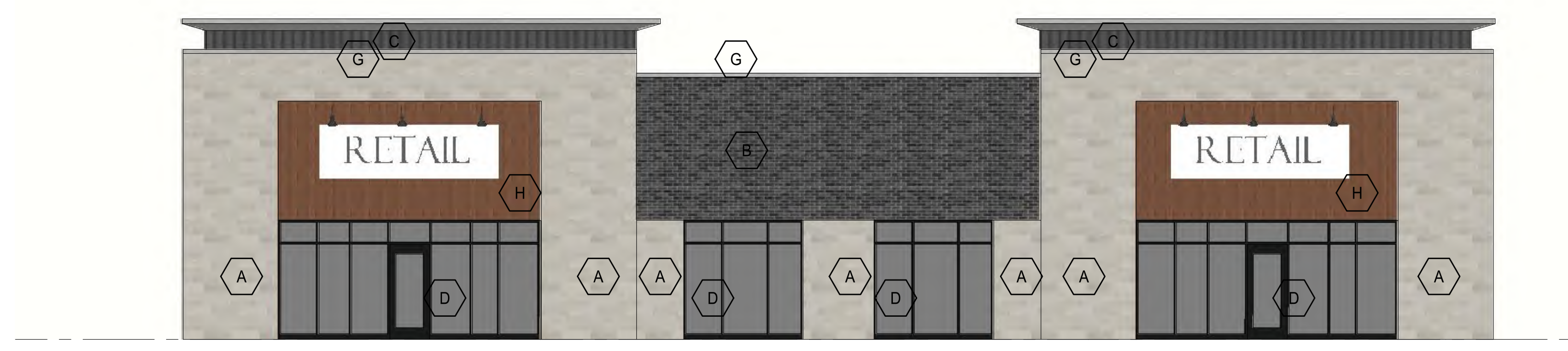
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SCALE: $\frac{1}{8}$ " = 1'-0"



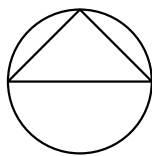
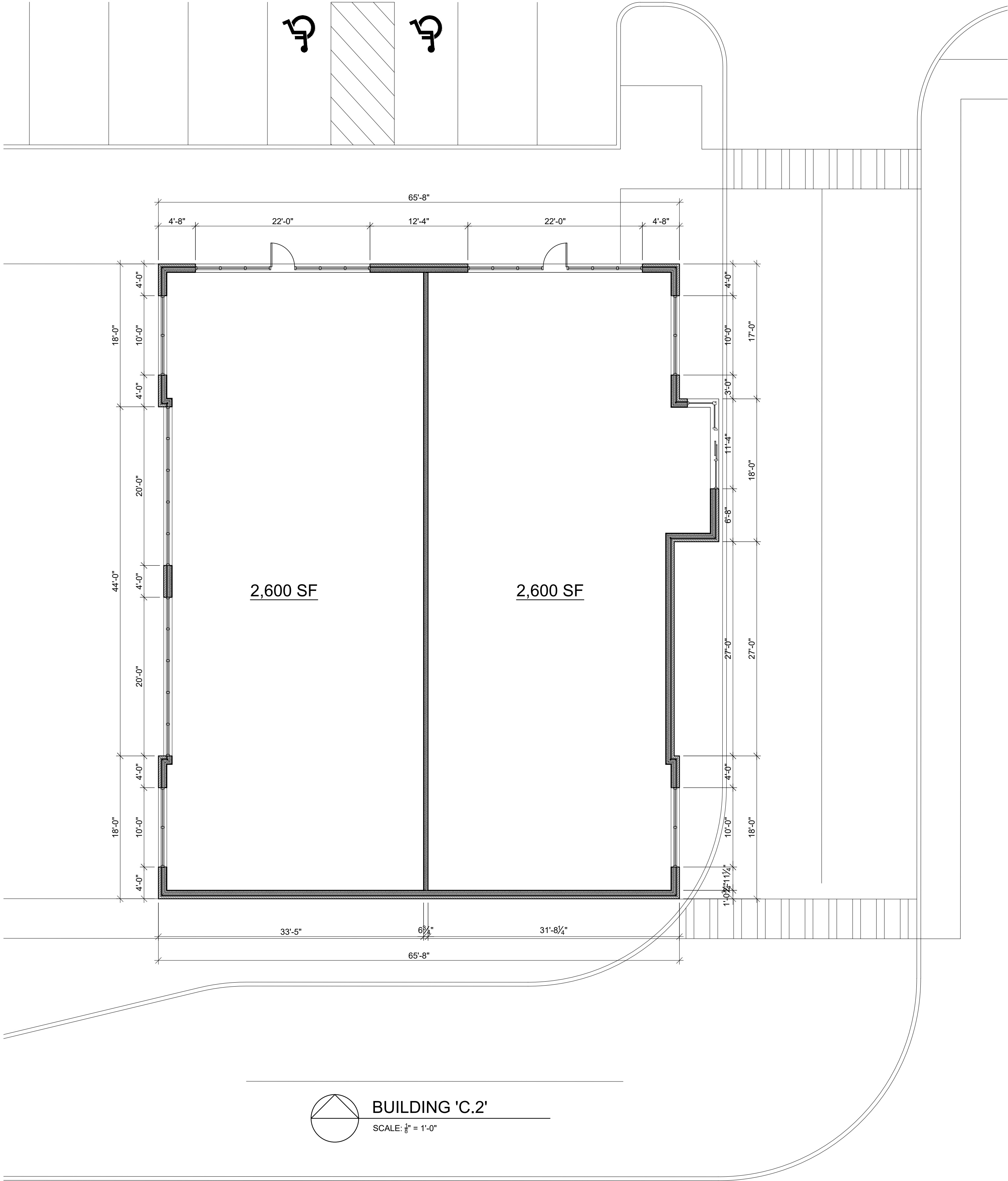
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SCALE: $\frac{1}{8}$ " = 1'-0"



EXTERIOR ELEVATION

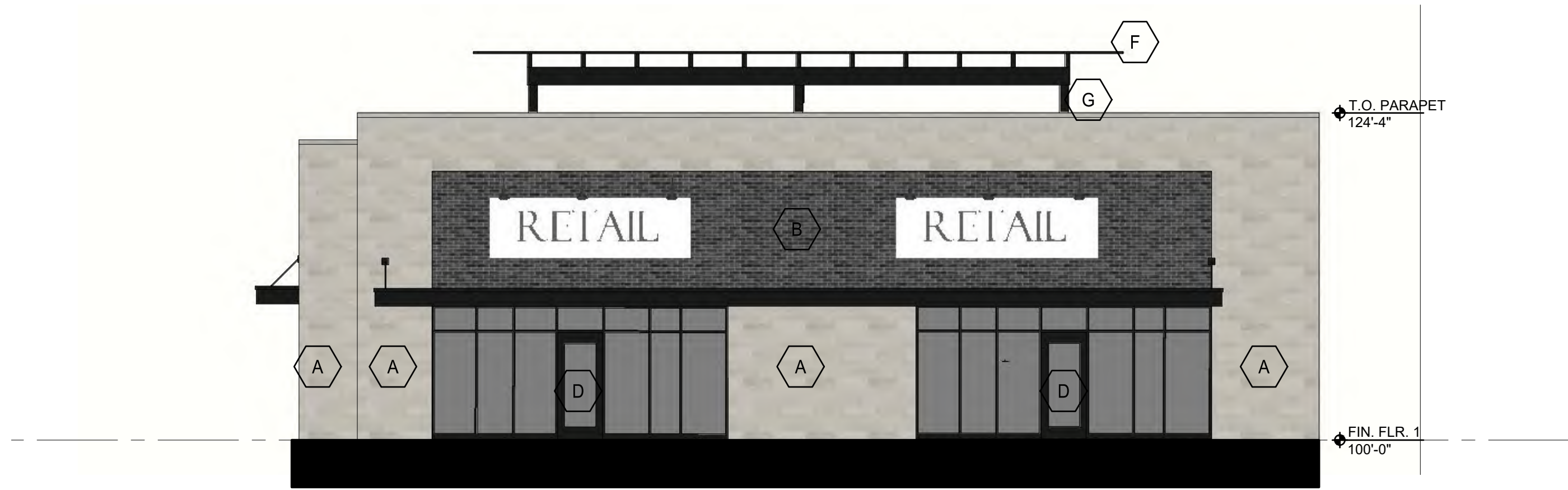
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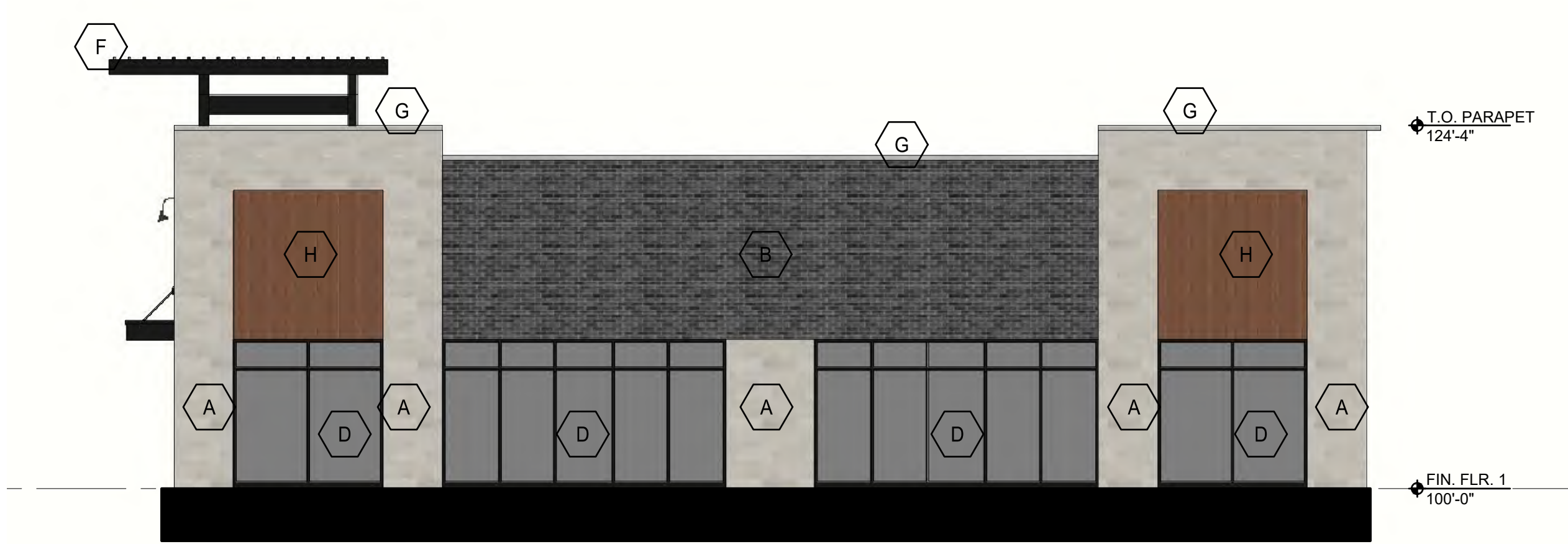
BUILDING 'C.2'

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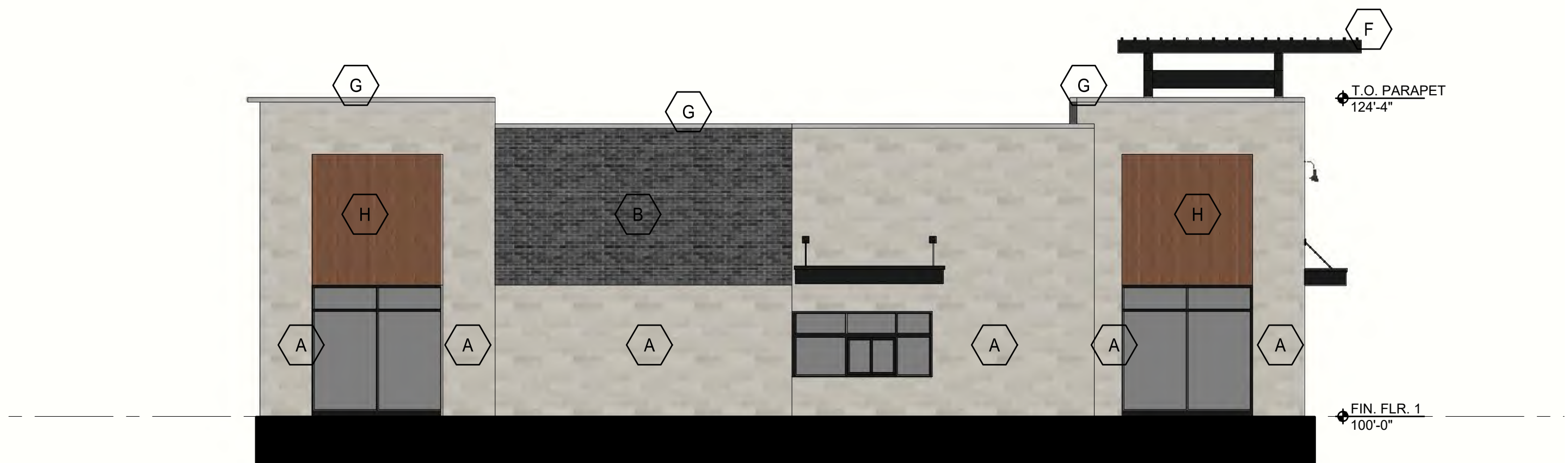
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CONSULTANT + NAME
PROJECT + INFORMATION RETAIL BUILDING C.2 FOX DRIVE LIVONIA, MI
PROJECT + NUMBER 23-211-10
ISSUE + DATE 25 JAN 2024 SITE
SHEET + TITLE FLOOR PLAN 2321110mast.dwg
SHEET + NUMBER A-100



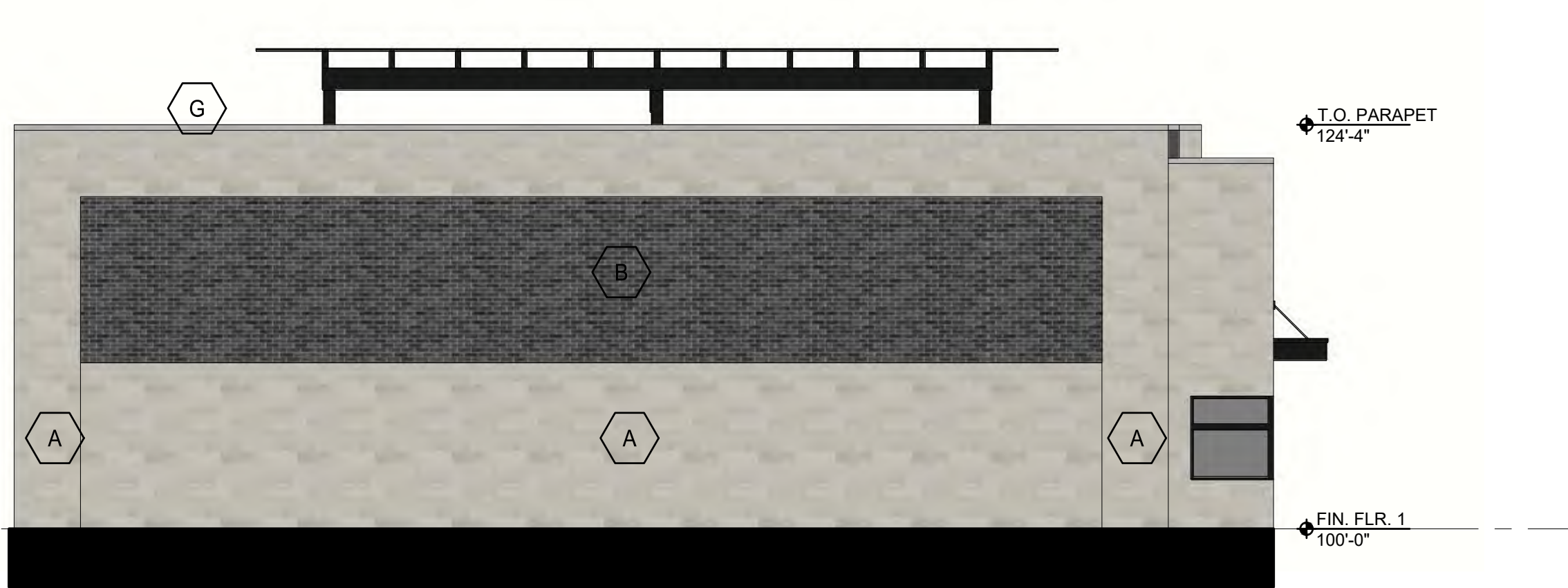
EXTERIOR
ELEVATION



EXTERIOR
ELEVATION



EXTERIOR
ELEVATION



EXTERIOR
ELEVATION

EXTERIOR FINISH LEGEND		
TAG	MATERIAL	MANUF/STYLE
A	STONE MASONRY	ROCKCAST
B	BRICK	BELDEN
C	NOT USED	
D	METAL FRAMES	TBD
E	METAL CANOPY	TBD
F	METAL PAINTED	TBD
G	METAL COPING	TBD
H	FIBER CEMENT PANEL	NICHIHA ROUGHSAWN WOOD LOOK



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PROJECT + INFORMATION
RETAIL
DRIVE THRU
FOX DRIVE
LIVONIA, MI

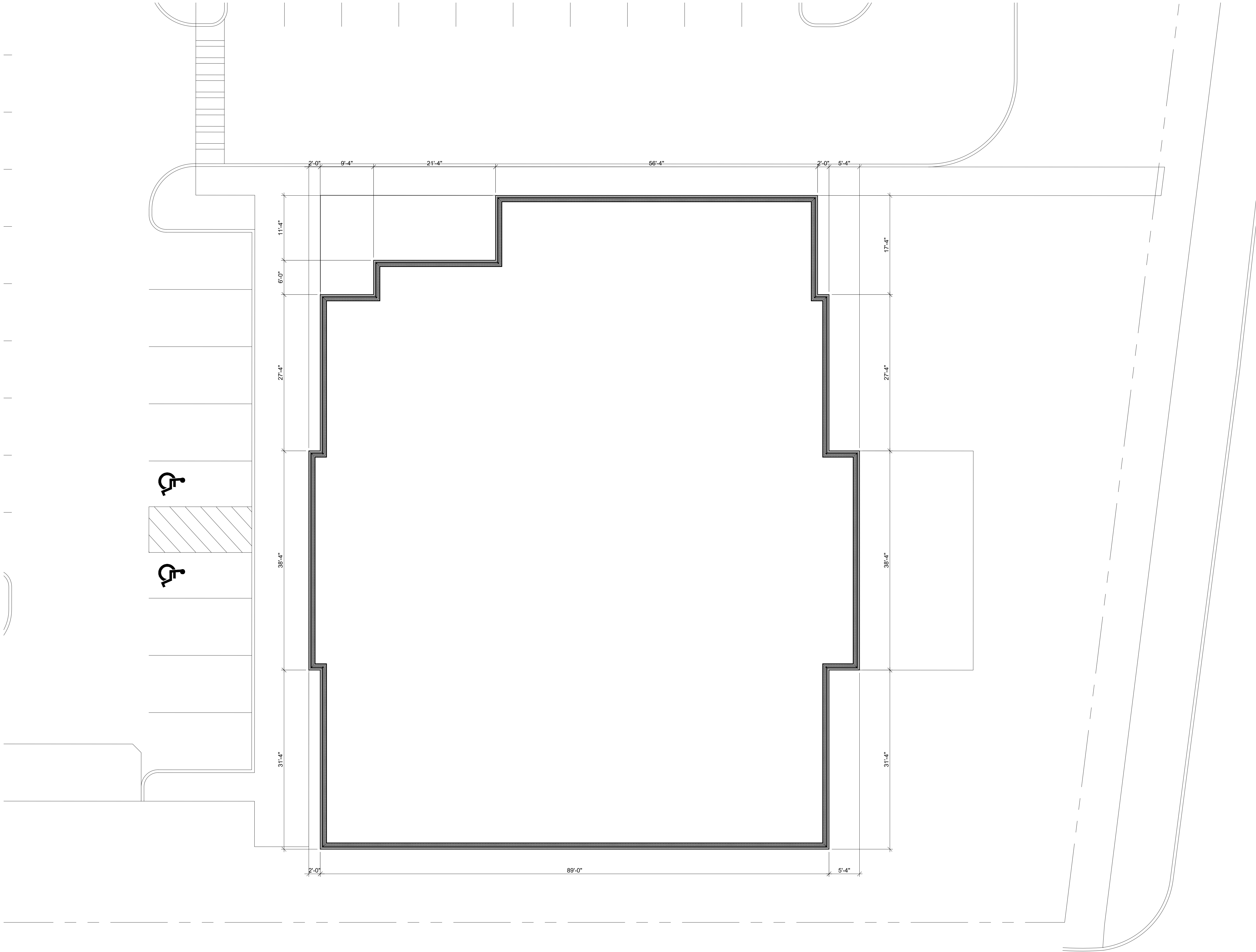
PROJECT + NUMBER
23-211-10

ISSUE + DATE
25 JAN 2024 SITE

SHEET + TITLE
EXTERIOR
ELEVATIONS
2321110a300.dwg

SHEET + NUMBER
A-300

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CONSULTANT + NAME

PROJECT + INFORMATION

RETAIL
BUILDING D
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-11

ISSUE + DATE

25 JAN 2024 SITE

SHEET + TITLE

FLOOR PLAN

2321111mast.dwg

SHEET + NUMBER

A-100



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}" = 1'-0"$

EXTERIOR FINISH LEGEND		
TAG	MATERIAL	MANUF/STYLE
A	STONE MASONRY	ROCKCAST
B	STONE ACCENTS	ROCKCAST
C	METAL FRAMES	TBD



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}" = 1'-0"$



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}" = 1'-0"$



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}" = 1'-0"$

B

A

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PROJECT + INFORMATION

RETAIL
BUILDING D

FOX DRIVE

LIVONIA, MI

PROJECT + NUMBER

23-211-11

ISSUE + DATE

25 JAN 2024

SITE

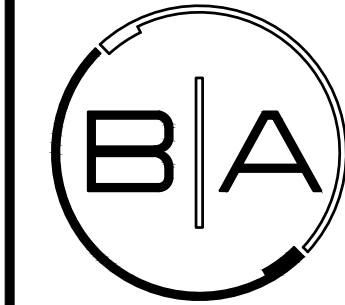
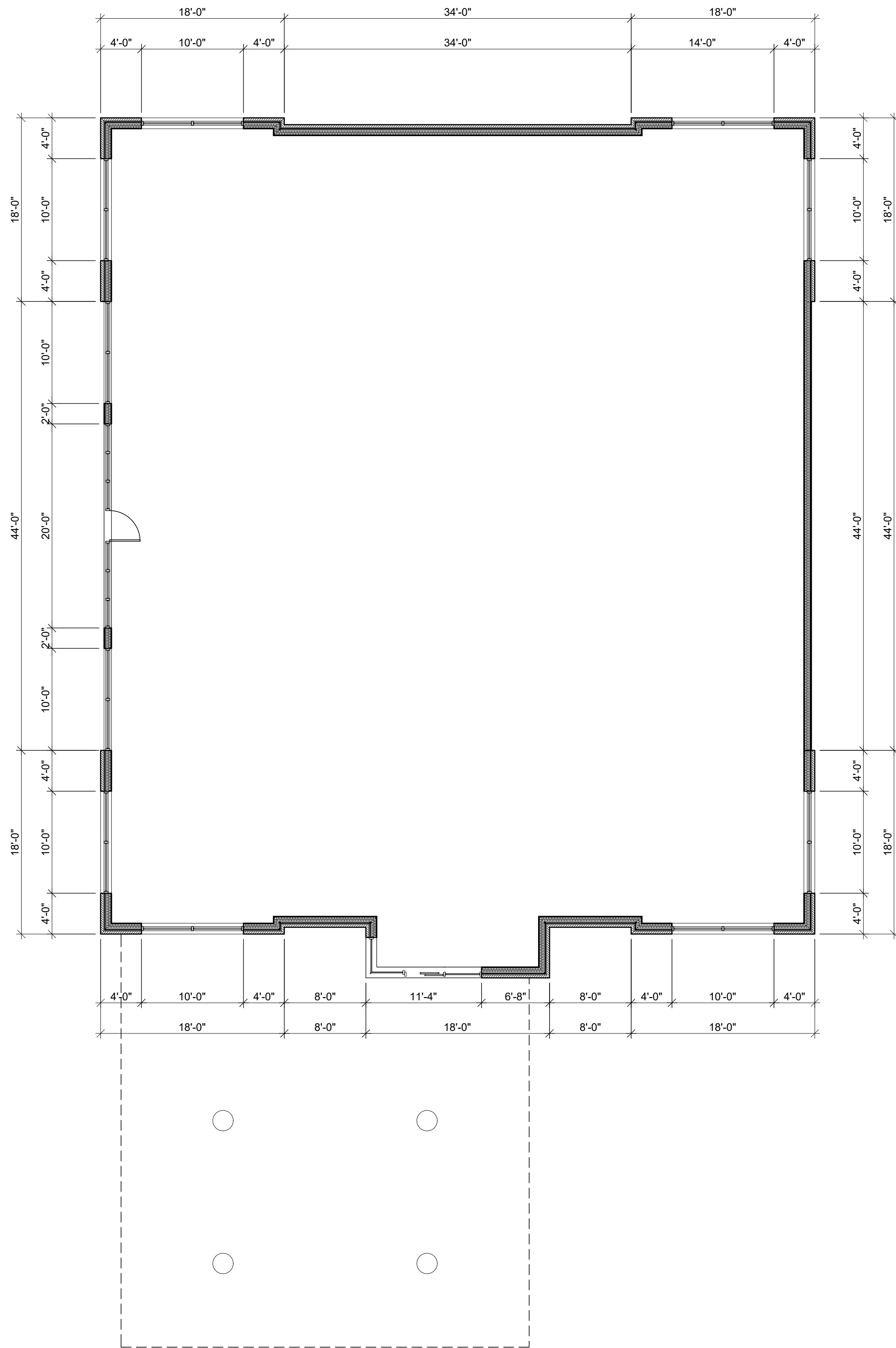
SHEET + TITLE

EXTERIOR
ELEVATIONS

2321111a300.dwg

SHEET + NUMBER

A-300



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CONSULTANT + NAME

PROJECT + INFORMATION
**BANK
BUILDING E**
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-12

ISSUE + DATE

05 FEB 2024 SITE

SHEET + TITLE
FLOOR PLAN

2321112mast.dwg

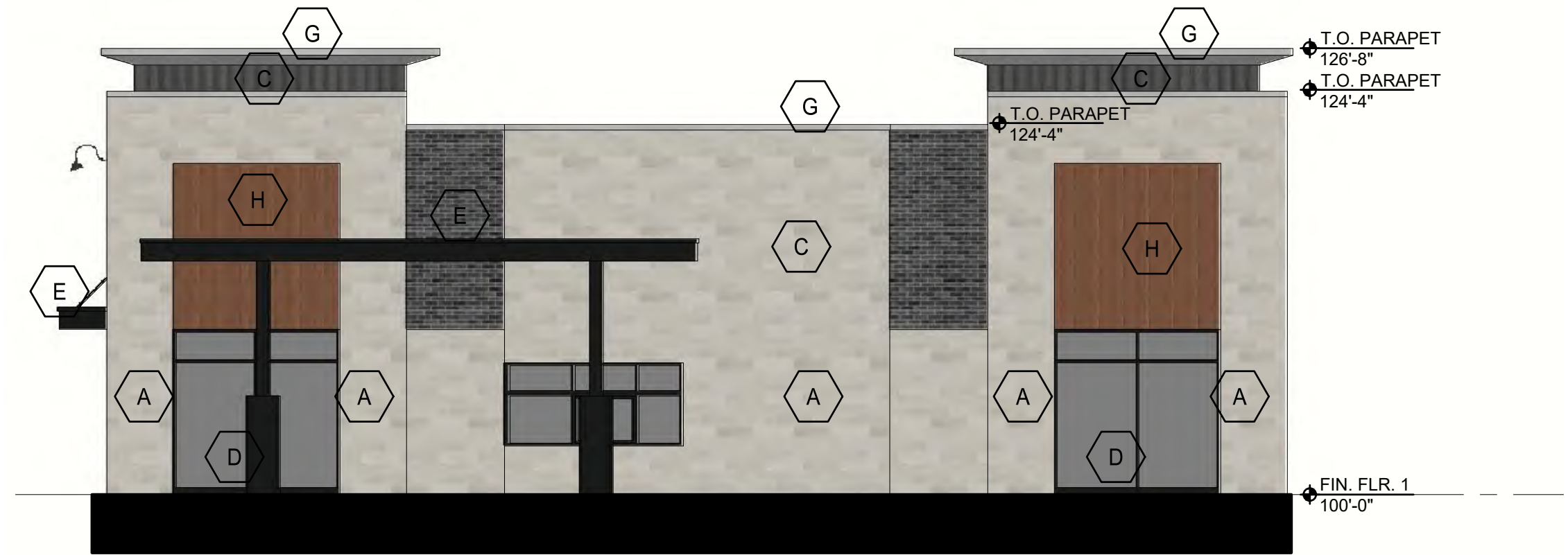
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A-100



EXTERIOR
ELEVATION

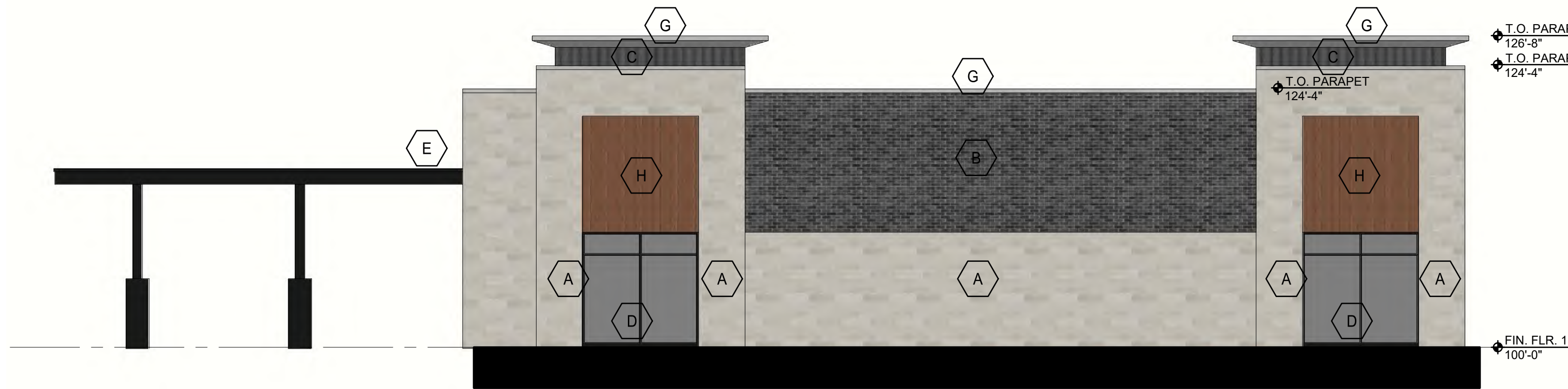
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EXTERIOR
ELEVATION

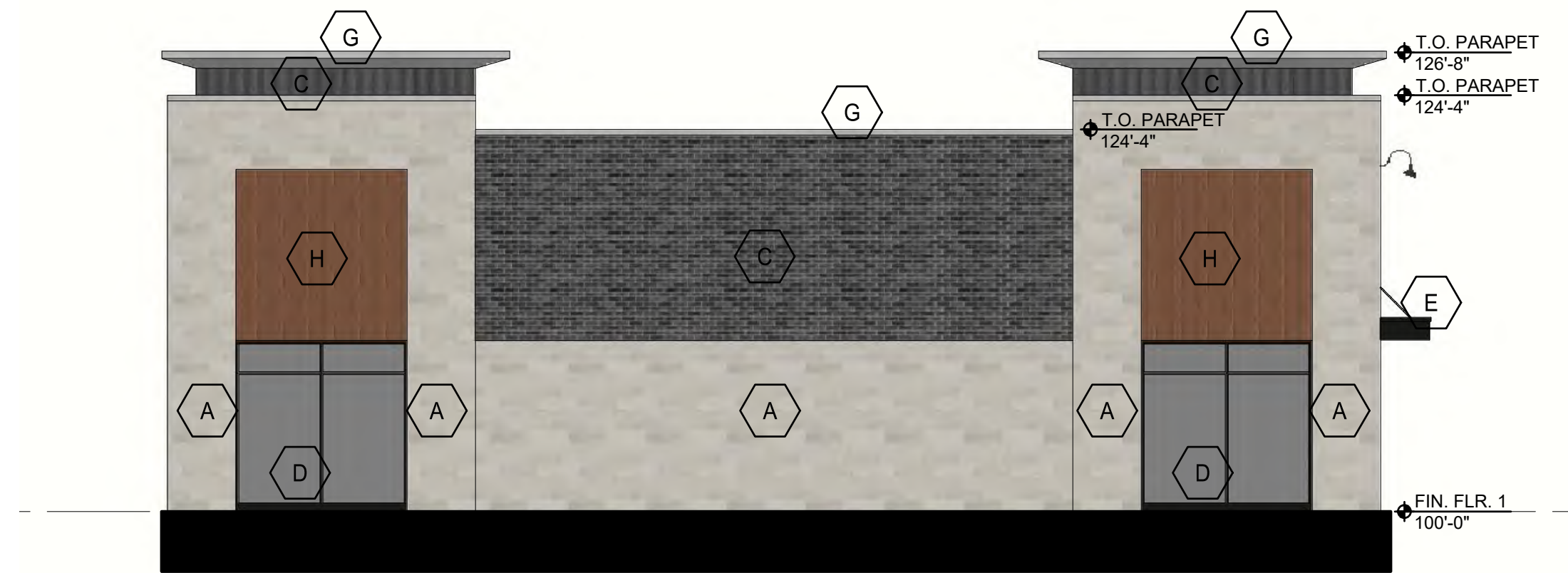
SCALE: $\frac{1}{8}" = 1'-0"$

EXTERIOR FINISH LEGEND			
TAG	MATERIAL	MANUF/STYLE	COLOR
A	STONE MASONRY	ROCKCAST	BUFFSTONE
B	BRICK	BELDEN	DARK GREY
C	METAL PANELS	ATAS VERTICAL RIBBED	GRAY
D	METAL FRAMES	TBD	
E	METAL CANOPY	TBD	
F	METAL PAINTED	TBD	
G	METAL COPING	TBD	
H	FIBER CEMENT PANEL	NICHIHA ROUGHSAWN WOOD LOOK	



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}" = 1'-0"$



EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}" = 1'-0"$



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PROJECT + INFORMATION
**BANK
BUILDING E**
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-12

ISSUE + DATE

05 FEB 2024 SITE

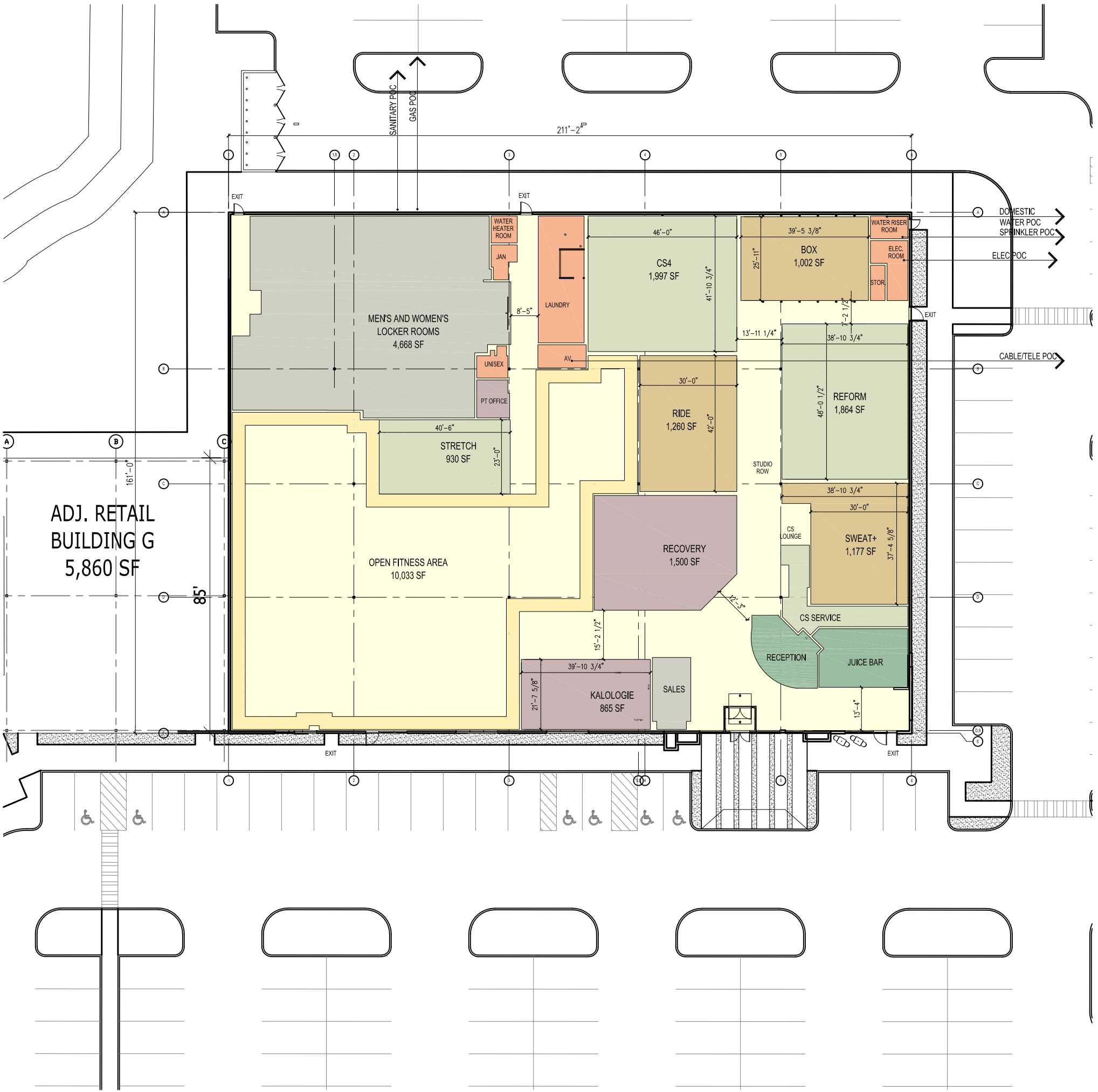
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EXTERIOR
ELEVATIONS

2321112a300.dwg

SHEET + NUMBER

A-300

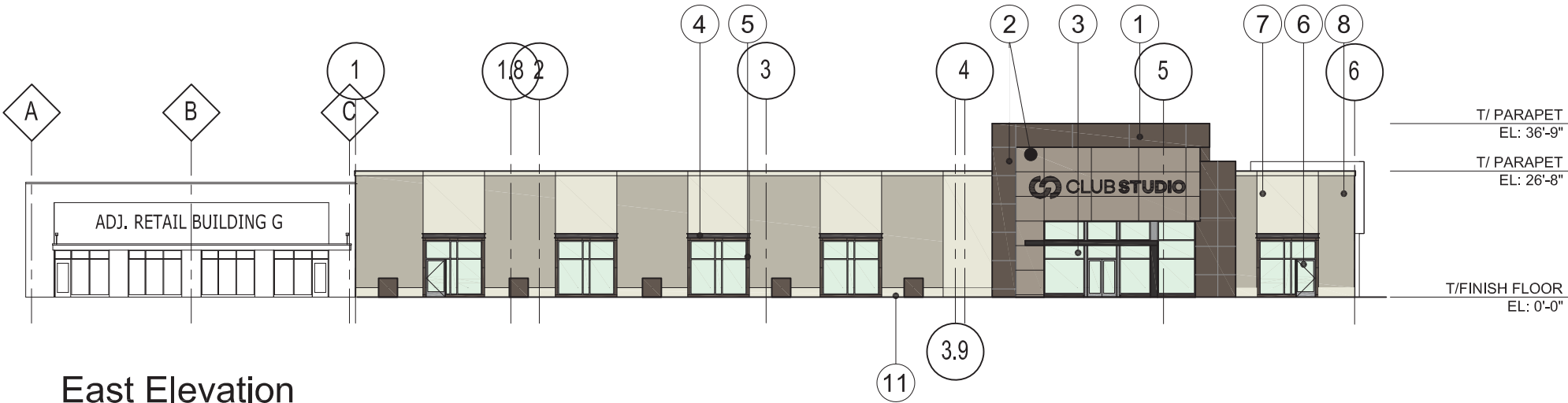


Ground Floor Level

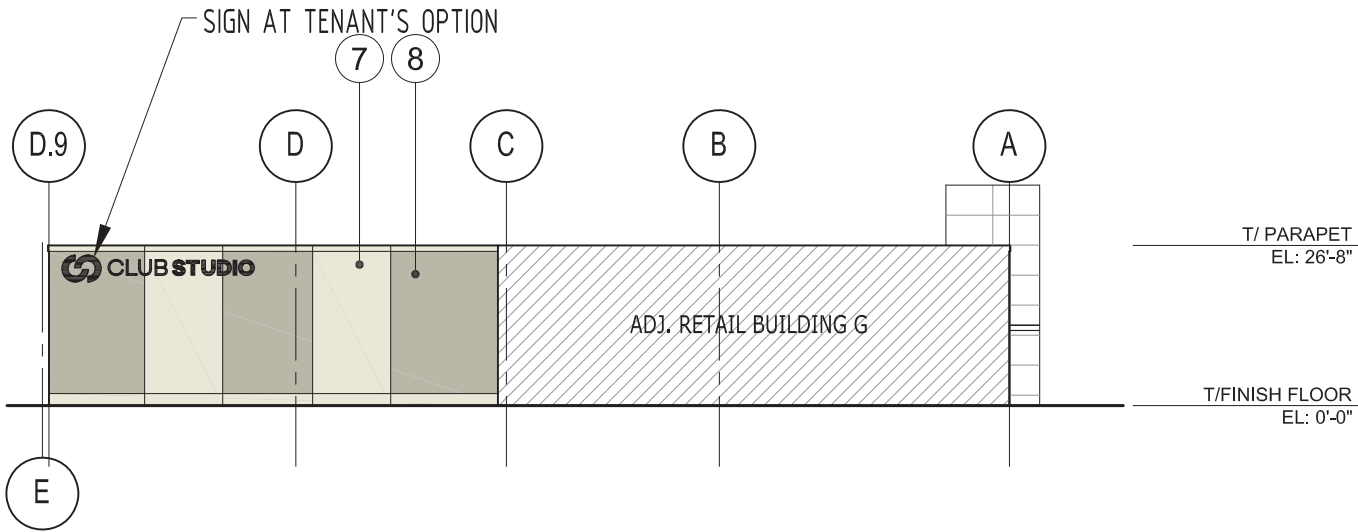
Ground Floor - 34,000 S.F.
TOTAL - 34,000 S.F.

GENERAL NOTES:

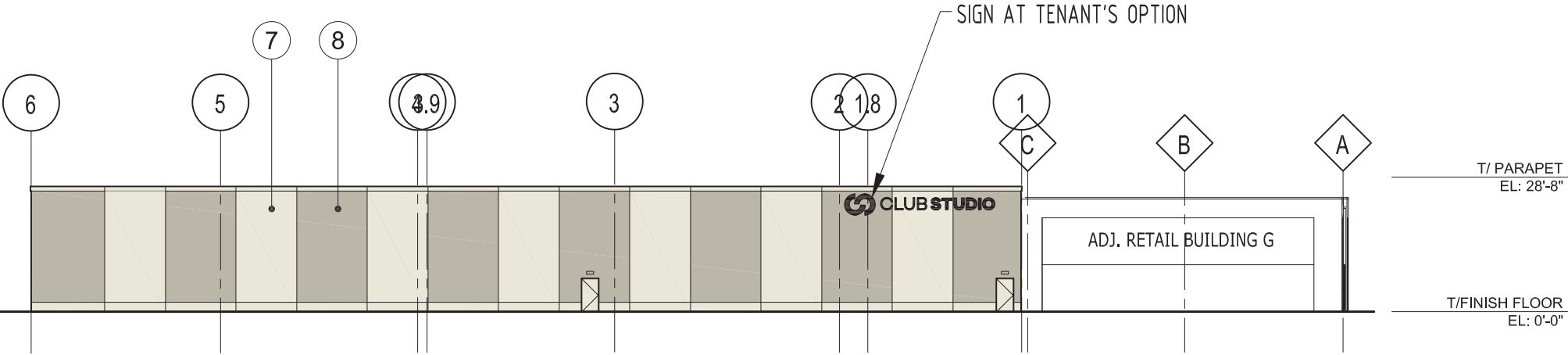
- Information provided for design intent only. Design professional of record is responsible for verification of all applicable code requirements. Wall types illustrated are for preliminary space planning only; the design professional shall be responsible for code conformance and floor plan development per LAF's programming criteria. These plans are specifically not for use as layers to be imported into documents / files or to be used as tracing underlayment(s) for construction documents / files by the professional of record for this or any other project.
- Ground floor area tabulation is the gross leasable area measure from the exterior surface of exterior walls, face of glass and from the center of Tenant demising partitions, including interior columns; excluding arcades, bump-outs, elevators, shafts, leave-outs. Existing mezzanines at the rear of the premises will not be counted unless they provide usable space such as electrical room or if they are large enough for fitness use.



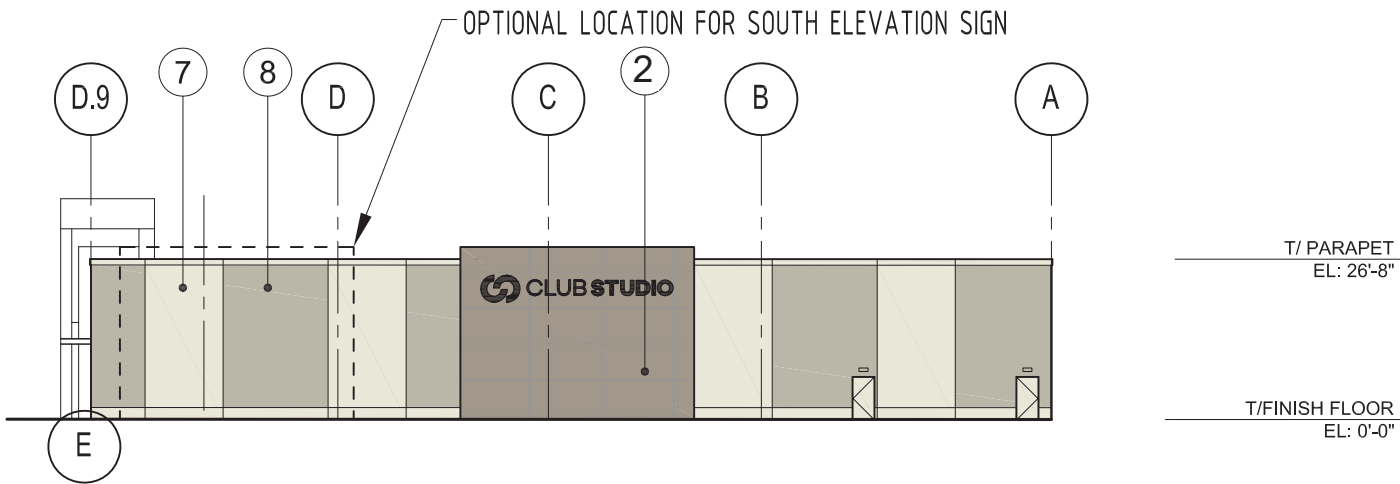
East Elevation



North Elevation



West Elevation



South Elevation

GENERAL NOTES:

1. Information provided for design intent only. Design professional of record is responsible for verification of all applicable code requirements. Wall types illustrated are for preliminary space planning only; the design professional shall be responsible for code conformance and floor plan development per Fitness International's programming criteria. These plans are specifically not for use as layers to be imported into documents / files or to be used as tracing underlayment(s) for construction documents / files by the professional of record for this or any other project.

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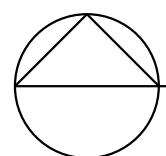
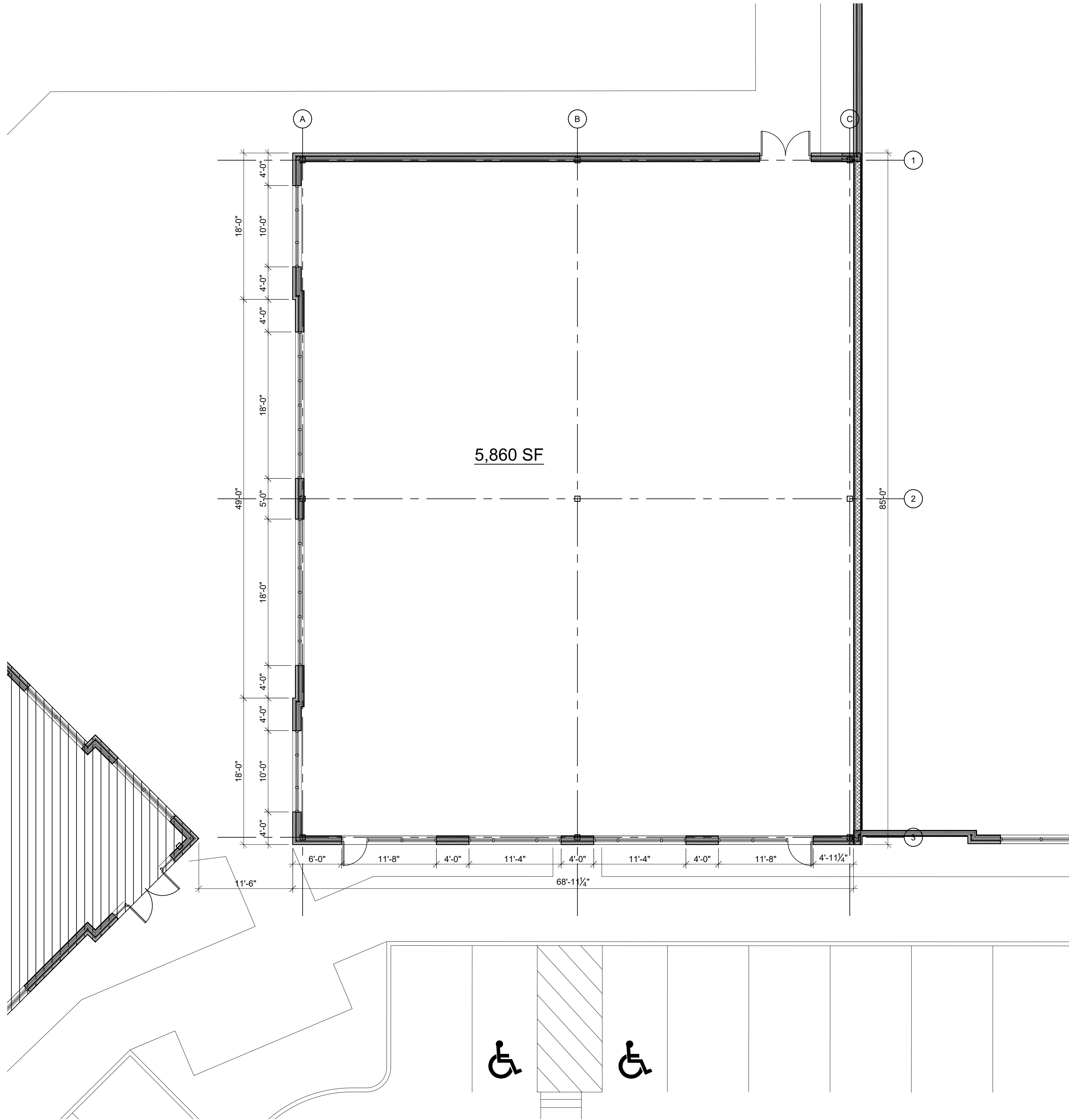
1	Prefinished Aluminum Panels Kynar color 'Charcoal Gray'	2	Prefinished Aluminum Panels - Kynar color 'Slate Gray'	3	Prefinished Aluminum Panels - Kynar color 'T.B.D.'	4	Painted Galvanized Steel Canopy - Match Kynar color 'Charcoal Gray'
5	Prefinished Aluminum Panels at Window Surrounds Kynar color 'Charcoal Gray'	6	Curtainwall and Entry Doors - Clear Anodized Finish w/ Dual Glazed Green Tint Glass	7	Painted Precast Panel - Dunn Edwards Paints 'Abstract White' #DE6232	8	Painted Precast Panel - Dunn Edwards Paints 'Reclaimed Wood' #DET625





DRAFT

INFORMATION ONLY



BUILDING 'G'

SCALE: 1/8" = 1'-0"



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PROJECT + INFORMATION

RETAIL
BUILDING G
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211-14

ISSUE + DATE

25 JAN 2024

SITE

SHEET + TITLE

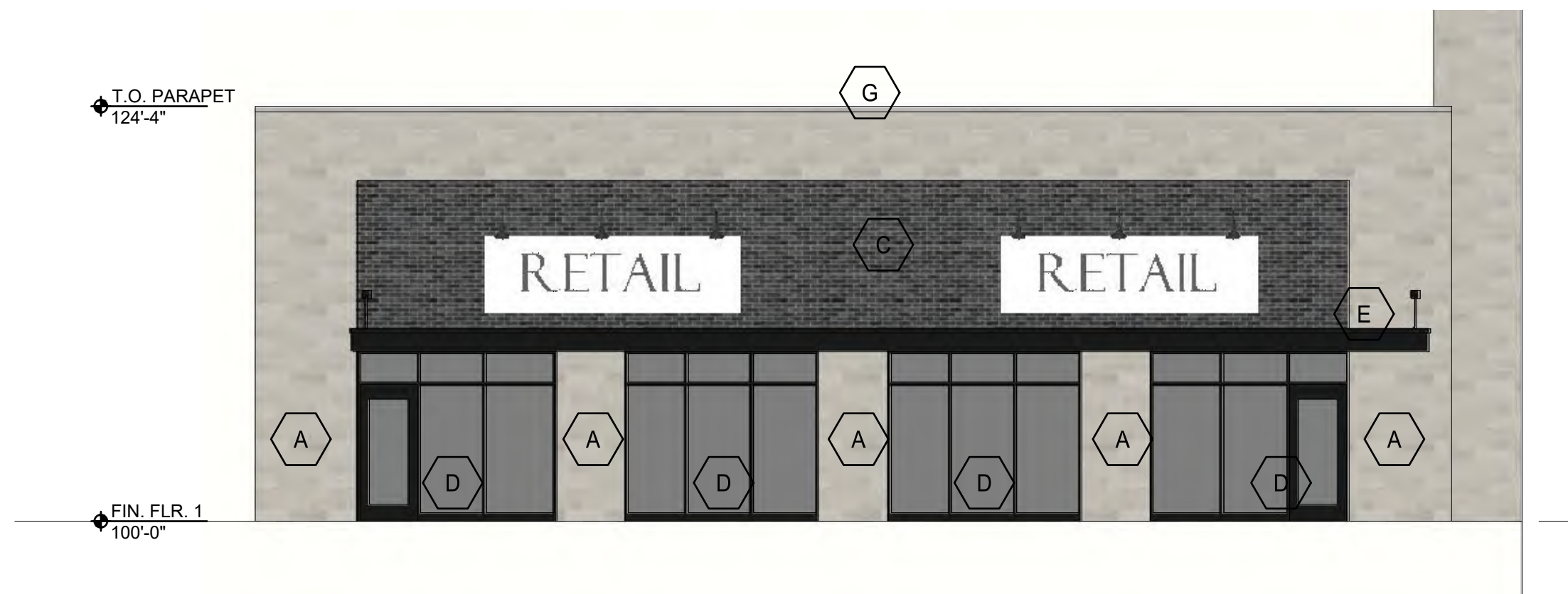
BUILDING 'G'

2321114mast.dwg

SHEET + NUMBER

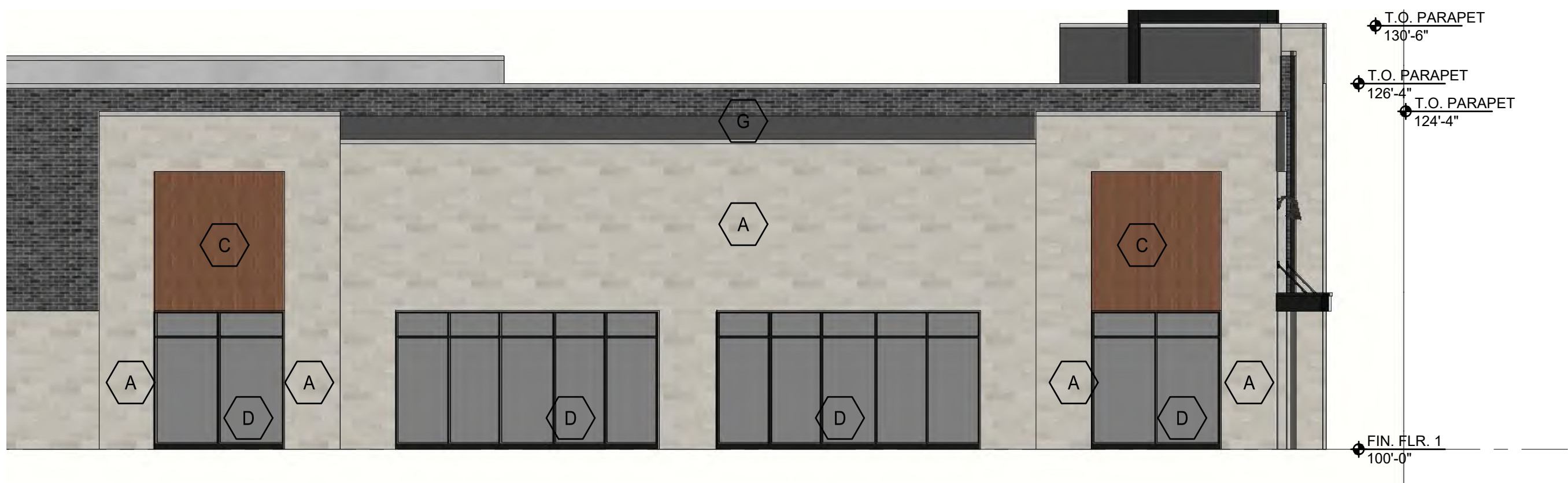
A-100

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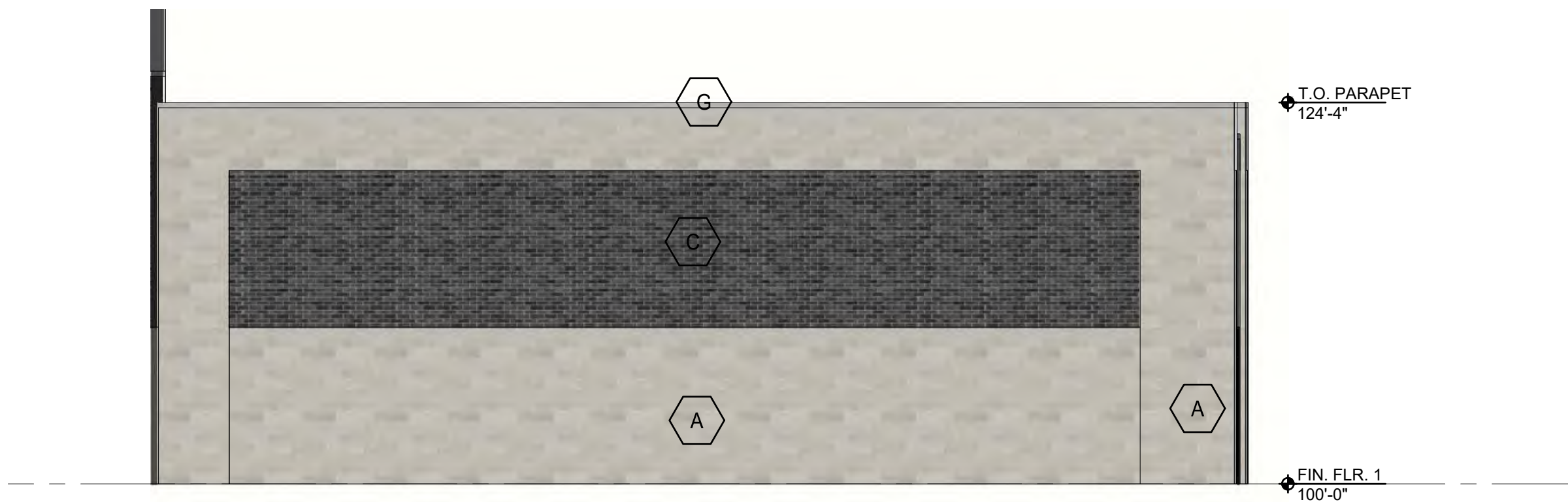
EXTERIOR
ELEVATION

SCALE: $\frac{1}{8}" = 1'-0"$



EXTERIOR
ELEVATION

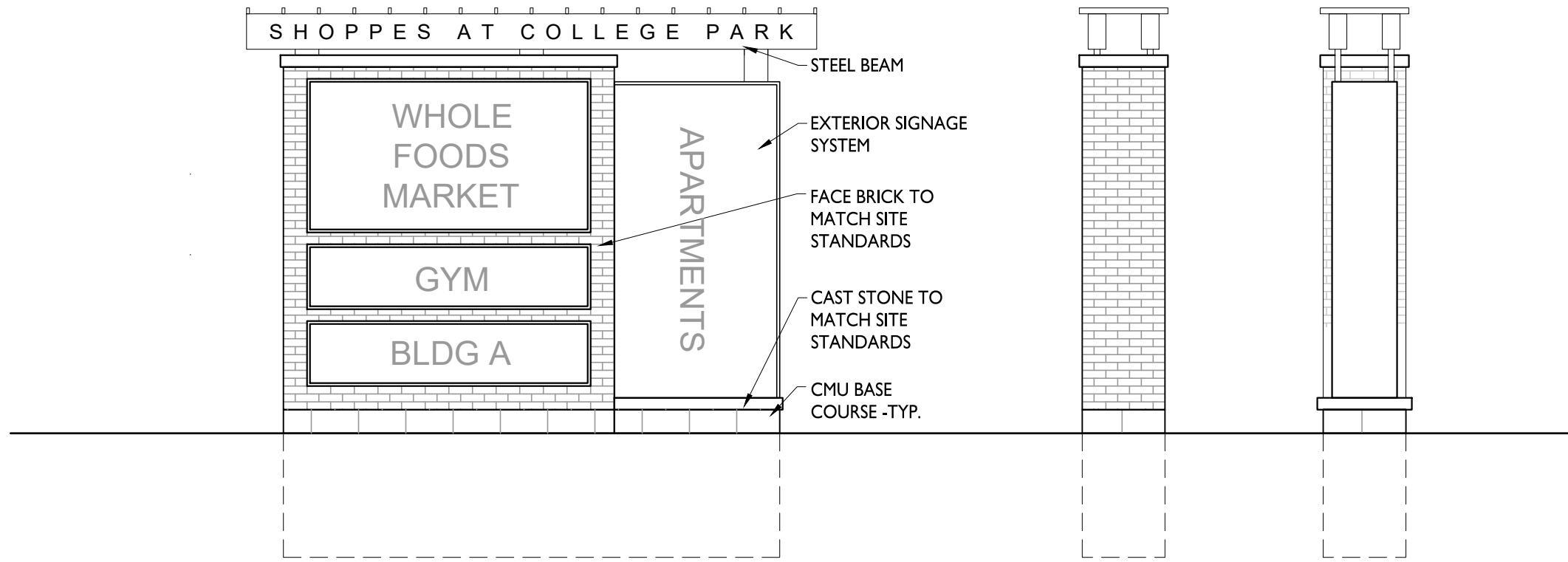
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EXTERIOR
ELEVATION

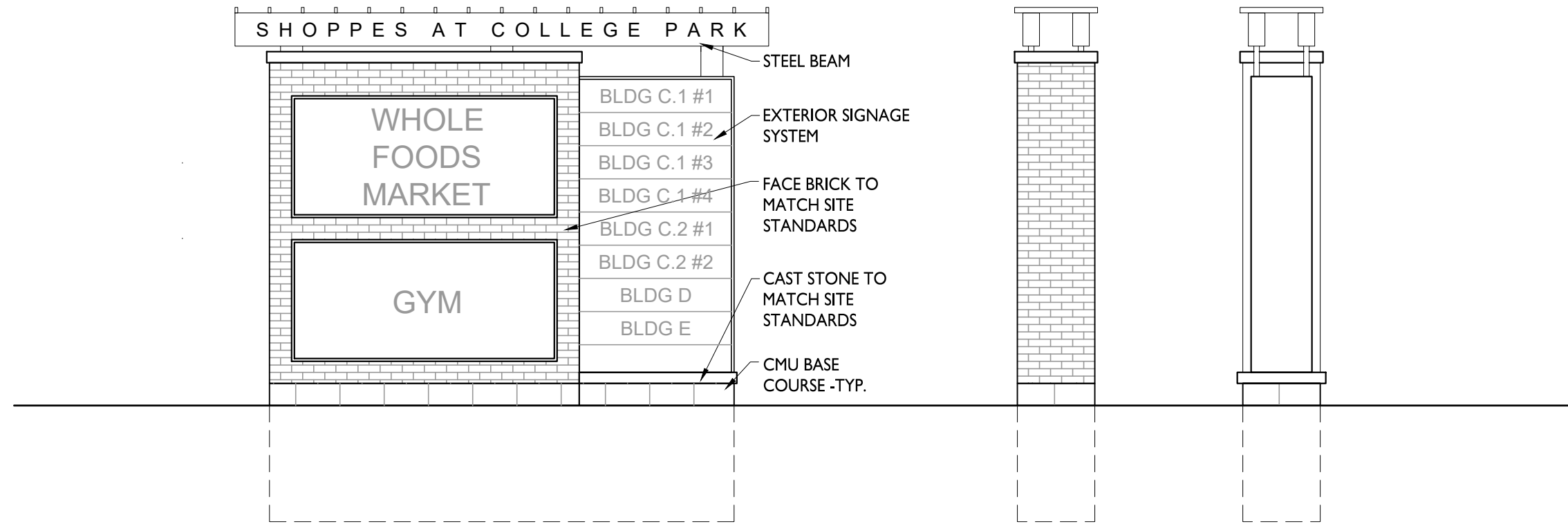
SCALE: $\frac{1}{8}" = 1'-0"$

EXTERIOR FINISH LEGEND		
TAG	MATERIAL	MANUF/STYLE
A	STONE MASONRY	ROCKCAST
B	METAL PANELS	TBD
C	BRICK	BELDEN
D	METAL FRAMES	TBD
E	METAL CANOPY	TBD
F	METAL PAINTED	TBD
G	METAL COPING	TBD
H	FIBER CEMENT PANEL	NICHIHA VINTAGE WOOD
		COLOR
		BUFFSTONE
		CARBON BLACK
		REDWOOD



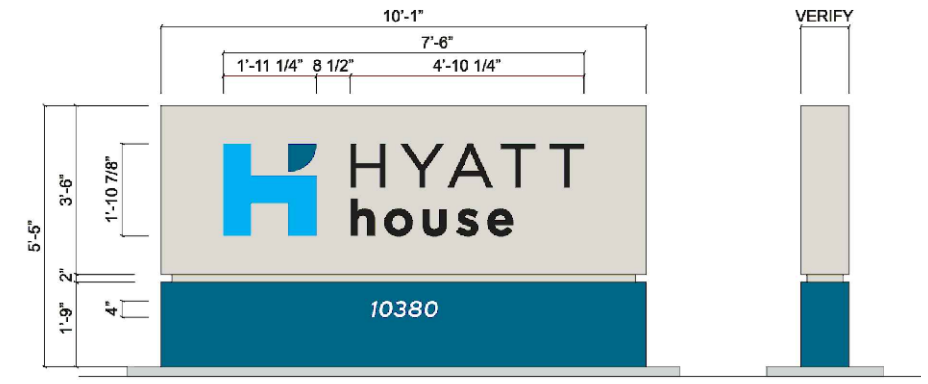
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SIGN A

1
A-002 | A-001 SCALE: 1/4" = 1'-0"



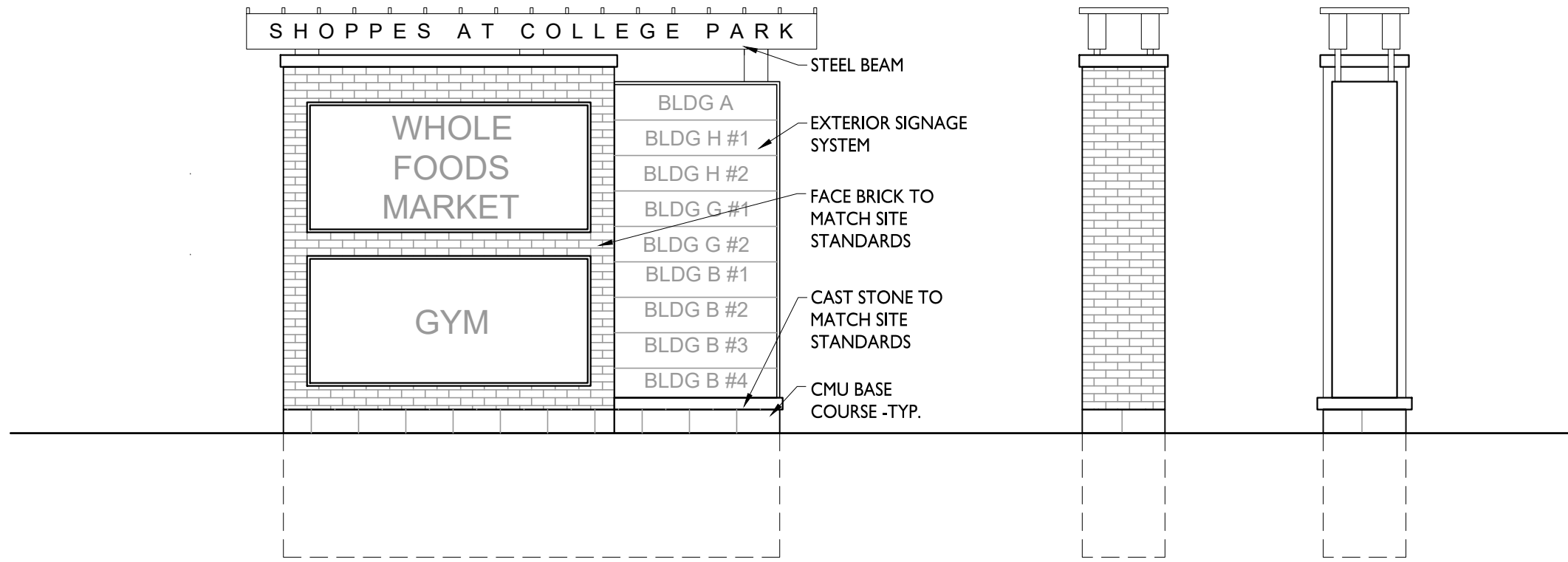
MONUMENT
SIGN C

3
A-002 | A-001 SCALE: 1/4" = 1'-0"



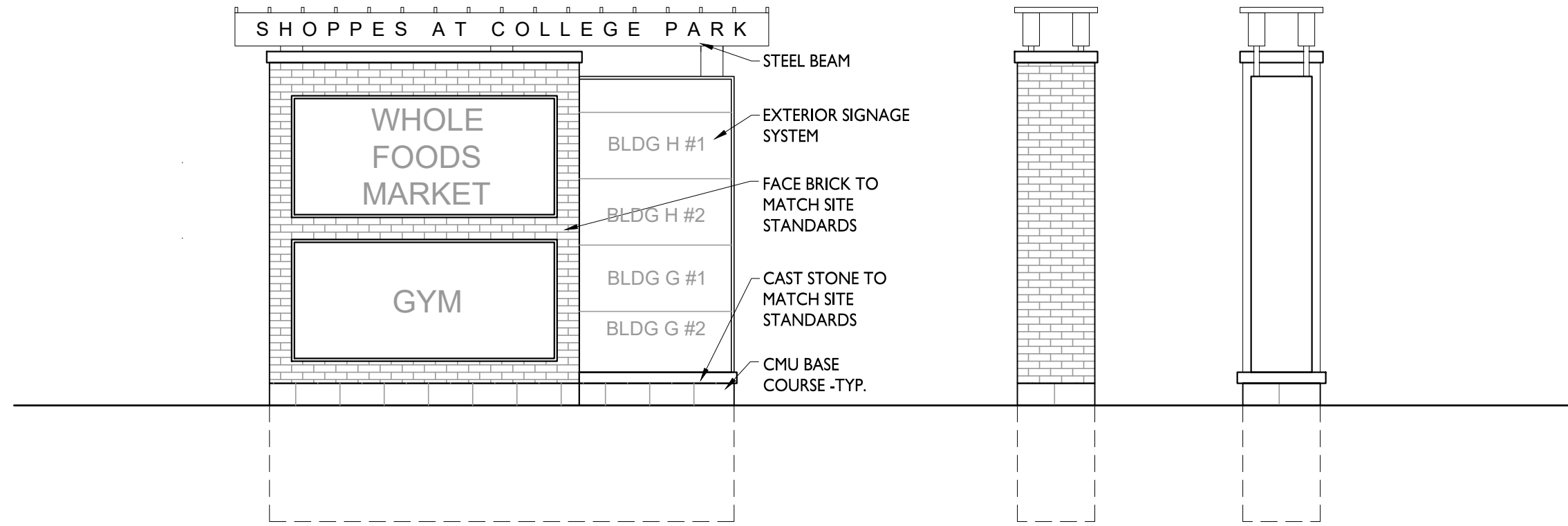
MONUMENT
SIGN E

5
A-002 | A-001 SCALE: 1/4" = 1'-0"



MONUMENT
SIGN B

2
A-002 | A-001 SCALE: 1/4" = 1'-0"



MONUMENT
SIGN D

4
A-002 | A-001 SCALE: 1/4" = 1'-0"



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PROJECT + INFORMATION
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COMMONS
FOX DRIVE
LIVONIA, MI

PROJECT + NUMBER

23-211

ISSUE + DATE

25 JAN 2024 REVIEW

SHEET + TITLE

MONUMENT
SIGN PLAN

23211z100.dwg

SHEET + NUMBER

A-002



OVERALL PROPOSED DEVELOPMENT AERIAL
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

BOWERS+ASSOCIATES
ARCHITECTURE DESIGN



OVERALL PROPOSED DEVELOPMENT AERIAL
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

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ARCHITECTURE DESIGN



OVERALL PROPOSED DEVELOPMENT AERIAL
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

BOWERS+ASSOCIATES
ARCHITECTURE DESIGN



OVERALL PROPOSED DEVELOPMENT AERIAL
 SIX MILE & HAGGERTY | LIVONIA, MICHIGAN



PROPOSED INTERIOR RETAIL VIEW
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN



PROPOSED HAGGERTY SIDEWALK VIEW
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

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PROPOSED APARTMENTS
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

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PROPOSED APARTMENTS
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PROPOSED HYATT HOUSE HOTEL
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PROPOSED HAGGERTY INTERSECTION

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PROPOSED RETAIL BUILDING B
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

BOWERS+ASSOCIATES
ARCHITECTURE DESIGN



PROPOSED DRIVE-THRU
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

BOWERS+ASSOCIATES
ARCHITECTURE DESIGN



PROPOSED GYM
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

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ARCHITECTURE DESIGN



PROPOSED RETAIL BUILDING G
SIX MILE & HAGGERTY | LIVONIA, MICHIGAN

BOWERS+ASSOCIATES
ARCHITECTURE DESIGN

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

TODD J. ZILINCIK, P.E.
CITY ENGINEER

DAVID W. LEAR, P.E.
ASST. CITY ENGINEER



MAUREEN MILLER BROSNAN
MAYOR

DONALD R ROHRAFF
DIRECTOR OF PUBLIC WORKS

12973 FARMINGTON ROAD
LIVONIA, MICHIGAN 48150
(734) 466-2571
FAX: (734) 466-2195

February 27, 2024

Mr. Jacob Uhazie
Assistant Planning Director
City of Livonia

Re: Petition 2024-02-02-03 – #39200 Six Mile Road

Dear Mr. Uhazie:

In accordance with your request, the Engineering Division has reviewed the above referenced petition. We have no objections to the proposed waiver use at this time, but would like to note the following items:

1. The subject parcel is assigned the address of **#39200 Six Mile Road**. Should additional addresses be needed, the Owner will need to contact this Department once permitting has been completed.
2. The legal description submitted with the drawings appears to be correct and should be used for the parcel should the waiver-use be granted.
3. The existing parcel is currently serviced by public sanitary sewer and water main, as well as private storm sewer. The submitted drawings indicate do not include any information regarding the proposed utility services or drainage, so we are unable to comment on those issues at this time. Based on the submitted drawings, we do not believe there will be negative impacts to the existing systems.
4. The drawings do not indicate any information regarding existing or proposed storm water detention, so we have no comments on those issues. The development will be required to provide detention per the latest version of the Wayne County Stormwater Ordinance. Stormwater calculations will be reviewed during the permitting process.
5. Any disturbances with the Six Mile Road or Haggerty Road right-of-way's will require permits through the Wayne County Department of Public Service, including drive approach and sidewalk removals and placements. The developer will be required to work with Wayne County, and possibly the Michigan Department of Transportation

To: Mr. Jacob Uhazie
Re: Petition 2024-02-02-03 – 39200 Six Mile Road

February 27, 2024
Page 2

(MDOT) regarding the proposed traffic signals, and may be required to provide a traffic survey for the proposed project

Should you have any additional questions on this matter, please feel free to contact myself at (734) 466-2608 or the City Engineer, Mr. Todd Zilincik at (734) 466-2561. If you would prefer, you can e-mail either of us at dlear@livonia.gov or tzilincik@livonia.gov.

Sincerely,



David W. Lear, P.E.
Assistant City Engineer

cc: 2024 Petition File

DEPARTMENT OF PUBLIC SAFETY
LIVONIA FIRE & RESCUE

ROBERT JENNISON
FIRE CHIEF



MAUREEN MILLER BROSNAN
MAYOR

14910 FARMINGTON ROAD
LIVONIA, MICHIGAN 48154-5419
734-466-2444
734-466-2082 fax

DATE: 3/18/2024

TO: Scott O. Miller, Planner IV

FROM: Livonia Fire Prevention Division

SUBJECT: Petition #2024-02-02-03, 39200 Six Mile Rd. (Mixed Use Development)

This office has reviewed the site plan submitted in connection with a request to construct a commercial building on property located at the above referenced address.

We have no objections to this proposal with the following stipulations:

1. Maintain appropriate emergency vehicle roadway access per fire code.
2. Submit plans for review on suppression system(s) and Fire alarms during the development process.
3. For **every** Fire Department Connection (FDC) installed, a fire hydrant for water supply is required to be within 100 ft of that connection.

A further detailed plan review will take place when this division receives an official plan set.

Sincerely,

Brian Kukla

Brian Kukla
Fire Marshal

DEPARTMENT OF PUBLIC SAFETY
DIVISION OF POLICE

THOMAS GORALSKI
CHIEF OF POLICE



MAUREEN MILLER BROSNAN
MAYOR

15050 Farmington Road
Livonia, Michigan 48154-5499
(734) 466-2470
FAX: (734) 261-2265

February 29th 2024

Mr. Scott Miller
City of Livonia Planning Dept
33000 Civic Center Drive
Livonia, MI 48154

Re: Petition 2024-02-02-03 39200 Six Mile Road

Mr. Miller,

I have reviewed the plans in connection with the petition as well as the traffic impact study completed by Fishbeck. I agree that with such a complex, a new signalized intersection is required along Haggerty Road to allow safe ingress and egress from the complex. While the proposal did not call for the installation of a traffic signal at Six Mile and Fox Drive, I do agree with the recommendation in the traffic study conducted by HRC in regards to their findings for this location. HRC recommended the installation of a single traffic signal that would control the intersection of Six Mile Road and Fox Drive, and the intersection of Six Mile Road and Quakertown Lane. The existing driveway for Buca Di Beppo Italian Restaurant onto Six Mile Road will be closed, and a new driveway for the restaurant will be constructed on Fox Drive. Fox Drive would become a full movement intersection by removing the median barrier to allow for the installation of a left turn lane. It should be noted the traffic impact study accounted for the addition of traffic signals at this location. However, it is not shown on the petition. I would recommend that the traffic impact study be followed and all recommended changes be made in order to approve the petition at the cost of the petitioner.

According to the traffic impact study, the intersection of Six Mile and Haggerty currently operates near capacity during the p.m. peak hours and several intersections in the area already have poor levels of service. According to the study provided by Fishbeck, many of these intersections will continue to suffer poor levels of service or become worse after the proposed development as seen on page 22 of the study. If the recommended

improvements by Fishbeck were made, there would still areas that suffer decreased levels of service compared to existing conditions as seen on page 25 of the study. It should be noted one of the areas with decreased levels of service would be traffic entering Six Mile from Quakertown, even with the addition of a traffic light at Quakertown. This would affect a large amount of Livonia residents that live in that subdivision.

My next area of concern is the ability for large trucks to effectively maneuver through the complex to make deliveries or for emergency response incidents. Figure C-16 shows the circulation of a standard pumper fire truck. Based on this diagram, it appears this truck may be unable to take the most direct routes through the complex. I am also concerned about how a ladder truck, which would be necessary for the proposed hotel and apartment complex, would be able to maneuver through the complex. Delivery trucks shown in figure C-15 would have to block the north drive while backing up to deliver to the proposed grocery store. Looking at the location of trash dumpsters, trucks would be blocking the drive on the S/E corner of the proposed grocery store to load/offload the compactor dumpsters. This would also create a vision obstruction for vehicles in the area during these times as they come around the corner of the building. When looking at the other dumpster location sites, it does not appear there are any close dumpster locations for buildings B, C, E, H, or G. It must be considered that employees of these businesses would be required to traverse the parking lots with trash carts which could become an additional hazard in a congested parking lot.

My last area of concern is the lack of parking. Per figure C-2, city ordinance requires 1,280 parking spaces, yet the proposal only provides 987, with more than a third of those provided by the existing parking structure. There is very limited parking outside of the apartment building and I would like to ask if the parking garage is going to be limited in any fashion for tenant use only? If each building is examined as its own facility and there is a lack of designated handicap parking in several locations in the proposal to meet ADA guidelines.

A parking analysis completed in the traffic impact study has an inconsistency to the supplied petition (Table 12). The traffic impact study states the proposal shows a total of **1,031** parking spaces whereas figure C-2 in the petition states **987** parking spaces and by my count of the parking spaces on figure C-2 only **985** parking spaces are planned. The analysis also states the required amount of parking spaces per city ordinance is 1,358 whereas figure C-2 in the petition states 1,280 parking spaces are required. Due to this inconsistency, I question the validity of the parking analysis until the actual number of parking spaces proposed is verified.

The parking analysis, while using a more traditional approach shows parking occupancy (1,031 spaces) would be at 91% on weekdays, 97% on Saturday and 106% on Sunday. The study also states that the public perceives a parking lot to be full at 85-95% occupancy. Going by this analysis, every single resident in the apartment complex would struggle to locate a parking space everyday of the week. The study also used an urban model which suggests mixed use spaces require less parking. Under this analysis, the study reads in numbers rather than percentages, stating 979 required parking spaces on a weekday and 840 parking spaces required on a weekend. The

study states the excess of 52 parking spaces on a weekday and 191 parking spaces on a weekend would create no parking occupancy issues with a projected 1,031 parking spaces in the complex. When you break that down to percentages like the study did under the traditional modeling with 1,031 available parking spaces, the percentages are 95% occupancy on a weekday and 81% occupancy on a weekend. I would argue that this is insufficient parking. More residents of the apartment building are likely to be home with their vehicles parked on a weekend when the majority of the population is not at work. Furthermore, with 357 parking spaces inside of the structure, the open parking lot will almost always appear full to the public while they struggle to locate the parking space vacancies throughout the complex. Now if the actual number of parking spaces I counted on figure C-2 is correct (985) the occupancy results would be worse than the study projects and insufficient for the proposed petition.

Looking at the petition, the proposed building locations and the proposed parking areas, one can reasonably argue where people are likely to park. The parking structure will largely be used by the residents of the apartments with only 29 parking spaces adjacent to the apartment building. Per city ordinance, the apartment complex requires 375 parking spaces. The spaces adjacent and the parking structure provide 386 parking spaces, therefore, the majority of the parking structure will be occupied by residents of the apartment building. The parking lot west of the proposed grocery store and a few spaces south of the attached retail space provides 202 parking spaces to service this area, which is sufficient under the city ordinance requirement of 192 parking spaces. Looking at the placement of the northern most row of parking spaces west of the proposed grocery store, these spots would cause constant congestion with the traffic entering and exiting of off Haggerty Road as vehicles must enter the drive to back out of the parking spaces. The parking area due north of the proposed hotel and all parking next to the hotel is 96 parking spaces and where guests and employees of this hotel are likely to park. The city ordinance requires 111 spaces for this area, however full occupancy at a hotel is not a daily occurrence.

The area that concerns me most is the parking provided for all of the retail stores, bank, restaurants, and gym located on the southwestern portion of the property, south of the signalized entrance and west of the hotel. This entire area only has 300 parking spaces to serve these businesses. This is a significant deficiency from the city ordinance requirement of 602 parking spaces that would be required to serve both restaurants, the bank, the gym and the remaining 46,183 square feet of retail space in that immediate area.

As presented, I recommend the denial of this petition due to lack of parking and impact on traffic in the area. If passed, I urge all the recommended traffic improvements be made from the Fishbeck traffic impact study, including the traffic signal proposal for Fox and Quakertown at Six Mile, which is missing from the petition. I do not believe there is adequate parking for the proposal regardless of whether the true number of spaces is 985, 987 or 1,031.

Please feel free to contact me, should you have any questions.

Sincerely,

FOR THE CHIEF OF POLICE,

A handwritten signature in black ink, appearing to read "Paul Walters", with a long horizontal flourish extending to the right.

Paul Walters, Sergeant
Traffic Bureau
(734) 466-2107

March 7, 2024
Project No. 230942

Doraid Markus
Markus Management Group
251 East Merrill, Suite 205
Birmingham, MI 48009

Response to Letter from City of Livonia Department of Public Safety
RE: Petition 2024-02-02-03 39200 Six Mile Road

The following are a summary of items regarding the Traffic Impact Study (TIS) and parking study included in the letter dated February 29, 2024, signed on behalf of the Chief of Police by Traffic Bureau Sergeant Paul Walters. For each summarized item, Fishbeck has included our response. The TIS and parking study associated results and recommendations were completed consistent with accepted engineering practice.

1. The first paragraph discusses the installation of the traffic signal at Six Mile Road and Fox Drive. The recommendation for this signal is from a traffic study completed by HRC. The letter notes that this signal is included in the analysis but not included in the petition for the development.

Fishbeck Response: The proposed traffic signal at Six Mile Road and Fox Drive is a recommendation of a study completed for Schoolcraft College. The installation of this signal and necessary roadway improvements are presumed to be constructed by Schoolcraft College. The signal was included in the TIS at the request of the Wayne County Department of Public Services (WCDPS) since it is planned with or without this proposed development and therefore is not included as a recommendation in the TIS or in the petition for the development.

It is our understanding that Schoolcraft College is currently in the process of installing the traffic signal at Six Mile and Fox Drive and Haggerty Six Partners, LLC have contributed funds to the cost of traffic signal installation.

2. The second paragraph discusses the results of the future conditions analysis and future improvement conditions analysis, particularly at the Six Mile Road and Quakertown intersection.

Fishbeck Response: The recommended traffic signal timing improvements are proposed to provide better progression on Six Mile and Haggerty Roads. The increase in cycle length allows additional time for left turns and all through movements at Haggerty and Six Mile Roads and additional time for Six Mile Road and Fox Drive at the proposed signal at Six Mile Road and Fox Drive. This does result in an increase in delay for Quakertown Lane which is a result of the longer cycle length. This increase in delay results in a minor increase in queued vehicles from 88 feet (4 vehicles) to 114 feet (5 vehicles) in the p.m. peak hour.

3. The third paragraph discussed truck site circulation.

Fishbeck Response: This is not related to the TIS and will need to be addressed on the site plan.

4. The fourth through eighth paragraphs discuss the parking analysis and various concerns regarding parking for the site.

Fishbeck Response: A parking analysis was included in the August 16, 2023, TIS. This analysis was for the site plan that provided 1,031 parking spaces (674 surface parking and 357 parking structure spaces). The City Ordinance required 1,358 parking spaces based on the various uses. The Urban Land Institute (ULI) Shared Parking 3rd Edition was used to determine the required parking supply based on the proposed uses in the development at the time of the TIS submittal. In mixed use developments such as the proposed development, it is common for the mix of uses to have varying peak hour and monthly parking demands and for vehicles to visit more than one component in the development. The Institute of Transportation Engineers (ITE) Parking Generation, 5th Edition was used to determine the parking demand based on studies completed for the various proposed uses in the development at the time of the TIS submittal per the request of the City of Livonia. This demand does not represent the required supply and does not take into consideration the sharing of parking spaces by the various uses proposed.

After the submittal of the August 16, 2023, TIS, the site plan was updated and a revised parking analysis was prepared, dated February 14, 2024. Based on the new site plan, the City Ordinance requires 1,290 parking spaces and 987 parking spaces were provided on the site plan. The ULI and ITE calculations for parking supply required and parking demand were updated, respectively. These calculations showed the required parking supply based on ULI is below the proposed number of spaces and occupancy based on ITE is now 77% during the weekday and 82% on the weekend. The attachments to the updated parking analysis includes information on the peak times during a typical weekday and weekend for each use proposed and the peak months for parking.

If you have any questions or require additional information, please contact me at 517.420.6746 or jmbauer@fishbeck.com.

Sincerely,



Jill Bauer, PE, PTOE

Senior Traffic Engineer/Project Manager

By email

Copy: Michael J. Labadie, PE – Fishbeck

INSPECTION DEPARTMENT

BUILDING
HEATING
PLUMBING
ELECTRICAL
ZONING
ENVIRONMENTAL PROTECTION
ORDINANCE ENFORCEMENT



MAUREEN MILLER BROSNAN
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33000 CIVIC CENTER DRIVE
LIVONIA, MICHIGAN 48154-3097
(734) 466-2580
FAX: (734) 466-2095

Date: March 11, 2024

To: Scott O. Miller

From: Jerome Hanna

RE: Petition 2024-02-02-03 39200 Six Mile Road

Pursuant to your request, the above-referenced Petition has been reviewed.

1. All signage shall be conforming. A variance from the Zoning Board of Appeals would be required for any non-conforming signage.
2. Outdoor lighting shall be directed toward and confined to the ground areas. Light trespass shall not exceed .5-foot candles at the property line.
3. An enclosure of sufficient height to completely screen the dumpster is required on three (3) sides of the waste receptacle with a solid gate on the fourth side. The height of the enclosure must be not less than six (6) feet or at least one (1) foot above the height of the dumpster, whichever is greater. The enclosure gates shall be of solid panel steel construction or durable, long-lasting solid panel fiberglass and, when not in use, closed at all times. The enclosure must be constructed of the same or compatible material and colors as the principal building in terms of texture and quality.
4. Accessible parking spaces shall be provided and sized in accordance with the Michigan Building Code 2015 and ICC A117.1-2009.
5. Accessible routes within the site shall be provided in accordance with the Michigan Building Code 2015 and ICC A117.1-2009.

This Department has no further objections to this Petition.

I trust this provides the requested information.

Jerome Hanna

Jerome Hanna
Director of Inspection

DEPARTMENT OF FINANCE

Michael T. Slater
DIRECTOR OF FINANCE

Connie Kumpula
CHIEF ACCOUNTANT



MAUREEN MILLER BROSAN
MAYOR

33000 CIVIC CENTER DRIVE
LIVONIA, MICHIGAN 48154-3097
(734) 466-2260
FAX: (734) 421-1807

February 28, 2024

Mr. Jacob Uhazie
Planning Commission
33000 Civic Center Drive
Livonia, MI 48154

Petition – 32900 Six Mile Road

Dear Mr. Uhazie,

I have reviewed the address connected with the above noted petition. As there are no outstanding amounts receivable (general or water and sewer), I have no objections to the proposal.

Please contact me if you have any further questions.

Very truly yours,

Connie Kumpula
Chief Accountant

CK: jw

TREASURER

Technical Memo

SUBJECT: NEC Six Mile Road and Haggerty Road Mixed-Use Development
Revised Parking Study

DATE: February 14, 2024

PROJECT NO.: 230942

On behalf of Markus Management Group, Fishbeck has completed a revised parking study related to a proposed mixed-use development that will be constructed in the northeast quadrant of Six Mile Road and Haggerty Road in the City of Livonia (City), Wayne County, Michigan. Revisions were completed to address comments from the City and to incorporate changes made to the site plan.

This parcel currently contains an approximately 400,000-square-foot (sft) office building and a three-story parking deck with 357 parking spaces. The existing office building will be demolished while the existing parking deck will remain. The proposed development will consist of the following:

- Hotel: Four Stories, 101 rooms
- Multifamily Residential: Five Stories, 170 Dwelling Units
- 38,020 sft Grocery Store
- Building A: 6,003 sft Mixed-Use Retail
- Building B: 15,942 sft Mixed-Use Retail
- Building C: 9,357 sft Mixed-Use Retail
- 5,295 sft Coffee Shop with Drive-Thru
- Building D: 10,018 sft Fine Dining Restaurant
- Building E: 2,500 sft Bank
- Building F: 34,924 sft Gym
- Building G: 5,889 sft Mixed-Use Retail
- Building H: 14,995 sft Mixed-Use Retail

In accordance with the City ordinance, 1,290 parking spaces are required. The development is proposing 987 parking spaces, which is a deficit of 303 parking spaces. Given the parking deficit, a Shared Parking Study was completed.

The anticipated parking demand was calculated using the methodologies presented in the Institute of Transportation Engineers (ITE) *Parking Generation Manual*, 5th Edition. Finally, the required parking supply was calculated using the Shared Parking spreadsheet published by the Urban Land Institute (ULI), which utilizes the methodologies and data in the *Shared Parking*, 3rd Edition manual.

In mixed-use developments, not all parked vehicles are from sources outside the boundaries of the development but rather, are “shared” within the site, meaning a parked vehicle may visit several components of a mixed-use development in a single trip. Additionally, it is common for sites with a mixture of uses to have varying peak hour and monthly parking demands. The methodology presented in *Shared Parking* was followed to determine an appropriate shared parking reduction for the site. The results of this analysis suggest a 19% shared parking reduction on a typical weekday and a 27% shared parking reduction on a typical weekend for the combination of land uses.

Table 1 compares the number of parking spaces required by the City ordinance, the parking demand calculated using the ITE *Parking Generation Manual* data, and the required parking supply estimated by ULI utilizing the *Shared Parking* methodologies. All parking calculations are attached.

Table 1 – Parking Generation

Source	Number of Parking Spaces	
	Weekday	Weekend
City of Livonia Ordinance	1,290 Required Parking Spaces	
ITE <i>Parking Generation Manual</i>	763 Parking Space Demand	806 Parking Space Demand
ULI <i>Shared Parking</i>	953 Required Parking Spaces	860 Required Parking Spaces

As indicated in Table 1, the ITE methodologies result in a peak weekday parking demand of 763 parking spaces and a peak weekend demand of 806 parking spaces. A parking facility is perceived as “full” in the range of 85%–95% occupancy, less than its actual capacity. Comparing the ITE weekday parking demand of 763 spaces and weekend parking demand of 806 spaces to the proposed supply of 987 parking spaces, the parking facility would be at 77% occupancy on a weekday and at 82% occupancy on a weekend, which is below the perceived “parking facility full” threshold.

The ULI methodologies result in a required weekday parking supply of 953 parking spaces and weekend parking supply of 860 parking spaces. The recommended ULI ratios include the consideration of effective supply issues and do not require additional buffer.

Based on this analysis, no parking occupancy issues are projected if the proposed number of spaces (987 parking spaces) were approved instead of the ordinance requirement of 1,290 parking spaces.

CITY OF LIVONIA ZONING ORDINANCE PARKING REQUIREMENTS			
RETAIL	52,186 GSF	150 SF PER SPACE	348 SPACES
GROCERY	38,020 GSF	250 GLA PER SPACE	152 SPACES
RESTAURANT WITH DRIVE THROUGH WINDOW	5,295 GSF	125 SF PER SPACE	42 SPACES
	40 OUTDOOR SEATS	1 SPACE PER 3 OUTDOOR SEATS	13 SPACES
	6 EMPLOYEES	1 SPACE PER EMPLOYEE	6 SPACES
RESTAURANT	40 INTERIOR SEATS	1 SPACE PER 2 INTERIOR SEATS	20 SPACES
	15 EXTERIOR SEATS	1 SPACE PER 3 EXTERIOR SEATS	5 SPACES
	8 EMPLOYEES	1 SPACE PER EMPLOYEE	8 SPACES
BANK	2,500 GSF	150 SF PER SPACE	17 SPACES
	8 EMPLOYEES	1 SPACE PER EMPLOYEE	8 SPACES
MULTI-FAMILY RESIDENTIAL	100 DU	2 SPACES PER 1 OR 2 BEDROOM UNIT	200 SPACES
	70 DU	2.5 SPACES PER 3+ BEDROOM UNIT	175 SPACES
HOTEL	101 ROOMS	1 SPACE PER GUEST ROOM	101 SPACES
	20 EMPLOYEES	1 SPACE PER EMPLOYEE	20 SPACES
GYM	34,924 GSF	200 SF PER SPACE	175 SPACES
			1,290 SPACES REQUIRED

Building	ITE Land Use	Land Use Code	Units	Weekday	Weekend
Retail & Grocery	Shopping Center	820	90,206 GSF	235	290
Restaurant With Drive Through Window	Coffee/Donut Shop with Drive-Through Window	937	5,295 GSF	28	46
Restaurant	Fine Dining Restaurant	931	55 Seats	29	25
Bank	Drive-In Bank	912	2,500 GSF	10	8
Multifamily Residential	Multifamily Housing (Mid-Rise)	221	170 DU	219	207
Hotel	Hotel	310	101 Rooms	83	116
Gym	Health/Fitness Club	492	34,924 GSF	159	114
Total				763	806
Occupancy				77%	82%

Building	ITE Land Use	Land Use Code	Units	Time Period	Equation	Rate	Studies	Notes
Retail & Grocery	Shopping Center	820	90,206 GSF	Weekday	$P=1.49(X)+100.32$	1.95	46	# Studies>20, Use Fitted Curve
				Saturday	$P=2.78(X)+39.26$	2.91	58	# Studies>20, Use Fitted Curve
Restaurant With Drive Through Window	Coffee/Donut Shop with Drive-Through Window	937	5,295 GSF	Weekday	-	5.22	11	Use Average Rate.
				Saturday	-	8.7	2	Use Average Rate.
Restaurant	Fine Dining Restaurant	931	55 Seats	Weekday	-	0.52	2	Use Average Rate.
				Saturday	$P=0.59(X)-23.12$	0.46	4	Choose Line at Cluster. Average Rate Higher.
Bank	Drive-In Bank	912	2,500 GSF	Weekday	$P=3.62(X)+0.57$	3.72	39	# Studies>20, Use Fitted Curve
				Saturday	-	3.05	17	Use Average Rate.
Multifamily Residential	Multifamily Housing (Mid-Rise)	221	170 DU	Weekday	$P=1.34(X)-8.73$	1.31	73	# Studies>20, Use Fitted Curve
				Saturday	-	1.22	3	Use Average Rate.
Hotel	Hotel	310	101 Rooms	Weekday	$\ln(P)=0.90\ln(X)+0.26$	0.74	22	# Studies>20, Use Fitted Curve
				Saturday	-	1.15	1	Use Average Rate.
Gym	Health/Fitness Club	492	34,924 GSF	Weekday	$P=3.33(X)+42.58$	4.73	26	# Studies>20, Use Fitted Curve
				Saturday	$\ln(P)=0.89\ln(X)+1.56$	3.26	6	Choose Line at Cluster. Average Rate Higher.

Customer/Visitor	556	Customer	470
Employee/Resident	94	Employee/Resident	87
Reserved	303	Reserved	303
Total	953	Total	860

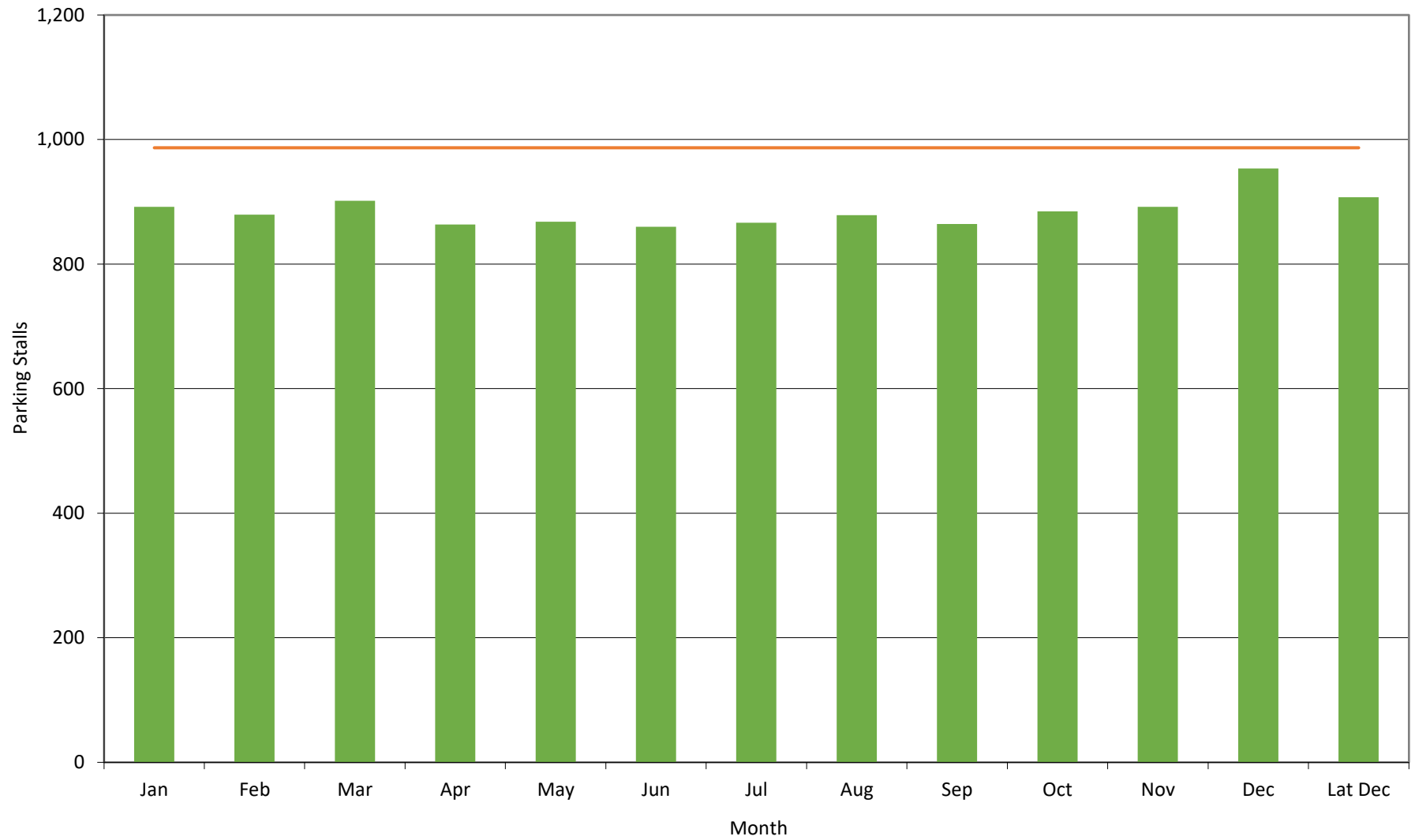
Project: NEC Six Mile Road and Haggerty Road

Description:

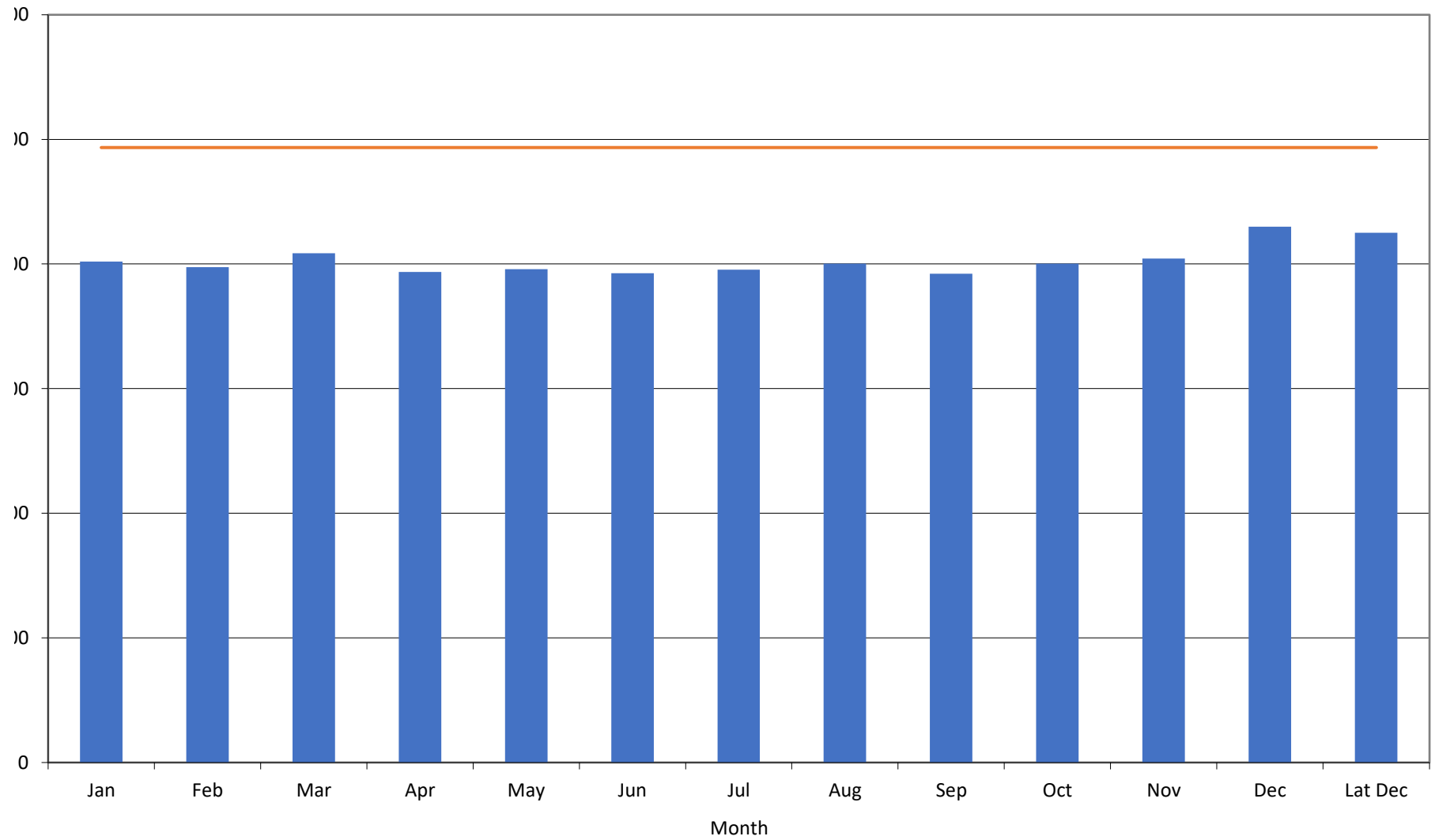
Monthly Comparison Summary								
Month	Weekday							
	Overall Pk		AM Peak Hr		PM Peak Hr		Eve Peak Hr	
	Time	Demand	Time	Demand	Time	Demand	Time	Demand
January	6 PM	892	11 AM	757	5 PM	866	6 PM	892
February	6 PM	879	11 AM	750	5 PM	854	6 PM	879
March	6 PM	902	11 AM	765	5 PM	876	6 PM	902
April	6 PM	863	11 AM	736	5 PM	841	6 PM	863
May	6 PM	868	11 AM	736	5 PM	845	6 PM	868
June	6 PM	860	11 AM	731	5 PM	838	6 PM	860
July	6 PM	866	11 AM	737	5 PM	844	6 PM	866
August	6 PM	878	11 AM	747	5 PM	747	6 PM	878
September	6 PM	864	11 AM	735	5 PM	841	6 PM	864
October	6 PM	884	11 AM	750	5 PM	859	6 PM	884
November	6 PM	892	11 AM	757	5 PM	867	6 PM	892
December	6 PM	953	11 AM	801	5 PM	922	6 PM	953
Late December	6 PM	907	11 AM	778	5 PM	900	6 PM	907

Monthly Comparison Summary								
Month	Weekend							
	Overall Pk		AM Peak Hr		PM Peak Hr		Eve Peak Hr	
	Time	Demand	Time	Demand	Time	Demand	Time	Demand
January	5 PM	804	11 AM	716	5 PM	804	6 PM	767
February	5 PM	795	11 AM	711	5 PM	795	6 PM	762
March	5 PM	817	11 AM	738	5 PM	817	6 PM	783
April	5 PM	787	11 AM	722	5 PM	787	6 PM	754
May	5 PM	791	11 AM	729	5 PM	791	6 PM	757
June	5 PM	785	11 AM	725	5 PM	785	6 PM	751
July	5 PM	791	11 AM	730	5 PM	791	6 PM	756
August	5 PM	801	11 AM	736	5 PM	801	6 PM	766
September	5 PM	784	11 AM	713	5 PM	784	6 PM	749
October	5 PM	801	11 AM	725	5 PM	801	6 PM	765
November	5 PM	809	11 AM	736	5 PM	809	6 PM	771
December	5 PM	860	11 AM	767	5 PM	860	6 PM	807
Late December	5 PM	850	11 AM	731	5 PM	850	6 PM	801

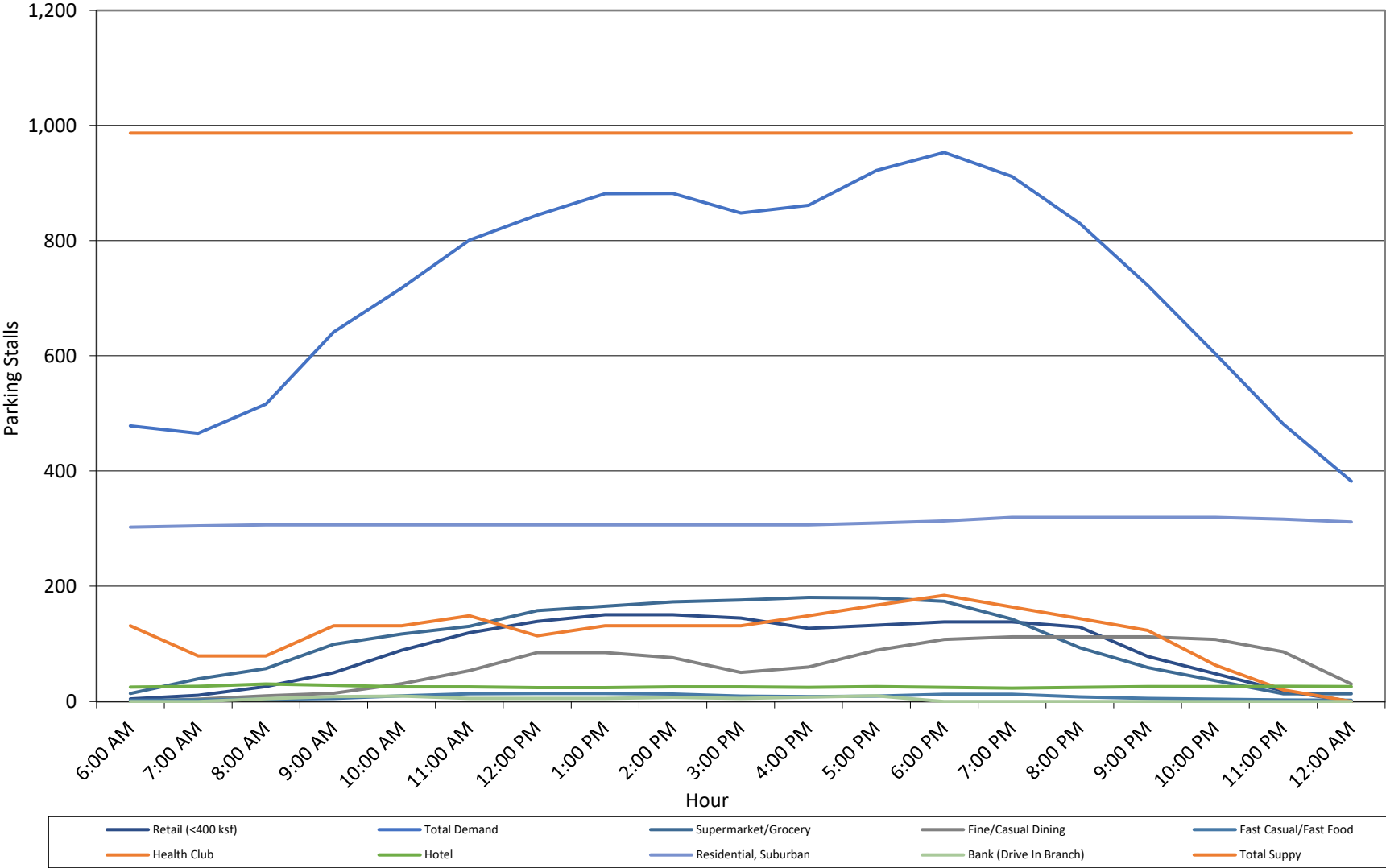
Weekday Month-by-Month Estimated Parking Demand



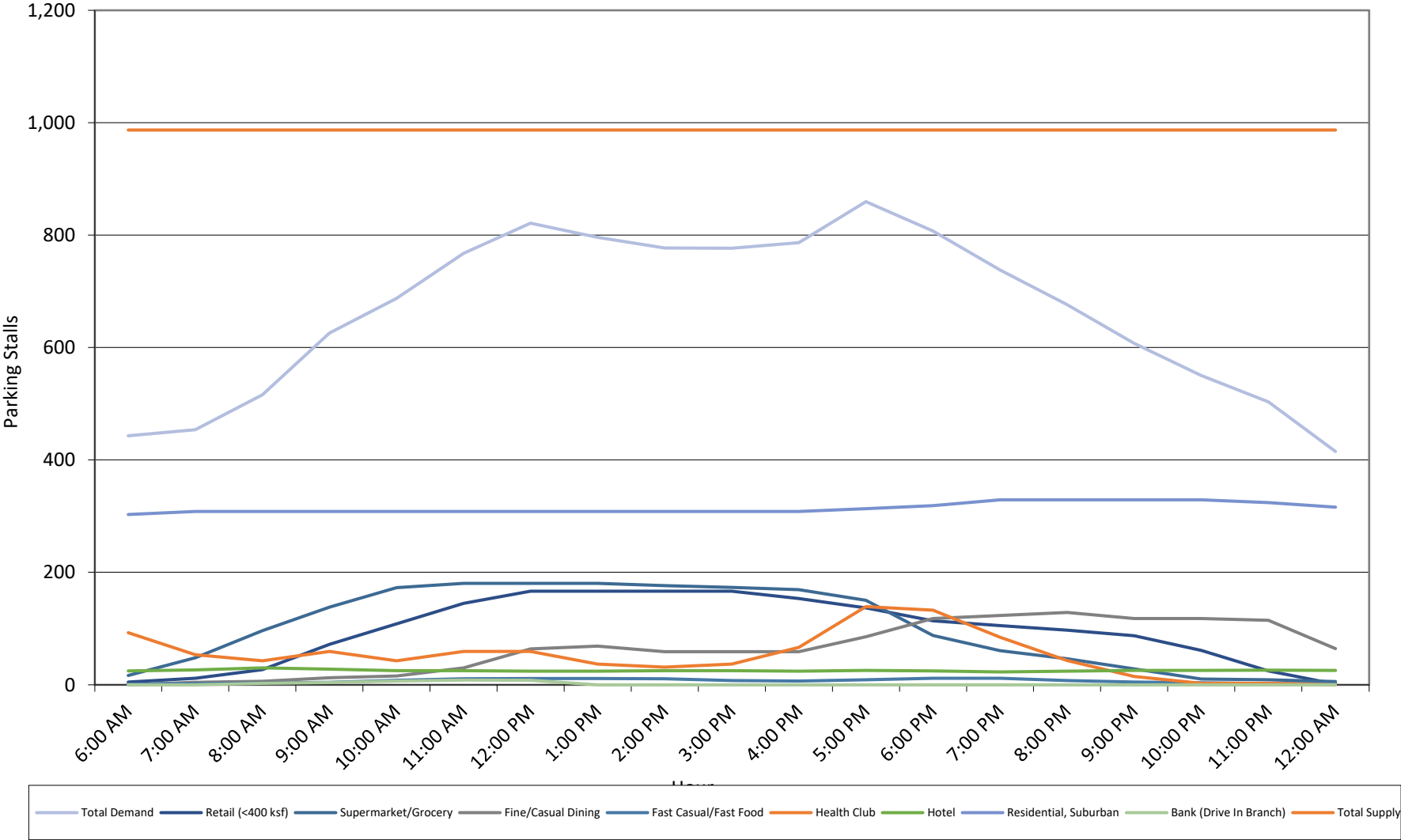
Weekend Month-by-Month Estimated Parking Demand



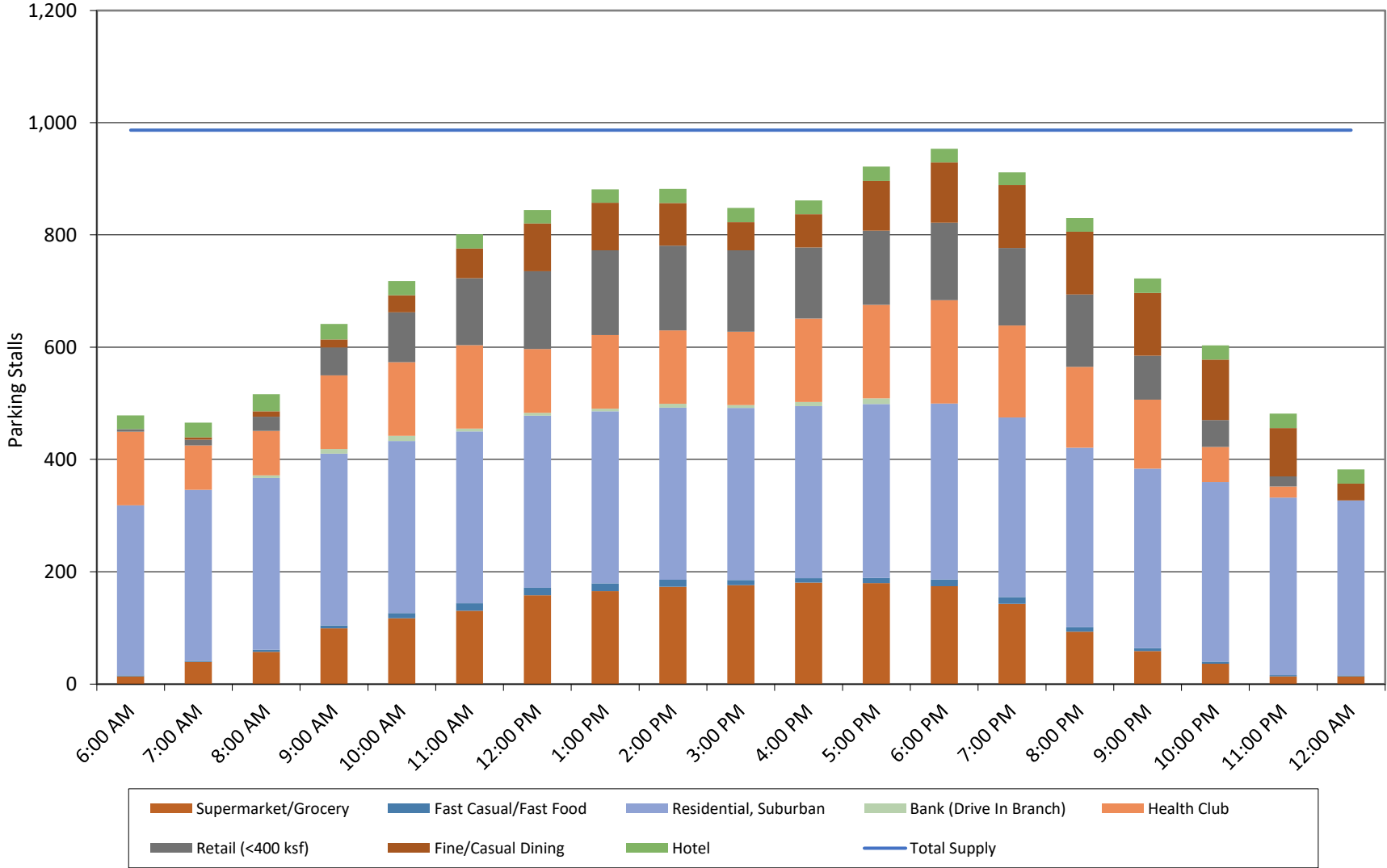
Peak Month Daily Parking Demand by Hour (Weekday)



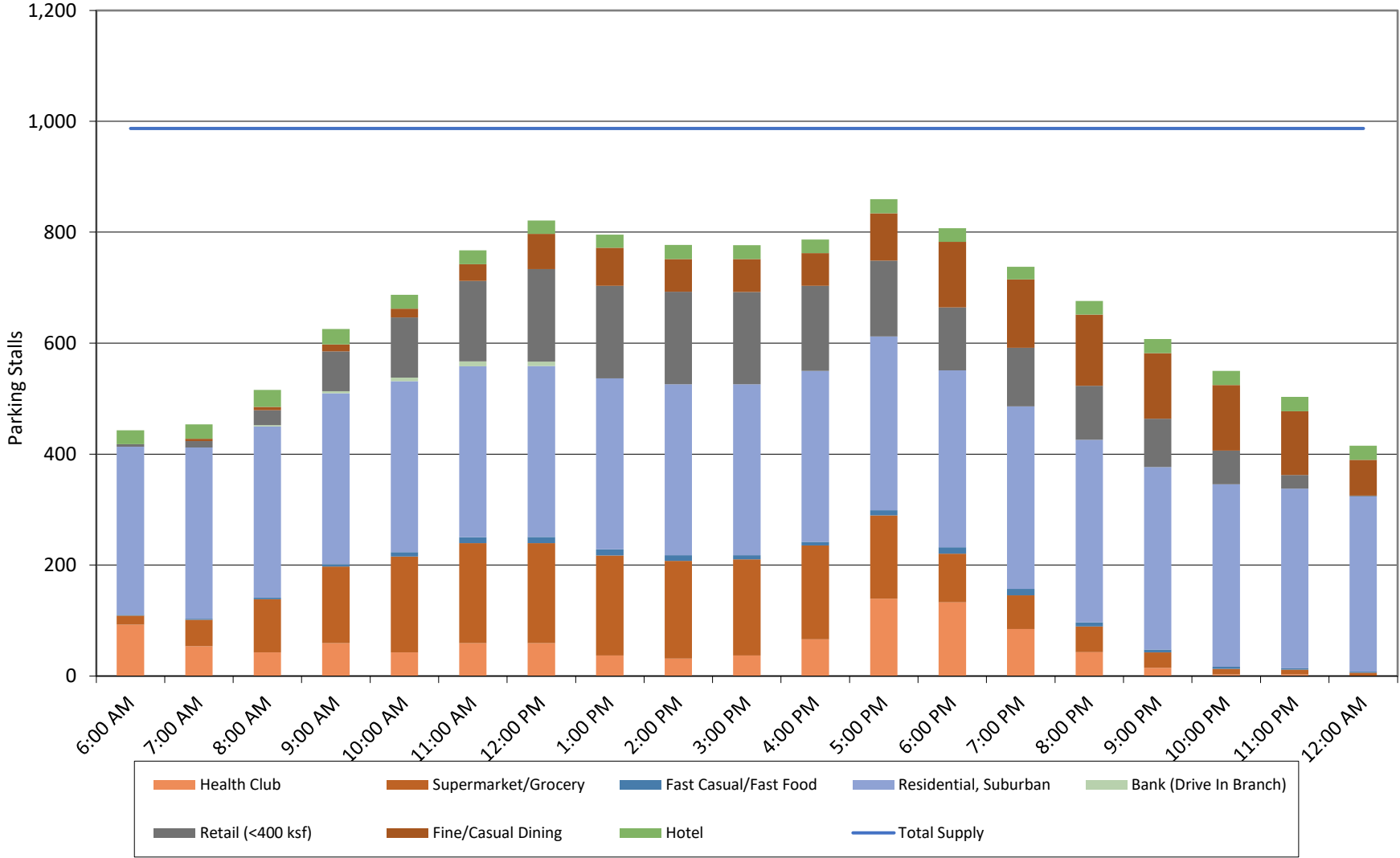
Peak Month Daily Parking Demand by Hour (Weekend)



Peak Month Daily Parking Demand by Hour (Weekday)



Peak Month Daily Parking Demand by Hour (Weekend)



NEC Six Mile Road and Haggerty Road Mixed-Use Development Traffic Impact Study Revision 1

Markus Management Group

Project No. 230942

August 16, 2023

NEC Six Mile Road and Haggerty Road Mixed-Use Development Traffic Impact Study Revision 1

**Prepared For:
Markus Management Group
Birmingham, Michigan**

**August 16, 2023
Project No. 230942**

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List of Abbreviations/Acronyms

AASHTO	American Association of State Highway and Transportation Officials
City	City of Livonia
DU	Dwelling Units
EB	Eastbound
EBT	Eastbound Through
EBT/R	Eastbound Through Right-Turn Movement
HCM	Highway Capacity Manual
HRC	Hubbell, Roth, & Clark, Inc.
ITE	Institute of Transportation Engineers
LOS	Level of Service
MDOT	Michigan Department of Transportation
MMUTCD	Michigan Manual on Uniform Traffic Control Devices
NB	Northbound
NBR	Northbound Right
SB	Southbound
SBL	Southbound Left
SBR	Southbound Right
SEMCOG	Southeast Michigan Council of Governments
sft	Square Foot
TCDS	Traffic Count Database System
TDMS	Transportation Data Management System
TIS	Traffic Impact Study
TMC	Turning Movement Count
TWLT	Two-Way Left Turn Lane
ULI	Urban Land Institute
v/c	Volume To Capacity Ratio
WB	Westbound
WBR	Westbound Right
WBT	Westbound Through
WCDPS	Wayne County Department of Public Services

References

Institute of Transportation Engineers, 2017, *Trip Generation Handbook*, 3rd Edition.
 Institute of Transportation Engineers, 2019, *Parking Generation Handbook*, 5th Edition.
 Institute of Transportation Engineers, 2021, *Trip Generation Manual*, 11th Edition.
 Michigan Department of Transportation, 2017, *Geometric Design Guidance*.
 Michigan Department of Transportation, 2013, *Michigan Manual on Uniform Traffic Control Devices*.
 Smith, Mary S, Urban Land Institute, ICSC, and National Parking Association, 2020, *Shared Parking*, 3rd Edition.
 Transportation Research Board, 2016, *Highway Capacity Manual*, 6th Edition.
 Transportation Research Board, 2000, *Highway Capacity Manual: 2000*.

Executive Summary

Fishbeck has completed a revised traffic impact study (TIS) related to a proposed mixed-use development that will be in the northeast quadrant of Six Mile Road and Haggerty Road in the City of Livonia (City), Wayne County, Michigan. Revisions were completed to address comments from the Wayne County Department of Public Services (WCDPS) and the City, and to incorporate changes made to the site plan.

This parcel currently contains an approximately 400,000 square-foot (sft) office building and a 3-story parking deck with 357 parking spaces. The existing office building will be demolished while the existing parking deck will remain. The site will be redeveloped as a mixed-use development and will be completed in one phase, assumed to be open and fully operational in 2025.

Access to the site will be provided via the four existing driveways and one proposed driveway. The site generated traffic will utilize the existing driveway on Six Mile Road, the northern two existing driveways on Haggerty Road, the existing driveway on College Parkway (which provides access to Haggerty Road), and one proposed driveway on Fox Drive (which provides access to Six Mile Road). The southernmost existing driveway on Haggerty Road will be closed.

This study was conducted according to the methodologies and guidance published by Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), Michigan Department of Transportation (MDOT), Wayne County Department of Public Services (WCDPS), and the city.

Vehicular Turning Movement Counts (TMCs) were collected at several of the study intersections on Tuesday, May 16, 2023, during the weekday a.m. (7 to 9 a.m.) and p.m. (4 to 6 p.m.) peak periods for the roadway network. Additional TMCs were taken from the “Six Mile Rd and Fox Drive Traffic Analysis” completed by Hubbell, Roth, & Clark, Inc. (HRC). These counts were collected on Thursday, February 23, 2023. While no background developments were identified for inclusion in this study, the HRC study involved reassignment of traffic due to the proposed installation of a traffic signal at the intersection of Six Mile Road and Fox Drive and Quakertown Lane. These traffic reassignments and proposed signal are included in this study as a background condition.

Site-generated traffic was forecast using the information and methodologies specified in the *Trip Generation Manual*. Existing traffic volumes, site layout, and engineering judgement were used to develop a trip distribution model for the a.m. and p.m. peak hours for the new traffic that would be generated by the proposed development.

A portion of the site-generated trips is anticipated to be “internally captured” within the site, meaning a vehicle may visit several components of the development in a single trip. An additional portion of the site-generated trips is anticipated to be “pass-by” in nature, meaning they already exist on the adjacent road network and are interrupted to visit the site.

Level of service (LOS) analyses were conducted for existing, background, and total future conditions based on the *Highway Capacity Manual* (HCM) 6th Edition and HCM 2000 methodologies using Synchro traffic analysis software. Synchro network models were also simulated using SimTraffic to evaluate network operations including intersection queueing.

Based on the findings of the HCM operational analyses and site traffic generation, Table 1 – Proposed Improvements has the recommended existing, background, and future improvements to the study intersections to mitigate traffic impacts.

Table 1 – Proposed Improvements

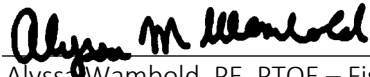
Intersection	Background	Future
Six Mile Road and Haggerty Road	• Optimize Cycle Length and timing splits. • Install WB, NB, and SB right turn overlap phases.	
Six Mile Road and Fox Drive/Quakertown Lane		• Optimize Cycle Length and timing splits.
Six Mile Road and I-275 SB Off-Ramp	• Optimize timing splits.	
Six Mile Road Corridor	• Optimize signal offsets.	
Haggerty Road and Middle Site Driveway		• Install NB right turn lane. • Install actuated-coordinated traffic signal.

Northbound (NB)
Southbound (SB)
Westbound (WB)

The City required a shared parking analysis for this proposed development as the proposed plan does not meet the City Ordinance requirements for off-street parking spaces. The proposed site plan shows a total of 1,031 parking spaces. Based on the results of the shared parking analysis, no parking occupancy issues are projected if the proposed 1,031 parking spaces were approved instead of expanding the parking areas to meet the City Ordinance requirements.

The opinions, findings, and conclusions expressed in this TIS are those of Fishbeck and not necessarily those of the Owner/Applicant, MDOT, WCDPS, or the City.

Prepared By:



Alyssa Wambold, PE, PTOE – Fishbeck



Jill Bauer, PE, PTOE – Fishbeck
Project Manager

1.0 Introduction

1.1 Project Overview

On behalf of Markus Management Group, Fishbeck has completed a revised traffic impact study (TIS) related to a proposed mixed-use development that will be in the northeast quadrant of Six Mile Road and Haggerty Road in the City of Livonia (City), Wayne County, Michigan. Revisions were completed to address comments from the Wayne County Department of Public Services (WCDPS) and the City, and to incorporate changes made to the site plan.

This parcel currently contains an approximately 400,000 square-foot (sft) office building and a three-story parking deck with 357 parking spaces. The existing office building will be demolished while the existing parking deck will remain. The proposed development will consist of the following uses:

- Retail Building A: 6,249 sft Medical-Dental Office Building.
- Retail Building B: 5,600 sft Small Office Building.
- 38,020 sft Grocery Store.
- Retail Building C: 9,688 sft Mixed-Use Retail.
- Retail Building D: 15,000 sft Furniture Store.
- Retail Building E: 6,003 sft Furniture Store.
- Restaurant A: 6,249 sft Sit-Down Restaurant.
- Restaurant B: 10,000 sft Fine Dining Restaurant.
- Food Service with Drive-Through: 2,556 sft Coffee Shop with Drive-Through.
- Food Services: 3,280 sft, 3,280 sft, and 2,580 sft Fast-Casual Restaurants.
- 35,292 sft Gym.
- Hotel: Four Stories, 101 rooms.
- Multifamily Residential: Five Stories, 170 dwelling units (DU).

The development will be completed in one phase, assumed to be open and fully operational in 2025.

Access to the site will be provided via the four existing driveways and one proposed driveway. The site generated traffic will utilize the existing driveway on Six Mile Road, the northern two existing driveways on Haggerty Road, the existing driveway on College Parkway (which provides access to Haggerty Road), and one proposed driveway on Fox Drive (which provides access to Six Mile Road). The southernmost existing driveway on Haggerty Road will be closed.

The project location and study intersections are displayed in Figure 1 – Project Location and Study Network, below.

Figure 1 – Project Location and Study Network



1.2 Study Methodology

The objectives of this TIS were to determine what impacts the proposed project would have on adjacent roadway traffic operations, and to develop recommendations for any improvements necessary to mitigate the project impacts on the studied intersections. Study analyses were completed relative to typical weekday a.m. and p.m. peak periods. This study was conducted according to the methodologies and guidance published by Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), Michigan Department of Transportation (MDOT), WCDPS, and the City.

1.3 Intersection Characteristics

Based on the type and size of the proposed development and the likely area of influence for the site trips, traffic operations were analyzed for the following intersections:

- A. Six Mile Road and Haggerty Road (signalized).
- B. Six Mile Road and Fox Drive (unsignalized).
- C. Six Mile Road and Quakertown Lane (unsignalized).
- D. Six Mile Road and I-275 SB Off-Ramp (signalized).
- E. Six Mile Road and I-274 NB Off-Ramp (signalized).
- F. Six Mile Road and North Laurel Park Drive (signalized).
- G. Six Mile Road and Newburgh Road (signalized)
- H. Haggerty Road and College Parkway (signalized)
- I. Haggerty Road and South Drive/Cross Road (signalized).
- J. Six Mile Road and South Site Driveway (unsignalized).
- K. Haggerty Road and Middle Site Driveway (unsignalized).
- L. Haggerty Road and North Site Driveway (unsignalized).

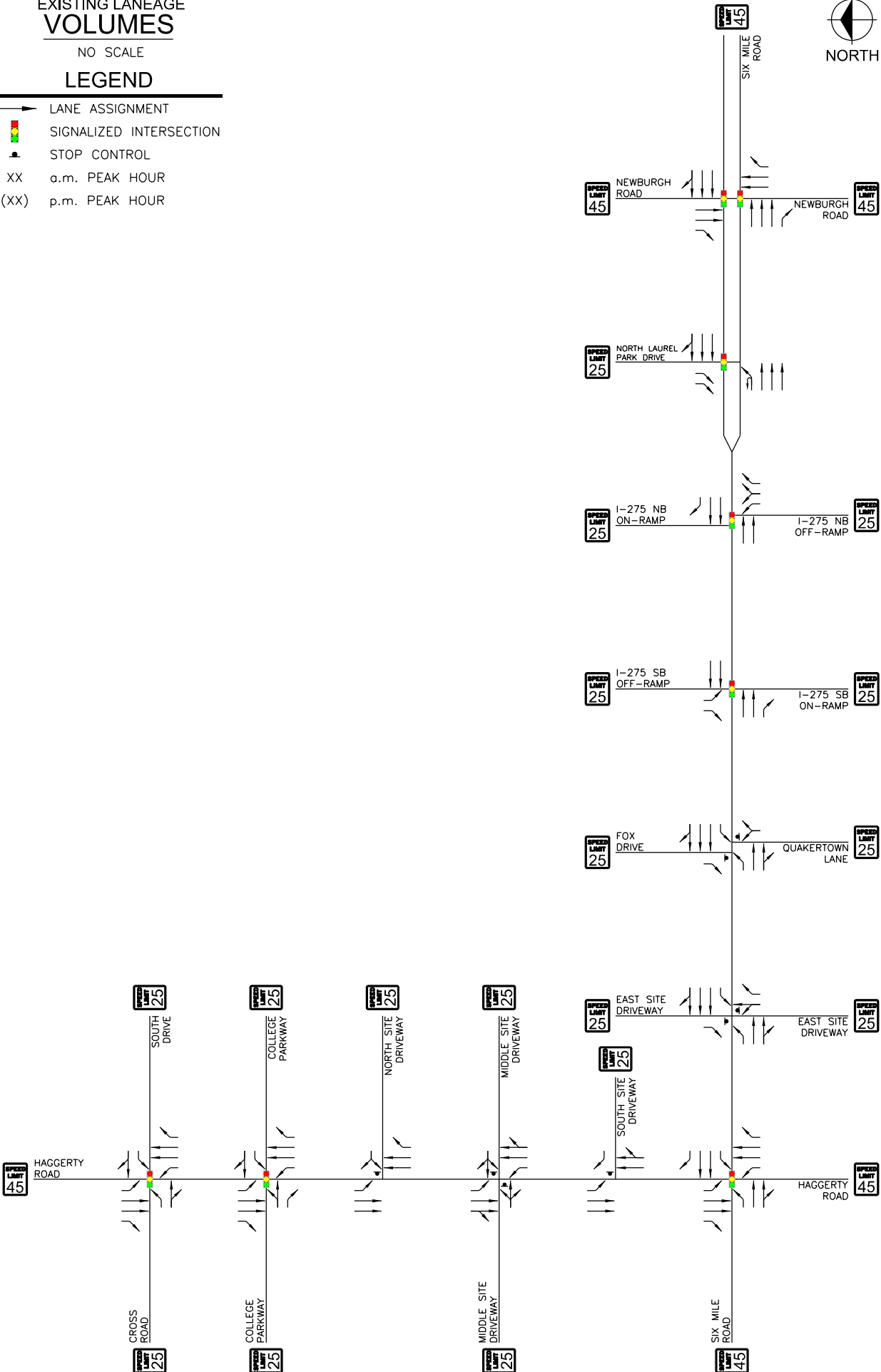
The existing intersection lane configurations, traffic controls, and posted speed limits are displayed in Figure 2 – Existing Lane Configurations.

EXISTING LANEAGE VOLUMES

NO SCALE

LEGEND

- LANE ASSIGNMENT
-  SIGNALIZED INTERSECTION
-  STOP CONTROL
- XX a.m. PEAK HOUR
- (XX) p.m. PEAK HOUR



Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

NEC SIX MILE ROAD AND HAGGERTY ROAD Livonia, MI 48152 Traffic Impact Study

PROJECT NO.

230942

FIGURE NO.

2

1.4 Existing Traffic Volumes

Vehicular Turning Movement Count (TMC)s were collected at the following study intersections during the weekday a.m. (7 to 9 a.m.) and p.m. (4 to 6 p.m.) peak periods of the road network on Tuesday, May 16, 2023:

- Six Mile Road and Haggerty Road.
- Six Mile Road and I-275 SB Off-Ramp.
- Six Mile Road and I-274 NB Off-Ramp.
- Six Mile Road and North Laurel Park Drive.
- Six Mile Road and Newburgh Road.
- Haggerty Road and College Parkway.
- Haggerty Road and South Drive/Cross Road.
- Six Mile Road and South Site Driveway.
- Haggerty Road and South Site Driveway.
- Haggerty Road and Middle Site Driveway.
- Haggerty Road and North Site Driveway.

Additional TMCs were obtained from the “Six Mile Rd and Fox Drive Traffic Analysis” completed by Hubbell, Roth, & Clark, Inc. (HRC). These counts were collected on Thursday, February 23, 2023, at the following locations:

- Six Mile Road and Fox Drive.
- Six Mile Road and Quakertown Lane.

Traffic volume information can be found in Appendix 1 – Traffic Volume Data, which includes heavy vehicle data. The existing traffic volumes used in this study are provided in Figure 3 – Existing Traffic Volumes.

2023 EXISTING TRAFFIC

VOLUMES

NO SCALE

LEGEND

- LANE ASSIGNMENT
- SIGNALIZED INTERSECTION
- STOP CONTROL
- XX a.m. PEAK HOUR
- (XX) p.m. PEAK HOUR



Engineers | Architects | Scientists | Constructors

Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

NEC SIX MILE ROAD AND HAGGERTY ROAD

Livonia, MI 48152

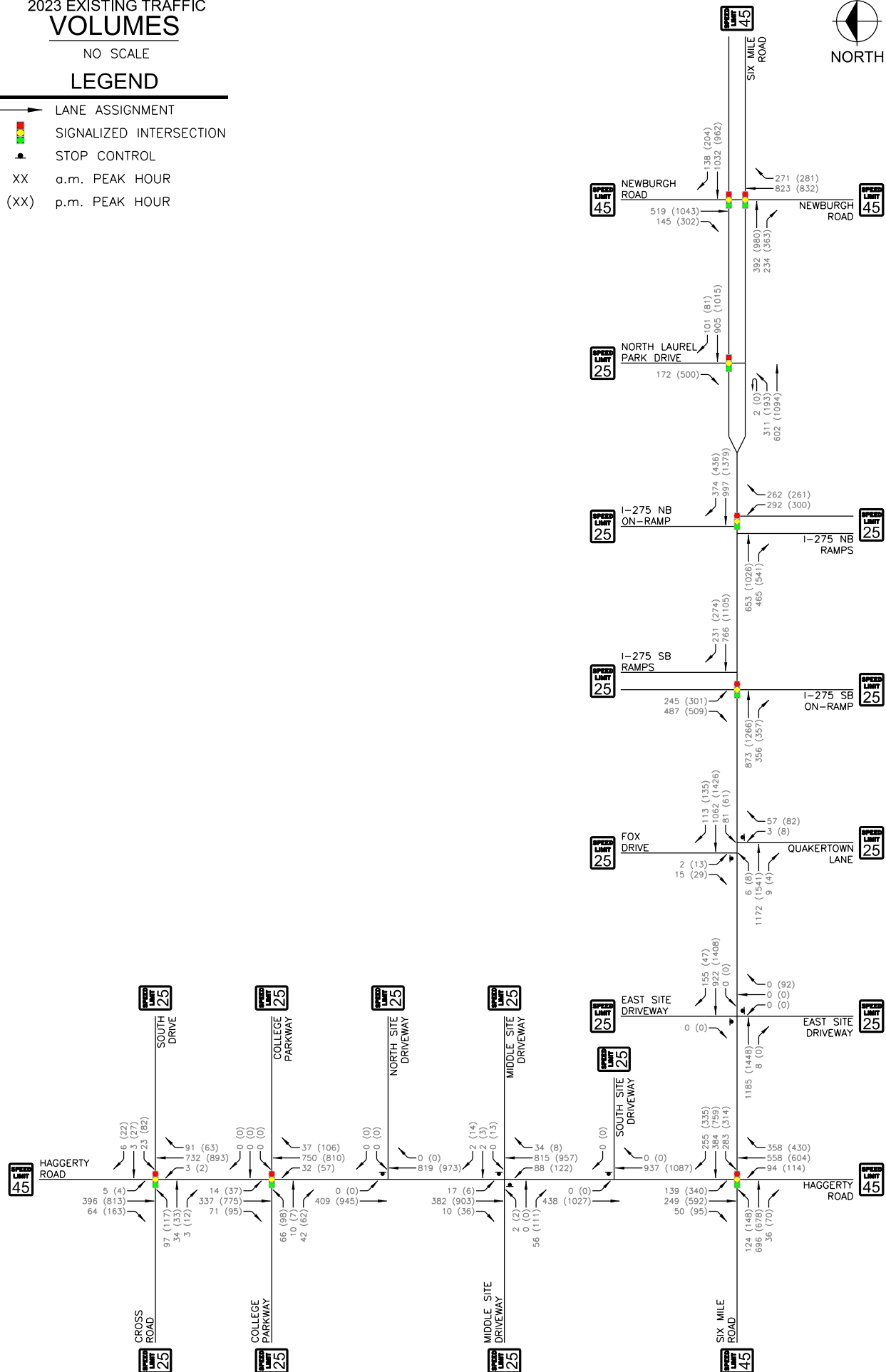
Traffic Impact Study

PROJECT NO.

230942

FIGURE NO.

3



2.0 Existing Conditions Analysis

2.1 Traffic Operations Analysis Methodology

Synchro was used to perform Highway Capacity Manual (HCM) operational analyses during the a.m. and p.m. peak hours for all intersections within this study. According to the most recent editions of the HCM, Level of Service (LOS) is a qualitative measure describing operational conditions of a traffic stream or intersection. LOS ranges from A to F, with LOS A representing desirable traffic operations characterized by low delay and LOS F representing extremely poor traffic operations characterized by excessive delays and long vehicle queues. LOS D is generally considered acceptable for most areas. Table 2 – LOS Criteria presents the HCM criteria for various LOSs for unsignalized and signalized intersections. The color coding in the table is used in the LOS analysis summary tables later in this report.

Table 2 – LOS Criteria

LOS	Average Stopped Vehicle Delay (seconds)	
	Unsignalized	Signalized
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

2.2 Existing Conditions Traffic Analysis

Synchro models for the existing network were created based on the existing roadway configurations and traffic controls. Where applicable, data concerning the existing intersections and roadway lane configurations, geometry, and traffic control that were observed in the field were entered in the models. The traffic signal timing permits for the signalized intersections were provided by WCDPS and MDOT for use in the models.

Several intersections could not be evaluated with HCM 6th Edition methodologies. The following scenarios necessitated the use of HCM 2000 methodologies at the noted intersections:

- HCM 6th Edition does not support turning movements with shared and exclusive turn lanes:
 - Six Mile Road and I-275 NB Off-Ramps.
- HCM 6th Edition does not calculate delays on the mainline roadway at signalized one-way crossovers:
 - Six Mile Road and North Laurel Park Drive.
- HCM 6th Edition does not support clustered intersections:
 - Six Mile Road and Newburgh Road.

The resulting LOS and delay for the existing conditions are provided in Table 3 – LOS Analysis for Existing Conditions.

Table 3 – LOS Analysis for Existing Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Haggerty Road (Signalized)				
EB Six Mile Road	D	51.6	E	56.7
WB Six Mile Road	C	34.1	E	74.1
NB Haggerty Road	E	75.2	F	84.4
SB Haggerty Road	D	35.3	D	47.1
Overall	D	52.5	E	67.0

Table 3 – LOS Analysis for Existing Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Fox Drive (Stop-Controlled)				
EB Six Mile Road	A	0.1	A	0.1
WB Six Mile Road	A	0.0	A	0.0
SB Fox Drive	C	17.4	E	35.5
Overall	A	0.2	A	0.6
Six Mile Road and Quakertown Lane (Stop-Controlled)				
EB Six Mile Road	A	0.0	A	0.0
WB Six Mile Road	A	0.8	A	0.6
NB Quakertown Lane	C	17.7	D	27.9
Overall	A	0.9	A	1.3
Six Mile Road and I-275 SB Off-Ramp (Signalized)				
EB Six Mile Road	B	10.6	B	12.4
WB Six Mile Road	A	0.6	A	0.9
SB I-275 SB Off-Ramp	F	81.1	F	99.9
Overall	C	25.8	C	29.2
Six Mile Road and I-275 NB Off-Ramp (Signalized)				
EB Six Mile Road	A	3.4	A	3.6
WB Six Mile Road	A	2.2	A	7.7
NB I-275 NB Off-Ramp	D	36.2	D	37.1
Overall	B	10.6	B	11.8
Six Mile Road and North Laurel Park Drive (Signalized)				
WB Six Mile Road	A	5.7	A	7.2
NB EB to WB Crossover	B	15.5	B	17.5
SB North Laurel Park Drive	B	13.6	C	25.9
Overall	A	8.7	B	14.2
Six Mile Road and Newburgh Road (Signalized)				
EB Six Mile Road	B	14.6	B	15.3
WB Six Mile Road	B	18.9	B	18.3
NB Newburgh Road	B	18.5	B	18.9
SB Newburgh Road	B	16.8	C	22.4
Overall	B	13.7	B	16.4
Haggerty Road and College Parkway (Signalized)				
EB College Parkway	D	36.2	C	32.5
WB College Parkway	D	36.2	C	33.4
NB Haggerty Road	A	8.0	B	12.0
SB Haggerty Road	A	1.7	A	2.2
Overall	A	9.5	B	11.4
Haggerty Road and South Drive/Cross Road (Signalized)				
EB Cross Road	C	24.5	C	27.1
WB South Drive	C	22.9	C	25.2
NB Haggerty Road	A	0.5	A	0.6
SB Haggerty Road	A	8.3	A	9.5
Overall	A	5.9	A	8.4

Eastbound (EB)

Westbound (WB)

Further analysis of the LOS results for existing conditions indicated that most movements, approaches, and intersections are expected to operate at an acceptable LOS D or better during both the a.m. and p.m. peak hours, with the following exceptions:

- Six Mile Road and Haggerty Road:
 - The eastbound through (EBT) and eastbound through right-turn (EBT/R) movements and NB approach operate at LOS E in the a.m. peak hour.
 - The northbound right (NBR) movement operates at LOS F in the a.m. peak hour.
 - The EBT, EBT/R, westbound through (WBT), westbound right (WBR), and southbound left (SBL) movements, EB and WB approaches, and overall intersection operate at LOS E in the p.m. peak hour.
 - The WBL and NBR movements and NB approach operate at LOS F in the p.m. peak hour.
- Six Mile Road and Fox Drive:
 - The SB approach operates at LOS E in the p.m. peak hour.
- Six Mile Road and I-275 SB Off-Ramp:
 - The southbound right (SBR) movement and SB approach operate at LOS F in the a.m. and p.m. peak hours.

The intersection of Six Mile Road and Haggerty Road operates near capacity during the p.m. peak hour. Several movements, approaches, and the overall intersection operate with poor LOS and volume to capacity (v/c) ratios near or exceeding 1.00 under existing traffic conditions. Additionally, the SB I-275 Off-Ramp operates with significant delays and v/c ratios exceeding 1.00 during the a.m. and p.m. peak hours under existing traffic conditions.

SimTraffic simulations were also reviewed to observe network operations and vehicle queues. For existing conditions, study network operations are acceptable, with no queue spill-back from available storage lanes. No 95th percentile queue lengths for the turning movements exceed the provided storage length. See Appendix 2 – Existing LOS Output Reports for the existing conditions LOS reports and queueing analysis reports.

3.0 Background Conditions Analysis

Historical traffic data on the Southeast Michigan Council of Governments (SEMCOG) Traffic Count Database System (TCDS) and the MDOT Transportation Data Management System (TDMS) websites and were referenced to determine the applicable growth rate for the existing traffic volumes to the project build-out year in 2025. In addition, recent traffic studies that were completed within the proposed project vicinity were reviewed. Based on this review, a background growth rate of 1.0% was utilized. No background developments were identified for inclusion in this study as all the reviewed traffic studies were for developments that have already opened.

The “Six Mile Road and Fox Drive Traffic Analysis” completed by HRC recommended the installation of a single traffic signal that would control the intersection of Six Mile Road and Fox Drive and the intersection of Six Mile Road and Quakertown Lane. The existing driveway for Buca Di Beppo Italian Restaurant onto Six Mile Road will be closed, and a new driveway for the restaurant will be constructed on Fox Drive. Given the clustered nature of the two intersections, HCM 2000 methodologies were used to calculate vehicular delays and LOS. Additionally, the HRC study assumed that some traffic that currently exits the Schoolcraft College campus onto SB Haggerty Road to EB Six Mile Road will use the new signal on Fox Drive. These vehicle reassignments were incorporated into the background and subsequent conditions for this study.

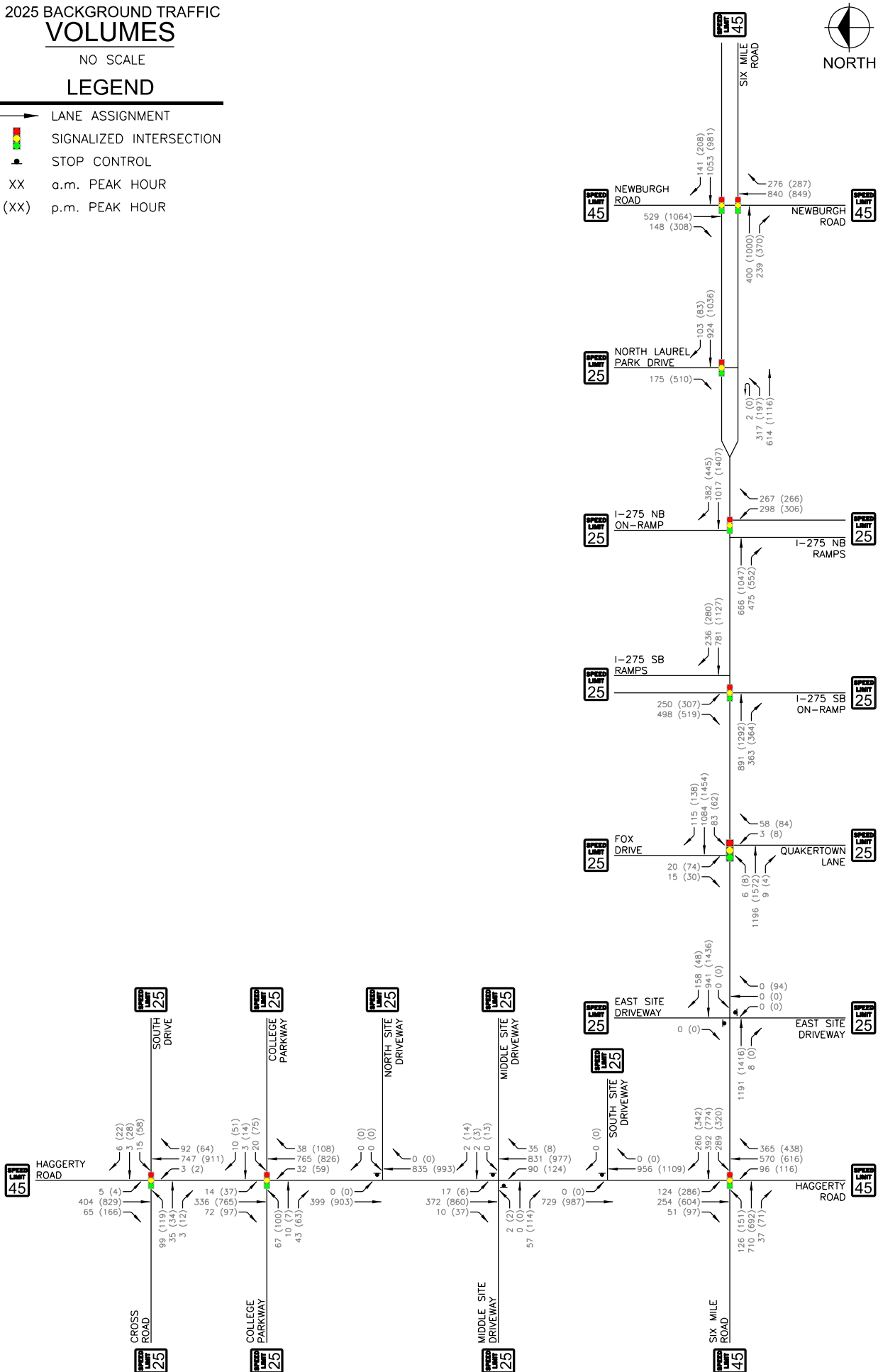
Refer to Appendix 3 – Background Development Concept Signal Design for additional details on the signal layout. The total background traffic volumes are presented in Figure 4 – Background Traffic Volumes.

2025 BACKGROUND TRAFFIC VOLUMES

NO SCALE

LEGEND

- LANE ASSIGNMENT
-  SIGNALIZED INTERSECTION
-  STOP CONTROL
- XX a.m. PEAK HOUR
- (XX) p.m. PEAK HOUR



Engineers | Architects | Scientists | Constructors

Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

NEC SIX MILE ROAD AND HAGGERTY ROAD

Livonia, MI 48152

Traffic Impact Study

PROJECT NO.

230942

FIGURE NO.

4

3.1 Background Conditions Traffic Analysis

The resulting LOS and delay for the background conditions are provided in Table 4 – LOS Analysis for Background Conditions.

Table 4 – LOS Analysis for Background Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Haggerty Road (Signalized)				
EB Six Mile Road	D	54.0	E	58.9
WB Six Mile Road	C	34.6	E	69.7
NB Haggerty Road	E	78.8	F	88.7
SB Haggerty Road	C	34.5	D	44.4
Overall	D	54.4	E	66.8
Six Mile Road and Fox Drive (Signalized)				
EB Six Mile Road	B	19.1	C	23.3
WB Six Mile Road	A	0.2	A	0.2
SB Fox Drive	C	31.2	C	33.5
Overall	B	10.1	B	12.3
Six Mile Road and Quakertown Lane (Signalized)				
EB Six Mile Road	A	0.3	A	0.3
WB Six Mile Road	B	12.5	B	17.6
NB Quakertown Lane	C	33.1	D	35.2
Overall	A	7.2	B	10.1
Six Mile Road and I-275 SB Off-Ramp (Signalized)				
EB Six Mile Road	B	10.7	B	12.6
WB Six Mile Road	A	0.6	A	1.0
SB I-275 SB Off-Ramp	F	87.5	F	106.1
Overall	C	27.5	C	30.7
Six Mile Road and I-275 NB Off-Ramp (Signalized)				
EB Six Mile Road	A	2.9	A	2.4
WB Six Mile Road	A	2.3	A	8.1
NB I-275 NB Off-Ramp	D	36.2	D	37.0
Overall	B	10.6	B	11.6
Six Mile Road and North Laurel Park Drive (Signalized)				
WB Six Mile Road	A	5.7	A	7.2
NB EB to WB Crossover	B	13.0	B	17.8
SB North Laurel Park Drive	B	13.6	C	26.3
Overall	A	8.2	B	14.4
Six Mile Road and Newburgh Road (Signalized)				
EB Six Mile Road	B	11.1	B	17.1
WB Six Mile Road	B	19.1	B	18.4
NB Newburgh Road	B	18.7	B	19.0
SB Newburgh Road	B	16.9	C	22.8
Overall	B	13.9	B	16.6

Table 4 – LOS Analysis for Background Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Haggerty Road and College Parkway (Signalized)				
EB College Parkway	D	36.2	C	33.9
WB College Parkway	D	35.4	C	33.2
NB Haggerty Road	A	8.0	B	11.5
SB Haggerty Road	A	1.7	A	2.2
Overall	A	9.3	B	11.0
Haggerty Road and South Drive/Cross Road (Signalized)				
EB Cross Road	C	24.6	C	27.2
WB South Drive	C	22.6	C	24.2
NB Haggerty Road	A	0.5	A	0.6
SB Haggerty Road	A	8.3	A	9.6
Overall	A	5.8	A	8.2

Further analysis of the LOS results for background conditions indicated that most movements, approaches, and intersections are expected to continue to operate at an acceptable LOS D or better during both the a.m. and p.m. peak hours, with the following exceptions:

- Six Mile Road and Haggerty Road:
 - The EBT and EBT/R movements and NB approach would continue to operate at LOS E in the a.m. peak hour.
 - The NBR movement would continue to operate at LOS F in the a.m. peak hour.
 - The EBT, EBT/R, WBT, WBR, and SBL movements, EB and WB approaches, and overall intersection would continue to operate at LOS E in the p.m. peak hour.
 - The WBL movement would improve from LOS F to LOS E in the p.m. peak hour.
 - The NBR movement and NB approach would continue to operate at LOS F in the p.m. peak hour.
- Six Mile Road and I-275 SB Off-Ramp:
 - The SBR movement and SB approach would continue to operate at LOS F in the a.m. and p.m. peak hours.

The intersection of Six Mile Road and Haggerty Road will continue to operate near capacity during the p.m. peak hour. Several movements, approaches, and the overall intersection operate with poor LOS and v/c ratios near or exceeding 1.00 under background traffic conditions. Additionally, the SB I-275 Off-Ramp will continue to operate with significant delays and v/c ratios exceeding 1.00 during the a.m. and p.m. peak hours under background traffic conditions.

SimTraffic simulations were also reviewed to observe network operations and vehicle queues. For background conditions, study network operations are acceptable, with no queue spill-back from available storage lanes. No 95th percentile queue lengths for the turning movements exceed the provided storage length. The queue lengths for the WBL at the intersection of Six Mile Road and Haggerty Road are contained within the two-way left turn lane (TWLTL) but frequently block several minor streets and driveways that also wish to use the TWLTL during the p.m. peak hour. See Appendix 4 – Background LOS Output Reports.

3.2 Background Improvement Conditions Traffic Analysis

Observations of the background traffic conditions were made, and improvements are recommended, at the following intersections:

- Six Mile Road and Haggerty Road:
 - Reduce cycle length from 90 seconds to 80 seconds to coordinate with adjacent intersections.
 - Optimize signal splits.
 - Add right-turn overlap phases to the WB, NB, and SB approaches.

- Six Mile Road and I-275 SB Off-Ramp:
 - Optimize signal splits.
- Six Mile Road Corridor:
 - Optimize signal offsets.

The resulting LOS and delay for the background improvement conditions are provided in Table 5 – LOS Analysis for Background Improvement Conditions.

Table 5 – LOS Analysis for Background Improvement Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Haggerty Road (Signalized)				
EB Six Mile Road	D	48.6	D	53.1
WB Six Mile Road	C	34.8	D	50.3
NB Haggerty Road	D	36.0	D	48.0
SB Haggerty Road	C	33.6	D	43.6
Overall	D	38.6	D	48.8
Six Mile Road and Fox Drive (Signalized)				
EB Six Mile Road	B	11.7	C	17.6
WB Six Mile Road	A	0.2	A	0.2
SB Fox Drive	C	31.2	C	33.5
Overall	A	6.5	A	9.5
Six Mile Road and Quakertown Lane (Signalized)				
EB Six Mile Road	A	0.3	A	0.3
WB Six Mile Road	B	11.6	B	17.0
NB Quakertown Lane	C	33.1	D	35.2
Overall	A	6.8	A	9.8
Six Mile Road and I-275 SB Off-Ramp (Signalized)				
EB Six Mile Road	B	14.7	B	15.7
WB Six Mile Road	A	0.9	A	1.3
SB I-275 SB Off-Ramp	D	37.3	E	59.3
Overall	B	16.4	C	21.4
Six Mile Road and I-275 NB Off-Ramp (Signalized)				
EB Six Mile Road	A	2.9	A	2.8
WB Six Mile Road	A	2.3	A	8.1
NB I-275 NB Off-Ramp	D	36.2	D	37.0
Overall	B	10.6	B	11.7
Six Mile Road and North Laurel Park Drive (Signalized)				
WB Six Mile Road	A	5.7	A	7.2
NB EB to WB Crossover	B	13.6	B	17.9
SB North Laurel Park Drive	B	13.6	C	26.3
Overall	A	8.3	B	14.4
Six Mile Road and Newburgh Road (Signalized)				
EB Six Mile Road	B	11.7	B	17.2
WB Six Mile Road	B	19.1	B	18.4
NB Newburgh Road	B	18.7	B	19.0
SB Newburgh Road	B	16.9	C	22.8
Overall	B	13.9	B	16.6

Table 5 – LOS Analysis for Background Improvement Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Haggerty Road and College Parkway (Signalized)				
EB College Parkway	D	36.2	C	33.9
WB College Parkway	D	35.4	C	33.2
NB Haggerty Road	A	4.0	B	11.5
SB Haggerty Road	A	1.7	A	2.2
Overall	A	6.8	B	11.0
Haggerty Road and South Drive/Cross Road (Signalized)				
EB Cross Road	C	24.6	C	27.2
WB South Drive	C	22.6	C	24.2
NB Haggerty Road	A	0.5	A	0.6
SB Haggerty Road	A	8.3	A	9.6
Overall	A	5.8	A	8.2

Further analysis of the LOS results for background improvement conditions indicated that most movements, approaches, and intersections are expected to continue to operate at an acceptable LOS D or better during both the a.m. and p.m. peak hours, with the following exceptions:

- Six Mile Road and Haggerty Road:
 - The EBT, EBT/R, and SBL movements would continue to operate at LOS E in the p.m. peak hour.
 - The WBL movement would degrade from LOS E to LOS F in the p.m. peak hour.
 - The overall intersection improves from LOS E to LOS D in the p.m. peak hour.
- Six Mile Road and I-275 SB Off-Ramp:
 - The SBR movement would continue to operate at LOS F in the p.m. peak hour.
 - The SB approach would improve from LOS F to LOS E in the p.m. peak hour.

The intersection of Six Mile Road and Haggerty Road will continue to operate near capacity during the p.m. peak hour with several movements, operating with poor LOS and v/c ratios near or exceeding 1.00. However, the delays experienced by motorists and the v/c ratios with the proposed improvements are lower than existing conditions.

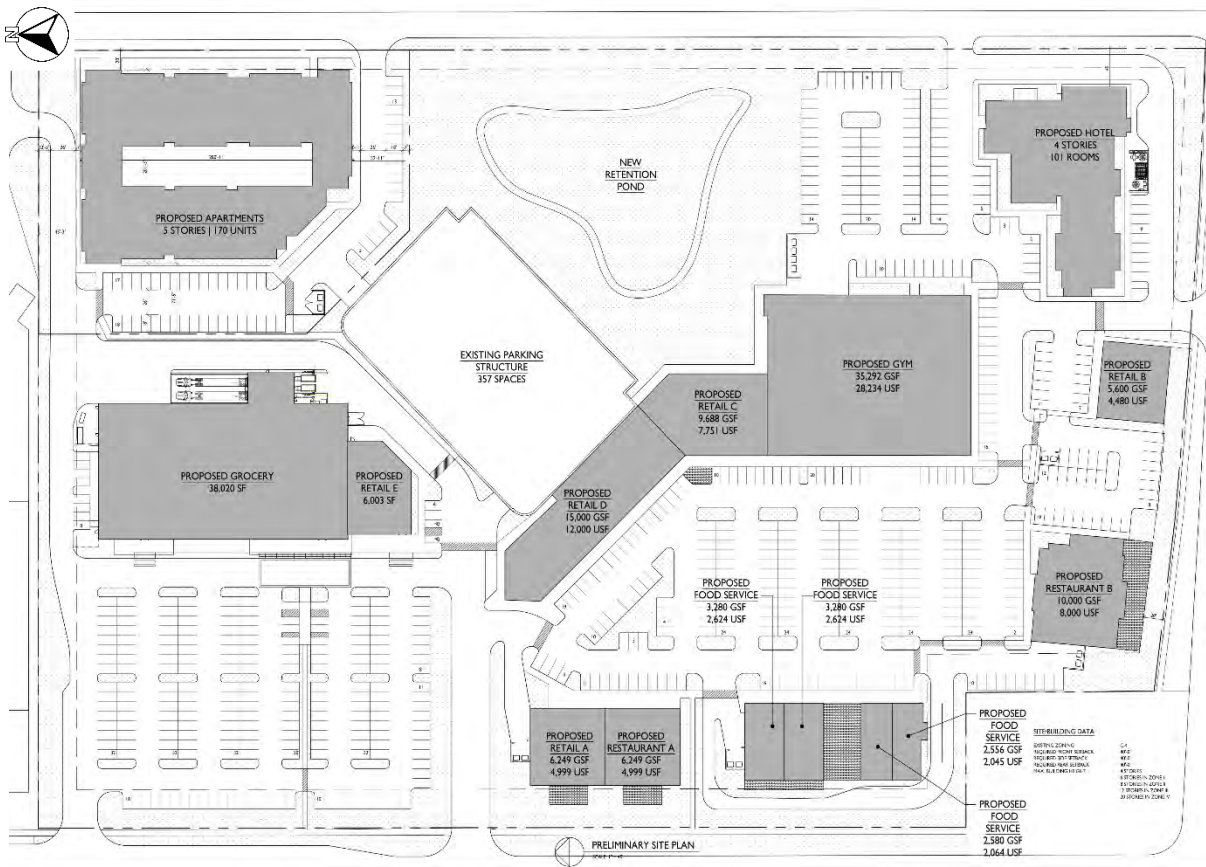
Additionally, the SB I-275 Off-Ramp will continue to operate with significant delays and v/c ratios exceeding 1.00 during the p.m. peak hour. However, the delays during the p.m. peak hour would be reduced from 106.1 seconds to 59.3 seconds, or a reduction of 46.8 seconds.

SimTraffic simulations were also reviewed to observe network operations and vehicle queues. For background improvement conditions, study network operations are acceptable, with no queue spill-back from available storage lanes. No 95th percentile queue lengths for the turning movements exceed the provided storage length. The queue lengths for the WBL at the intersection of Six Mile Road and Haggerty Road are contained within the TWLTL but occasionally block several minor streets and driveways that also wish to use the TWLTL during the p.m. peak hour. These blockages are less frequent than under background traffic conditions without the proposed improvements. See Appendix 5 – Background Improvement LOS Output Reports.

4.0 Site Traffic Characteristics

A representation of the current conceptual site plan is provided in Figure 5 – Conceptual Site Plan.

Figure 5 – Conceptual Site Plan



4.1 Trip Generation

Using the information and methodologies specified in the *Trip Generation Manual*, Fishbeck forecast the weekday a.m. and p.m. peak hour trips associated with the proposed development.

In mixed-use developments, not all trips generated are from sources outside the boundaries of the development but rather, are trips that are “internally captured” within the site, meaning that a vehicle may visit several components of a mixed-use development in a single trip. The methodology presented in the *Trip Generation Handbook* was followed to determine an appropriate internal capture rate for the proposed development. The results of this analysis suggest a 14% (13% in, 15% out) a.m. internal capture rate and a 37% (35% in, 38% out) p.m. peak hour internal capture rate for the combination of land uses.

Additionally, a portion of the site-generated trips are anticipated to be “pass-by” in nature, meaning they already exist on the adjacent road network and are interrupted to visit the site. According to ITE methodology, new trips are assumed to return to their direction of origin whereas pass-by trips continue in their original direction of travel. The *Trip Generation Manual* was used to calculate what percentage of the trips would be pass-by trips, meaning they are vehicles already on the network that would access the development and are not additional trips added to the network. For specific land uses where pass-by data are not provided by ITE, pass-by rates for comparable land uses were referenced.

Table 6 – Trip Generation for Proposed Development presents the resulting trip generation for the development. Refer to Appendix 6 – Trip Generation Calculations for additional information.

Table 6 – Trip Generation for Proposed Development

Building	ITE Land Use	LUC	Units	a.m. Peak Hour			p.m. Peak Hour			Weekday
				In	Out	Total	In	Out	Total	
Retail A	Medical-Dental Office Building	720	6,249 SF	16	4	20	7	15	22	225
Retail B	Small Office Building	712	5,600 SF	8	1	9	4	8	12	81
Grocery and Retail C	Shopping Plaza (40-150K), Supermarket - Yes	821	47,708 SF	104	64	168	233	252	485	4,508
Retail D-E	Furniture Store	890	21,003 SF	4	2	6	5	6	11	132
Restaurant A	High-Turnover (Sit-Down) Restaurant	932	6,249 SF	33	27	60	35	22	57	670
Restaurant B	Fine Dining Restaurant	931	10,000 SF	7	0	7	52	26	78	838
Food Service with Drive Through Window	Coffee/Donut Shop with Drive-Through Window	937	2,556 SF	112	108	220	50	50	100	1,366
Food Service	Fast Casual Restaurant	930	9,140 SF	7	6	13	63	52	115	888
Gym	Health/Fitness Club	492	35,292 SF	24	22	46	69	53	122	1,017
Hotel	Hotel	310	101 Rooms	24	19	43	24	23	47	807
Residential	Multifamily Housing (Mid-Rise)	221	170 DU	15	48	63	41	26	67	772
Total				354	301	655	583	533	1,116	11,304
Internal Capture Reductions 14% a.m. (13% In, 15% Out), 37% p.m. (35% In, 38% Out)				45	45	90	205	205	410	-
Total External Trips				309	256	565	378	328	706	11,304
Pass-By Rates, LUC 821: 40% PM				-	-	-	62	68	130	-
Pass-By Rates, LUC 890: 53% PM				-	-	-	2	2	4	-
Pass-By Rates, LUC 930 ¹ : 43% PM				-	-	-	17	10	27	-
Pass-By Rates, LUC 931: 44% PM				-	-	-	15	5	20	-
Pass-By Rates, LUC 932: 43% PM				-	-	-	9	4	13	-
Pass-By Rates, LUC 937 ² : 50% AM; 55% PM				48	49	97	17	12	29	-
Total New Trips				261	207	468	256	227	483	11,304

¹Used Pass-By Rates for LUC 932: High-Turnover (Sit-Down) Restaurant
²Used Pass-By Rates from LUC 934 – Fast-Food Restaurant with Drive-Through Window

The directions that site traffic will travel to and from were based upon existing traffic patterns during the a.m. and p.m. peak hours. The existing traffic patterns reflect the gravity between origins and destinations in the study area, and therefore an accurate indication of where the proposed trips would be coming from and going to. Table 7 – Trip Distribution provides the probable distribution based on existing traffic patterns.

Table 7 – Trip Distribution

Direction	Via	New Trips				Pass-By Trips	
		a.m. Peak Hour		p.m. Peak Hour		a.m. Peak Hour	p.m. Peak Hour
		To	From	To	From		
North	Haggerty Road	29%	14%	24%	23%	27%	22%
South	Haggerty Road	18%	31%	22%	26%	13%	21%
East	Six Mile Road	37%	29%	32%	31%	34%	29%
West	Six Mile Road	16%	26%	22%	20%	26%	28%

The trip distribution for the site is indicated in Figure 6 – Trip Generation Volumes. The pass-by volumes are indicated in Figure 7 – Pass-By Volumes. These trips were added to the background volumes (Figure 4 – Background Traffic Volumes) to result in the future conditions volumes in Figure 8 – Future Conditions Volumes. Additionally, there was existing traffic entering and exiting the site at the East Site Driveway on Six Mile Road and at the Middle Site Driveway on Haggerty Road. Any existing traffic entering or exiting the site at these two driveways was removed from the network in future conditions.

2025 TRIP GENERATION VOLUMES

NO SCALE

LEGEND

- LANE ASSIGNMENT
-  SIGNALIZED INTERSECTION
-  STOP CONTROL
- XX a.m. PEAK HOUR
- (XX) p.m. PEAK HOUR



Engineers | Architects | Scientists | Constructors

Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

NEC SIX MILE ROAD AND HAGGERTY ROAD

Livonia, MI 48152

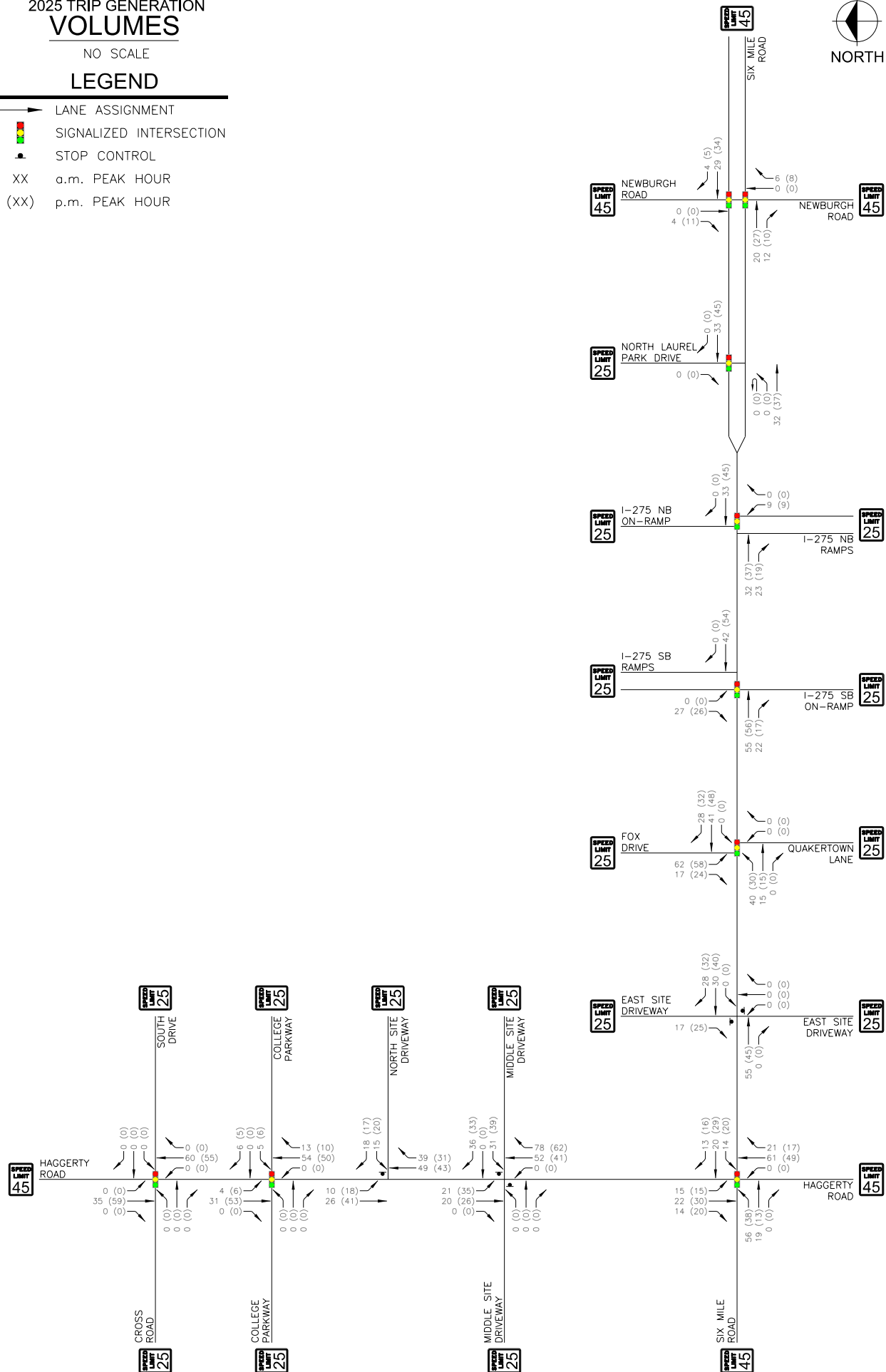
Traffic Impact Study

PROJECT NO.

230942

FIGURE NO.

6



2025 PASS-BY TRAFFIC VOLUMES

NO SCALE

LEGEND

- LANE ASSIGNMENT
-  SIGNALIZED INTERSECTION
-  STOP CONTROL
- XX a.m. PEAK HOUR
- (XX) p.m. PEAK HOUR



Engineers | Architects | Scientists | Constructors

Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

NEC SIX MILE ROAD AND HAGGERTY ROAD

Livonia, MI 48152

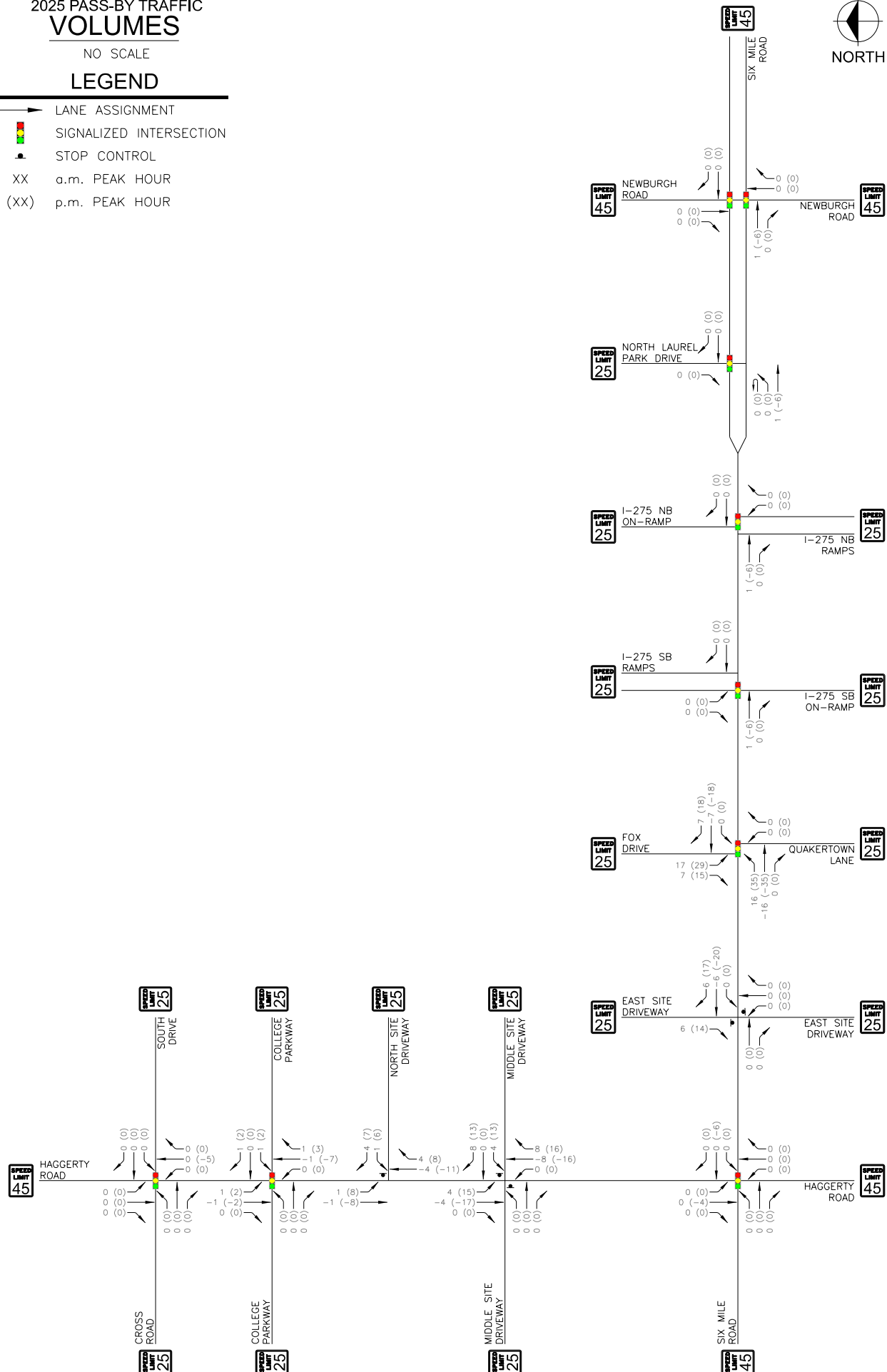
Traffic Impact Study

PROJECT NO.

230942

FIGURE NO.

7



2025 FUTURE TRAFFIC VOLUMES

NO SCALE

LEGEND

- LANE ASSIGNMENT
- 🚦 SIGNALIZED INTERSECTION
- 🛑 STOP CONTROL
- XX a.m. PEAK HOUR
- (XX) p.m. PEAK HOUR



Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

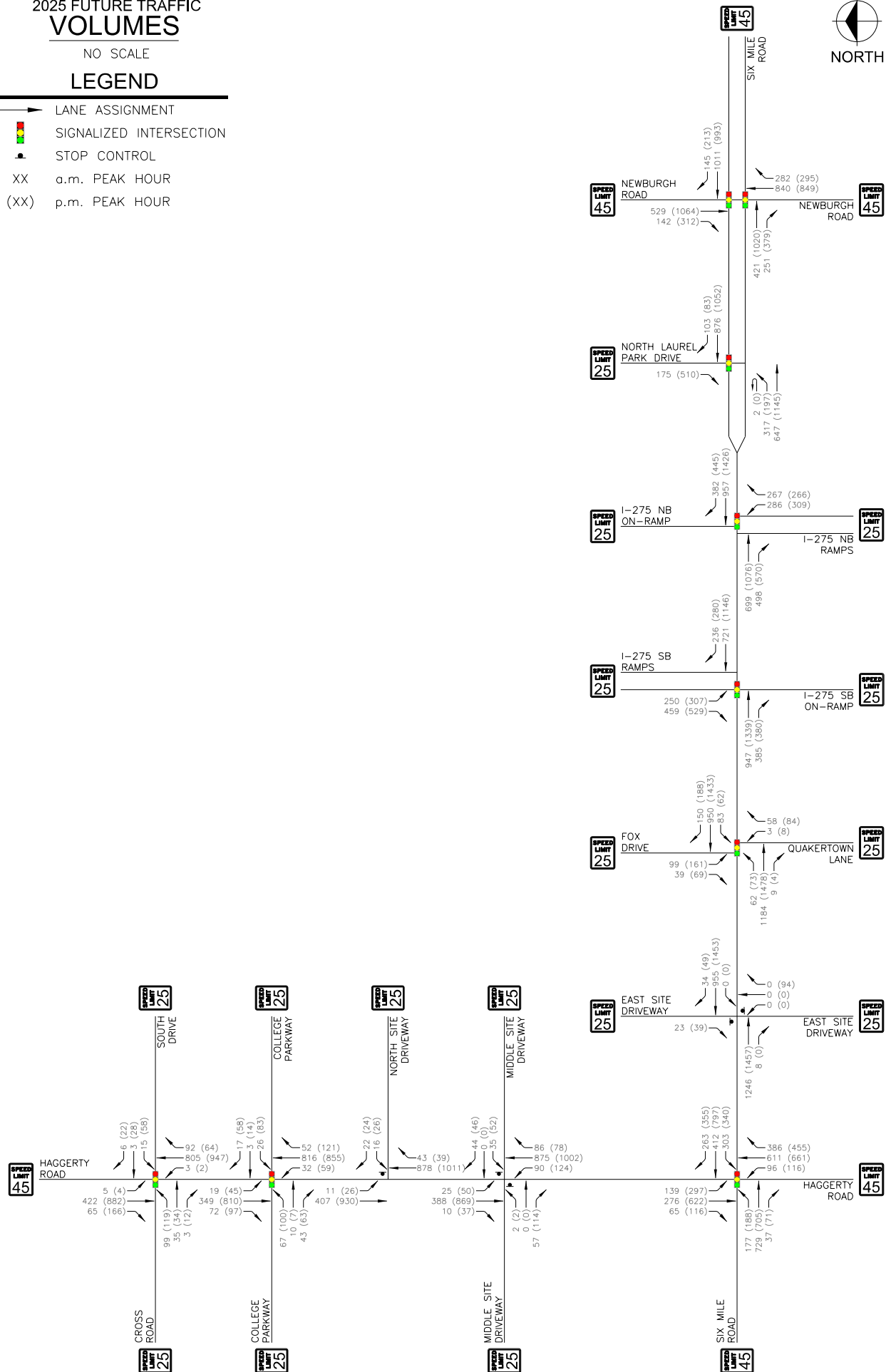
NEC SIX MILE ROAD AND HAGGERTY ROAD Livonia, MI 48152 Traffic Impact Study

PROJECT NO.

230942

FIGURE NO.

8



5.0 Future Conditions Analysis

5.1 Turn Lane Warrants

An evaluation was performed in accordance with WCDPS requirements to determine if right turn deceleration lanes are required at the site driveways. There is an existing TWLTL on Six Mile Road and Haggerty Road along the site frontage, therefore no left turn lane warrant analysis was required.

The results of the analysis indicated right turn lanes are required at all the site driveways except for the North Driveway on Haggerty Road. A NB right turn lane was added in the future and subsequent models at the Middle Site Driveway. Right turn lanes were not added at the other four driveways.

Currently on Haggerty Road, there is an existing NB right turn lane for the intersection with College Parkway. This existing turn lane extends south of the North Site Driveway and is separated from the adjacent through lanes by a solid white line and has signage that states “Right Lane Must Turn Right”. While the North Site Driveway does not have a dedicated right turn lane, site generated traffic can use this existing lane as a right turn lane into the site. Pavement markings and signage should be installed to alert motorists that the rightmost lane should be treated as a right turn only lane for the North Site Driveway and Haggerty Road.

Currently on WB Six Mile Road, the right turn lane for intersection with Haggerty Road extends east of Fox Drive, is separated from the adjacent through lanes by a solid white line and has signage that states “Right Lane Must Turn Right”. Fox Drive and the East Site Driveway do not have a dedicated right turn lane; however, site generated traffic can use this existing lane as a right turn lane into the site. Pavement marking and signage should be installed to alert motorists that the rightmost lane should be treated as a right turn only lane for Fox Drive, the East Site Driveway, the existing Exxon Gas Station, and Haggerty Road.

All turn lane warrant charts are provided in Appendix 7 – Turn Lane Warrants. The results of the analysis are presented in Table 8 – Turn Lane Warrants.

Table 8 – Turn Lane Warrants

Intersection	Movement	Existing Treatment	Result
Six Mile Road and Fox Drive	WB Right	Full-Width Turn Lane	Warranted
Haggerty Road and College Parkway	NB Right	Full-Width Turn Lane	Warranted
Six Mile Road and East Site Driveway	WB Right	Full-Width Turn Lane	Warranted
Haggerty Road and Middle Site Driveway	NB Right	None	Warranted
Haggerty Road and North Site Driveway	NB Right	Full-Width Turn Lane	Not Warranted

5.2 Future Conditions Traffic Analysis

The resulting LOS and delay for the future conditions without any of the improvements discussed in the Background Improvement Conditions Traffic Analysis section above are presented in Table 9 – LOS Analysis for Future Conditions.

The intersection of Six Mile Road and East Site Driveway could not be evaluated with HCM 6th Edition methodologies due to the lane configuration. HCM 2000 methodologies were used to evaluate this intersection.

Table 9 – LOS Analysis for Future Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Haggerty Road (Signalized)				
EB Six Mile Road	E	56.0	E	61.2
WB Six Mile Road	C	35.1	F	85.2
NB Haggerty Road	F	91.4	F	97.1
SB Haggerty Road	D	35.8	D	45.7
Overall	E	59.4	E	74.7

Table 9 – LOS Analysis for Future Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Fox Drive (Signalized)				
EB Six Mile Road	B	19.0	C	23.3
WB Six Mile Road	A	0.2	A	0.3
SB Fox Drive	D	38.7	D	54.5
Overall	B	12.6	B	14.7
Six Mile Road and Quakertown Lane (Signalized)				
EB Six Mile Road	A	0.1	A	0.2
WB Six Mile Road	B	12.8	B	17.6
NB Quakertown Lane	C	33.1	D	35.6
Overall	A	6.9	A	9.9
Six Mile Road and I-275 SB Off-Ramp (Signalized)				
EB Six Mile Road	B	11.0	B	12.9
WB Six Mile Road	A	0.5	A	1.0
SB I-275 SB Off-Ramp	E	65.7	F	112.8
Overall	C	21.6	C	32.2
Six Mile Road and I-275 NB Off-Ramp (Signalized)				
EB Six Mile Road	A	3.2	A	2.5
WB Six Mile Road	A	2.2	A	8.1
NB I-275 NB Off-Ramp	D	36.3	D	37.4
Overall	B	10.6	B	11.6
Six Mile Road and North Laurel Park Drive (Signalized)				
WB Six Mile Road	A	5.6	A	7.3
NB EB to WB Crossover	B	13.1	B	18.1
SB North Laurel Park Drive	B	13.6	C	26.3
Overall	A	8.3	B	14.4
Six Mile Road and Newburgh Road (Signalized)				
EB Six Mile Road	B	11.3	B	17.6
WB Six Mile Road	B	18.8	B	18.5
NB Newburgh Road	B	18.7	B	19.1
SB Newburgh Road	B	16.9	C	22.8
Overall	B	13.7	B	16.7
Haggerty Road and College Parkway (Signalized)				
EB College Parkway	D	35.9	C	33.8
WB College Parkway	D	35.1	C	33.2
NB Haggerty Road	A	8.5	B	11.9
SB Haggerty Road	A	2.1	A	2.5
Overall	A	9.8	B	11.2
Haggerty Road and South Drive/Cross Road (Signalized)				
EB Cross Road	C	24.6	C	27.2
WB South Drive	C	22.6	C	24.2
NB Haggerty Road	A	0.6	A	0.7
SB Haggerty Road	A	8.4	A	9.8
Overall	A	5.7	A	8.2

Table 9 – LOS Analysis for Future Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and East Site Driveway (Stop-Controlled)				
EB Six Mile Road	A	0.0	A	0.0
WB Six Mile Road	A	0.0	A	0.0
SB East Site Driveway	A	8.6	A	9.0
Overall	A	0.1	A	0.5
Haggerty Road and Middle Site Driveway (Stop-Controlled)				
EB Middle Site Driveway	B	11.3	C	17.8
WB Middle Site Driveway	F	81.5	F	809.5
NB Haggerty Road	A	0.7	A	1.2
SB Haggerty Road	A	0.7	A	0.6
Overall	A	6.7	E	48.8
Haggerty Road and North Site Driveway (Stop-Controlled)				
WB North Site Driveway	C	16.0	C	19.7
NB Haggerty Road	A	0.0	A	0.0
SB Haggerty Road	A	0.3	A	0.3
Overall	A	0.5	A	0.6

Further analysis of the LOS results for future conditions indicated that most movements, approaches, and intersections are expected to continue to operate at an acceptable LOS D or better during both the a.m. and p.m. peak hours, with the following exceptions:

- Six Mile Road and Haggerty Road:
 - The EBT and EBT/R movements, and overall intersection would operate at LOS E in the a.m. peak hour.
 - The EB approach would degrade from LOS D to LOS E in the a.m. peak hour.
 - The NBR movement would continue to operate at LOS F in the a.m. peak hour.
 - The NB approach would degrade from LOS E to LOS F in the a.m. peak hour.
 - The EBT, EBT/R, and SBL movements, EB approach, and overall intersection would continue to operate at LOS E in the p.m. peak hour.
 - The NBR movement NB approach would continue to operate at LOS F in the p.m. peak hour.
 - The WBL, WBT, and WBR movements and WB approach would degrade from LOS E to LOS F in the p.m. peak hour.
- Six Mile Road and Fox Drive:
 - The SBL movement would operate at LOS E in the p.m. peak hour.
- Six Mile Road and I-275 SB Off-Ramp:
 - The SB approach would improve from LOS F to LOS E in the a.m. peak hour.
 - This improvement in LOS and delay is due to a reduction in volume on the SB approach from the removal of traffic currently entering the office building on the proposed site.
 - The SBR movement would continue to operate at LOS F in the a.m. peak hour.
 - The SBR movement and SB approach would continue to operate at LOS F in the p.m. peak hour.
- Haggerty Road and Middle Site Driveway:
 - The WBL/T movement and WB approach would operate at LOS F in the a.m. peak hour.
 - The WBL/T movement and WB approach would operate at LOS F in the p.m. peak hour.

The intersection of Six Mile Road and Haggerty Road will continue to operate near capacity during the p.m. peak hour. Several movements, approaches, and the overall intersection operate with poor LOS and v/c ratios near or exceeding 1.00 under future traffic conditions. Additionally, the SB I-275 Off-Ramp will continue to operate with significant delays and v/c ratios exceeding 1.00 during the a.m. and p.m. peak hours under future traffic conditions.

SimTraffic simulations were also reviewed to observe network operations and vehicle queues. For future conditions, some vehicle queues and spill-back from available storage lanes starts to occur for left turning traffic on Six Mile Road between Haggerty Road and Fox Drive. The existing TWLTL on Six Mile Road does not have enough storage to accommodate the opposing left turn queues between Haggerty Road and Fox Drive, leading to minor left turn interlock during the p.m. peak hour. See Appendix 8 – Future LOS Output Reports for the future conditions LOS reports and queueing analysis reports.

5.3 Traffic Signal Warrant Analysis

Traffic signal warrants were completed at the intersection of Haggerty Road and Middle Site Driveway in accordance with *Michigan Manual on Uniform Traffic Control Devices* (MMUTCD) requirements. This proposed signal will also control the existing driveway for the Northville Village Center located on the west side of Haggerty Road. The results of this analysis revealed that several warrants are met at the intersection. The results of this analysis are presented in Table 10 – Signal Warrants – Intersection of Haggerty Road and Middle Site Driveway. All signal warrant charts are provided in Appendix 9 – Signal Warrants.

Table 10 – Signal Warrants – Intersection of Haggerty Road and Middle Site Driveway

Warrant		Is Warrant Met?	Comments
Eight Hour Vehicular Volume	Overall	Yes	
	Condition A	No	Hours Met: 0
	Condition B	Yes	Hours Met: 11
	Conditions A and B	-	Hours Met: -
Four Hour Vehicular Volume (70%)		Yes	Hours Met: 9
Peak Hour Vehicular Volume (70%)	Overall	Yes	
	Condition A	No	-
	Condition B	Yes	Hours Met: 4

5.4 Future Improvement Conditions Traffic Analysis

Observations of existing traffic conditions were made, and improvements are recommended, at the following intersections:

- Six Mile Road and Haggerty Road:
 - Optimize cycle length. A cycle length of 120 seconds was used in this analysis.
 - Optimize signal splits.
 - Add right-turn overlap phases to the WB, NB, and SB approaches.
- Six Mile Road and Fox Drive/Six Mile Road and Quakertown Lane:
 - Optimize cycle length. A cycle length of 120 seconds was used in this analysis.
 - Optimize signal splits.
- Six Mile Road and I-275 SB Off-Ramp:
 - Optimize signal splits.
- Six Mile Road Corridor:
 - Optimize signal offsets.
- Haggerty Road and Middle Site Driveway:
 - Install actuated-coordinated traffic signal. A cycle length of 80 seconds was used in this analysis.

The resulting LOS and delay for the future improvement conditions are presented in Table 11 – LOS Analysis for Future Improvement Conditions.

Table 11 – LOS Analysis for Future Improvement Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Haggerty Road (Signalized)				
EB Six Mile Road	D	47.7	E	58.3
WB Six Mile Road	C	27.0	C	28.0
NB Haggerty Road	D	42.2	D	52.7
SB Haggerty Road	D	36.0	D	48.9
Overall	D	38.7	D	45.0

Table 11 – LOS Analysis for Future Improvement Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Six Mile Road and Fox Drive (Signalized)				
EB Six Mile Road	B	10.2	B	17.0
WB Six Mile Road	A	0.2	A	0.2
SB Fox Drive	D	47.0	D	47.4
Overall	A	9.0	B	11.3
Six Mile Road and Quakertown Lane (Signalized)				
EB Six Mile Road	A	0.1	A	0.3
WB Six Mile Road	B	15.6	B	17.1
NB Quakertown Lane	D	51.1	E	56.2
Overall	A	8.7	B	10.4
Six Mile Road and I-275 SB Off-Ramp (Signalized)				
EB Six Mile Road	B	15.1	B	16.3
WB Six Mile Road	A	9.0	A	1.4
SB I-275 SB Off-Ramp	C	31.7	E	63.6
Overall	B	17.5	C	22.6
Six Mile Road and I-275 NB Off-Ramp (Signalized)				
EB Six Mile Road	A	3.6	A	3.8
WB Six Mile Road	A	2.2	A	8.1
NB I-275 NB Off-Ramp	D	36.3	D	37.4
Overall	B	10.7	B	12.0
Six Mile Road and North Laurel Park Drive (Signalized)				
WB Six Mile Road	A	5.6	A	7.3
NB EB to WB Crossover	B	15.1	B	17.9
SB North Laurel Park Drive	B	13.6	C	26.3
Overall	A	8.7	B	14.4
Six Mile Road and Newburgh Road (Signalized)				
EB Six Mile Road	B	13.6	B	16.8
WB Six Mile Road	B	18.8	B	18.5
NB Newburgh Road	B	18.7	B	19.1
SB Newburgh Road	B	16.9	C	22.8
Overall	B	13.7	B	16.7
Haggerty Road and College Parkway (Signalized)				
EB College Parkway	D	35.9	C	33.8
WB College Parkway	D	35.1	C	33.2
NB Haggerty Road	B	19.4	C	22.1
SB Haggerty Road	A	2.1	A	2.5
Overall	B	16.3	B	15.8
Haggerty Road and South Drive/Cross Road (Signalized)				
EB Cross Road	C	24.6	C	27.2
WB South Drive	C	22.6	C	24.2
NB Haggerty Road	A	0.6	A	0.7
SB Haggerty Road	A	8.4	A	9.8
Overall	A	5.7	A	8.2
Six Mile Road and East Site Driveway (Stop-Controlled)				
EB Six Mile Road	A	0.0	A	0.0
WB Six Mile Road	A	0.0	A	0.0
SB East Site Driveway	A	8.6	A	8.9
Overall	A	0.1	A	0.5

Table 11 – LOS Analysis for Future Improvement Conditions

Approach	LOS/Delay(s)			
	a.m. Peak Hour		p.m. Peak Hour	
Haggerty Road and Middle Site Driveway (Signalized)				
EB Middle Site Driveway	D	36.5	D	36.9
WB Middle Site Driveway	D	36.3	D	35.0
NB Haggerty Road	A	3.3	A	4.0
SB Haggerty Road	A	0.2	A	0.6
Overall	A	6.2	A	6.1
Haggerty Road and North Site Driveway (Stop-Controlled)				
WB North Site Driveway	C	16.0	C	19.7
NB Haggerty Road	A	0.0	A	0.0
SB Haggerty Road	A	0.3	A	0.3
Overall	A	0.5	A	0.6

Further analysis of the LOS results for future improvement conditions revealed that most movements, approaches, and intersections are expected to continue to operate at an acceptable LOS D or better during both the a.m. and p.m. peak hours, with the following exceptions:

- Six Mile Road and Haggerty Road:
 - The EBT, EBT/R, WBL, NBT, and SBL movements and EB approach would operate at LOS E in the p.m. peak hour.
- Six Mile Road and Quakertown Lane:
 - The NBR movement and NB approach would operate at LOS E in the p.m. peak hour.
- Six Mile Road and I-275 SB Off-Ramp:
 - The SBR movement would continue to operate at LOS F in the p.m. peak hour.
 - The SB approach would improve from LOS F to LOS E in the p.m. peak hour.

The intersection of Six Mile Road and Haggerty Road will continue to operate near capacity during the p.m. peak hour with several movements, operating with poor LOS and v/c ratios near or exceeding 1.00. However, the delays experienced by motorists and the v/c ratios with the proposed improvements are less than or nearly equal to existing conditions.

Additionally, the SB I-275 Off-Ramp will continue to operate with significant delays and v/c ratios exceeding 1.00 during the p.m. peak hour. However, the delays during the p.m. peak hour would be reduced from 112.8 seconds to 63.6 seconds, or a reduction of 49.2 seconds. The amount of green time that the SB I-275 off-ramp would need during the p.m. peak hour to lower the LOS and delays to acceptable levels would significantly degrade operations on EB and WB Six Mile Road.

SimTraffic simulations were also reviewed to observe network operations and vehicle queues. For future improvement conditions, study network operations are acceptable, with no significant vehicle queues or spill-back from available storage lanes. With the proposed improvements, the existing TWLTL on Six Mile Road has enough storage to accommodate the opposing left turn queues between Haggerty Road and Fox Drive, with no observed left turn interlock between the two movements. No 95th percentile queue lengths for the turning movements exceed the provided storage length; see Appendix 10 – Future Improvement LOS Output Reports.

6.0 Parking Analysis

The City requires a shared parking analysis for this proposed development. The proposed site plan shows a total of 1,031 parking spaces. 674 of these spaces are surface parking, with 357 additional parking spaces provided in the existing parking structure that will remain.

The number of parking spaces required by the City Ordinance were calculated. Additionally, the anticipated parking demand was calculated using the methodologies presented in the *ITE Parking Generation, 5th Edition*. Finally, the required parking supply was calculated using the spreadsheet published by the Urban Land Institute (ULI), which utilizes the methodologies and data in the *Shared Parking, 3rd Edition* manual.

In mixed-use developments, not all parked vehicles that are generated are from sources outside the boundaries of the development but rather, are “shared” within the site, meaning that a parked vehicle may visit several components of a mixed-use development in a single trip. Additionally, it is common for sites with a mixture of uses to have varying peak hour and monthly parking demands. The methodology presented in *Shared Parking, 3rd Edition* was followed to determine an appropriate shared parking reduction for the site. The results of this analysis suggest a 21% shared parking reduction on a typical weekday and a 29% shared parking reduction on a typical weekend for the combination of land uses.

Table 12 – Parking Generation indicates the comparison between the number of parking spaces required by the City Ordinance, the parking demand calculated using the ITE Parking Generation data, and the required parking supply estimated by ULI utilizing the Shared Parking methodologies. All parking calculations are provided in Appendix 11 – Parking Generation Calculations.

Table 12 – Parking Generation

Source	Number of Parking Spaces		
	Weekday	Saturday	Sunday
City Ordinance	1,358 Required Parking Spaces		
ITE Parking Generation	941 Parking Space Demand	998 Parking Space Demand	1,090 Parking Space Demand
ULI	979 Required Parking Spaces	840 Required Parking Spaces	

As indicated in the table above, the ITE Parking Generation results in a peak parking demand of 941 spaces on a weekday, 998 parking spaces on a Saturday, and 1,090 parking spaces on a Sunday. Generally, a parking facility is perceived as “full” at somewhat less than its actual capacity, generally in the range of 85% - 95% occupancy. Comparing the ITE parking demand to the proposed parking supply, the parking facilities would be at 91% occupancy on a weekday, 97% occupancy on a Saturday, and 106% occupancy on a Sunday. However, these calculations do not account for any sharing of parking spaces between the different uses on the site.

As indicated in the table above, the ULI Shared Parking methodologies results in 979 required parking spaces on a weekday and 840 required parking spaces on a weekend. This would result in an excess of 52 parking spaces on a weekday and 191 parking spaces on a weekend. Based on this analysis, no parking occupancy issues are projected if the proposed 1,031 parking spaces were approved instead of expanding the parking areas to meet the City Ordinance requirements of 1,358 parking spaces.

7.0 Findings and Recommendations

The analyses conducted for this TIS indicate the proposed development will not result in any significant impact to the adjacent road network with improvements. The proposed site access configuration is appropriate and will acceptably facilitate site ingress and egress. These conclusions are supported by the following key findings:

1. Existing storage lengths are adequate for all movements in existing and future conditions.
2. Lane configurations and physical capacity are appropriate within the study area.

Based on the findings of the HCM operational analyses and site traffic generation, Table 13 – Proposed Improvements includes the recommended existing, background, and future improvements to the study intersections to mitigate traffic impacts.

Table 13 – Proposed Improvements

Intersection	Background	Future
Six Mile Road and Haggerty Road	• Optimize Cycle Length and timing splits. • Install WB, NB, and SB right turn overlap phases.	
Six Mile Road and Fox Drive/Quakertown Lane		• Optimize Cycle Length and timing splits.
Six Mile Road and I-275 SB Off-Ramp	• Optimize timing splits.	
Six Mile Road Corridor	• Optimize signal offsets.	
Haggerty Road and Middle Site Driveway		• Install NB right turn lane. • Install actuated-coordinated traffic signal.

Appendix 1

Traffic Volume Data

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#100 - Six Mile Road and Haggerty Road	a.m. Peak Hour 05/16/23 7:45 a.m. - 8:45 a.m.		PHF	0.93			0.95			0.85			0.89		
			% Heavy	1%			1%			4%			2%		
			Existing	124	696	36	283	384	255	94	558	358	139	236	50
		2023	Existing Adj.	124	696	36	283	384	255	94	558	358	139	249	50
		2025	Background	126	710	37	289	392	260	96	570	365	142	254	51
			Bckgrd. Dev. A										-18		
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	126	710	37	289	392	260	96	570	365	124	254	51
			Rem. Ex. Site Trips	-5					-10		-20				
			Site Generated	56	19		14	20	13		61	21	15	22	14
			Pass By												
			Total Site Gen	51	19	0	14	20	3	0	41	21	15	22	14
			Total Future	177	729	37	303	412	263	96	611	386	139	276	65

Count Date:	5/16/2023
Count Year:	2023
Existing Adj. Year:	2023
Existing Adjustment Rate:	1.00
Growth Rate:	1.0%
Buildout Year:	2025
Scenario:	a.m. Peak Hour

Bckgrd. Dev. A: Reassign Traffic for Fox Drive Signal
Bckgrd. Dev. B:
Bckgrd. Dev. C:

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#200 - Six Mile Road and Fox Drive	a.m. Peak Hour 02/23/22 8:00 a.m. - 9:00 a.m.		PHF	0.93			0.94						0.61		
			% Heavy	2%			1%						0%		
			Existing	6	941			1062	113				2		15
		2023	Existing Adj.	6	1179			1062	113				2		15
		2025	Background	6	1203			1084	115				2		15
			Bckgrd. Dev. A		-18								18		
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	6	1185			1084	115				20		15
			Rem. Ex. Site Trips					-168							
			Site Generated	40	15			41	28				62		17
			Pass By	16	-16			-7	7				17		7
			Total Site Gen	56	-1			-134	35				79		24
			Total Future	62	1184			950	150				99		39

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#300 - Six Mile Road and Quakertown Lane	a.m. Peak Hour 02/23/22 7:45 a.m. - 8:45 a.m.		PHF	0.90			0.95			0.71					
			% Heavy	2%			1%			5%					
			Existing		923	9	81	1165		3		57			
		2023	Existing Adj.		1172	9	81	1172		3		57			
		2025	Background		1196	9	83	1196		3		58			
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		1196	9	83	1196		3		58			
			Rem. Ex. Site Trips					-168							
			Site Generated		77			69							
			Pass By		1										
			Total Site Gen		78	0	0	-99		0		0			
			Total Future		1274	9	83	1097		3		58			

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#400/410 - Six Mile Road and I-275 SB Off-Ramp	a.m. Peak Hour 05/16/23 7:45 a.m. - 8:45 a.m.		PHF	0.92			0.85						0.94		
			% Heavy	2%			2%						1%		
			Existing		873	356		763	231				245		432
		2023	Existing Adj.		873	356		766	231				245		487
		2025	Background		891	363		781	236				250		498
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		891	363		781	236				250		498
			Rem. Ex. Site Trips					-102							-66
			Site Generated		55	22		42							27
			Pass By		1										
			Total Site Gen		56	22		-60	0				0		-39
			Total Future		947	385		721	236				250		459

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#500/510 - Six Mile Road and I-275 NB Off-Ramp	a.m. Peak Hour 05/16/23 7:45 a.m. - 8:45 a.m.		PHF	0.95			0.85			0.90					
			% Heavy	3%			2%			2%					
			Existing		648	465		705	374	292		199			
		2023	Existing Adj.		653	465		997	374	292		262			
		2025	Background		666	475		1017	382	298		267			
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		666	475		1017	382	298		267			
			Rem. Ex. Site Trips					-102		-21					
			Site Generated		32	23		42		9					
			Pass By		1										
			Total Site Gen		33	23		-60	0	-12		0			
			Total Future		699	498		957	382	286		267			

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#600/610 - Six Mile Road and North Laurel Park Drive	a.m. Peak Hour 05/16/23 8:00 a.m. - 9:00 a.m.		PHF	0.84			0.92			0.89			0.86		
			% Heavy	2%			2%			1%			3%		
			2023 Existing	313	602			894	101	2	311				172
		2023	Existing Adj.	313	602			905	101	2	311				172
		2025	Background	319	614			924	103	2	317				175
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	319	614			924	103	2	317				175
			Rem. Ex. Site Trips					-81							
			Site Generated		32			33							
			Pass By		1										
			Total Site Gen	0	33			-48	0	0	0				0
			Total Future	319	647			876	103	2	317				175

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#700/710 - Six Mile Road and Newburgh Road	a.m. Peak Hour 05/16/23 7:30 a.m. - 8:30 a.m.		PHF	0.91			0.89			0.93			0.84		
			% Heavy	2%			2%			3%			3%		
			2023 Existing		392	234		1032	138		823	271		519	145
		2023	Existing Adj.		392	234		1032	138		823	271		519	145
		2025	Background		400	239		1053	141		840	276		529	148
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		400	239		1053	141		840	276		529	148
			Rem. Ex. Site Trips					-71							-10
			Site Generated		20	12		29	4			6			4
			Pass By		1										
			Total Site Gen		21	12		-42	4		0	6		0	-6
			Total Future		421	251		1011	145		840	282		529	142

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#800 - Haggerty Road and College Parkway	a.m. Peak Hour 05/16/23 8:00 a.m. - 9:00 a.m.		PHF	0.84			0.72			0.82			0.85		
			% Heavy	3%			2%			2%			2%		
			2023 Existing	66	10	42	30	3	10	32	708	37	14	320	71
		2023	Existing Adj.	66	10	42	30	3	10	32	750	37	14	337	71
		2025	Background	67	10	43	30	3	10	32	765	38	14	344	72
			Bckgrd. Dev. A				-10								-8
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	67	10	43	20	3	10	32	765	38	14	336	72
			Rem. Ex. Site Trips								-2				-17
			Site Generated				5		6		54	13	4		31
			Pass By				1		1		-1	1	1	-1	
			Total Site Gen	0	0	0	6	0	7	0	51	14	5	13	0
			Total Future	67	10	43	26	3	17	32	816	52	19	349	72

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#900 - Haggerty Road and South Drive/Cross Road	a.m. Peak Hour 05/16/23 8:00 a.m. - 9:00 a.m.		PHF	0.78			0.80			0.85			0.84		
			% Heavy	2%			3%			2%			1%		
			2023 Existing	97	34	3	23	3	6	3	685	91	5	396	64
		2023	Existing Adj.	97	34	3	23	3	6	3	732	91	5	396	64
		2025	Background	99	35	3	23	3	6	3	747	92	5	404	65
			Bckgrd. Dev. A				-8								
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	99	35	3	15	3	6	3	747	92	5	404	65
			Rem. Ex. Site Trips								-2				-17
			Site Generated								60			35	
			Pass By												
			Total Site Gen	0	0	0	0	0	0	0	58	0	0	18	0
			Total Future	99	35	3	15	3	6	3	805	92	5	422	65

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#1000 - Six Mile Road and East Site Driveway	a.m. Peak Hour 05/16/23		PHF	0.93			0.95			0.92			0.92		
			% Heavy	2%			1%			2%			2%		
			2023 Existing	0	1185	8	0	922	155	0	0	0	0	0	0
		2023	Existing Adj.	0	1185	8	0	922	155	0	0	0	0	0	0
		2025	Background	0	1209	8	0	941	158	0	0	0	0	0	0
			Bckgrd. Dev. A		-18										
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	0	1191	8	0	941	158	0	0	0	0	0	0
			Rem. Ex. Site Trips					-10	-158						
			Site Generated		55			30	28						17
			Pass By					-6	6						6
			Total Site Gen	0	55	0	0	14	-124	0	0	0	0	0	23
			Total Future	0	1246	8	0	955	34	0	0	0	0	0	23

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#1200 - Haggerty Road and Middle Site Driveway	a.m. Peak Hour 05/16/23 8:00 a.m. - 9:00 a.m.		PHF	0.73			0.60			0.86			0.90		
			% Heavy	2%			0%			2%			3%		
		2023	Existing	2	0	56	0	2	2	88	766	34	17	374	10
		2023	Existing Adj.	2	0	56	0	2	2	88	815	34	17	382	10
		2025	Background	2	0	57	0	2	2	90	831	35	17	390	10
			Bckgrd. Dev. A											-18	
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	2	0	57	0	2	2	90	831	35	17	372	10
			Rem. Ex. Site Trips					-2	-2			-35	-17		
			Site Generated				31		36		52	78	21	20	
			Pass By				4		8		-8	8	4	-4	
			Total Site Gen	0	0	0	35	-2	42	0	44	51	8	16	0
			Total Future	2	0	57	35	0	44	90	875	86	25	388	10

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#1300 - Haggerty Road and North Site Driveway	a.m. Peak Hour 05/16/23		PHF				0.92			0.84			0.88		
			% Heavy				2%			2%			3%		
		2023	Existing				0		0		819	0	0	409	
		2023	Existing Adj.				0		0		819	0	0	409	
		2025	Background				0		0		835	0	0	417	
			Bckgrd. Dev. A											-18	
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background				0		0		835	0	0	399	
			Rem. Ex. Site Trips								-2			-17	
			Site Generated				15		18		49	39	10	26	
			Pass By				1		4		-4	4	1	-1	
			Total Site Gen				16		22		43	43	11	8	
			Total Future				16		22		878	43	11	407	

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#100 - Six Mile Road and Haggerty Road	p.m. Peak Hour 05/16/23 4:45 p.m. - 5:45 p.m.		PHF	0.93			0.90			0.94			0.92		
			% Heavy	1%			1%			0%			1%		
			Existing	148	678	70	314	759	335	114	572	430	340	592	95
		2023	Existing Adj.	148	678	70	314	759	335	114	604	430	340	592	95
		2025	Background	151	692	71	320	774	342	116	616	438	347	604	97
			Bckgrd. Dev. A										-61		
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	151	692	71	320	774	342	116	616	438	286	604	97
			Rem. Ex. Site Trips	-1					-3		-4		-4	-8	-1
			Site Generated	38	13		20	29	16		49	17	15	30	20
			Pass By					-6						-4	
			Total Site Gen	37	13	0	20	23	13	0	45	17	11	18	19
			Total Future	188	705	71	340	797	355	116	661	455	297	622	116

Count Date:	5/16/2023
Count Year:	2023
Existing Adj. Year:	2023
Existing Adjustment Rate:	1.00
Growth Rate:	1.0%
Buildout Year:	2025
Scenario:	p.m. Peak Hour

Bckgrd. Dev. A: Reassign Traffic for Fox Drive Signal
Bckgrd. Dev. B:
Bckgrd. Dev. C:

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#200 - Six Mile Road and Fox Drive	p.m. Peak Hour 02/23/22 4:45 p.m. - 5:45 p.m.		PHF	0.95			0.95						0.88		
			% Heavy	1%									0%		
			Existing	8	1446			1234	135				13		29
		2023	Existing Adj.	8	1532			1426	135				13		29
		2025	Background	8	1563			1454	138				13		30
			Bckgrd. Dev. A		-61								61		
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	8	1502			1454	138				74		30
			Rem. Ex. Site Trips		-4			-51							
			Site Generated	30	15			48	32				58		24
			Pass By	35	-35			-18	18				29		15
			Total Site Gen	65	-24			-21	50				87		39
			Total Future	73	1478			1433	188				161		69

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#300 - Six Mile Road and Quakertown Lane	p.m. Peak Hour 02/23/22 4:45 p.m. - 5:45 p.m.		PHF	0.95			0.95			0.75					
			% Heavy	0%			0%			0%					
			Existing		1456	4	61	1354		8			82		
		2023	Existing Adj.		1541	4	61	1553		8			82		
		2025	Background		1572	4	62	1584		8			84		
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		1572	4	62	1584		8			84		
			Rem. Ex. Site Trips		-4			-51							
			Site Generated		73			80							
			Pass By		-6										
			Total Site Gen		63	0	0	29		0			0		
			Total Future		1635	4	62	1613		8			84		

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#400/410 - Six Mile Road and I-275 SB Off-Ramp	p.m. Peak Hour 05/16/23 4:30 p.m. - 5:30 p.m.		PHF	0.93			0.95						0.92		
			% Heavy	1%			0%						2%		
			Existing		1266	357		1105	274				301		509
		2023	Existing Adj.		1266	357		1105	274				301		509
		2025	Background		1292	364		1127	280				307		519
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		1292	364		1127	280				307		519
			Rem. Ex. Site Trips		-3	-1		-35							-16
			Site Generated		56	17		54							26
			Pass By		-6										
			Total Site Gen		47	16		19	0				0		10
			Total Future		1339	380		1146	280				307		529

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#500/510 - Six Mile Road and I-275 NB Off-Ramp	p.m. Peak Hour 05/16/23 4:30 p.m. - 5:30 p.m.		PHF	0.91			0.88			0.87					
			% Heavy	1%			1%			0%					
			Existing		1023	541		1077	372	300			197		
		2023	Existing Adj.		1026	541		1379	436	300			261		
		2025	Background		1047	552		1407	445	306			266		
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		1047	552		1407	445	306			266		
			Rem. Ex. Site Trips		-2	-1		-35		-6					
			Site Generated		37	19		54		9					
			Pass By		-6										
			Total Site Gen		29	18		19	0	3			0		
			Total Future		1076	570		1426	445	309			266		

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#600/610 - Six Mile Road and North Laurel Park Drive	p.m. Peak Hour 05/16/23 4:15 p.m. - 5:15 p.m.		PHF	0.93			0.94			0.93			0.78		
			% Heavy	1%			1%			1%			0%		
			2023 Existing	193	1094			1015	81	0	193				500
		2023	Existing Adj.	193	1094			1015	81	0	193				500
		2025	Background	197	1116			1036	83	0	197				510
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	197	1116			1036	83	0	197				510
			Rem. Ex. Site Trips		-2			-29							
			Site Generated		37			45							
			Pass By		-6										
			Total Site Gen	0	29			16	0	0	0				0
			Total Future	197	1145			1052	83	0	197				510

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#700/710 - Six Mile Road and Newburgh Road	p.m. Peak Hour 05/16/23 4:30 p.m. - 5:30 p.m.		PHF	0.95			0.95			0.95			0.88		
			% Heavy	1%			1%			1%			1%		
			2023 Existing		980	363		962	204		832	281		1043	302
		2023	Existing Adj.		980	363		962	204		832	281		1043	302
		2025	Background		1000	370		981	208		849	287		1064	308
			Bckgrd. Dev. A												
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background		1000	370		981	208		849	287		1064	308
			Rem. Ex. Site Trips		-1	-1		-22							-7
			Site Generated		27	10		34	5			8			11
			Pass By		-6										
			Total Site Gen		20	9		12	5		0	8		0	4
			Total Future		1020	379		993	213		849	295		1064	312

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#800 - Haggerty Road and College Parkway	p.m. Peak Hour 05/16/23 4:45 p.m. - 5:45 p.m.		PHF	0.93			0.86			0.93			0.95		
			% Heavy	1%			0%			1%			0%		
			2023 Existing	98	7	62	108	14	50	57	810	106	37	726	95
		2023	Existing Adj.	98	7	62	108	14	50	57	810	106	37	775	95
		2025	Background	100	7	63	110	14	51	59	826	108	37	791	97
			Bckgrd. Dev. A				-35								-26
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	100	7	63	75	14	51	59	826	108	37	765	97
			Rem. Ex. Site Trips								-14			-6	
			Site Generated				6		5		50	10	6	53	
			Pass By				2		2		-7	3	2	-2	
			Total Site Gen	0	0	0	8	0	7	0	29	13	8	45	0
			Total Future	100	7	63	83	14	58	59	855	121	45	810	97

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#900 - Haggerty Road and South Drive/Cross Road	p.m. Peak Hour 05/16/23 4:30 p.m. - 5:30 p.m.		PHF	0.74			0.76			0.92			0.94		
			% Heavy	0%			0%			0%			0%		
			2023 Existing	117	33	12	82	27	22	2	876	63	4	771	163
		2023	Existing Adj.	117	33	12	82	27	22	2	893	63	4	813	163
		2025	Background	119	34	12	84	28	22	2	911	64	4	829	166
			Bckgrd. Dev. A				-26								
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	119	34	12	58	28	22	2	911	64	4	829	166
			Rem. Ex. Site Trips								-14			-6	
			Site Generated								55			59	
			Pass By								-5				
			Total Site Gen	0	0	0	0	0	0	0	36	0	0	53	0
			Total Future	119	34	12	58	28	22	2	947	64	4	882	166

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#1000 - Six Mile Road and East Site Driveway	p.m. Peak Hour 05/16/23		PHF	0.94			0.93			0.92			9.20		
			% Heavy	1%			1%			2%			2%		
			2023 Existing	0	1448	0	0	1408	47	0	0	92	0	0	0
		2023	Existing Adj.	0	1448	0	0	1408	47	0	0	92	0	0	0
		2025	Background	0	1477	0	0	1436	48	0	0	94	0	0	0
			Bckgrd. Dev. A		-61										
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	0	1416	0	0	1436	48	0	0	94	0	0	0
			Rem. Ex. Site Trips		-4			-3	-48						
			Site Generated		45			40	32						25
			Pass By					-20	17						14
			Total Site Gen	0	41	0	0	17	1	0	0	0	0	0	39
			Total Future	0	1457	0	0	1453	49	0	0	94	0	0	39

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#1200 - Haggerty Road and Middle Site Driveway	p.m. Peak Hour 05/16/23 4:45 p.m. - 5:45 p.m.		PHF	0.88			0.63			0.91			0.90		
			% Heavy	0%			0%			1%			0%		
		2023	Existing	2	0	111	13	3	14	122	956	8	6	899	36
		2023	Existing Adj.	2	0	111	13	3	14	122	957	8	6	903	36
		2025	Background	2	0	114	13	3	14	124	977	8	6	921	37
			Bckgrd. Dev. A											-61	
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background	2	0	114	13	3	14	124	977	8	6	860	37
			Rem. Ex. Site Trips				-13	-3	-14		-8	-6			
			Site Generated				39		33		41	62	35	26	
			Pass By				13		13		-16	16	15	-17	
			Total Site Gen	0	0	0	39	-3	32	0	25	70	44	9	0
			Total Future	2	0	114	52	0	46	124	1002	78	50	869	37

Intersection	Time period	Year	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#1300 - Haggerty Road and North Site Driveway	p.m. Peak Hour 05/16/23		PHF				0.92			0.92			0.93		
			% Heavy				2%			1%			0%		
		2023	Existing				0		0		973	0	0	945	
		2023	Existing Adj.				0		0		973	0	0	945	
		2025	Background				0		0		993	0	0	964	
			Bckgrd. Dev. A											-61	
			Bckgrd. Dev. B												
			Bckgrd. Dev. C												
			Total Background				0		0		993	0	0	903	
			Rem. Ex. Site Trips								-14			-6	
			Site Generated				20		17		43	31	18	41	
			Pass By				6		7		-11	8	8	-8	
			Total Site Gen				26		24		18	39	26	27	
			Total Future				26		24		1011	39	26	930	

Haggerty Road and Six Mile Road - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066324, Location: 42.410649, -83.432395



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	20	107	12	0	139	44	58	29	0	131	3	61	62	0	126	25	40	9	0	74	470
7:15AM	34	135	3	0	172	60	72	31	0	163	8	86	64	0	158	33	45	11	0	89	582
7:30AM	27	188	6	0	221	58	69	46	0	173	9	133	101	0	243	33	35	19	0	87	724
7:45AM	37	177	12	0	226	80	98	62	0	240	25	168	105	0	298	25	72	16	0	113	877
Hourly Total	118	607	33	0	758	242	297	168	0	707	45	448	332	0	825	116	192	55	0	363	2653
8:00AM	29	160	11	0	200	73	80	59	0	212	19	125	81	0	225	41	44	11	0	96	733
8:15AM	21	173	6	0	200	70	93	69	0	232	28	132	86	0	246	36	49	12	0	97	775
8:30AM	37	186	7	0	230	60	113	65	0	238	22	133	86	0	241	37	71	11	0	119	828
8:45AM	41	183	19	0	243	70	110	68	0	248	22	150	84	0	256	35	64	17	0	116	863
Hourly Total	128	702	43	0	873	273	396	261	0	930	91	540	337	0	968	149	228	51	0	428	3199
4:00PM	37	164	10	0	211	75	125	55	0	255	26	124	93	0	243	100	134	28	0	262	971
4:15PM	30	145	22	0	197	84	161	57	0	302	24	128	98	0	250	94	126	22	0	242	991
4:30PM	31	170	20	0	221	77	134	86	0	297	26	115	108	0	249	87	168	18	0	273	1040
4:45PM	38	192	10	0	240	79	186	88	0	353	31	150	115	0	296	72	139	19	0	230	1119
Hourly Total	136	671	62	0	869	315	606	286	0	1207	107	517	414	0	1038	353	567	87	0	1007	4121
5:00PM	31	185	21	0	237	73	175	68	0	316	30	127	103	0	260	91	170	19	0	280	1093
5:15PM	44	149	17	0	210	84	217	92	0	393	33	147	115	0	295	83	151	25	0	259	1157
5:30PM	35	152	22	0	209	78	181	87	0	346	20	148	97	0	265	94	132	32	0	258	1078
5:45PM	44	145	17	0	206	77	171	95	0	343	24	127	64	0	215	73	115	26	0	214	978
Hourly Total	154	631	77	0	862	312	744	342	0	1398	107	549	379	0	1035	341	568	102	0	1011	4306
Total	536	2611	215	0	3362	1142	2043	1057	0	4242	350	2054	1462	0	3866	959	1555	295	0	2809	14279
% Approach	15.9%	77.7%	6.4%	0%	-	26.9%	48.2%	24.9%	0%	-	9.1%	53.1%	37.8%	0%	-	34.1%	55.4%	10.5%	0%	-	-
% Total	3.8%	18.3%	1.5%	0%	23.5%	8.0%	14.3%	7.4%	0%	29.7%	2.5%	14.4%	10.2%	0%	27.1%	6.7%	10.9%	2.1%	0%	19.7%	-
Lights	531	2575	211	0	3317	1128	2010	1047	0	4185	342	2028	1428	0	3798	945	1543	291	0	2779	14079
% Lights	99.1%	98.6%	98.1%	0%	98.7%	98.8%	98.4%	99.1%	0%	98.7%	97.7%	98.7%	97.7%	0%	98.2%	98.5%	99.2%	98.6%	0%	98.9%	98.6%
Articulated Trucks	1	14	1	0	16	9	10	4	0	23	2	6	8	0	16	4	1	2	0	7	62
% Articulated Trucks	0.2%	0.5%	0.5%	0%	0.5%	0.8%	0.5%	0.4%	0%	0.5%	0.6%	0.3%	0.5%	0%	0.4%	0.4%	0.1%	0.7%	0%	0.2%	0.4%
Buses and Single-Unit Trucks	4	22	3	0	29	5	23	6	0	34	6	20	26	0	52	10	11	2	0	23	138
% Buses and Single-Unit Trucks	0.7%	0.8%	1.4%	0%	0.9%	0.4%	1.1%	0.6%	0%	0.8%	1.7%	1.0%	1.8%	0%	1.3%	1.0%	0.7%	0.7%	0%	0.8%	1.0%

*L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and Six Mile Road - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066324, Location: 42.410649, -83.432395



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Haggerty Rd

Total: 6456

In: 2809

Out: 3647

295
1555
959

[W] Six Mile Rd

Total: 6050

In: 3362

Out: 2688

536
2611
215

1057
2043
1142

Out: 5032

In: 4242

Total: 9274

[E] Six Mile Rd

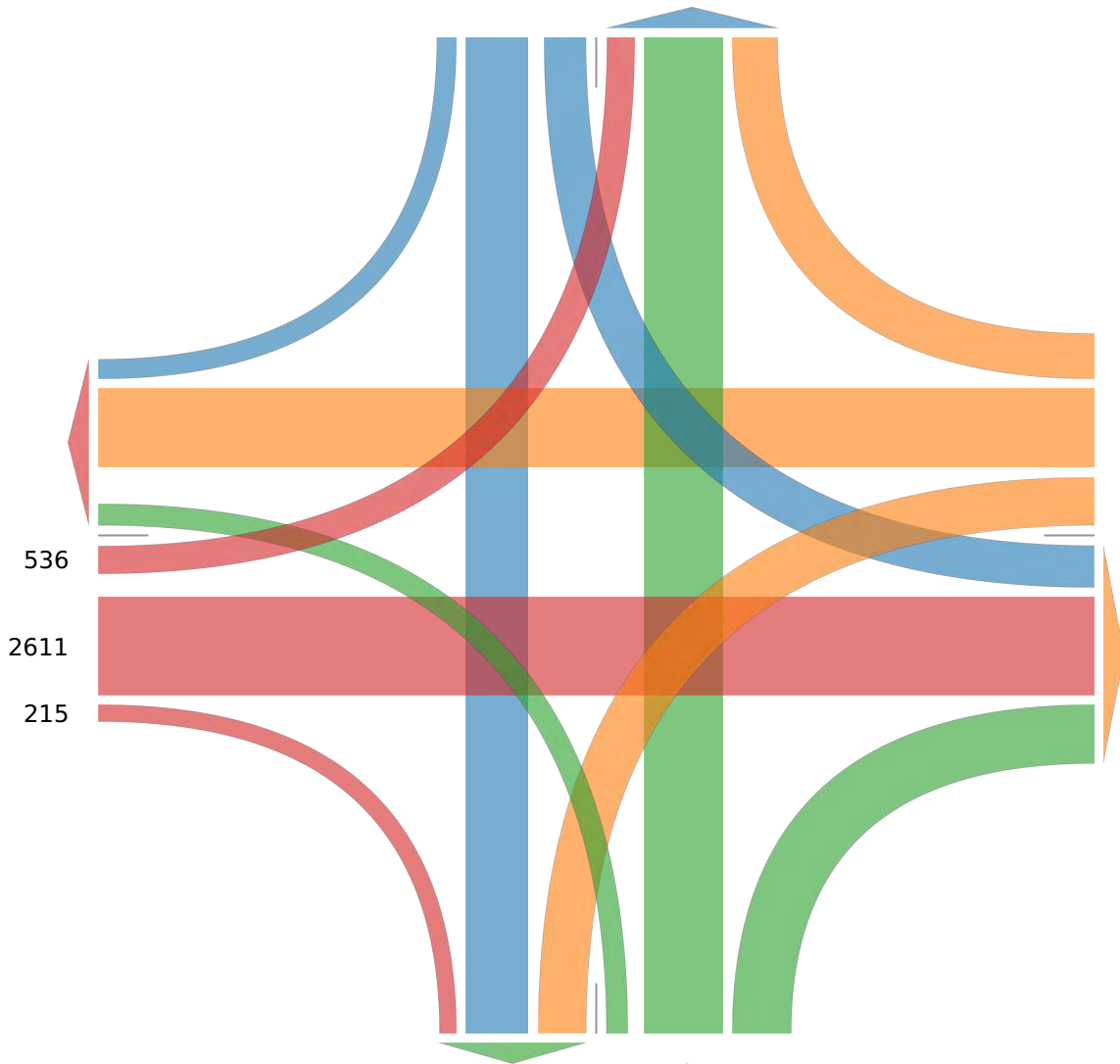
Out: 2912

In: 3866

Total: 6778

[S] Haggerty Rd

350
2054
1462



Haggerty Road and Six Mile Road - TMC

Tue May 16, 2023

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066324, Location: 42.410649, -83.432395



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:45AM	37	177	12	0	226	80	98	62	0	240	25	168	105	0	298	25	72	16	0	113	877
8:00AM	29	160	11	0	200	73	80	59	0	212	19	125	81	0	225	41	44	11	0	96	733
8:15AM	21	173	6	0	200	70	93	69	0	232	28	132	86	0	246	36	49	12	0	97	775
8:30AM	37	186	7	0	230	60	113	65	0	238	22	133	86	0	241	37	71	11	0	119	828
Total	124	696	36	0	856	283	384	255	0	922	94	558	358	0	1010	139	236	50	0	425	3213
% Approach	14.5%	81.3%	4.2%	0%	-	30.7%	41.6%	27.7%	0%	-	9.3%	55.2%	35.4%	0%	-	32.7%	55.5%	11.8%	0%	-	-
% Total	3.9%	21.7%	1.1%	0%	26.6%	8.8%	12.0%	7.9%	0%	28.7%	2.9%	17.4%	11.1%	0%	31.4%	4.3%	7.3%	1.6%	0%	13.2%	-
PHF	0.838	0.935	0.750	-	0.930	0.884	0.850	0.924	-	0.960	0.839	0.830	0.852	-	0.847	0.848	0.819	0.781	-	0.893	0.916
Lights	122	686	36	0	844	283	379	252	0	914	90	546	339	0	975	136	232	49	0	417	3150
% Lights	98.4%	98.6%	100%	0%	98.6%	100%	98.7%	98.8%	0%	99.1%	95.7%	97.8%	94.7%	0%	96.5%	97.8%	98.3%	98.0%	0%	98.1%	98.0%
Articulated Trucks	1	3	0	0	4	0	2	0	0	2	1	4	4	0	9	1	1	0	0	2	17
% Articulated Trucks	0.8%	0.4%	0%	0%	0.5%	0%	0.5%	0%	0%	0.2%	1.1%	0.7%	1.1%	0%	0.9%	0.7%	0.4%	0%	0%	0.5%	0.5%
Buses and Single-Unit Trucks	1	7	0	0	8	0	3	3	0	6	3	8	15	0	26	2	3	1	0	6	46
% Buses and Single-Unit Trucks	0.8%	1.0%	0%	0%	0.9%	0%	0.8%	1.2%	0%	0.7%	3.2%	1.4%	4.2%	0%	2.6%	1.4%	1.3%	2.0%	0%	1.4%	1.4%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and Six Mile Road - TMC

Tue May 16, 2023

AM Peak (7:45 AM - 8:45 AM)

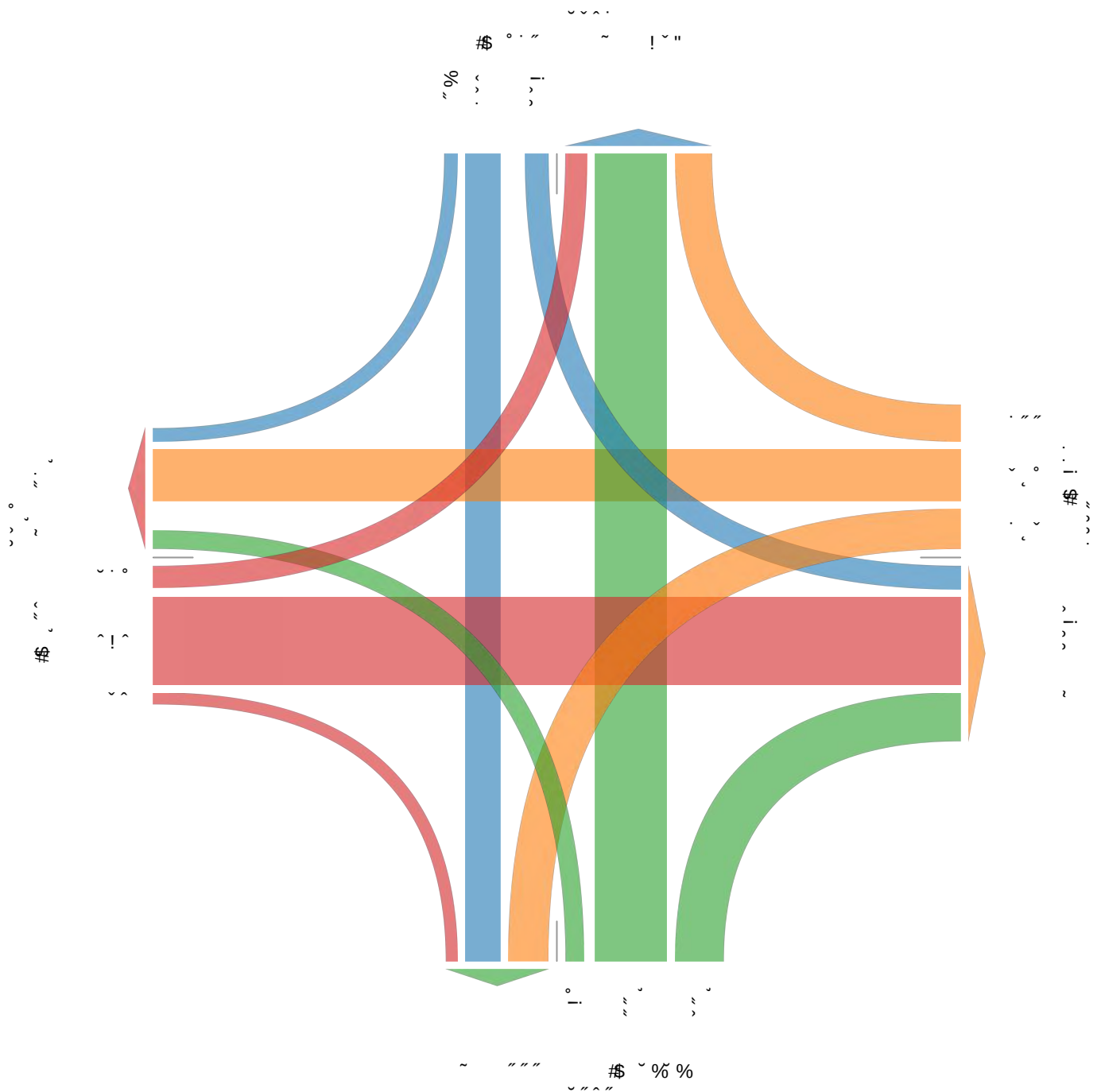
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066324, Location: 42.410649, -83.432395



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and Six Mile Road - TMC

Tue May 16, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066324, Location: 42.410649, -83.432395



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:45PM	38	192	10	0	240	79	186	88	0	353	31	150	115	0	296	72	139	19	0	230	1119
5:00PM	31	185	21	0	237	73	175	68	0	316	30	127	103	0	260	91	170	19	0	280	1093
5:15PM	44	149	17	0	210	84	217	92	0	393	33	147	115	0	295	83	151	25	0	259	1157
5:30PM	35	152	22	0	209	78	181	87	0	346	20	148	97	0	265	94	132	32	0	258	1078
Total	148	678	70	0	896	314	759	335	0	1408	114	572	430	0	1116	340	592	95	0	1027	4447
% Approach	16.5%	75.7%	7.8%	0%	-	22.3%	53.9%	23.8%	0%	-	10.2%	51.3%	38.5%	0%	-	33.1%	57.6%	9.3%	0%	-	-
% Total	3.3%	15.2%	1.6%	0%	20.1%	7.1%	17.1%	7.5%	0%	31.7%	2.6%	12.9%	9.7%	0%	25.1%	7.6%	13.3%	2.1%	0%	23.1%	-
PHF	0.841	0.883	0.795	-	0.933	0.935	0.874	0.910	-	0.896	0.864	0.953	0.935	-	0.943	0.904	0.871	0.742	-	0.917	0.961
Lights	147	667	70	0	884	310	756	335	0	1401	112	570	429	0	1111	339	589	94	0	1022	4418
% Lights	99.3%	98.4%	100%	0%	98.7%	98.7%	99.6%	100%	0%	99.5%	98.2%	99.7%	99.8%	0%	99.6%	99.7%	99.5%	98.9%	0%	99.5%	99.3%
Articulated Trucks	0	6	0	0	6	2	2	0	0	4	1	0	0	0	1	1	0	1	0	2	13
% Articulated Trucks	0%	0.9%	0%	0%	0.7%	0.6%	0.3%	0%	0%	0.3%	0.9%	0%	0%	0%	0.1%	0.3%	0%	1.1%	0%	0.2%	0.3%
Buses and Single-Unit Trucks	1	5	0	0	6	2	1	0	0	3	1	2	1	0	4	0	3	0	0	3	16
% Buses and Single-Unit Trucks	0.7%	0.7%	0%	0%	0.7%	0.6%	0.1%	0%	0%	0.2%	0.9%	0.3%	0.2%	0%	0.4%	0%	0.5%	0%	0%	0.3%	0.4%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and Six Mile Road - TMC

Tue May 16, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066324, Location: 42.410649, -83.432395



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Haggerty Rd

Total: 2082

In: 1027

Out: 1055

95

592

340

[W] Six Mile Rd

Total: 1864

In: 896

Out: 968

148

678

70

335

759

314

In: 1408

Total: 2856

Out: 1448

[E] Six Mile Rd

Out: 976

In: 1116

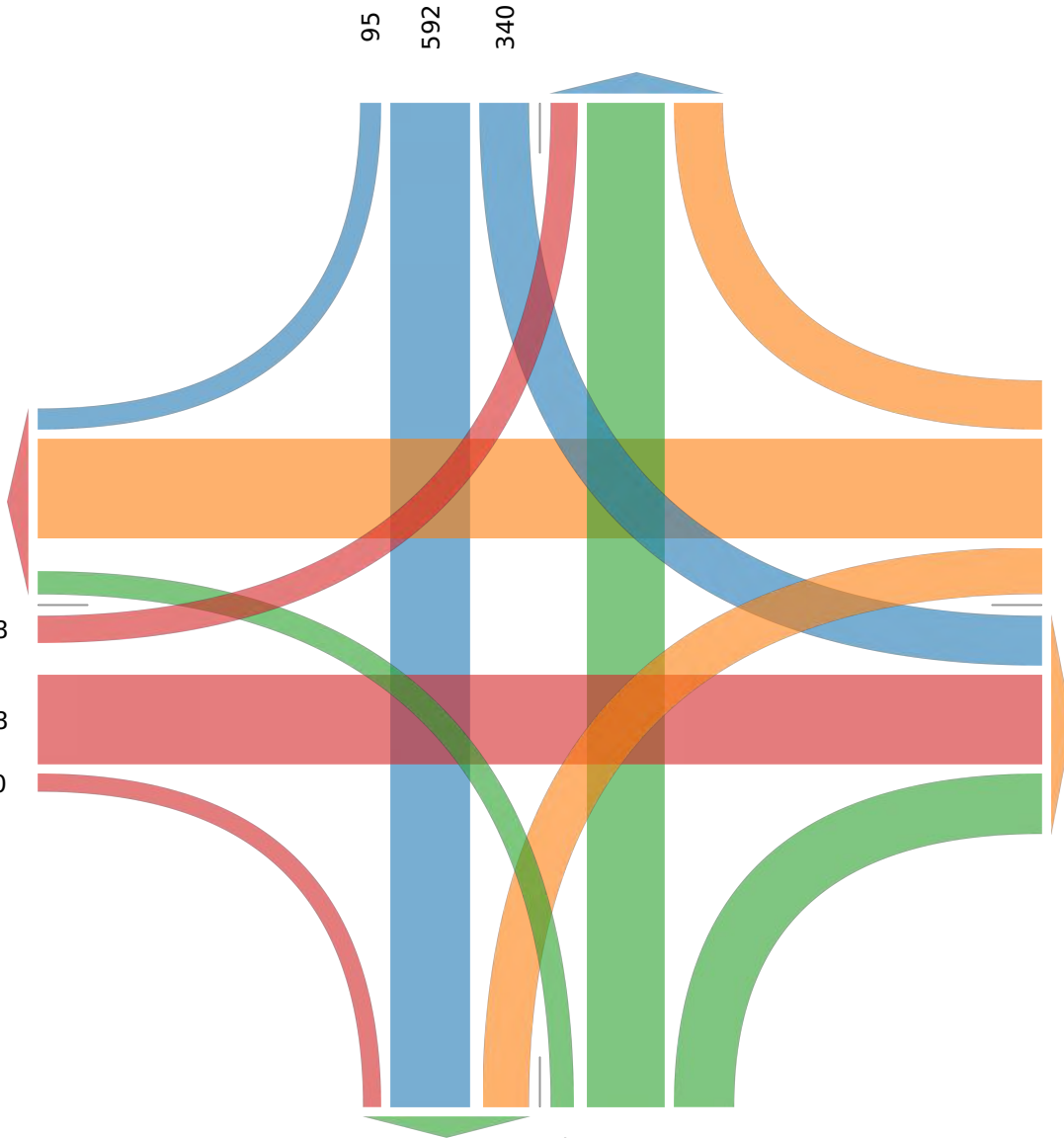
Total: 2092

[S] Haggerty Rd

114

572

430

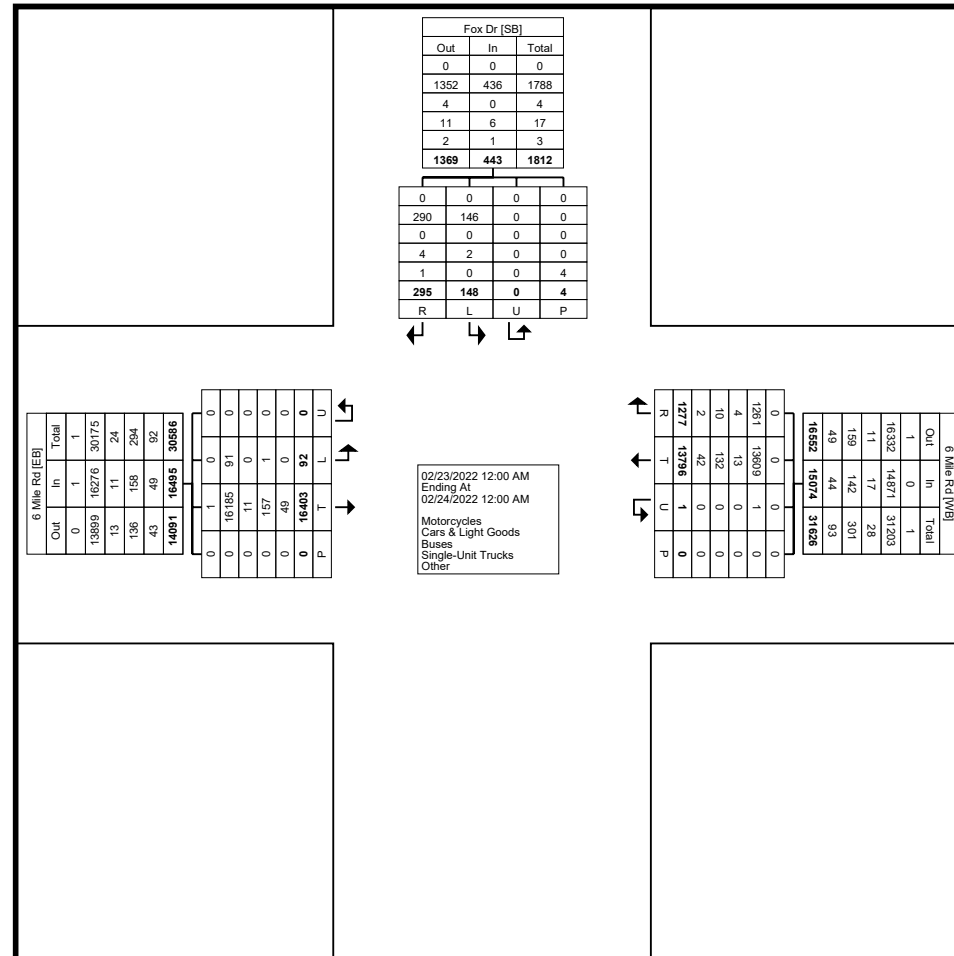


Turning Movement Data

Start Time	6 Mile Rd Eastbound					6 Mile Rd Westbound					Fox Dr Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
12:00 AM	1	18	0	0	19	15	1	0	0	16	0	1	0	0	1	36
12:15 AM	0	19	0	0	19	10	1	0	0	11	0	0	0	0	0	30
12:30 AM	0	14	0	0	14	9	2	0	0	11	0	0	0	0	0	25
12:45 AM	1	10	0	0	11	14	2	0	0	16	0	0	0	0	0	27
Hourly Total	2	61	0	0	63	48	6	0	0	54	0	1	0	0	1	118
1:00 AM	0	7	0	0	7	6	1	0	0	7	0	0	0	0	0	14
1:15 AM	0	5	0	0	5	3	0	0	0	3	1	0	0	0	1	9
1:30 AM	0	4	0	0	4	1	1	0	0	2	0	0	0	0	0	6
1:45 AM	0	4	0	0	4	5	1	0	0	6	0	0	0	0	0	10
Hourly Total	0	20	0	0	20	15	3	0	0	18	1	0	0	0	1	39
2:00 AM	0	6	0	0	6	5	1	0	0	6	0	0	0	0	0	12
2:15 AM	0	2	0	0	2	4	3	0	0	7	1	0	0	0	1	10
2:30 AM	0	6	0	0	6	6	0	0	0	6	1	0	0	0	1	13
2:45 AM	0	7	0	0	7	10	0	0	0	10	0	0	0	0	0	17
Hourly Total	0	21	0	0	21	25	4	0	0	29	2	0	0	0	2	52
3:00 AM	0	12	0	0	12	2	0	0	0	2	0	0	0	0	0	14
3:15 AM	0	7	0	0	7	2	0	0	0	2	0	0	0	0	0	9
3:30 AM	0	6	0	0	6	7	0	0	0	7	0	0	0	0	0	13
3:45 AM	0	4	0	0	4	9	0	0	0	9	1	1	0	0	2	15
Hourly Total	0	29	0	0	29	20	0	0	0	20	1	1	0	0	2	51
4:00 AM	0	8	0	0	8	9	0	0	0	9	0	0	0	0	0	17
4:15 AM	0	10	0	0	10	12	0	0	0	12	0	1	0	0	1	23
4:30 AM	0	12	0	0	12	22	2	0	0	24	1	0	0	0	1	37
4:45 AM	1	17	0	0	18	15	0	0	0	15	0	1	0	0	1	34
Hourly Total	1	47	0	0	48	58	2	0	0	60	1	2	0	0	3	111
5:00 AM	0	20	0	0	20	17	0	0	0	17	0	0	0	0	0	37
5:15 AM	1	37	0	0	38	39	0	0	0	39	1	1	0	0	2	79
5:30 AM	0	50	0	0	50	80	2	0	0	82	0	0	0	0	0	132
5:45 AM	0	65	0	0	65	105	3	1	0	109	3	2	0	0	5	179
Hourly Total	1	172	0	0	173	241	5	1	0	247	4	3	0	0	7	427
6:00 AM	0	77	0	0	77	59	6	0	0	65	0	2	0	0	2	144
6:15 AM	1	90	0	0	91	76	2	0	0	78	1	2	0	0	3	172
6:30 AM	0	116	0	0	116	124	9	0	0	133	1	2	0	0	3	252
6:45 AM	0	110	0	0	110	140	10	0	0	150	0	4	0	0	4	264
Hourly Total	1	393	0	0	394	399	27	0	0	426	2	10	0	0	12	832
7:00 AM	1	173	0	0	174	96	16	0	0	112	4	2	0	0	6	292

7:15 AM	0	192	0	0	192	171	24	0	0	195	1	4	0	0	5	392
7:30 AM	0	217	0	0	217	191	22	0	0	213	2	6	0	0	8	438
7:45 AM	2	222	0	0	224	249	39	0	0	288	2	7	0	0	9	521
Hourly Total	3	804	0	0	807	707	101	0	0	808	9	19	0	0	28	1643
8:00 AM	3	224	0	0	227	289	25	0	0	314	1	6	0	0	7	548
8:15 AM	1	225	0	0	226	247	32	0	0	279	0	4	0	0	4	509
8:30 AM	1	255	0	0	256	268	30	0	0	298	1	5	0	0	6	560
8:45 AM	1	237	0	0	238	258	26	0	0	284	0	0	0	0	0	522
Hourly Total	6	941	0	0	947	1062	113	0	0	1175	2	15	0	0	17	2139
9:00 AM	3	228	0	0	231	210	23	0	0	233	1	2	0	0	3	467
9:15 AM	2	206	0	0	208	207	21	0	0	228	2	5	0	0	7	443
9:30 AM	0	171	0	0	171	175	23	0	0	198	0	6	0	0	6	375
9:45 AM	0	192	0	0	192	188	24	0	0	212	2	4	0	0	6	410
Hourly Total	5	797	0	0	802	780	91	0	0	871	5	17	0	0	22	1695
10:00 AM	0	223	0	0	223	178	11	0	0	189	3	3	0	0	6	418
10:15 AM	0	219	0	0	219	172	17	0	0	189	0	4	0	0	4	412
10:30 AM	1	210	0	0	211	182	15	0	0	197	1	2	0	0	3	411
10:45 AM	2	244	0	0	246	193	9	0	0	202	1	7	0	0	8	456
Hourly Total	3	896	0	0	899	725	52	0	0	777	5	16	0	0	21	1697
11:00 AM	0	233	0	0	233	179	15	0	0	194	1	4	0	0	5	432
11:15 AM	5	267	0	0	272	190	18	0	0	208	0	7	0	0	7	487
11:30 AM	1	274	0	0	275	235	17	0	0	252	2	6	0	0	8	535
11:45 AM	0	278	0	0	278	260	23	0	0	283	1	2	0	0	3	564
Hourly Total	6	1052	0	0	1058	864	73	0	0	937	4	19	0	0	23	2018
12:00 PM	1	286	0	0	287	232	28	0	0	260	3	4	0	0	7	554
12:15 PM	0	284	0	0	284	237	22	0	0	259	1	8	0	1	9	552
12:30 PM	0	276	0	0	276	250	14	0	0	264	0	4	0	0	4	544
12:45 PM	1	258	0	0	259	250	22	0	0	272	1	0	0	0	1	532
Hourly Total	2	1104	0	0	1106	969	86	0	0	1055	5	16	0	1	21	2182
1:00 PM	1	247	0	0	248	219	13	0	0	232	1	3	0	0	4	484
1:15 PM	1	239	0	0	240	234	16	0	0	250	0	7	0	0	7	497
1:30 PM	2	317	0	0	319	220	18	0	0	238	3	4	0	0	7	564
1:45 PM	0	264	0	0	264	233	18	0	0	251	2	0	0	0	2	517
Hourly Total	4	1067	0	0	1071	906	65	0	0	971	6	14	0	0	20	2062
2:00 PM	1	275	0	0	276	199	10	0	0	209	3	7	0	0	10	495
2:15 PM	0	285	0	0	285	247	12	0	0	259	1	7	0	0	8	552
2:30 PM	5	296	0	0	301	251	20	0	0	271	2	3	0	0	5	577
2:45 PM	2	276	0	0	278	230	20	0	0	250	2	7	0	0	9	537
Hourly Total	8	1132	0	0	1140	927	62	0	0	989	8	24	0	0	32	2161
3:00 PM	2	334	0	0	336	250	16	0	0	266	2	5	0	0	7	609
3:15 PM	4	312	0	0	316	286	8	0	0	294	1	2	0	0	3	613
3:30 PM	0	331	0	0	331	256	18	0	0	274	3	8	0	0	11	616
3:45 PM	1	351	0	0	352	255	12	0	0	267	1	3	0	0	4	623
Hourly Total	7	1328	0	0	1335	1047	54	0	0	1101	7	18	0	0	25	2461
4:00 PM	0	385	0	0	385	233	22	0	0	255	4	9	0	0	13	653
4:15 PM	0	375	0	0	375	248	19	0	0	267	3	5	0	0	8	650
4:30 PM	1	363	0	0	364	277	23	0	0	300	2	5	0	0	7	671
4:45 PM	2	369	0	0	371	319	37	0	0	356	1	7	0	0	8	735
Hourly Total	3	1492	0	0	1495	1077	101	0	0	1178	10	26	0	0	36	2709
5:00 PM	0	369	0	0	369	294	26	0	0	320	3	9	0	1	12	701
5:15 PM	1	366	0	0	367	313	33	0	0	346	3	7	0	1	10	723
5:30 PM	5	342	0	0	347	308	39	0	0	347	6	6	0	0	12	706

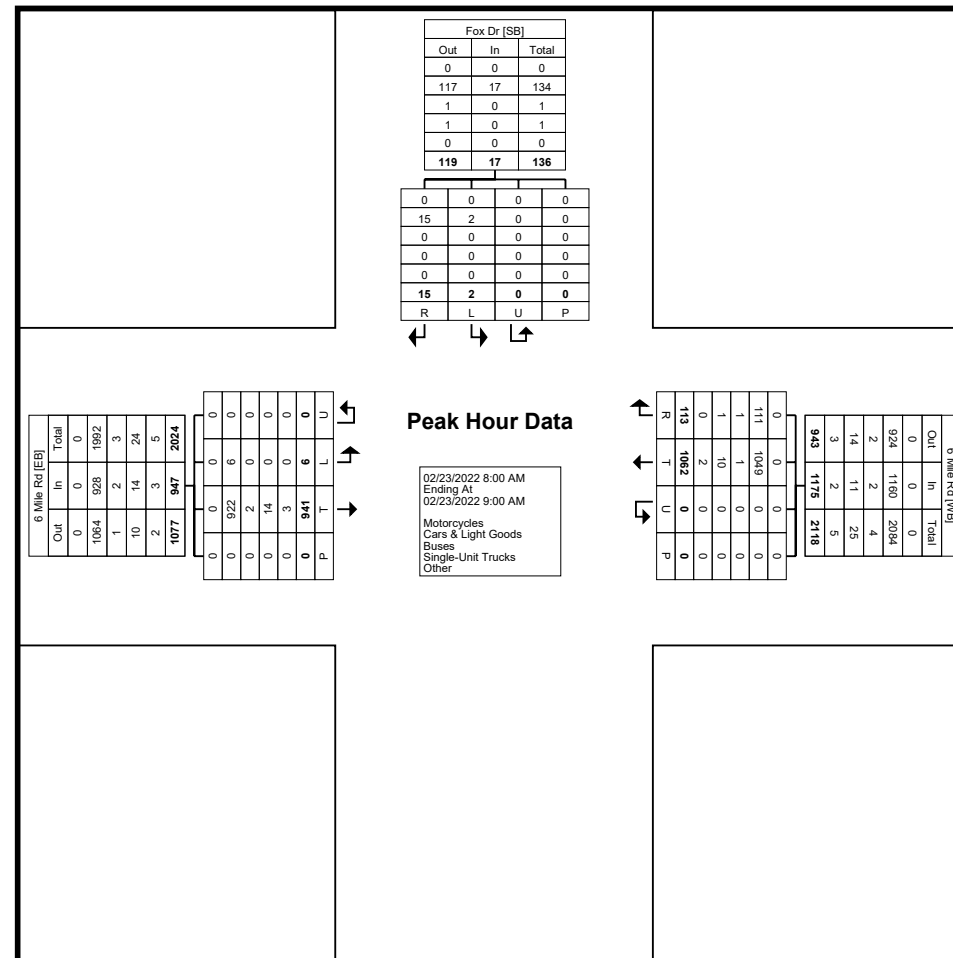
5:45 PM	5	326	0	0	331	335	48	0	0	383	1	7	0	0	8	722
Hourly Total	11	1403	0	0	1414	1250	146	0	0	1396	13	29	0	2	42	2852
6:00 PM	2	312	0	0	314	281	31	0	0	312	2	5	0	0	7	633
6:15 PM	2	277	0	0	279	287	29	0	0	316	1	6	0	0	7	602
6:30 PM	2	261	0	0	263	252	29	0	0	281	2	3	0	0	5	549
6:45 PM	2	241	0	0	243	234	25	0	0	259	3	4	0	0	7	509
Hourly Total	8	1091	0	0	1099	1054	114	0	0	1168	8	18	0	0	26	2293
7:00 PM	1	242	0	0	243	195	26	0	0	221	5	6	0	0	11	475
7:15 PM	2	205	0	0	207	159	18	0	0	177	1	3	0	0	4	388
7:30 PM	1	246	0	0	247	169	12	0	0	181	4	7	0	0	11	439
7:45 PM	1	206	0	0	207	122	13	0	0	135	4	6	0	0	10	352
Hourly Total	5	899	0	0	904	645	69	0	0	714	14	22	0	0	36	1654
8:00 PM	3	236	0	0	239	104	10	0	0	114	2	4	0	0	6	359
8:15 PM	1	171	0	0	172	112	15	0	0	127	3	2	0	0	5	304
8:30 PM	2	155	0	0	157	98	14	0	0	112	5	1	0	0	6	275
8:45 PM	1	168	0	0	169	105	13	0	0	118	2	4	0	0	6	293
Hourly Total	7	730	0	0	737	419	52	0	0	471	12	11	0	0	23	1231
9:00 PM	2	191	0	0	193	80	8	0	0	88	2	2	0	0	4	285
9:15 PM	1	164	0	0	165	77	5	0	0	82	3	0	0	1	3	250
9:30 PM	1	105	0	0	106	69	4	0	0	73	2	1	0	0	3	182
9:45 PM	0	98	0	0	98	48	7	0	0	55	5	3	0	0	8	161
Hourly Total	4	558	0	0	562	274	24	0	0	298	12	6	0	1	18	878
10:00 PM	0	115	0	0	115	47	8	0	0	55	2	2	0	0	4	174
10:15 PM	0	52	0	0	52	41	3	0	0	44	2	1	0	0	3	99
10:30 PM	0	68	0	0	68	46	3	0	0	49	3	0	0	0	3	120
10:45 PM	3	44	0	0	47	39	5	0	0	44	2	2	0	0	4	95
Hourly Total	3	279	0	0	282	173	19	0	0	192	9	5	0	0	14	488
11:00 PM	1	36	0	0	37	30	3	0	0	33	5	1	0	0	6	76
11:15 PM	1	24	0	0	25	34	1	0	0	35	3	0	0	0	3	63
11:30 PM	0	12	0	0	12	16	3	0	0	19	0	1	0	0	1	32
11:45 PM	0	15	0	0	15	31	1	0	0	32	0	1	0	0	1	48
Hourly Total	2	87	0	0	89	111	8	0	0	119	8	3	0	0	11	219
Grand Total	92	16403	0	0	16495	13796	1277	1	0	15074	148	295	0	4	443	32012
Approach %	0.6	99.4	0.0	-	-	91.5	8.5	0.0	-	-	33.4	66.6	0.0	-	-	-



Turning Movement Data Plot

Turning Movement Peak Hour Data (8:00 AM)

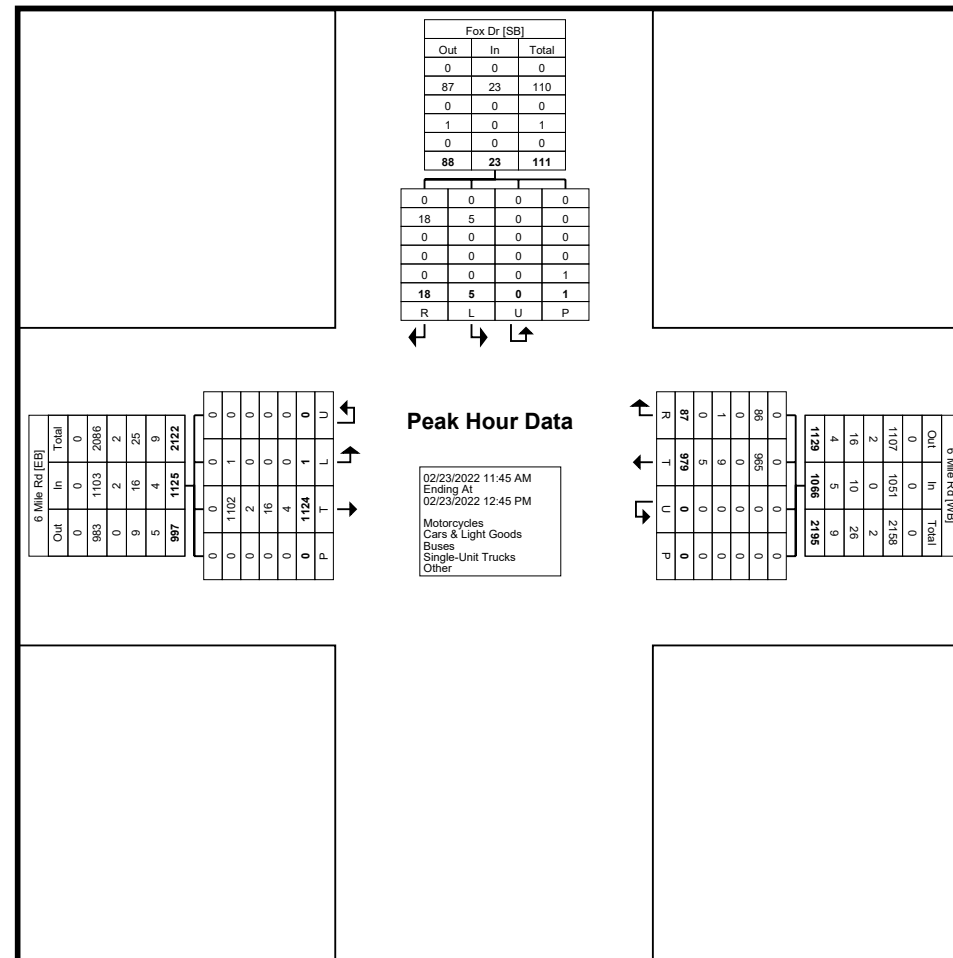
[illegible]



Turning Movement Peak Hour Data Plot (8:00 AM)

Turning Movement Peak Hour Data (11:45 AM)

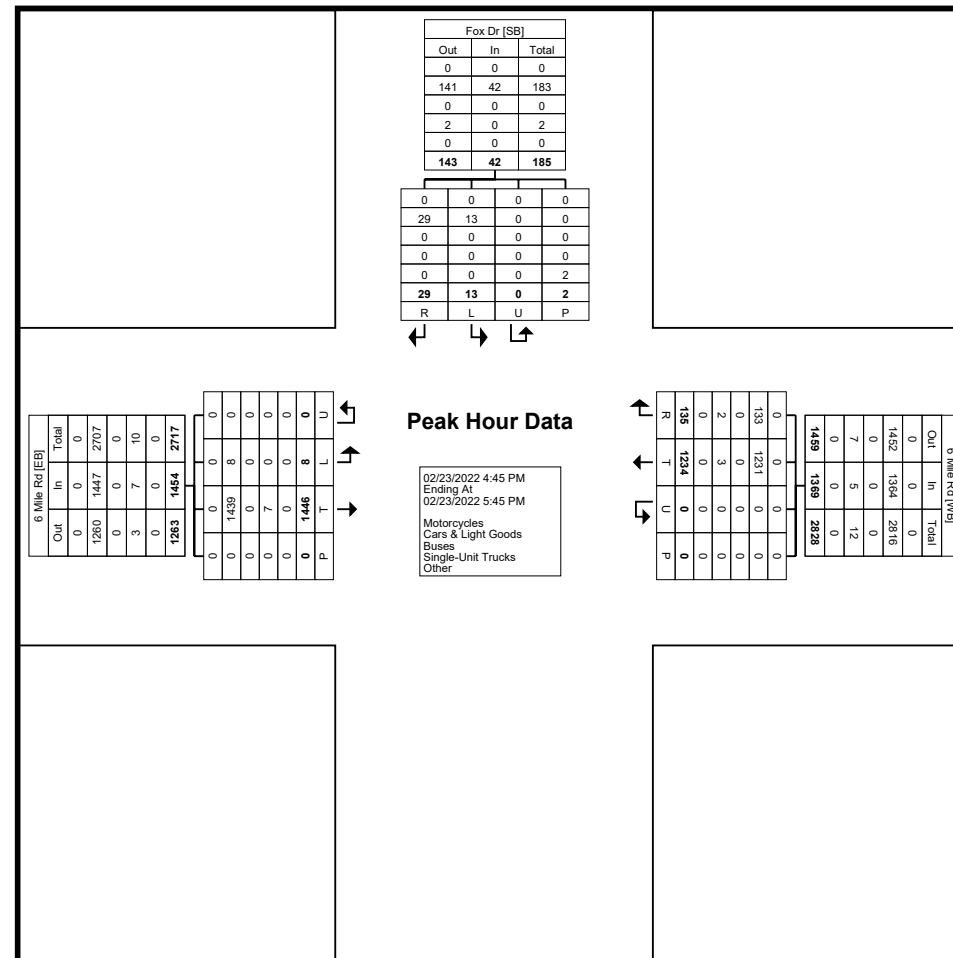
Start Time	6 Mile Rd Eastbound					6 Mile Rd Westbound					Fox Dr Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
11:45 AM	0	278	0	0	278	260	23	0	0	283	1	2	0	0	3	564
12:00 PM	1	286	0	0	287	232	28	0	0	260	3	4	0	0	7	554
12:15 PM	0	284	0	0	284	237	22	0	0	259	1	8	0	1	9	552
12:30 PM	0	276	0	0	276	250	14	0	0	264	0	4	0	0	4	544
Total	1	1124	0	0	1125	979	87	0	0	1066	5	18	0	1	23	2214
Approach %	0.1	99.9	0.0	-	-	91.8	8.2	0.0	-	-	21.7	78.3	0.0	-	-	-
Total %	0.0	50.8	0.0	-	50.8	44.2	3.9	0.0	-	48.1	0.2	0.8	0.0	-	1.0	-
PHF	0.250	0.983	0.000	-	0.980	0.941	0.777	0.000	-	0.942	0.417	0.563	0.000	-	0.639	0.981
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	1	1102	0	-	1103	965	86	0	-	1051	5	18	0	-	23	2177
% Cars & Light Goods	100.0	98.0	-	-	98.0	98.6	98.9	-	-	98.6	100.0	100.0	-	-	100.0	98.3
Buses	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	2
% Buses	0.0	0.2	-	-	0.2	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.1
Single-Unit Trucks	0	16	0	-	16	9	1	0	-	10	0	0	0	-	0	26
% Single-Unit Trucks	0.0	1.4	-	-	1.4	0.9	1.1	-	-	0.9	0.0	0.0	-	-	0.0	1.2
Articulated Trucks	0	4	0	-	4	5	0	0	-	5	0	0	0	-	0	9
% Articulated Trucks	0.0	0.4	-	-	0.4	0.5	0.0	-	-	0.5	0.0	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (11:45 AM)

Turning Movement Peak Hour Data (4:45 PM)

Start Time	6 Mile Rd Eastbound					6 Mile Rd Westbound					Fox Dr Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
4:45 PM	2	369	0	0	371	319	37	0	0	356	1	7	0	0	8	735
5:00 PM	0	369	0	0	369	294	26	0	0	320	3	9	0	1	12	701
5:15 PM	1	366	0	0	367	313	33	0	0	346	3	7	0	1	10	723
5:30 PM	5	342	0	0	347	308	39	0	0	347	6	6	0	0	12	706
Total	8	1446	0	0	1454	1234	135	0	0	1369	13	29	0	2	42	2865
Approach %	0.6	99.4	0.0	-	-	90.1	9.9	0.0	-	-	31.0	69.0	0.0	-	-	-
Total %	0.3	50.5	0.0	-	50.8	43.1	4.7	0.0	-	47.8	0.5	1.0	0.0	-	1.5	-
PHF	0.400	0.980	0.000	-	0.980	0.967	0.865	0.000	-	0.961	0.542	0.806	0.000	-	0.875	0.974
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	8	1439	0	-	1447	1231	133	0	-	1364	13	29	0	-	42	2853
% Cars & Light Goods	100.0	99.5	-	-	99.5	99.8	98.5	-	-	99.6	100.0	100.0	-	-	100.0	99.6
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	7	0	-	7	3	2	0	-	5	0	0	0	-	0	12
% Single-Unit Trucks	0.0	0.5	-	-	0.5	0.2	1.5	-	-	0.4	0.0	0.0	-	-	0.0	0.4
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Turning Movement Data

Start Time	6 Mile Rd Eastbound					6 Mile Rd Westbound					Quakertown Ln Northbound					Int. Total
	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
12:00 AM	18	0	0	0	18	1	17	0	0	18	0	0	0	0	0	36
12:15 AM	19	0	0	0	19	0	10	0	0	10	0	0	0	0	0	29
12:30 AM	14	0	0	0	14	2	11	0	0	13	0	0	0	0	0	27
12:45 AM	10	0	0	0	10	0	16	0	0	16	0	0	0	0	0	26
Hourly Total	61	0	0	0	61	3	54	0	0	57	0	0	0	0	0	118
1:00 AM	6	1	0	0	7	0	7	0	0	7	0	1	0	0	1	15
1:15 AM	6	0	0	0	6	0	3	0	0	3	0	0	0	0	0	9
1:30 AM	4	0	0	0	4	0	2	0	0	2	0	0	0	0	0	6
1:45 AM	4	0	0	0	4	0	6	0	0	6	0	0	0	0	0	10
Hourly Total	20	1	0	0	21	0	18	0	0	18	0	1	0	0	1	40
2:00 AM	6	0	0	0	6	0	6	0	0	6	0	0	0	0	0	12
2:15 AM	3	0	0	0	3	0	7	0	0	7	0	0	0	0	0	10
2:30 AM	7	0	0	0	7	0	6	0	0	6	0	0	0	0	0	13
2:45 AM	7	0	0	0	7	1	10	0	0	11	0	0	0	0	0	18
Hourly Total	23	0	0	0	23	1	29	0	0	30	0	0	0	0	0	53
3:00 AM	12	0	0	0	12	0	2	0	0	2	0	0	0	0	0	14
3:15 AM	7	0	0	0	7	2	2	0	0	4	0	1	0	0	1	12
3:30 AM	6	0	0	0	6	0	6	0	0	6	1	1	0	0	2	14
3:45 AM	5	0	0	0	5	0	8	0	0	8	0	1	0	0	1	14
Hourly Total	30	0	0	0	30	2	18	0	0	20	1	3	0	0	4	54
4:00 AM	8	0	0	0	8	0	9	0	0	9	0	1	0	0	1	18
4:15 AM	9	0	0	0	9	0	12	0	0	12	0	1	0	0	1	22
4:30 AM	14	0	0	0	14	0	24	0	0	24	0	0	0	0	0	38
4:45 AM	16	0	0	0	16	0	15	0	0	15	0	2	0	0	2	33
Hourly Total	47	0	0	0	47	0	60	0	0	60	0	4	0	0	4	111
5:00 AM	20	0	0	0	20	0	17	0	0	17	0	2	0	0	2	39
5:15 AM	38	0	0	0	38	0	39	0	0	39	0	3	0	0	3	80
5:30 AM	48	0	1	0	49	0	81	0	0	81	0	5	0	0	5	135
5:45 AM	68	0	0	0	68	1	107	0	0	108	0	1	0	0	1	177
Hourly Total	174	0	1	0	175	1	244	0	0	245	0	11	0	0	11	431
6:00 AM	75	2	0	0	77	2	64	0	0	66	0	7	0	0	7	150
6:15 AM	85	0	0	0	85	2	78	0	0	80	0	8	0	0	8	173
6:30 AM	116	1	0	0	117	5	131	0	0	136	1	8	0	0	9	262
6:45 AM	105	3	0	0	108	4	150	0	0	154	1	10	0	0	11	273
Hourly Total	381	6	0	0	387	13	423	0	0	436	2	33	0	0	35	858
7:00 AM	175	1	0	0	176	6	108	0	0	114	3	27	0	0	30	320

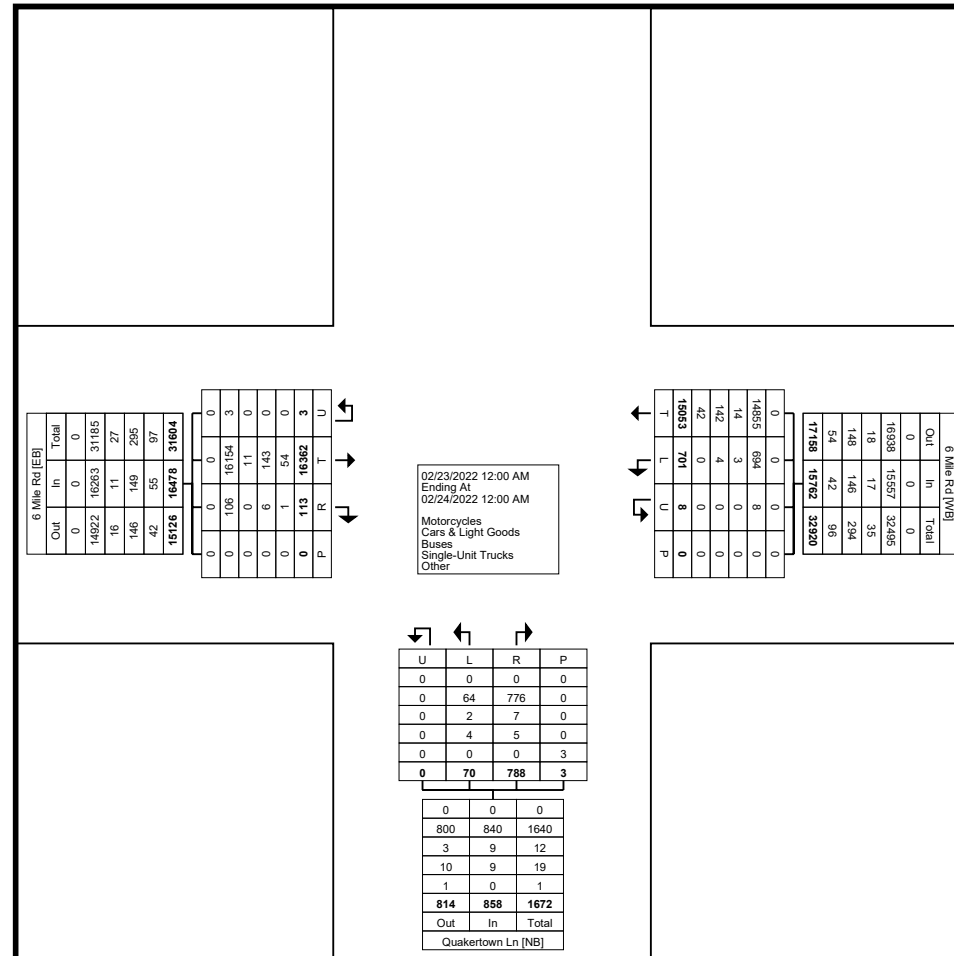
7:15 AM	191	1	0	0	192	9	193	0	0	202	0	12	0	0	12	406
7:30 AM	213	4	0	0	217	7	214	0	0	221	0	16	0	0	16	454
7:45 AM	220	3	0	0	223	28	285	0	0	313	0	21	0	0	21	557
Hourly Total	799	9	0	0	808	50	800	0	0	850	3	76	0	0	79	1737
8:00 AM	220	4	0	0	224	15	310	0	0	325	1	14	0	0	15	564
8:15 AM	226	1	0	0	227	24	276	0	0	300	0	11	0	0	11	538
8:30 AM	257	1	0	0	258	14	294	0	0	308	2	11	0	0	13	579
8:45 AM	233	4	0	0	237	23	280	0	0	303	0	14	0	0	14	554
Hourly Total	936	10	0	0	946	76	1160	0	0	1236	3	50	0	0	53	2235
9:00 AM	229	3	0	0	232	23	233	0	0	256	0	8	0	0	8	496
9:15 AM	210	1	0	0	211	15	226	0	0	241	0	9	0	0	9	461
9:30 AM	166	3	0	0	169	11	199	0	0	210	1	17	0	0	18	397
9:45 AM	192	2	0	0	194	12	212	0	0	224	3	4	0	0	7	425
Hourly Total	797	9	0	0	806	61	870	0	0	931	4	38	0	0	42	1779
10:00 AM	224	2	0	0	226	8	188	0	0	196	1	4	0	0	5	427
10:15 AM	221	2	0	0	223	5	187	1	0	193	0	9	0	0	9	425
10:30 AM	209	0	0	0	209	2	194	2	0	198	0	11	0	0	11	418
10:45 AM	244	1	1	0	246	10	200	0	0	210	2	19	0	0	21	477
Hourly Total	898	5	1	0	904	25	769	3	0	797	3	43	0	0	46	1747
11:00 AM	230	3	0	0	233	8	192	0	0	200	3	14	0	0	17	450
11:15 AM	271	0	0	0	271	11	204	1	0	216	3	11	0	0	14	501
11:30 AM	270	1	0	0	271	7	261	1	0	269	1	10	0	0	11	551
11:45 AM	279	2	0	0	281	8	289	0	0	297	1	14	0	0	15	593
Hourly Total	1050	6	0	0	1056	34	946	2	0	982	8	49	0	0	57	2095
12:00 PM	288	0	0	0	288	11	258	1	0	270	1	14	0	0	15	573
12:15 PM	282	2	0	0	284	9	262	0	0	271	1	12	0	0	13	568
12:30 PM	273	4	0	0	277	14	266	0	0	280	2	18	0	0	20	577
12:45 PM	259	2	0	0	261	10	273	0	0	283	2	4	0	0	6	550
Hourly Total	1102	8	0	0	1110	44	1059	1	0	1104	6	48	0	0	54	2268
1:00 PM	248	3	0	0	251	9	238	0	0	247	1	12	0	0	13	511
1:15 PM	236	2	0	0	238	6	250	0	0	256	4	15	0	0	19	513
1:30 PM	321	2	0	0	323	13	236	0	0	249	5	6	0	0	11	583
1:45 PM	266	6	0	0	272	12	303	0	0	315	1	10	0	0	11	598
Hourly Total	1071	13	0	0	1084	40	1027	0	0	1067	11	43	0	0	54	2205
2:00 PM	275	1	0	0	276	6	210	0	0	216	0	10	0	0	10	502
2:15 PM	287	1	0	0	288	11	257	0	0	268	2	14	0	0	16	572
2:30 PM	291	3	0	0	294	17	263	0	0	280	2	13	0	0	15	589
2:45 PM	280	1	0	0	281	11	253	0	0	264	0	12	0	0	12	557
Hourly Total	1133	6	0	0	1139	45	983	0	0	1028	4	49	0	0	53	2220
3:00 PM	316	3	0	0	319	19	264	0	0	283	2	7	0	0	9	611
3:15 PM	302	1	0	0	303	13	293	0	0	306	1	13	0	0	14	623
3:30 PM	318	0	0	0	318	17	272	0	0	289	1	22	0	0	23	630
3:45 PM	327	2	0	0	329	10	268	0	0	278	0	17	0	0	17	624
Hourly Total	1263	6	0	0	1269	59	1097	0	0	1156	4	59	0	0	63	2488
4:00 PM	383	3	0	0	386	12	253	0	0	265	0	24	0	0	24	675
4:15 PM	380	3	0	0	383	16	264	0	0	280	1	14	0	0	15	678
4:30 PM	361	4	0	0	365	13	295	0	0	308	1	24	0	0	25	698
4:45 PM	371	2	0	0	373	15	350	1	0	366	1	18	0	0	19	758
Hourly Total	1495	12	0	0	1507	56	1162	1	0	1219	3	80	0	0	83	2809
5:00 PM	370	1	0	0	371	18	317	0	0	335	2	28	0	0	30	736
5:15 PM	368	0	0	0	368	15	340	0	0	355	3	22	0	0	25	748
5:30 PM	347	1	0	0	348	13	347	0	0	360	2	14	0	0	16	724

5:45 PM	322	1	0	0	323	14	385	0	0	399	0	17	0	0	17	739
Hourly Total	1407	3	0	0	1410	60	1389	0	0	1449	7	81	0	0	88	2947
6:00 PM	316	0	0	0	316	14	309	0	0	323	2	13	0	3	15	654
6:15 PM	274	1	0	0	275	14	316	0	0	330	2	17	0	0	19	624
6:30 PM	263	3	0	0	266	11	285	0	0	296	3	15	0	0	18	580
6:45 PM	240	2	0	0	242	8	265	0	0	273	2	12	0	0	14	529
Hourly Total	1093	6	0	0	1099	47	1175	0	0	1222	9	57	0	3	66	2387
7:00 PM	238	2	0	0	240	10	219	0	0	229	0	14	0	0	14	483
7:15 PM	207	0	0	0	207	15	173	0	0	188	0	8	0	0	8	403
7:30 PM	246	2	0	0	248	4	178	0	0	182	0	5	0	0	5	435
7:45 PM	206	4	0	0	210	3	135	1	0	139	0	4	0	0	4	353
Hourly Total	897	8	0	0	905	32	705	1	0	738	0	31	0	0	31	1674
8:00 PM	235	1	0	0	236	6	112	0	0	118	1	3	0	0	4	358
8:15 PM	173	1	0	0	174	2	127	0	0	129	0	6	0	0	6	309
8:30 PM	159	1	0	0	160	6	111	0	0	117	0	2	0	0	2	279
8:45 PM	170	0	0	0	170	2	115	0	0	117	0	3	0	0	3	290
Hourly Total	737	3	0	0	740	16	465	0	0	481	1	14	0	0	15	1236
9:00 PM	193	0	0	0	193	5	86	0	0	91	1	4	0	0	5	289
9:15 PM	164	1	0	0	165	9	82	0	0	91	0	0	0	0	0	256
9:30 PM	106	0	0	0	106	5	70	0	0	75	0	4	0	0	4	185
9:45 PM	101	0	0	0	101	0	55	0	0	55	0	2	0	0	2	158
Hourly Total	564	1	0	0	565	19	293	0	0	312	1	10	0	0	11	888
10:00 PM	115	1	0	0	116	7	55	0	0	62	0	2	0	0	2	180
10:15 PM	55	0	0	0	55	1	44	0	0	45	0	1	0	0	1	101
10:30 PM	70	0	1	0	71	1	47	0	0	48	0	1	0	0	1	120
10:45 PM	46	0	0	0	46	5	42	0	0	47	0	1	0	0	1	94
Hourly Total	286	1	1	0	288	14	188	0	0	202	0	5	0	0	5	495
11:00 PM	42	0	0	0	42	1	33	0	0	34	0	1	0	0	1	77
11:15 PM	28	0	0	0	28	0	35	0	0	35	0	0	0	0	0	63
11:30 PM	13	0	0	0	13	1	20	0	0	21	0	1	0	0	1	35
11:45 PM	15	0	0	0	15	1	31	0	0	32	0	1	0	0	1	48
Hourly Total	98	0	0	0	98	3	119	0	0	122	0	3	0	0	3	223
Grand Total	16362	113	3	0	16478	701	15053	8	0	15762	70	788	0	3	858	33098
Approach %	99.3	0.7	0.0	-	-	4.4	95.5	0.1	-	-	8.2	91.8	0.0	-	-	-
Total %	49.4	0.3	0.0	-	49.8	2.1	45.5	0.0	-	47.6	0.2	2.4	0.0	-	2.6	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	16154	106	3	-	16263	694	14855	8	-	15557	64	776	0	-	840	32660
% Cars & Light Goods	98.7	93.8	100.0	-	98.7	99.0	98.7	100.0	-	98.7	91.4	98.5	-	-	97.9	98.7
Buses	11	0	0	-	11	3	14	0	-	17	2	7	0	-	9	37
% Buses	0.1	0.0	0.0	-	0.1	0.4	0.1	0.0	-	0.1	2.9	0.9	-	-	1.0	0.1
Single-Unit Trucks	143	6	0	-	149	4	142	0	-	146	4	5	0	-	9	304
% Single-Unit Trucks	0.9	5.3	0.0	-	0.9	0.6	0.9	0.0	-	0.9	5.7	0.6	-	-	1.0	0.9
Articulated Trucks	54	1	0	-	55	0	42	0	-	42	0	0	0	-	0	97
% Articulated Trucks	0.3	0.9	0.0	-	0.3	0.0	0.3	0.0	-	0.3	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Hubbell, Roth & Clark, Inc.
555 Hulet Drive

Bloomfield Hills, Michigan, United States 48302
248.454.6300 jhankin@hrcengr.com

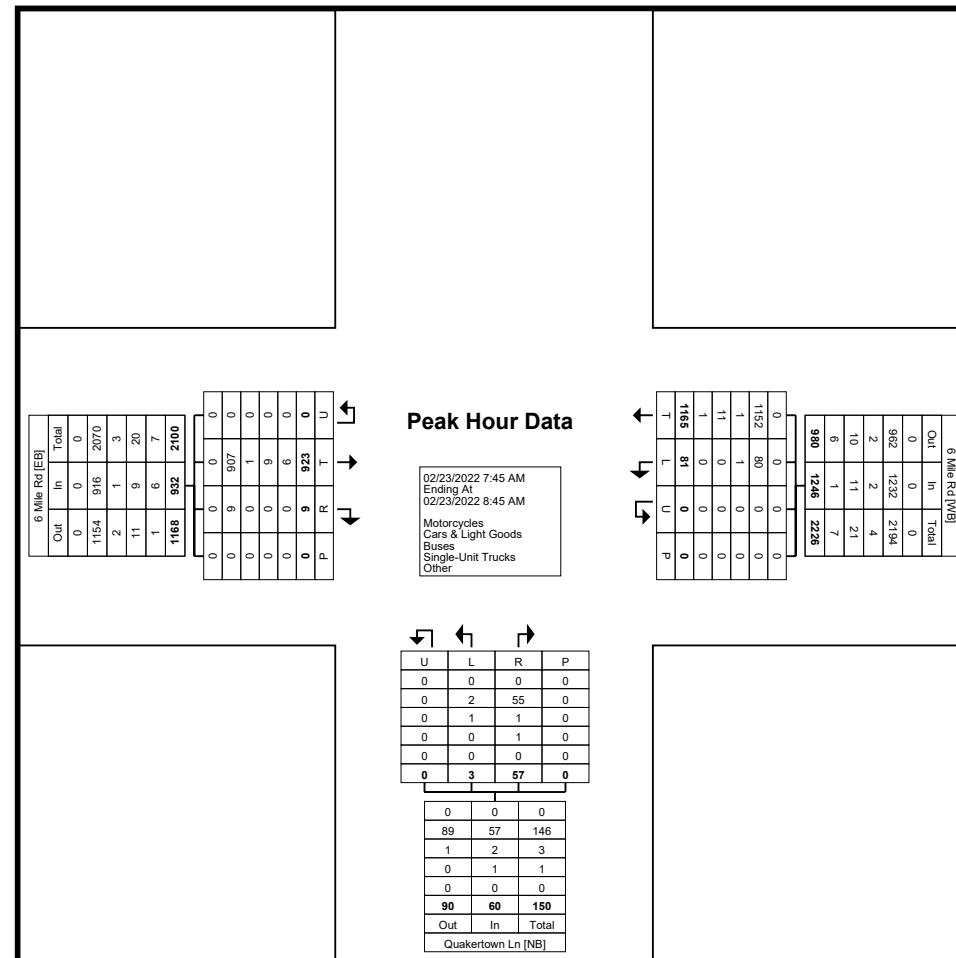
Count Name: 6 Mile Rd and Quakertown Ln
Site Code:
Start Date: 02/23/2022
Page No: 4



Turning Movement Data Plot

Turning Movement Peak Hour Data (7:45 AM)

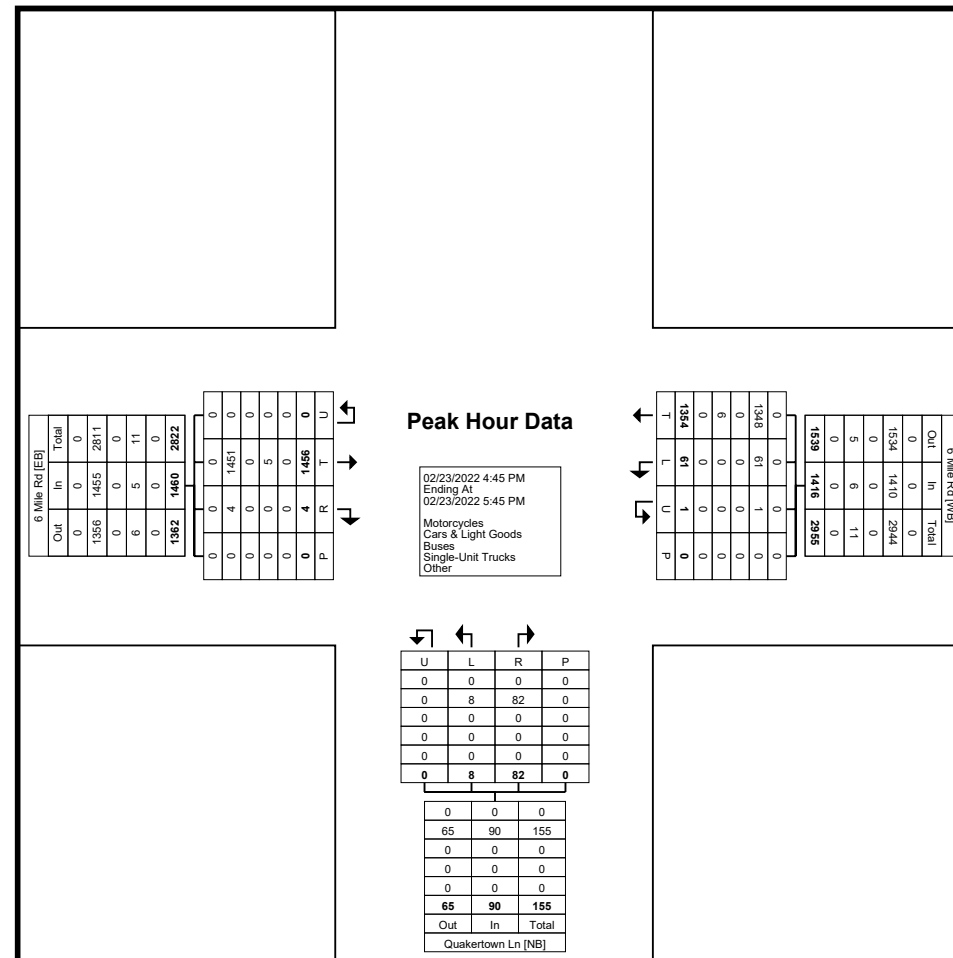
[illegible]



Turning Movement Peak Hour Data Plot (7:45 AM)

Turning Movement Peak Hour Data (4:45 PM)

[illegible]



Turning Movement Peak Hour Data Plot (4:45 PM)

Six Mile Road and I-275 SB off ramp - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066325, Location: 42.410544, -83.426608



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					I-275 SB On Ramp Northbound					I-275 SB Off Ramp Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	0	136	83	0	219	0	79	48	0	127	0	0	0	0	0	34	0	86	0	120	466
7:15AM	0	164	87	0	251	0	115	59	0	174	0	0	0	0	0	51	0	74	0	125	550
7:30AM	0	214	106	0	320	0	154	70	0	224	0	0	0	0	0	59	0	74	0	133	677
7:45AM	0	240	93	0	333	0	225	68	0	293	0	0	0	0	0	53	0	113	0	166	792
Hourly Total	0	754	369	0	1123	0	573	245	0	818	0	0	0	0	0	197	0	347	0	544	2485
8:00AM	0	193	93	0	286	0	149	62	0	211	0	0	0	0	0	57	0	95	0	152	649
8:15AM	0	224	87	0	311	0	196	55	0	251	0	0	0	0	0	70	0	111	0	181	743
8:30AM	0	216	83	0	299	0	193	46	0	239	0	0	0	0	0	65	0	113	0	178	716
8:45AM	0	238	81	0	319	0	231	42	0	273	0	0	0	0	0	80	0	99	0	179	771
Hourly Total	0	871	344	0	1215	0	769	205	0	974	0	0	0	0	0	272	0	418	0	690	2879
4:00PM	0	300	104	0	404	0	204	75	0	279	0	0	0	0	0	65	0	88	0	153	836
4:15PM	0	278	81	0	359	0	221	64	0	285	0	0	0	0	0	74	0	109	0	183	827
4:30PM	0	303	90	0	393	0	246	65	0	311	0	0	0	0	0	78	0	126	0	204	908
4:45PM	0	354	77	0	431	0	298	63	0	361	0	0	0	0	0	92	0	123	0	215	1007
Hourly Total	0	1235	352	0	1587	0	969	267	0	1236	0	0	0	0	0	309	0	446	0	755	3578
5:00PM	0	330	108	0	438	0	272	78	0	350	0	0	0	0	0	56	0	115	0	171	959
5:15PM	0	279	82	0	361	0	289	68	0	357	0	0	0	0	0	75	1	145	0	221	939
5:30PM	0	285	77	0	362	0	230	45	0	275	0	0	0	0	0	74	0	141	0	215	852
5:45PM	0	261	61	0	322	0	270	27	0	297	0	0	0	0	0	96	2	147	0	245	864
Hourly Total	0	1155	328	0	1483	0	1061	218	0	1279	0	0	0	0	0	301	3	548	0	852	3614
Total	0	4015	1393	0	5408	0	3372	935	0	4307	0	0	0	0	0	1079	3	1759	0	2841	12556
% Approach	0%	74.2%	25.8%	0%	-	0%	78.3%	21.7%	0%	-	0%	0%	0%	0%	-	38.0%	0.1%	61.9%	0%	-	-
% Total	0%	32.0%	11.1%	0%	43.1%	0%	26.9%	7.4%	0%	34.3%	0%	0%	0%	0%	0%	8.6%	0%	14.0%	0%	22.6%	-
Lights	0	3949	1376	0	5325	0	3329	923	0	4252	0	0	0	0	0	1063	3	1730	0	2796	12373
% Lights	0%	98.4%	98.8%	0%	98.5%	0%	98.7%	98.7%	0%	98.7%	0%	0%	0%	0%	-	98.5%	100%	98.4%	0%	98.4%	98.5%
Articulated Trucks	0	15	10	0	25	0	10	7	0	17	0	0	0	0	0	6	0	15	0	21	63
% Articulated Trucks	0%	0.4%	0.7%	0%	0.5%	0%	0.3%	0.7%	0%	0.4%	0%	0%	0%	0%	-	0.6%	0%	0.9%	0%	0.7%	0.5%
Buses and Single-Unit Trucks	0	51	7	0	58	0	33	5	0	38	0	0	0	0	0	10	0	14	0	24	120
% Buses and Single-Unit Trucks	0%	1.3%	0.5%	0%	1.1%	0%	1.0%	0.5%	0%	0.9%	0%	0%	0%	0%	-	0.9%	0%	0.8%	0%	0.8%	1.0%

*L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and I-275 SB off ramp - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066325, Location: 42.410544, -83.426608



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] I-275 SB Off Ramp

Total: 3776

In: 2841 Out: 935

1759 3 1079

[W] Six Mile Rd
Total: 10539
In: 5408 Out: 5131

4015

1393

935

3372

Out: 5094 In: 4307
Total: 9401
[E] Six Mile Rd

Out: 1396 In: 0

Total: 1396

[S] I-275 SB On Ramp

Six Mile Road and I-275 SB off ramp - TMC

Tue May 16, 2023

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066325, Location: 42.410544, -83.426608



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					I-275 SB On Ramp Northbound					I-275 SB Off Ramp Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:45AM	0	240	93	0	333	0	225	68	0	293	0	0	0	0	0	53	0	113	0	166	792
8:00AM	0	193	93	0	286	0	149	62	0	211	0	0	0	0	0	57	0	95	0	152	649
8:15AM	0	224	87	0	311	0	196	55	0	251	0	0	0	0	0	70	0	111	0	181	743
8:30AM	0	216	83	0	299	0	193	46	0	239	0	0	0	0	0	65	0	113	0	178	716
Total	0	873	356	0	1229	0	763	231	0	994	0	0	0	0	0	245	0	432	0	677	2900
% Approach	0%	71.0%	29.0%	0%	-	0%	76.8%	23.2%	0%	-	0%	0%	0%	0%	-	36.2%	0%	63.8%	0%	-	-
% Total	0%	30.1%	12.3%	0%	42.4%	0%	26.3%	8.0%	0%	34.3%	0%	0%	0%	0%	0%	8.4%	0%	14.9%	0%	23.3%	-
PHF	-	0.909	0.957	-	0.923	-	0.848	0.849	-	0.848	-	-	-	-	-	0.875	-	0.956	-	0.935	0.915
Lights	0	849	352	0	1201	0	751	224	0	975	0	0	0	0	0	241	0	431	0	672	2848
% Lights	0%	97.3%	98.9%	0%	97.7%	0%	98.4%	97.0%	0%	98.1%	0%	0%	0%	0%	-	98.4%	0%	99.8%	0%	99.3%	98.2%
Articulated Trucks	0	4	2	0	6	0	4	4	0	8	0	0	0	0	0	2	0	0	0	2	16
% Articulated Trucks	0%	0.5%	0.6%	0%	0.5%	0%	0.5%	1.7%	0%	0.8%	0%	0%	0%	0%	-	0.8%	0%	0%	0%	0.3%	0.6%
Buses and Single-Unit Trucks	0	20	2	0	22	0	8	3	0	11	0	0	0	0	0	2	0	1	0	3	36
% Buses and Single-Unit Trucks	0%	2.3%	0.6%	0%	1.8%	0%	1.0%	1.3%	0%	1.1%	0%	0%	0%	0%	-	0.8%	0%	0.2%	0%	0.4%	1.2%

* L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and I-275 SB off ramp - TMC
Tue May 16, 2023
AM Peak (7:45 AM - 8:45 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1066325, Location: 42.410544, -83.426608



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] I-275 SB Off Ramp

Total: 908
In: 677 Out: 231

432 245

[W] Six Mile Rd
Total: 2424
In: 1229 Out: 1195



231
763
[E] Six Mile Rd
Total: 2112
In: 994 Out: 1118

Out: 356 In: 0
Total: 356
[S] I-275 SB On Ramp

Six Mile Road and I-275 SB off ramp - TMC

Tue May 16, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066325, Location: 42.410544, -83.426608



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					I-275 SB On Ramp Northbound					I-275 SB Off Ramp Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:30PM	0	303	90	0	393	0	246	65	0	311	0	0	0	0	0	78	0	126	0	204	908
4:45PM	0	354	77	0	431	0	298	63	0	361	0	0	0	0	0	92	0	123	0	215	1007
5:00PM	0	330	108	0	438	0	272	78	0	350	0	0	0	0	0	56	0	115	0	171	959
5:15PM	0	279	82	0	361	0	289	68	0	357	0	0	0	0	0	75	1	145	0	221	939
Total	0	1266	357	0	1623	0	1105	274	0	1379	0	0	0	0	0	301	1	509	0	811	3813
% Approach	0%	78.0%	22.0%	0%	-	0%	80.1%	19.9%	0%	-	0%	0%	0%	0%	-	37.1%	0.1%	62.8%	0%	-	-
% Total	0%	33.2%	9.4%	0%	42.6%	0%	29.0%	7.2%	0%	36.2%	0%	0%	0%	0%	0%	7.9%	0%	13.3%	0%	21.3%	-
PHF	-	0.894	0.826	-	0.926	-	0.927	0.878	-	0.955	-	-	-	-	-	0.818	0.250	0.878	-	0.917	0.947
Lights	0	1254	352	0	1606	0	1102	273	0	1375	0	0	0	0	0	297	1	500	0	798	3779
% Lights	0%	99.1%	98.6%	0%	99.0%	0%	99.7%	99.6%	0%	99.7%	0%	0%	0%	0%	-	98.7%	100%	98.2%	0%	98.4%	99.1%
Articulated Trucks	0	5	2	0	7	0	1	1	0	2	0	0	0	0	0	2	0	5	0	7	16
% Articulated Trucks	0%	0.4%	0.6%	0%	0.4%	0%	0.1%	0.4%	0%	0.1%	0%	0%	0%	0%	-	0.7%	0%	1.0%	0%	0.9%	0.4%
Buses and Single-Unit Trucks	0	7	3	0	10	0	2	0	0	2	0	0	0	0	0	2	0	4	0	6	18
% Buses and Single-Unit Trucks	0%	0.6%	0.8%	0%	0.6%	0%	0.2%	0%	0%	0.1%	0%	0%	0%	0%	-	0.7%	0%	0.8%	0%	0.7%	0.5%

* L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and I-275 SB off ramp - TMC

Tue May 16, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066325, Location: 42.410544, -83.426608



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] I-275 SB Off Ramp

Total: 1085

In: 811 Out: 274

509 1 301

[W] Six Mile Rd
Total: 3237
In: 1623 Out: 1614

1266

357

274

1105

[E] Six Mile Rd
Total: 2946
In: 1379 Out: 1567

Out: 358 In: 0
Total: 358

[S] I-275 SB On Ramp

Six Mile Road and I-275 NB off ramp - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066326, Location: 42.410679, -83.421209



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					I-275 NB Off Ramp Northbound					I-275 NB On Ramp Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	0	94	81	0	175	0	90	56	0	146	35	0	38	0	73	0	0	0	0	0	394
7:15AM	0	111	98	0	209	0	125	66	0	191	46	0	28	0	74	0	0	0	0	0	474
7:30AM	0	130	137	0	267	0	177	88	0	265	54	0	21	0	75	0	0	0	0	0	607
7:45AM	0	152	136	0	288	0	212	104	0	316	79	0	44	0	123	0	0	0	0	0	727
Hourly Total	0	487	452	0	939	0	604	314	0	918	214	0	131	0	345	0	0	0	0	0	2202
8:00AM	0	142	109	0	251	0	158	110	0	268	63	0	43	0	106	0	0	0	0	0	625
8:15AM	0	182	112	0	294	0	166	83	0	249	71	0	54	0	125	0	0	0	0	0	668
8:30AM	0	172	108	0	280	0	169	77	0	246	79	0	58	0	137	0	0	0	0	0	663
8:45AM	0	215	98	0	313	0	192	72	0	264	80	0	63	0	143	0	0	0	0	0	720
Hourly Total	0	711	427	0	1138	0	685	342	0	1027	293	0	218	0	511	0	0	0	0	0	2676
4:00PM	0	241	125	0	366	0	228	101	0	329	52	0	33	0	85	0	0	0	0	0	780
4:15PM	0	258	104	0	362	0	227	80	0	307	55	1	49	0	105	0	0	0	0	0	774
4:30PM	0	262	119	0	381	0	249	100	0	349	80	0	50	0	130	0	0	0	0	0	860
4:45PM	0	281	150	0	431	0	264	85	0	349	88	0	56	0	144	0	0	0	0	0	924
Hourly Total	0	1042	498	0	1540	0	968	366	0	1334	275	1	188	0	464	0	0	0	0	0	3338
5:00PM	0	257	139	0	396	0	302	110	0	412	56	1	41	0	98	0	0	0	0	0	906
5:15PM	0	223	133	0	356	0	262	77	0	339	76	1	50	0	127	0	0	0	0	0	822
5:30PM	0	234	122	0	356	0	219	69	0	288	78	1	54	0	133	0	0	0	0	0	777
5:45PM	0	263	93	0	356	0	214	67	0	281	86	0	56	0	142	0	0	0	0	0	779
Hourly Total	0	977	487	0	1464	0	997	323	0	1320	296	3	201	0	500	0	0	0	0	0	3284
Total	0	3217	1864	0	5081	0	3254	1345	0	4599	1078	4	738	0	1820	0	0	0	0	0	11500
% Approach	0%	63.3%	36.7%	0%	-	0%	70.8%	29.2%	0%	-	59.2%	0.2%	40.5%	0%	-	0%	0%	0%	0%	-	-
% Total	0%	28.0%	16.2%	0%	44.2%	0%	28.3%	11.7%	0%	40.0%	9.4%	0%	6.4%	0%	15.8%	0%	0%	0%	0%	0%	-
Lights	0	3180	1823	0	5003	0	3217	1319	0	4536	1061	4	732	0	1797	0	0	0	0	0	11336
% Lights	0%	98.8%	97.8%	0%	98.5%	0%	98.9%	98.1%	0%	98.6%	98.4%	100%	99.2%	0%	98.7%	0%	0%	0%	0%	-	98.6%
Articulated Trucks	0	5	12	0	17	0	6	4	0	10	9	0	0	0	9	0	0	0	0	0	36
% Articulated Trucks	0%	0.2%	0.6%	0%	0.3%	0%	0.2%	0.3%	0%	0.2%	0.8%	0%	0%	0%	0.5%	0%	0%	0%	0%	-	0.3%
Buses and Single-Unit Trucks	0	32	29	0	61	0	31	22	0	53	8	0	6	0	14	0	0	0	0	0	128
% Buses and Single-Unit Trucks	0%	1.0%	1.6%	0%	1.2%	0%	1.0%	1.6%	0%	1.2%	0.7%	0%	0.8%	0%	0.8%	0%	0%	0%	0%	-	1.1%

*L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and I-275 NB off ramp - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066326, Location: 42.410679, -83.421209

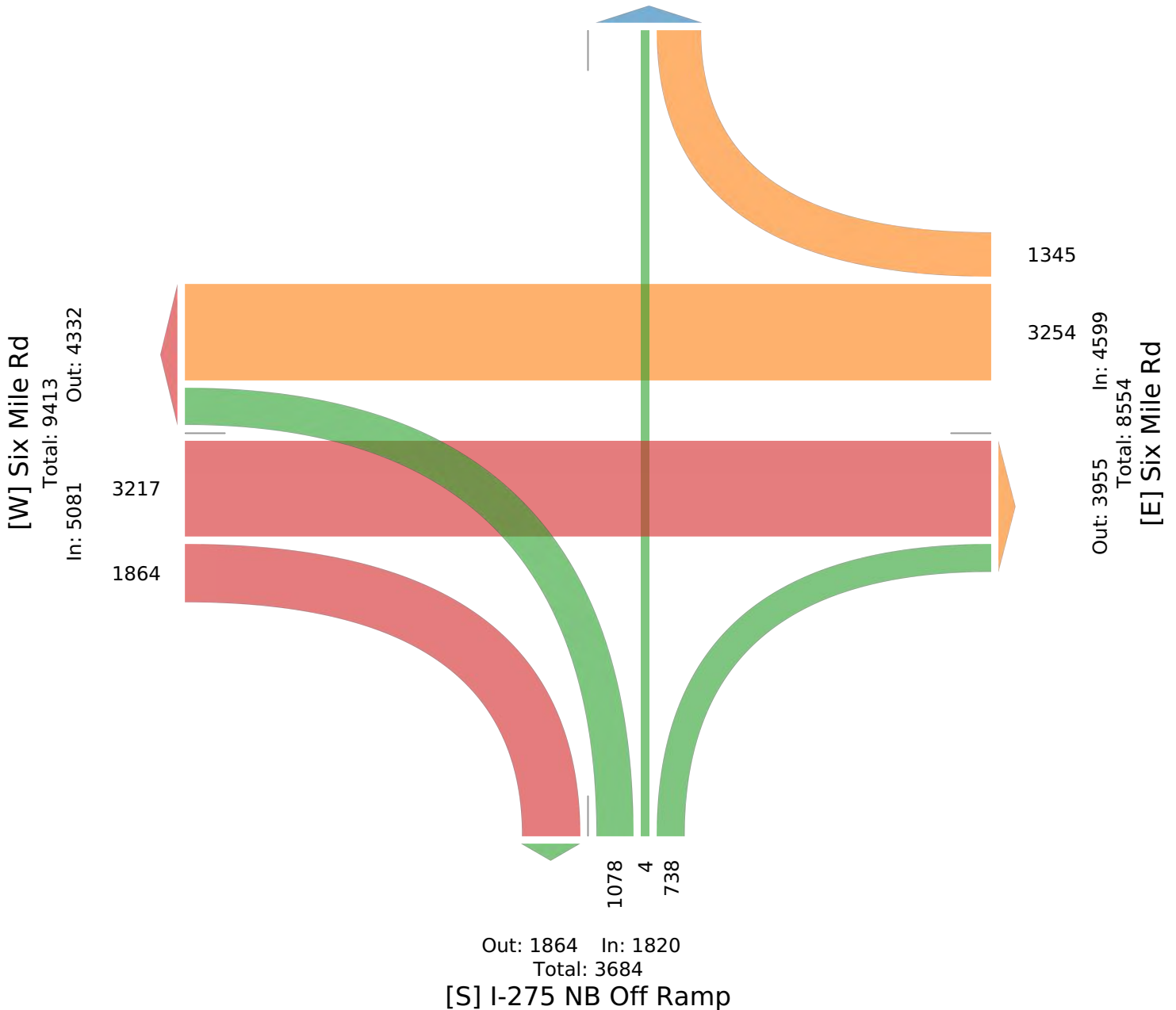


Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] I-275 NB On Ramp

Total: 1349

In: 0 Out: 1349



Six Mile Road and I-275 NB off ramp - TMC

Tue May 16, 2023

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066326, Location: 42.410679, -83.421209



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					I-275 NB Off Ramp Northbound					I-275 NB On Ramp Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:45AM	0	152	136	0	288	0	212	104	0	316	79	0	44	0	123	0	0	0	0	0	727
8:00AM	0	142	109	0	251	0	158	110	0	268	63	0	43	0	106	0	0	0	0	0	625
8:15AM	0	182	112	0	294	0	166	83	0	249	71	0	54	0	125	0	0	0	0	0	668
8:30AM	0	172	108	0	280	0	169	77	0	246	79	0	58	0	137	0	0	0	0	0	663
Total	0	648	465	0	1113	0	705	374	0	1079	292	0	199	0	491	0	0	0	0	0	2683
% Approach	0%	58.2%	41.8%	0%	-	0%	65.3%	34.7%	0%	-	59.5%	0%	40.5%	0%	-	0%	0%	0%	0%	-	-
% Total	0%	24.2%	17.3%	0%	41.5%	0%	26.3%	13.9%	0%	40.2%	10.9%	0%	7.4%	0%	18.3%	0%	0%	0%	0%	0%	-
PHF	-	0.890	0.855	-	0.946	-	0.831	0.850	-	0.854	0.924	-	0.858	-	0.896	-	-	-	-	-	0.923
Lights	0	639	446	0	1085	0	694	363	0	1057	285	0	198	0	483	0	0	0	0	0	2625
% Lights	0%	98.6%	95.9%	0%	97.5%	0%	98.4%	97.1%	0%	98.0%	97.6%	0%	99.5%	0%	98.4%	0%	0%	0%	0%	-	97.8%
Articulated Trucks	0	1	5	0	6	0	3	1	0	4	4	0	0	0	4	0	0	0	0	0	14
% Articulated Trucks	0%	0.2%	1.1%	0%	0.5%	0%	0.4%	0.3%	0%	0.4%	1.4%	0%	0%	0%	0.8%	0%	0%	0%	0%	-	0.5%
Buses and Single-Unit Trucks	0	8	14	0	22	0	8	10	0	18	3	0	1	0	4	0	0	0	0	0	44
% Buses and Single-Unit Trucks	0%	1.2%	3.0%	0%	2.0%	0%	1.1%	2.7%	0%	1.7%	1.0%	0%	0.5%	0%	0.8%	0%	0%	0%	0%	-	1.6%

* L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and I-275 NB off ramp - TMC

Tue May 16, 2023

AM Peak (7:45 AM - 8:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

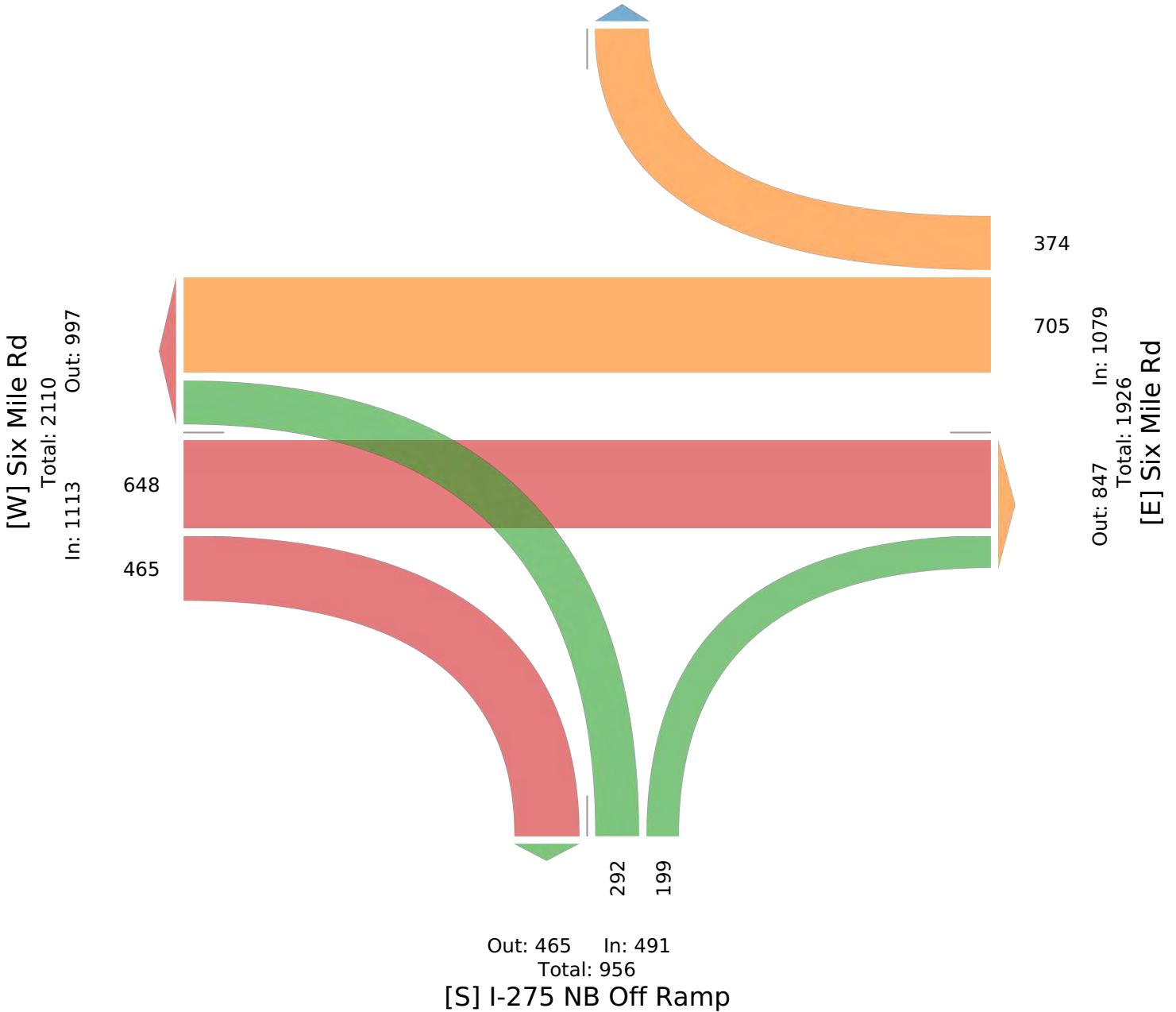
ID: 1066326, Location: 42.410679, -83.421209



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] I-275 NB On Ramp

Total: 374
In: 0 Out: 374



Six Mile Road and I-275 NB off ramp - TMC

Tue May 16, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066326, Location: 42.410679, -83.421209



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					I-275 NB Off Ramp Northbound					I-275 NB On Ramp Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:30PM	0	262	119	0	381	0	249	100	0	349	80	0	50	0	130	0	0	0	0	0	860
4:45PM	0	281	150	0	431	0	264	85	0	349	88	0	56	0	144	0	0	0	0	0	924
5:00PM	0	257	139	0	396	0	302	110	0	412	56	1	41	0	98	0	0	0	0	0	906
5:15PM	0	223	133	0	356	0	262	77	0	339	76	1	50	0	127	0	0	0	0	0	822
Total	0	1023	541	0	1564	0	1077	372	0	1449	300	2	197	0	499	0	0	0	0	0	3512
% Approach	0%	65.4%	34.6%	0%	-	0%	74.3%	25.7%	0%	-	60.1%	0.4%	39.5%	0%	-	0%	0%	0%	0%	-	-
% Total	0%	29.1%	15.4%	0%	44.5%	0%	30.7%	10.6%	0%	41.3%	8.5%	0.1%	5.6%	0%	14.2%	0%	0%	0%	0%	0%	-
PHF	-	0.910	0.902	-	0.907	-	0.892	0.845	-	0.879	0.852	0.500	0.879	-	0.866	-	-	-	-	-	0.950
Lights	0	1016	536	0	1552	0	1073	367	0	1440	300	2	197	0	499	0	0	0	0	0	3491
% Lights	0%	99.3%	99.1%	0%	99.2%	0%	99.6%	98.7%	0%	99.4%	100%	100%	100%	0%	100%	0%	0%	0%	0%	-	99.4%
Articulated Trucks	0	2	1	0	3	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	6
% Articulated Trucks	0%	0.2%	0.2%	0%	0.2%	0%	0.1%	0.5%	0%	0.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0.2%
Buses and Single-Unit Trucks	0	5	4	0	9	0	3	3	0	6	0	0	0	0	0	0	0	0	0	0	15
% Buses and Single-Unit Trucks	0%	0.5%	0.7%	0%	0.6%	0%	0.3%	0.8%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0.4%

* L: Left, R: Right, T: Thru, U: U-Turn

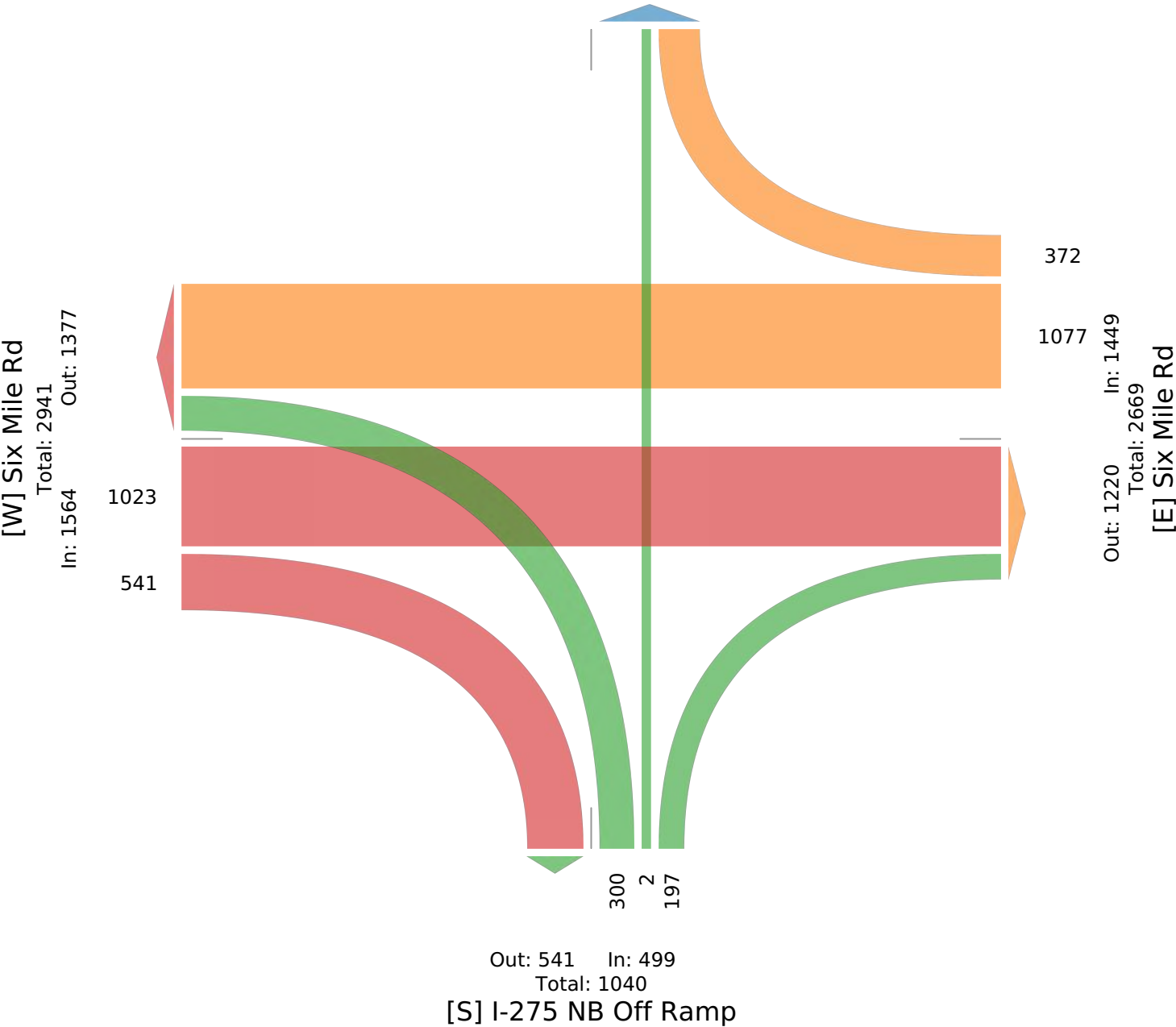
Six Mile Road and I-275 NB off ramp - TMC
Tue May 16, 2023
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1066326, Location: 42.410679, -83.421209



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] I-275 NB On Ramp

Total: 374
In: 0 Out: 374



Six Mile Road and Laurel Park Drive North - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066327, Location: 42.410875, -83.417859



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Laurel Park Dr Northbound					Laurel Park Dr Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	47	92	4	1	144	0	122	9	0	131	0	0	16	0	16	0	0	24	0	24	315
7:15AM	51	86	3	2	142	5	151	17	0	173	0	0	13	0	13	0	0	41	0	41	369
7:30AM	40	115	4	2	161	4	235	19	0	258	0	0	18	0	18	0	0	50	0	50	487
7:45AM	61	133	7	0	201	5	277	28	1	311	0	0	18	0	18	0	0	50	0	50	580
Hourly Total	199	426	18	5	648	14	785	73	1	873	0	0	65	0	65	0	0	165	0	165	1751
8:00AM	71	112	15	1	199	5	225	24	0	254	0	0	15	0	15	0	0	46	0	46	514
8:15AM	75	151	20	0	246	16	221	26	0	263	0	0	16	0	16	0	0	31	0	31	556
8:30AM	78	144	14	1	237	3	208	18	0	229	0	0	18	0	18	0	0	50	0	50	534
8:45AM	87	195	9	0	291	6	240	33	0	279	0	0	14	0	14	0	0	45	0	45	629
Hourly Total	311	602	58	2	973	30	894	101	0	1025	0	0	63	0	63	0	0	172	0	172	2233
4:00PM	45	218	22	0	285	15	255	17	0	287	0	0	27	0	27	0	0	77	0	77	676
4:15PM	50	260	12	0	322	10	230	18	1	259	0	0	29	0	29	0	0	93	0	93	703
4:30PM	46	279	19	0	344	8	276	22	0	306	0	0	24	0	24	0	0	127	0	127	801
4:45PM	52	290	20	0	362	19	255	23	2	299	0	0	21	0	21	0	0	120	0	120	802
Hourly Total	193	1047	73	0	1313	52	1016	80	3	1151	0	0	101	0	101	0	0	417	0	417	2982
5:00PM	45	265	13	0	323	12	254	18	1	285	0	0	24	0	24	0	0	160	0	160	792
5:15PM	27	247	15	0	289	5	256	20	0	281	0	0	37	0	37	0	0	94	0	94	701
5:30PM	40	240	23	0	303	15	227	24	0	266	0	0	30	0	30	0	0	91	0	91	690
5:45PM	45	263	24	0	332	10	209	23	1	243	0	0	29	0	29	0	0	77	0	77	681
Hourly Total	157	1015	75	0	1247	42	946	85	2	1075	0	0	120	0	120	0	0	422	0	422	2864
Total	860	3090	224	7	4181	138	3641	339	6	4124	0	0	349	0	349	0	0	1176	0	1176	9830
% Approach	20.6%	73.9%	5.4%	0.2%	-	3.3%	88.3%	8.2%	0.1%	-	0%	0%	100%	0%	-	0%	0%	100%	0%	-	-
% Total	8.7%	31.4%	2.3%	0.1%	42.5%	1.4%	37.0%	3.4%	0.1%	42.0%	0%	0%	3.6%	0%	3.6%	0%	0%	12.0%	0%	12.0%	-
Lights	852	3052	221	7	4132	134	3586	337	6	4063	0	0	347	0	347	0	0	1166	0	1166	9708
% Lights	99.1%	98.8%	98.7%	100%	98.8%	97.1%	98.5%	99.4%	100%	98.5%	0%	0%	99.4%	0%	99.4%	0%	0%	99.1%	0%	99.1%	98.8%
Articulated Trucks	3	11	0	0	14	1	23	0	0	24	0	0	1	0	1	0	0	2	0	2	41
% Articulated Trucks	0.3%	0.4%	0%	0%	0.3%	0.7%	0.6%	0%	0%	0.6%	0%	0%	0.3%	0%	0.3%	0%	0%	0.2%	0%	0.2%	0.4%
Buses and Single-Unit Trucks	5	27	3	0	35	3	32	2	0	37	0	0	1	0	1	0	0	8	0	8	81
% Buses and Single-Unit Trucks	0.6%	0.9%	1.3%	0%	0.8%	2.2%	0.9%	0.6%	0%	0.9%	0%	0%	0.3%	0%	0.3%	0%	0%	0.7%	0%	0.7%	0.8%

*L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and Laurel Park Drive North - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

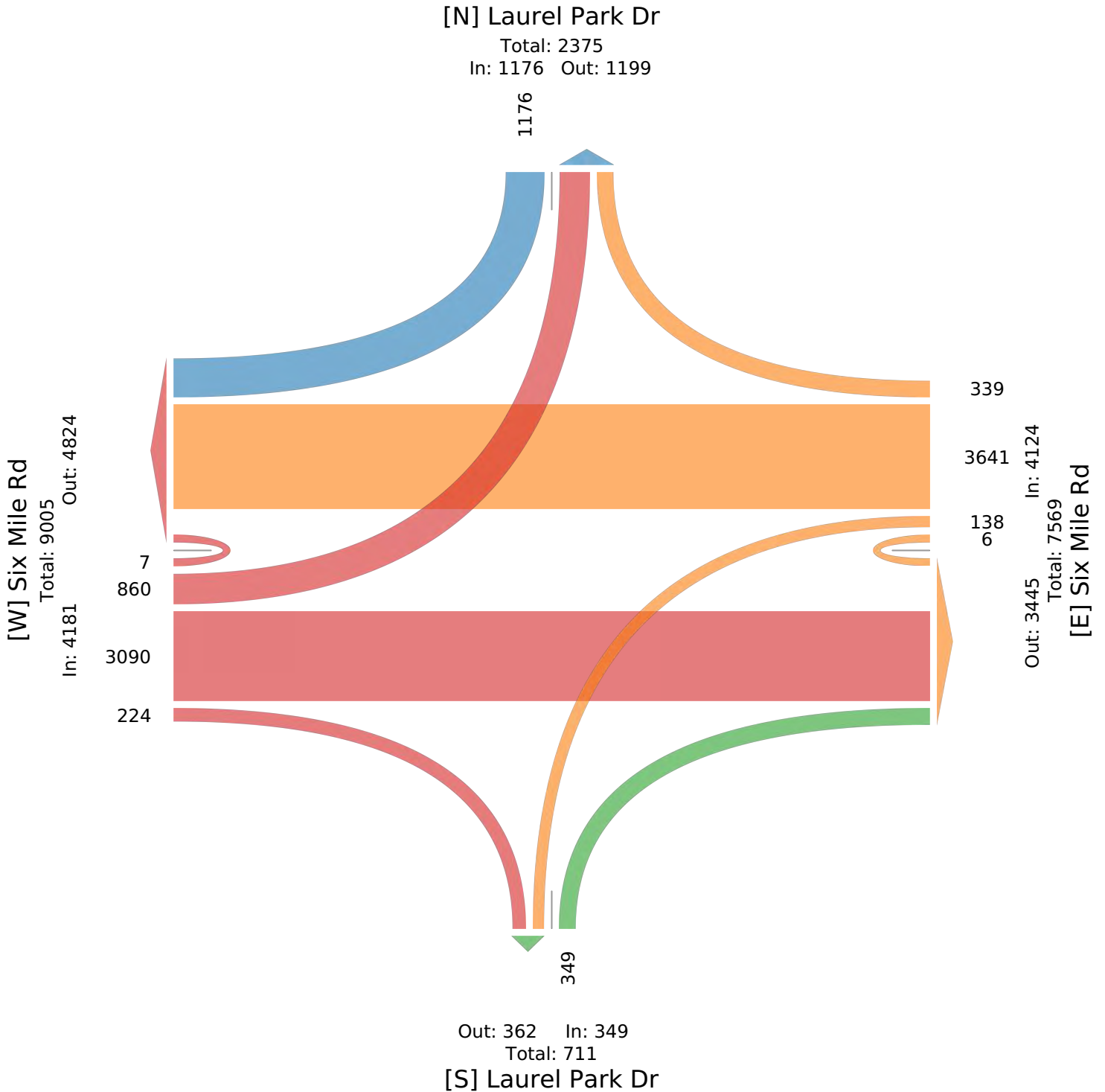
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066327, Location: 42.410875, -83.417859



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Six Mile Road and Laurel Park Drive North - TMC

Tue May 16, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066327, Location: 42.410875, -83.417859



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Laurel Park Dr Northbound					Laurel Park Dr Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 8:00AM	71	112	15	1	199	5	225	24	0	254	0	0	15	0	15	0	0	46	0	46	514
8:15AM	75	151	20	0	246	16	221	26	0	263	0	0	16	0	16	0	0	31	0	31	556
8:30AM	78	144	14	1	237	3	208	18	0	229	0	0	18	0	18	0	0	50	0	50	534
8:45AM	87	195	9	0	291	6	240	33	0	279	0	0	14	0	14	0	0	45	0	45	629
Total	311	602	58	2	973	30	894	101	0	1025	0	0	63	0	63	0	0	172	0	172	2233
% Approach	32.0%	61.9%	6.0%	0.2%	-	2.9%	87.2%	9.9%	0%	-	0% 0%	100% 0%	-	0% 0%	100% 0%	-	0% 0%	100% 0%	-	-	-
% Total	13.9%	27.0%	2.6%	0.1%	43.6%	1.3%	40.0%	4.5%	0%	45.9%	0% 0%	2.8% 0%	2.8%	0% 0%	7.7% 0%	7.7%	-	-	-	-	-
PHF	0.894	0.772	0.725	0.500	0.836	0.469	0.931	0.765	-	0.918	-	-	0.875	-	0.875	-	-	0.860	-	0.860	0.888
Lights	308	589	56	2	955	28	874	101	0	1003	0	0	62	0	62	0	0	167	0	167	2187
% Lights	99.0%	97.8%	96.6%	100%	98.2%	93.3%	97.8%	100%	0%	97.9%	0% 0%	98.4% 0%	98.4%	0% 0%	97.1% 0%	97.1%	0% 0%	97.1% 0%	97.1%	97.9%	97.9%
Articulated Trucks	2	2	0	0	4	1	4	0	0	5	0	0	1	0	1	0	0	2	0	2	12
% Articulated Trucks	0.6%	0.3%	0%	0%	0.4%	3.3%	0.4%	0%	0%	0.5%	0% 0%	1.6% 0%	1.6%	0% 0%	1.2% 0%	1.2%	0% 0%	1.2% 0%	1.2%	0.5%	0.5%
Buses and Single-Unit Trucks	1	11	2	0	14	1	16	0	0	17	0	0	0	0	0	0	0	3	0	3	34
% Buses and Single-Unit Trucks	0.3%	1.8%	3.4%	0%	1.4%	3.3%	1.8%	0%	0%	1.7%	0% 0%	0% 0%	0%	0% 0%	1.7% 0%	1.7%	0% 0%	1.7% 0%	1.7%	1.5%	1.5%

* L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and Laurel Park Drive North - TMC

Tue May 16, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066327, Location: 42.410875, -83.417859

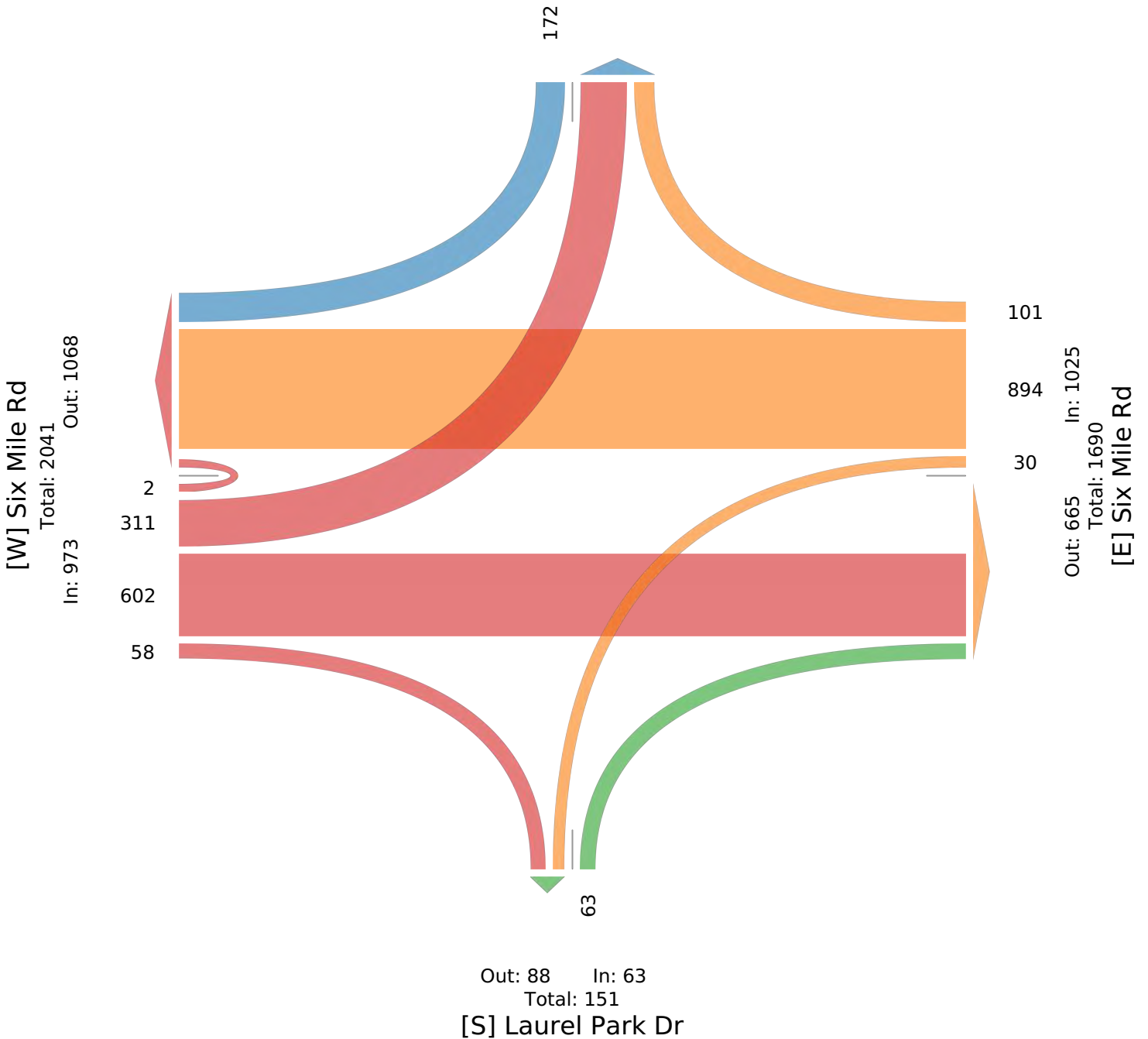


Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Laurel Park Dr

Total: 584

In: 172 Out: 412



Six Mile Road and Laurel Park Drive North - TMC

Tue May 16, 2023

PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066327, Location: 42.410875, -83.417859



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Laurel Park Dr Northbound					Laurel Park Dr Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:15PM	50	260	12	0	322	10	230	18	1	259	0	0	29	0	29	0	0	93	0	93	703
4:30PM	46	279	19	0	344	8	276	22	0	306	0	0	24	0	24	0	0	127	0	127	801
4:45PM	52	290	20	0	362	19	255	23	2	299	0	0	21	0	21	0	0	120	0	120	802
5:00PM	45	265	13	0	323	12	254	18	1	285	0	0	24	0	24	0	0	160	0	160	792
Total	193	1094	64	0	1351	49	1015	81	4	1149	0	0	98	0	98	0	0	500	0	500	3098
% Approach	14.3%	81.0%	4.7%	0%	-	4.3%	88.3%	7.0%	0.3%	-	0%	0%	100%	0%	-	0%	0%	100%	0%	-	-
% Total	6.2%	35.3%	2.1%	0%	43.6%	1.6%	32.8%	2.6%	0.1%	37.1%	0%	0%	3.2%	0%	3.2%	0%	0%	16.1%	0%	16.1%	-
PHF	0.928	0.943	0.800	-	0.933	0.645	0.919	0.880	0.500	0.939	-	-	0.845	-	0.845	-	-	0.781	-	0.781	0.966
Lights	191	1084	64	0	1339	49	1007	80	4	1140	0	0	97	0	97	0	0	498	0	498	3074
% Lights	99.0%	99.1%	100%	0%	99.1%	100%	99.2%	98.8%	100%	99.2%	0%	0%	99.0%	0%	99.0%	0%	0%	99.6%	0%	99.6%	99.2%
Articulated Trucks	0	3	0	0	3	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	6
% Articulated Trucks	0%	0.3%	0%	0%	0.2%	0%	0.3%	0%	0%	0.3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.2%
Buses and Single-Unit Trucks	2	7	0	0	9	0	5	1	0	6	0	0	1	0	1	0	0	2	0	2	18
% Buses and Single-Unit Trucks	1.0%	0.6%	0%	0%	0.7%	0%	0.5%	1.2%	0%	0.5%	0%	0%	1.0%	0%	1.0%	0%	0%	0.4%	0%	0.4%	0.6%

* L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and Laurel Park Drive North - TMC

Tue May 16, 2023

PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour

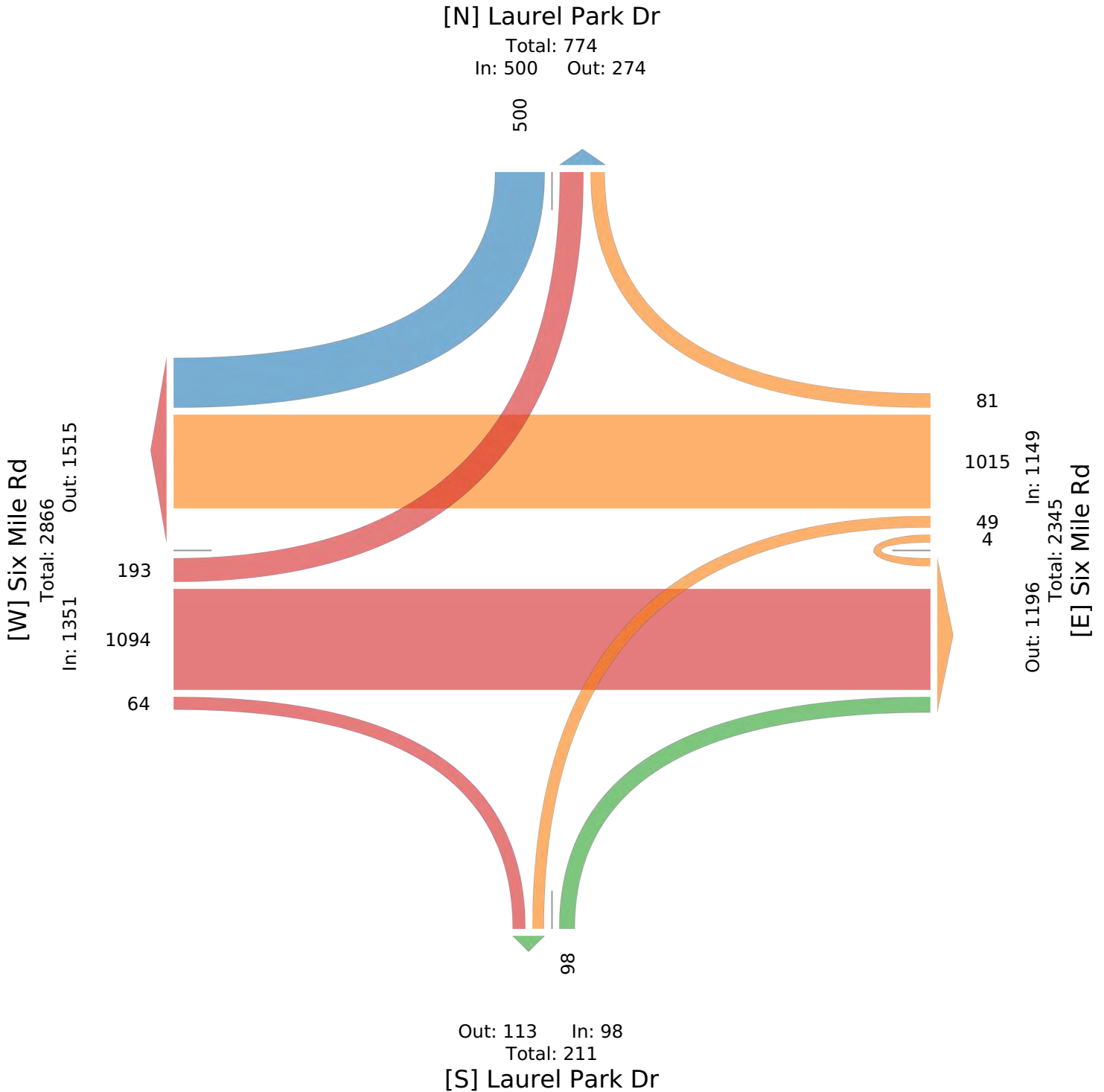
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066327, Location: 42.410875, -83.417859



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Six Mile Road and Newburgh Road - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066328, Location: 42.410861, -83.41346



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Newburgh Rd Northbound					Newburgh Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	0	75	52	0	127	0	130	27	0	157	0	124	42	0	166	0	100	24	0	124	574
7:15AM	0	75	63	0	138	0	193	29	0	222	0	166	47	0	213	0	130	19	0	149	722
7:30AM	0	75	83	0	158	0	270	35	0	305	0	192	77	0	269	0	155	37	0	192	924
7:45AM	0	115	54	0	169	0	285	43	0	328	0	184	98	0	282	0	159	39	0	198	977
Hourly Total	0	340	252	0	592	0	878	134	0	1012	0	666	264	0	930	0	544	119	0	663	3197
8:00AM	0	83	44	0	127	0	235	28	0	263	0	242	53	0	295	0	109	31	0	140	825
8:15AM	0	119	53	0	172	0	242	32	0	274	0	205	43	0	248	0	96	38	0	134	828
8:30AM	0	126	50	0	176	0	196	23	0	219	0	200	41	0	241	0	124	35	0	159	795
8:45AM	0	161	61	0	222	0	238	67	0	305	0	202	57	0	259	0	103	47	0	150	936
Hourly Total	0	489	208	0	697	0	911	150	0	1061	0	849	194	0	1043	0	432	151	0	583	3384
4:00PM	0	211	73	0	284	0	226	41	0	267	0	209	82	0	291	0	240	63	0	303	1145
4:15PM	0	219	97	0	316	0	223	39	0	262	0	202	73	0	275	0	241	57	0	298	1151
4:30PM	0	262	84	0	346	0	238	59	0	297	0	214	77	0	291	0	224	79	0	303	1237
4:45PM	0	255	82	0	337	0	244	40	0	284	0	214	78	0	292	0	268	74	0	342	1255
Hourly Total	0	947	336	0	1283	0	931	179	0	1110	0	839	310	0	1149	0	973	273	0	1246	4788
5:00PM	0	241	104	0	345	0	238	60	0	298	0	214	70	0	284	0	300	81	0	381	1308
5:15PM	0	222	93	0	315	0	242	45	0	287	0	190	56	0	246	0	251	68	0	319	1167
5:30PM	0	208	74	0	282	0	220	52	0	272	0	197	58	0	255	0	214	68	0	282	1091
5:45PM	0	200	99	0	299	0	190	42	0	232	0	178	53	0	231	0	210	77	0	287	1049
Hourly Total	0	871	370	0	1241	0	890	199	0	1089	0	779	237	0	1016	0	975	294	0	1269	4615
Total	0	2647	1166	0	3813	0	3610	662	0	4272	0	3133	1005	0	4138	0	2924	837	0	3761	15984
% Approach	0%	69.4%	30.6%	0%	-	0%	84.5%	15.5%	0%	-	0%	75.7%	24.3%	0%	-	0%	77.7%	22.3%	0%	-	-
% Total	0%	16.6%	7.3%	0%	23.9%	0%	22.6%	4.1%	0%	26.7%	0%	19.6%	6.3%	0%	25.9%	0%	18.3%	5.2%	0%	23.5%	-
Lights	0	2623	1132	0	3755	0	3556	651	0	4207	0	3069	986	0	4055	0	2862	820	0	3682	15699
% Lights	0%	99.1%	97.1%	0%	98.5%	0%	98.5%	98.3%	0%	98.5%	0%	98.0%	98.1%	0%	98.0%	0%	97.9%	98.0%	0%	97.9%	98.2%
Articulated Trucks	0	2	6	0	8	0	9	0	0	9	0	19	3	0	22	0	12	2	0	14	53
% Articulated Trucks	0%	0.1%	0.5%	0%	0.2%	0%	0.2%	0%	0%	0.2%	0%	0.6%	0.3%	0%	0.5%	0%	0.4%	0.2%	0%	0.4%	0.3%
Buses and Single-Unit Trucks	0	22	28	0	50	0	45	11	0	56	0	45	16	0	61	0	50	15	0	65	232
% Buses and Single-Unit Trucks	0%	0.8%	2.4%	0%	1.3%	0%	1.2%	1.7%	0%	1.3%	0%	1.4%	1.6%	0%	1.5%	0%	1.7%	1.8%	0%	1.7%	1.5%

*L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and Newburgh Road - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

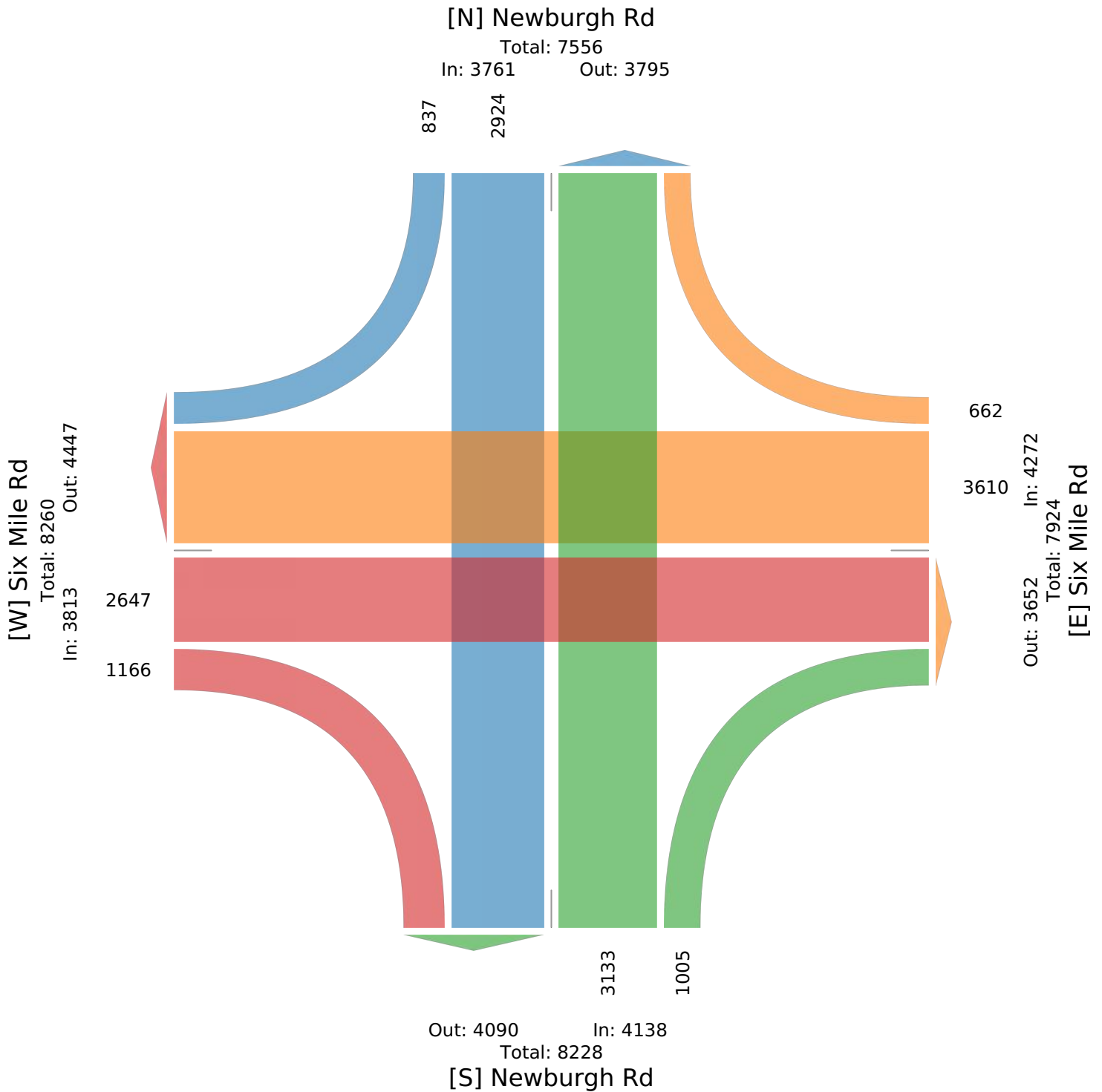
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066328, Location: 42.410861, -83.41346



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Six Mile Road and Newburgh Road - TMC

Tue May 16, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066328, Location: 42.410861, -83.41346



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Newburgh Rd Northbound					Newburgh Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:30AM	0	75	83	0	158	0	270	35	0	305	0	192	77	0	269	0	155	37	0	192	924
7:45AM	0	115	54	0	169	0	285	43	0	328	0	184	98	0	282	0	159	39	0	198	977
8:00AM	0	83	44	0	127	0	235	28	0	263	0	242	53	0	295	0	109	31	0	140	825
8:15AM	0	119	53	0	172	0	242	32	0	274	0	205	43	0	248	0	96	38	0	134	828
Total	0	392	234	0	626	0	1032	138	0	1170	0	823	271	0	1094	0	519	145	0	664	3554
% Approach	0%	62.6%	37.4%	0%	-	0%	88.2%	11.8%	0%	-	0%	75.2%	24.8%	0%	-	0%	78.2%	21.8%	0%	-	-
% Total	0%	11.0%	6.6%	0%	17.6%	0%	29.0%	3.9%	0%	32.9%	0%	23.2%	7.6%	0%	30.8%	0%	14.6%	4.1%	0%	18.7%	-
PHF	-	0.824	0.705	-	0.910	-	0.905	0.802	-	0.892	-	0.850	0.691	-	0.927	-	0.816	0.929	-	0.838	0.909
Lights	0	387	226	0	613	0	1011	136	0	1147	0	800	259	0	1059	0	503	141	0	644	3463
% Lights	0%	98.7%	96.6%	0%	97.9%	0%	98.0%	98.6%	0%	98.0%	0%	97.2%	95.6%	0%	96.8%	0%	96.9%	97.2%	0%	97.0%	97.4%
Articulated Trucks	0	0	2	0	2	0	4	0	0	4	0	7	2	0	9	0	2	2	0	4	19
% Articulated Trucks	0%	0%	0.9%	0%	0.3%	0%	0.4%	0%	0%	0.3%	0%	0.9%	0.7%	0%	0.8%	0%	0.4%	1.4%	0%	0.6%	0.5%
Buses and Single-Unit Trucks	0	5	6	0	11	0	17	2	0	19	0	16	10	0	26	0	14	2	0	16	72
% Buses and Single-Unit Trucks	0%	1.3%	2.6%	0%	1.8%	0%	1.6%	1.4%	0%	1.6%	0%	1.9%	3.7%	0%	2.4%	0%	2.7%	1.4%	0%	2.4%	2.0%

* L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and Newburgh Road - TMC

Tue May 16, 2023

AM Peak (7:30 AM - 8:30 AM)

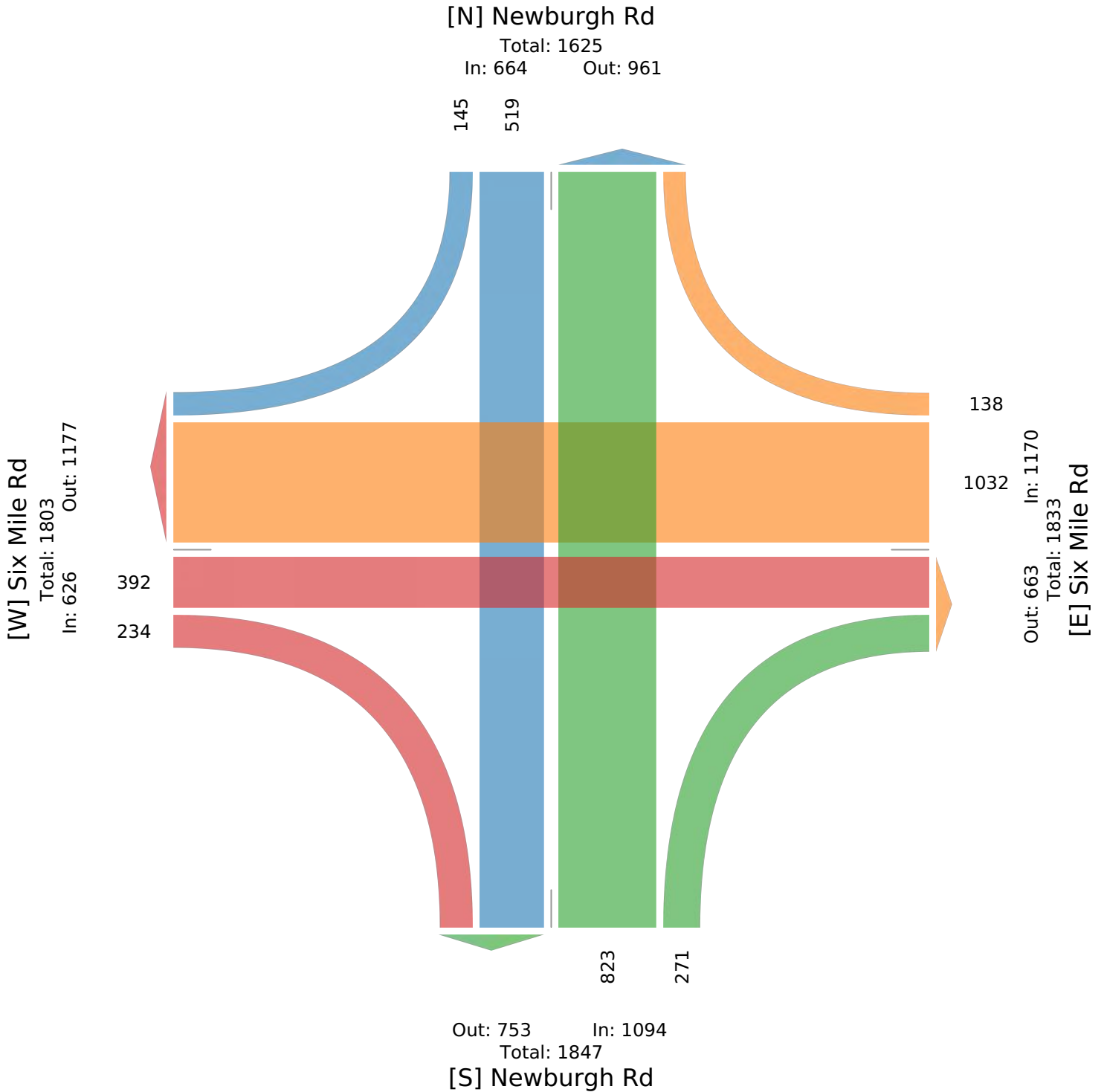
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066328, Location: 42.410861, -83.41346



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Six Mile Road and Newburgh Road - TMC

Tue May 16, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066328, Location: 42.410861, -83.41346



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Six Mile Rd Eastbound					Six Mile Rd Westbound					Newburgh Rd Northbound					Newburgh Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:30PM	0	262	84	0	346	0	238	59	0	297	0	214	77	0	291	0	224	79	0	303	1237
4:45PM	0	255	82	0	337	0	244	40	0	284	0	214	78	0	292	0	268	74	0	342	1255
5:00PM	0	241	104	0	345	0	238	60	0	298	0	214	70	0	284	0	300	81	0	381	1308
5:15PM	0	222	93	0	315	0	242	45	0	287	0	190	56	0	246	0	251	68	0	319	1167
Total	0	980	363	0	1343	0	962	204	0	1166	0	832	281	0	1113	0	1043	302	0	1345	4967
% Approach	0%	73.0%	27.0%	0%	-	0%	82.5%	17.5%	0%	-	0%	74.8%	25.2%	0%	-	0%	77.5%	22.5%	0%	-	-
% Total	0%	19.7%	7.3%	0%	27.0%	0%	19.4%	4.1%	0%	23.5%	0%	16.8%	5.7%	0%	22.4%	0%	21.0%	6.1%	0%	27.1%	-
PHF	-	0.935	0.873	-	0.970	-	0.986	0.850	-	0.978	-	0.972	0.901	-	0.953	-	0.869	0.932	-	0.883	0.949
Lights	0	976	357	0	1333	0	952	201	0	1153	0	826	280	0	1106	0	1026	301	0	1327	4919
% Lights	0%	99.6%	98.3%	0%	99.3%	0%	99.0%	98.5%	0%	98.9%	0%	99.3%	99.6%	0%	99.4%	0%	98.4%	99.7%	0%	98.7%	99.0%
Articulated Trucks	0	1	1	0	2	0	5	0	0	5	0	1	0	0	1	0	4	0	0	4	12
% Articulated Trucks	0%	0.1%	0.3%	0%	0.1%	0%	0.5%	0%	0%	0.4%	0%	0.1%	0%	0%	0.1%	0%	0.4%	0%	0%	0.3%	0.2%
Buses and Single-Unit Trucks	0	3	5	0	8	0	5	3	0	8	0	5	1	0	6	0	13	1	0	14	36
% Buses and Single-Unit Trucks	0%	0.3%	1.4%	0%	0.6%	0%	0.5%	1.5%	0%	0.7%	0%	0.6%	0.4%	0%	0.5%	0%	1.2%	0.3%	0%	1.0%	0.7%

* L: Left, R: Right, T: Thru, U: U-Turn

Six Mile Road and Newburgh Road - TMC

Tue May 16, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066328, Location: 42.410861, -83.41346



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Newburgh Rd

Total: 2381

In: 1345

Out: 1036

302

1043

[W] Six Mile Rd

Total: 2607

In: 1343

Out: 1264

980

363

204

962

Out: 1261

In: 1166

Total: 2427

[E] Six Mile Rd

Out: 1406

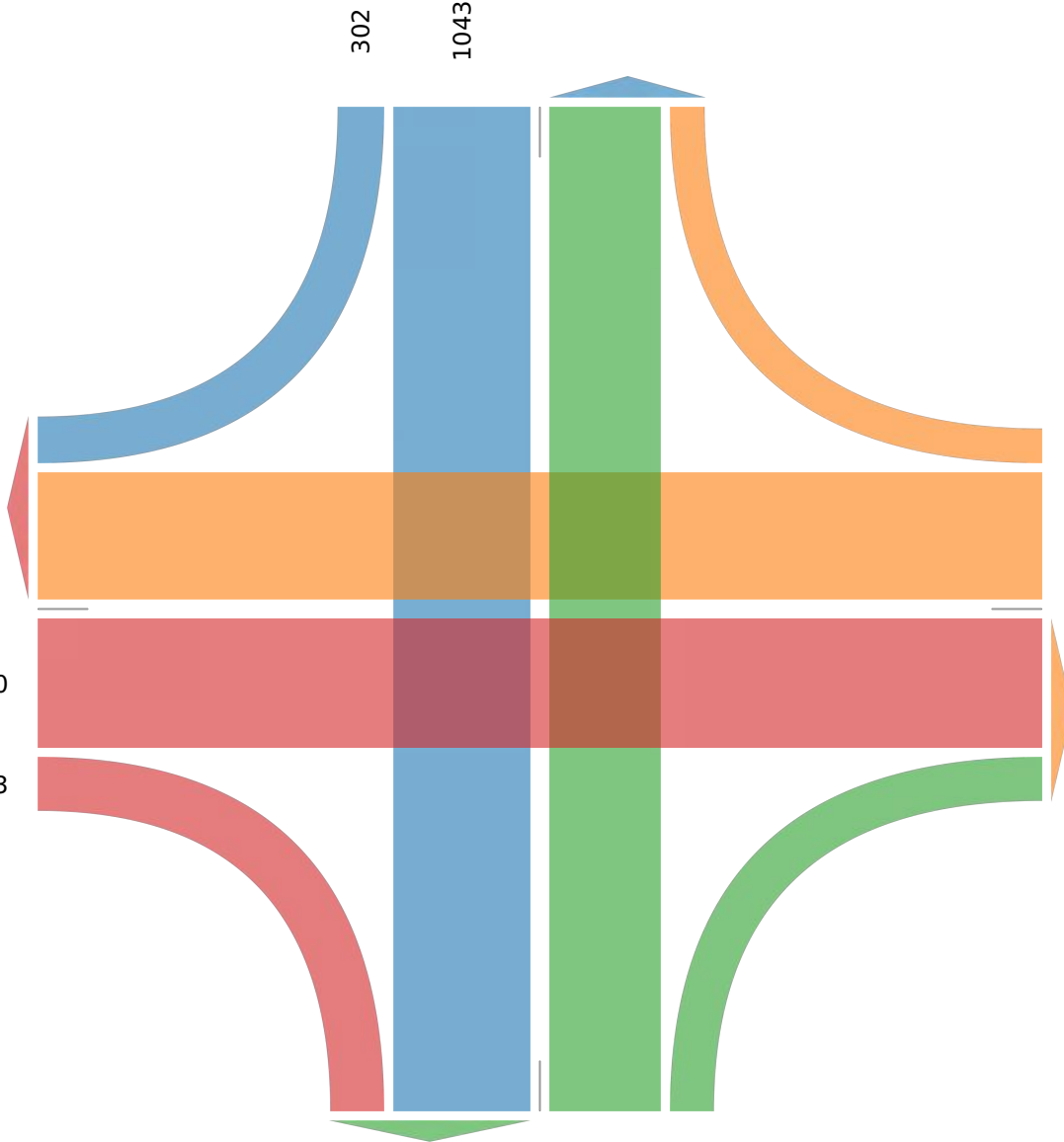
In: 1113

Total: 2519

[S] Newburgh Rd

832

281



Haggerty Road and College Parkway - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066322, Location: 42.4148, -83.432664



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	College Pkwy Eastbound					College Pkwy Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	14	0	5	0	19	1	0	2	0	3	3	70	5	0	78	1	62	13	0	76	176
7:15AM	5	2	7	0	14	3	2	4	0	9	1	114	7	0	122	3	64	10	0	77	222
7:30AM	15	2	2	0	19	8	0	3	0	11	2	158	9	0	169	6	69	13	0	88	287
7:45AM	16	2	9	0	27	7	0	4	0	11	5	219	10	0	234	5	83	23	0	111	383
Hourly Total	50	6	23	0	79	19	2	13	0	34	11	561	31	0	603	15	278	59	0	352	1068
8:00AM	14	4	10	0	28	9	0	2	0	11	6	170	7	0	183	3	79	17	0	99	321
8:15AM	16	3	13	0	32	7	2	3	0	12	9	163	9	0	181	4	59	21	0	84	309
8:30AM	15	1	7	0	23	9	1	5	0	15	6	163	8	0	177	3	86	14	0	103	318
8:45AM	21	2	12	0	35	5	0	0	0	5	11	212	13	0	236	4	96	19	0	119	395
Hourly Total	66	10	42	0	118	30	3	10	0	43	32	708	37	0	777	14	320	71	0	405	1343
4:00PM	34	1	17	0	52	19	0	10	0	29	8	187	17	0	212	7	184	22	0	213	506
4:15PM	19	1	13	0	33	23	0	5	0	28	11	179	17	0	207	7	187	27	0	221	489
4:30PM	25	2	16	0	43	36	7	14	0	57	12	186	10	0	208	4	200	17	0	221	529
4:45PM	28	4	12	0	44	22	4	10	0	36	12	221	25	0	258	12	164	26	0	202	540
Hourly Total	106	8	58	0	172	100	11	39	0	150	43	773	69	0	885	30	735	92	0	857	2064
5:00PM	24	0	14	0	38	43	2	5	0	50	15	190	15	0	220	4	196	26	0	226	534
5:15PM	24	2	19	0	45	18	5	14	0	37	16	215	30	0	261	10	182	23	0	215	558
5:30PM	22	1	17	0	40	25	3	21	0	49	14	184	36	0	234	11	184	20	0	215	538
5:45PM	34	1	13	0	48	33	3	14	0	50	21	210	28	0	259	10	136	17	0	163	520
Hourly Total	104	4	63	0	171	119	13	54	0	186	66	799	109	0	974	35	698	86	0	819	2150
Total	326	28	186	0	540	268	29	116	0	413	152	2841	246	0	3239	94	2031	308	0	2433	6625
% Approach	60.4%	5.2%	34.4%	0%	-	64.9%	7.0%	28.1%	0%	-	4.7%	87.7%	7.6%	0%	-	3.9%	83.5%	12.7%	0%	-	-
% Total	4.9%	0.4%	2.8%	0%	8.2%	4.0%	0.4%	1.8%	0%	6.2%	2.3%	42.9%	3.7%	0%	48.9%	1.4%	30.7%	4.6%	0%	36.7%	-
Lights	324	28	182	0	534	266	28	114	0	408	150	2805	243	0	3198	93	2014	306	0	2413	6553
% Lights	99.4%	100%	97.8%	0%	98.9%	99.3%	96.6%	98.3%	0%	98.8%	98.7%	98.7%	98.8%	0%	98.7%	98.9%	99.2%	99.4%	0%	99.2%	98.9%
Articulated Trucks	1	0	1	0	2	1	0	1	0	2	1	6	1	0	8	0	3	0	0	3	15
% Articulated Trucks	0.3%	0%	0.5%	0%	0.4%	0.4%	0%	0.9%	0%	0.5%	0.7%	0.2%	0.4%	0%	0.2%	0%	0.1%	0%	0%	0.1%	0.2%
Buses and Single-Unit Trucks	1	0	3	0	4	1	1	1	0	3	1	30	2	0	33	1	14	2	0	17	57
% Buses and Single-Unit Trucks	0.3%	0%	1.6%	0%	0.7%	0.4%	3.4%	0.9%	0%	0.7%	0.7%	1.1%	0.8%	0%	1.0%	1.1%	0.7%	0.6%	0%	0.7%	0.9%

*L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and College Parkway - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066322, Location: 42.4148, -83.432664



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Haggerty Rd

Total: 5716

In: 2433

Out: 3283

308

2031

94

[W] College Pkwy

Total: 1029

In: 540 Out: 489

326
28
186

116
29
268

Out: 368 In: 413

Total: 781

[E] College Pkwy

Out: 2485

In: 3239

Total: 5724

[S] Haggerty Rd

152

2841

246

Haggerty Road and College Parkway - TMC

Tue May 16, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066322, Location: 42.4148, -83.432664



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	College Pkwy Eastbound					College Pkwy Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 8:00AM	14	4	10	0	28	9	0	2	0	11	6	170	7	0	183	3	79	17	0	99	321
8:15AM	16	3	13	0	32	7	2	3	0	12	9	163	9	0	181	4	59	21	0	84	309
8:30AM	15	1	7	0	23	9	1	5	0	15	6	163	8	0	177	3	86	14	0	103	318
8:45AM	21	2	12	0	35	5	0	0	0	5	11	212	13	0	236	4	96	19	0	119	395
Total	66	10	42	0	118	30	3	10	0	43	32	708	37	0	777	14	320	71	0	405	1343
% Approach	55.9%	8.5%	35.6%	0%	-	69.8%	7.0%	23.3%	0%	-	4.1%	91.1%	4.8%	0%	-	3.5%	79.0%	17.5%	0%	-	-
% Total	4.9%	0.7%	3.1%	0%	8.8%	2.2%	0.2%	0.7%	0%	3.2%	2.4%	52.7%	2.8%	0%	57.9%	1.0%	23.8%	5.3%	0%	30.2%	-
PHF	0.786	0.625	0.808	-	0.843	0.833	0.375	0.500	-	0.717	0.727	0.835	0.712	-	0.823	0.875	0.833	0.845	-	0.851	0.850
Lights	66	10	39	0	115	30	2	10	0	42	32	696	36	0	764	14	314	70	0	398	1319
% Lights	100%	100%	92.9%	0%	97.5%	100%	66.7%	100%	0%	97.7%	100%	98.3%	97.3%	0%	98.3%	100%	98.1%	98.6%	0%	98.3%	98.2%
Articulated Trucks	0	0	1	0	1	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	5
% Articulated Trucks	0%	0%	2.4%	0%	0.8%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.3%	0%	0.6%	0%	0%	0.5%	0.4%
Buses and Single-Unit Trucks	0	0	2	0	2	0	1	0	0	1	0	10	1	0	11	0	4	1	0	5	19
% Buses and Single-Unit Trucks	0%	0%	4.8%	0%	1.7%	0%	33.3%	0%	0%	2.3%	0%	1.4%	2.7%	0%	1.4%	0%	1.3%	1.4%	0%	1.2%	1.4%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and College Parkway - TMC

Tue May 16, 2023

AM Peak (8 AM - 9 AM)

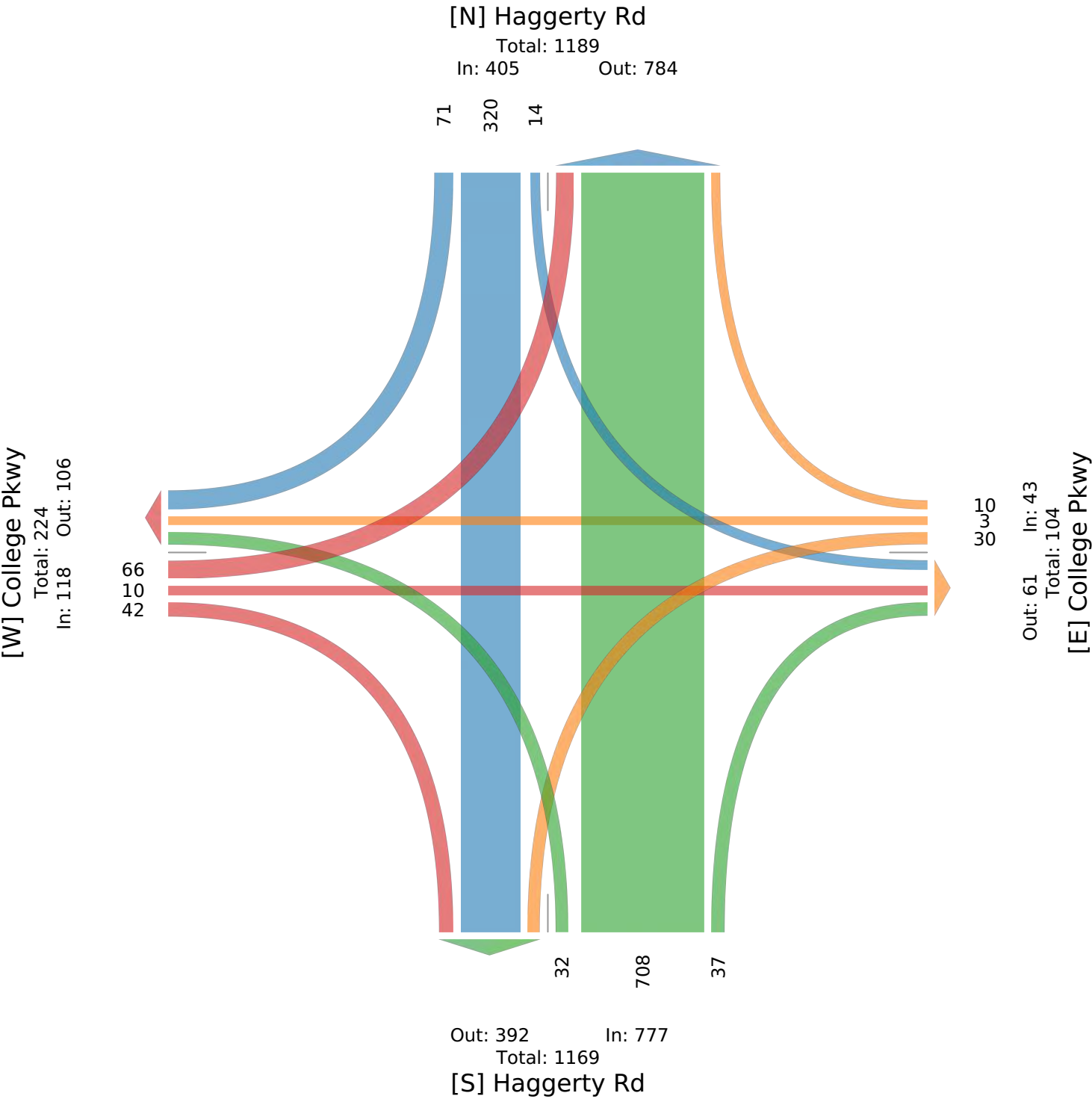
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066322, Location: 42.4148, -83.432664



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and College Parkway - TMC

Tue May 16, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066322, Location: 42.4148, -83.432664



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	College Pkwy Eastbound					College Pkwy Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:45PM	28	4	12	0	44	22	4	10	0	36	12	221	25	0	258	12	164	26	0	202	540
5:00PM	24	0	14	0	38	43	2	5	0	50	15	190	15	0	220	4	196	26	0	226	534
5:15PM	24	2	19	0	45	18	5	14	0	37	16	215	30	0	261	10	182	23	0	215	558
5:30PM	22	1	17	0	40	25	3	21	0	49	14	184	36	0	234	11	184	20	0	215	538
Total	98	7	62	0	167	108	14	50	0	172	57	810	106	0	973	37	726	95	0	858	2170
% Approach	58.7%	4.2%	37.1%	0%	-	62.8%	8.1%	29.1%	0%	-	5.9%	83.2%	10.9%	0%	-	4.3%	84.6%	11.1%	0%	-	-
% Total	4.5%	0.3%	2.9%	0%	7.7%	5.0%	0.6%	2.3%	0%	7.9%	2.6%	37.3%	4.9%	0%	44.8%	1.7%	33.5%	4.4%	0%	39.5%	-
PHF	0.875	0.438	0.816	-	0.928	0.628	0.700	0.595	-	0.860	0.891	0.916	0.736	-	0.932	0.771	0.926	0.913	-	0.949	0.972
Lights	98	7	61	0	166	108	14	50	0	172	56	806	106	0	968	37	723	95	0	855	2161
% Lights	100%	100%	98.4%	0%	99.4%	100%	100%	100%	0%	100%	98.2%	99.5%	100%	0%	99.5%	100%	99.6%	100%	0%	99.7%	99.6%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Articulated Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.1%	0%	0%	0.1%	0%
Buses and Single-Unit Trucks	0	0	1	0	1	0	0	0	0	0	1	4	0	0	5	0	2	0	0	2	8
% Buses and Single-Unit Trucks	0%	0%	1.6%	0%	0.6%	0%	0%	0%	0%	0%	1.8%	0.5%	0%	0%	0.5%	0%	0.3%	0%	0%	0.2%	0.4%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and College Parkway - TMC

Tue May 16, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

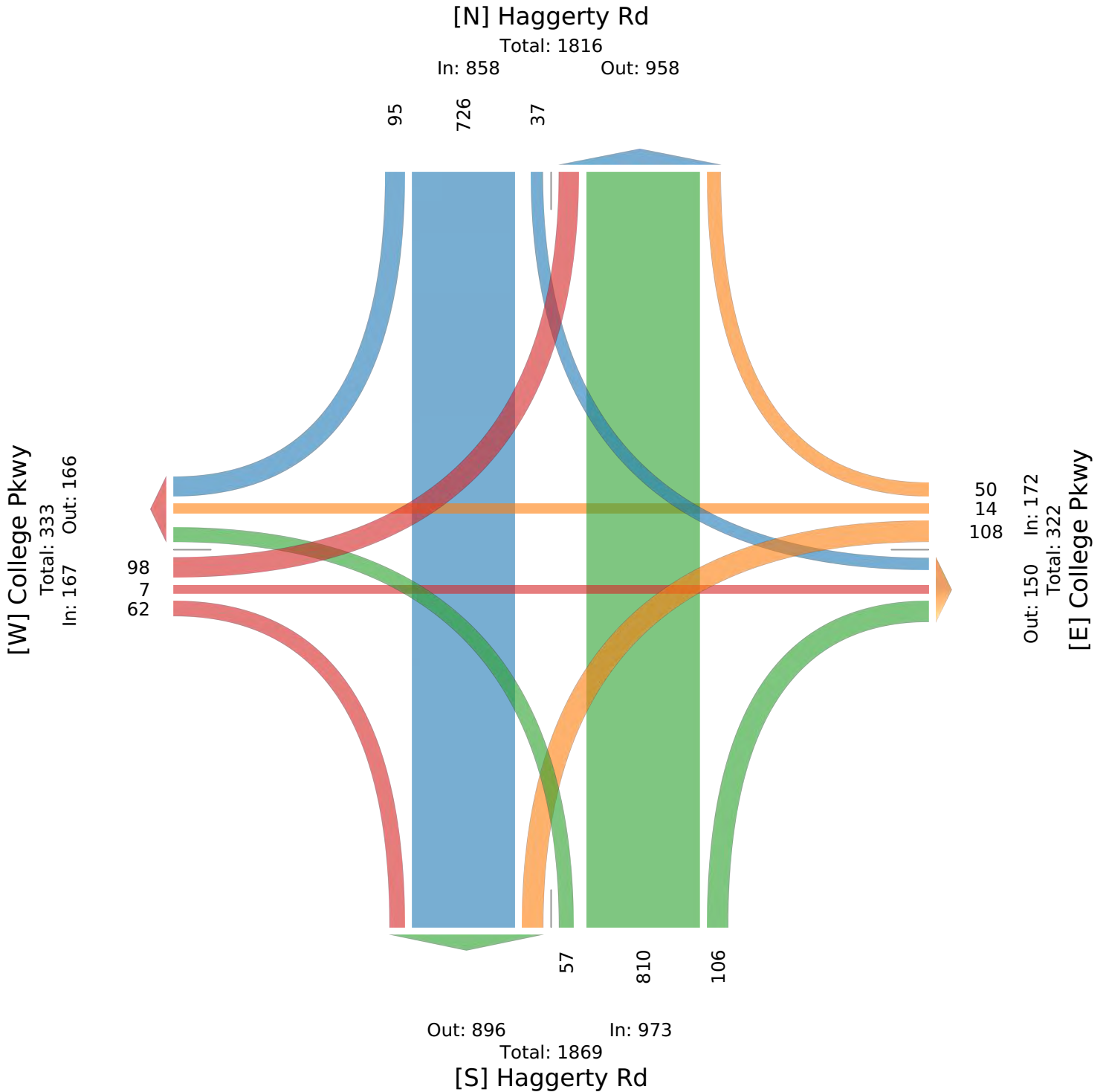
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066322, Location: 42.4148, -83.432664



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and South Dr - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066321, Location: 42.416857, -83.432649



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Cross Rd Eastbound					South Dr Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	12	1	0	0	13	2	0	1	0	3	1	80	5	0	86	3	75	10	0	88	190
7:15AM	13	0	0	0	13	1	0	0	0	1	1	120	7	0	128	1	85	6	0	92	234
7:30AM	12	8	0	0	20	2	1	0	0	3	0	149	26	0	175	1	87	10	0	98	296
7:45AM	21	9	1	0	31	3	0	2	0	5	0	186	43	0	229	2	111	15	0	128	393
Hourly Total	58	18	1	0	77	8	1	3	0	12	2	535	81	0	618	7	358	41	0	406	1113
8:00AM	19	8	1	0	28	6	0	1	0	7	1	167	21	0	189	1	99	22	0	122	346
8:15AM	35	8	0	0	43	4	2	2	0	8	1	162	21	0	184	0	85	14	0	99	334
8:30AM	24	9	2	0	35	9	1	0	0	10	0	160	16	0	176	1	94	11	0	106	327
8:45AM	19	9	0	0	28	4	0	3	0	7	1	196	33	0	230	3	118	17	0	138	403
Hourly Total	97	34	3	0	134	23	3	6	0	32	3	685	91	0	779	5	396	64	0	465	1410
4:00PM	31	3	2	0	36	24	4	5	0	33	0	219	12	0	231	2	197	37	0	236	536
4:15PM	36	4	3	0	43	20	4	4	0	28	1	187	13	0	201	1	193	32	0	226	498
4:30PM	25	9	3	0	37	21	6	4	0	31	0	210	8	0	218	0	192	44	0	236	522
4:45PM	42	12	1	0	55	23	11	6	0	40	1	224	30	0	255	2	187	43	0	232	582
Hourly Total	134	28	9	0	171	88	25	19	0	132	2	840	63	0	905	5	769	156	0	930	2138
5:00PM	24	4	2	0	30	26	7	10	0	43	0	208	8	0	216	2	196	51	0	249	538
5:15PM	26	8	6	0	40	12	3	2	0	17	1	234	17	0	252	0	196	25	0	221	530
5:30PM	34	7	5	0	46	9	7	2	0	18	2	208	15	0	225	4	186	43	0	233	522
5:45PM	30	12	4	0	46	13	5	8	0	26	2	214	39	0	255	4	149	52	1	206	533
Hourly Total	114	31	17	0	162	60	22	22	0	104	5	864	79	0	948	10	727	171	1	909	2123
Total	403	111	30	0	544	179	51	50	0	280	12	2924	314	0	3250	27	2250	432	1	2710	6784
% Approach	74.1%	20.4%	5.5%	0%	-	63.9%	18.2%	17.9%	0%	-	0.4%	90.0%	9.7%	0%	-	1.0%	83.0%	15.9%	0%	-	-
% Total	5.9%	1.6%	0.4%	0%	8.0%	2.6%	0.8%	0.7%	0%	4.1%	0.2%	43.1%	4.6%	0%	47.9%	0.4%	33.2%	6.4%	0%	39.9%	-
Lights	400	110	30	0	540	178	51	49	0	278	12	2888	312	0	3212	27	2234	432	1	2694	6724
% Lights	99.3%	99.1%	100%	0%	99.3%	99.4%	100%	98.0%	0%	99.3%	100%	98.8%	99.4%	0%	98.8%	100%	99.3%	100%	100%	99.4%	99.1%
Articulated Trucks	1	0	0	0	1	0	0	0	0	0	0	6	0	0	6	0	3	0	0	3	10
% Articulated Trucks	0.2%	0%	0%	0%	0.2%	0%	0%	0%	0%	0%	0%	0.2%	0%	0%	0.2%	0%	0.1%	0%	0%	0.1%	0.1%
Buses and Single-Unit Trucks	2	1	0	0	3	1	0	1	0	2	0	30	2	0	32	0	13	0	0	13	50
% Buses and Single-Unit Trucks	0.5%	0.9%	0%	0%	0.6%	0.6%	0%	2.0%	0%	0.7%	0%	1.0%	0.6%	0%	1.0%	0%	0.6%	0%	0%	0.5%	0.7%

*L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and South Dr - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

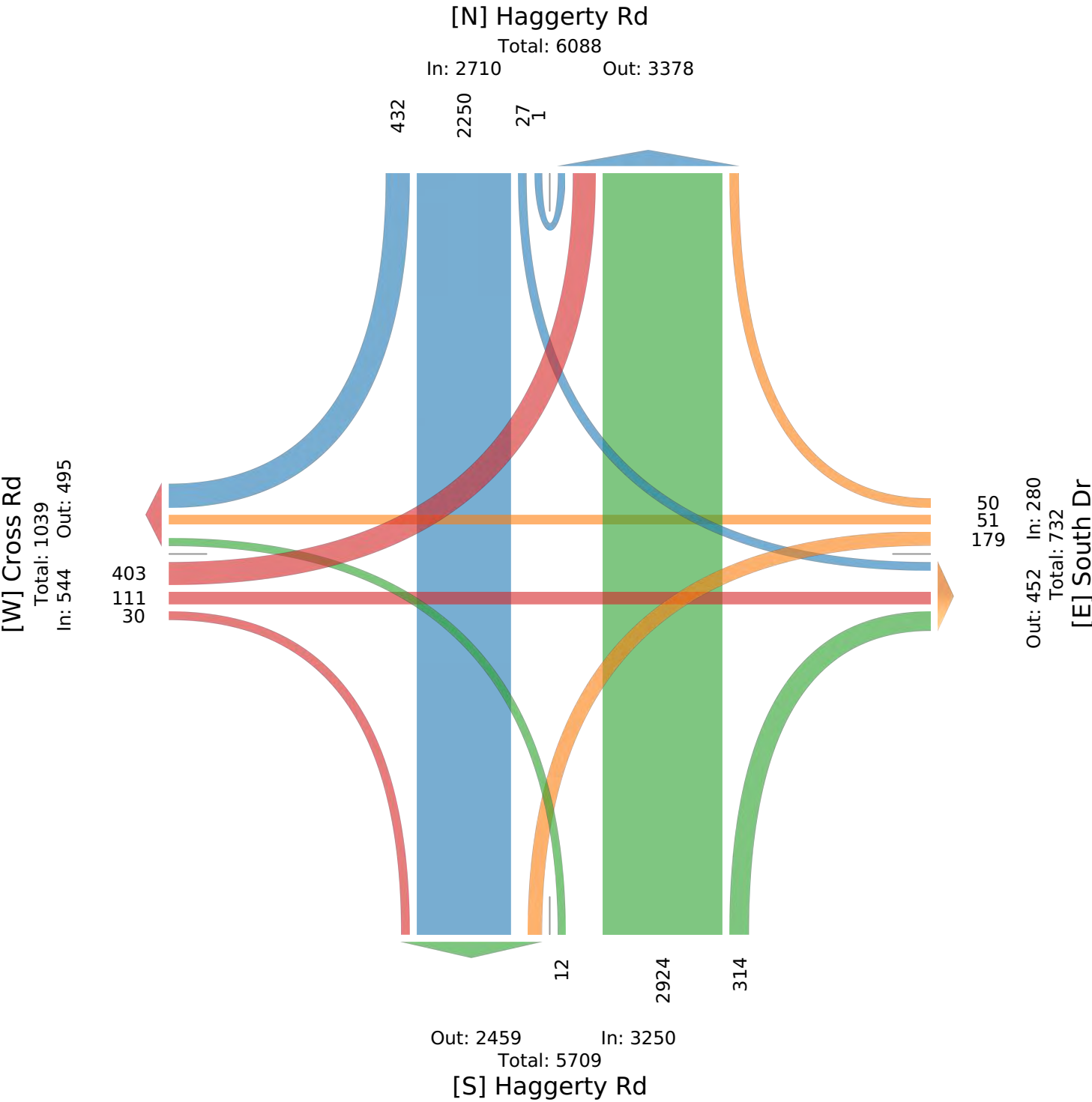
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066321, Location: 42.416857, -83.432649



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and South Dr - TMC

Tue May 16, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066321, Location: 42.416857, -83.432649



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

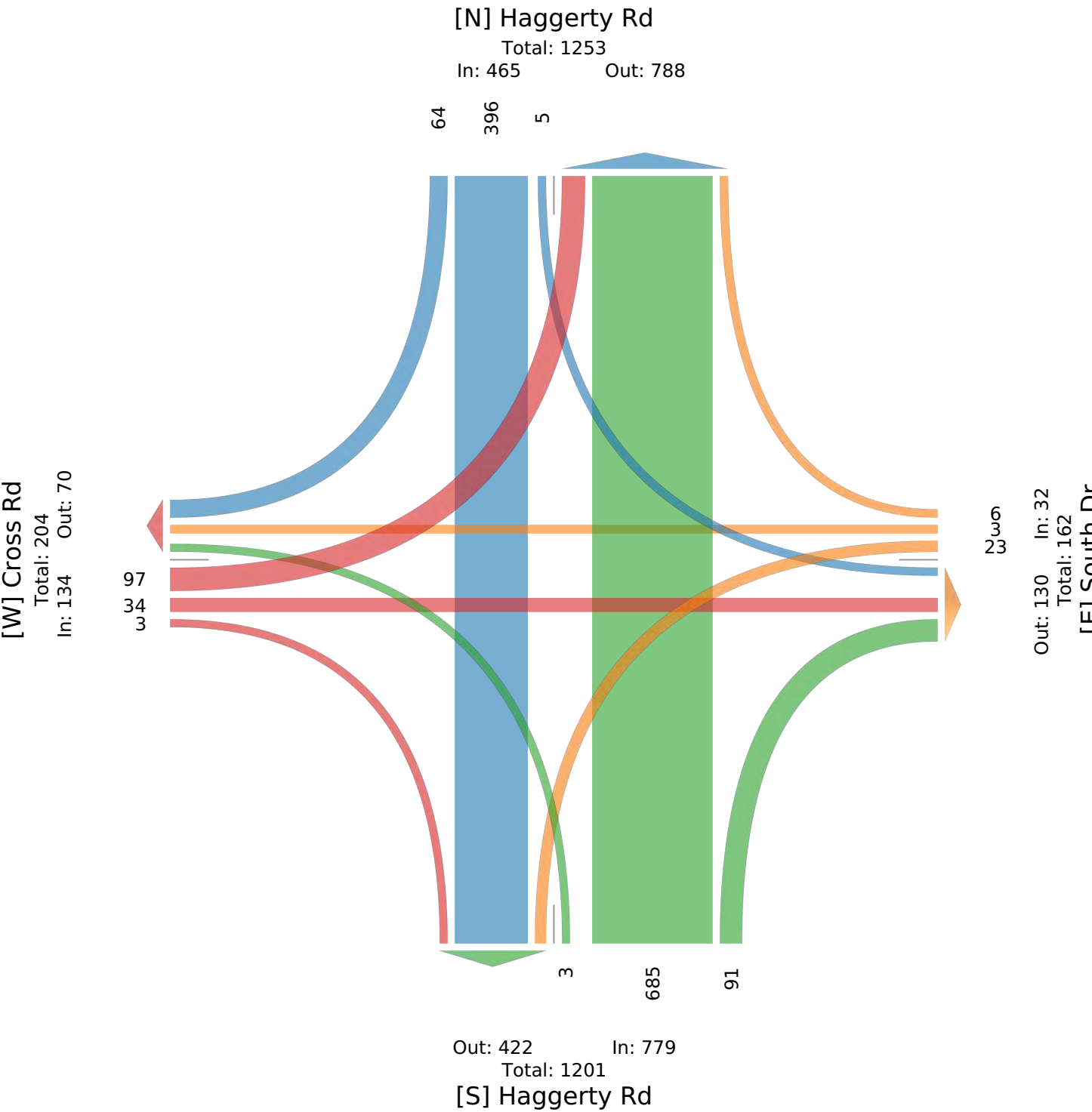
Leg Direction	Cross Rd Eastbound					South Dr Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 8:00AM	19	8	1	0	28	6	0	1	0	7	1	167	21	0	189	1	99	22	0	122	346
8:15AM	35	8	0	0	43	4	2	2	0	8	1	162	21	0	184	0	85	14	0	99	334
8:30AM	24	9	2	0	35	9	1	0	0	10	0	160	16	0	176	1	94	11	0	106	327
8:45AM	19	9	0	0	28	4	0	3	0	7	1	196	33	0	230	3	118	17	0	138	403
Total	97	34	3	0	134	23	3	6	0	32	3	685	91	0	779	5	396	64	0	465	1410
% Approach	72.4%	25.4%	2.2%	0%	-	71.9%	9.4%	18.8%	0%	-	0.4%	87.9%	11.7%	0%	-	1.1%	85.2%	13.8%	0%	-	-
% Total	6.9%	2.4%	0.2%	0%	9.5%	1.6%	0.2%	0.4%	0%	2.3%	0.2%	48.6%	6.5%	0%	55.2%	0.4%	28.1%	4.5%	0%	33.0%	-
PHF	0.693	0.944	0.375	-	0.779	0.639	0.375	0.500	-	0.800	0.750	0.874	0.689	-	0.847	0.417	0.839	0.727	-	0.842	0.875
Lights	95	34	3	0	132	22	3	6	0	31	3	674	89	0	766	5	390	64	0	459	1388
% Lights	97.9%	100%	100%	0%	98.5%	95.7%	100%	100%	0%	96.9%	100%	98.4%	97.8%	0%	98.3%	100%	98.5%	100%	0%	98.7%	98.4%
Articulated Trucks	1	0	0	0	1	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	5
% Articulated Trucks	1.0%	0%	0%	0%	0.7%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.3%	0%	0.5%	0%	0%	0.4%	0.4%
Buses and Single-Unit Trucks	1	0	0	0	1	1	0	0	0	1	0	9	2	0	11	0	4	0	0	4	17
% Buses and Single-Unit Trucks	1.0%	0%	0%	0%	0.7%	4.3%	0%	0%	0%	3.1%	0%	1.3%	2.2%	0%	1.4%	0%	1.0%	0%	0%	0.9%	1.2%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and South Dr - TMC
Tue May 16, 2023
AM Peak (8 AM - 9 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1066321, Location: 42.416857, -83.432649



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and South Dr - TMC

Tue May 16, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066321, Location: 42.416857, -83.432649



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Cross Rd Eastbound					South Dr Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:30PM	25	9	3	0	37	21	6	4	0	31	0	210	8	0	218	0	192	44	0	236	522
4:45PM	42	12	1	0	55	23	11	6	0	40	1	224	30	0	255	2	187	43	0	232	582
5:00PM	24	4	2	0	30	26	7	10	0	43	0	208	8	0	216	2	196	51	0	249	538
5:15PM	26	8	6	0	40	12	3	2	0	17	1	234	17	0	252	0	196	25	0	221	530
Total	117	33	12	0	162	82	27	22	0	131	2	876	63	0	941	4	771	163	0	938	2172
% Approach	72.2%	20.4%	7.4%	0%	-	62.6%	20.6%	16.8%	0%	-	0.2%	93.1%	6.7%	0%	-	0.4%	82.2%	17.4%	0%	-	-
% Total	5.4%	1.5%	0.6%	0%	7.5%	3.8%	1.2%	1.0%	0%	6.0%	0.1%	40.3%	2.9%	0%	43.3%	0.2%	35.5%	7.5%	0%	43.2%	-
PHF	0.696	0.688	0.500	-	0.736	0.788	0.614	0.550	-	0.762	0.500	0.936	0.525	-	0.923	0.500	0.983	0.799	-	0.942	0.933
Lights	117	33	12	0	162	82	27	22	0	131	2	873	63	0	938	4	769	163	0	936	2167
% Lights	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	99.7%	100%	0%	99.7%	100%	99.7%	100%	0%	99.8%	99.8%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Articulated Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.1%	0%	0%	0.1%	0%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	4
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.3%	0%	0.1%	0%	0%	0.1%	0.2%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and South Dr - TMC

Tue May 16, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

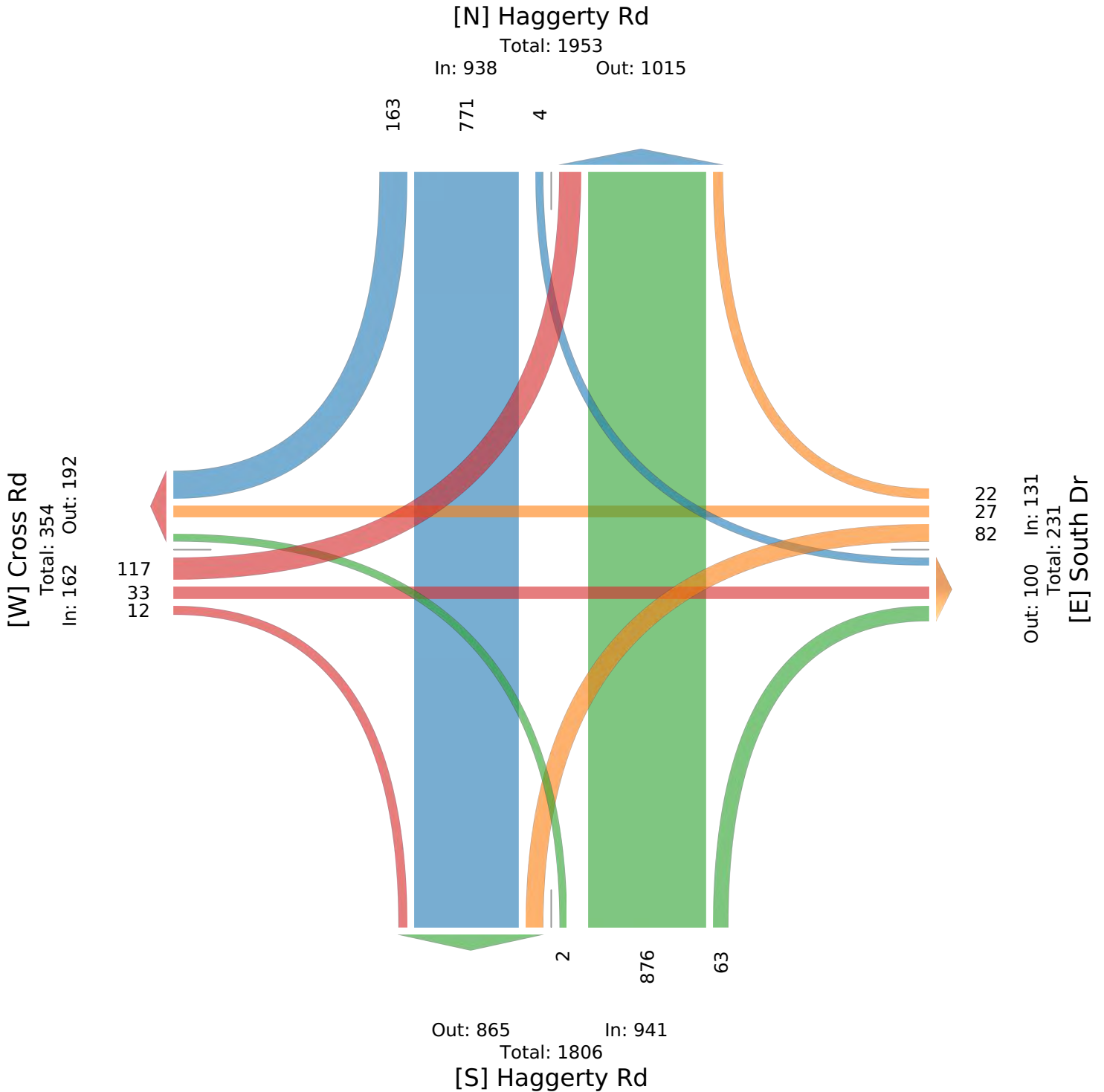
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066321, Location: 42.416857, -83.432649



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and Northville Village Center ... - TMC

Tue May 16, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066323, Location: 42.412767, -83.432494



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

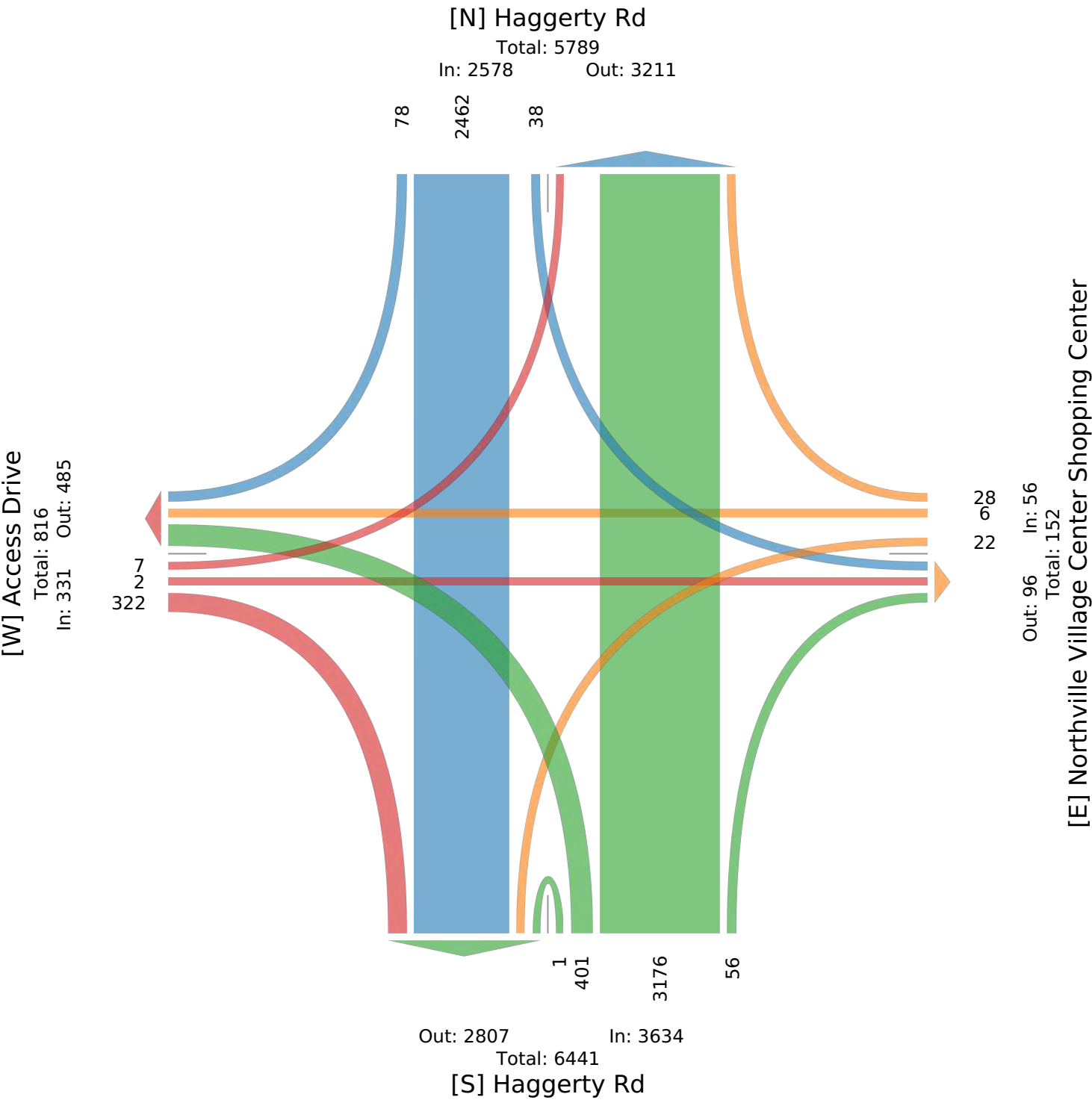
Leg	Access Drive					Northville Village Center Shopping Center					Haggerty Rd					Haggerty Rd					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 7:00AM	0	0	7	0	7	0	0	0	0	0	22	83	2	0	107	0	68	1	0	69	183
7:15AM	1	0	17	0	18	0	0	0	0	0	18	120	4	0	142	4	71	6	0	81	241
7:30AM	0	1	10	0	11	1	0	0	0	1	21	169	4	0	194	4	73	5	0	82	288
7:45AM	1	1	21	0	23	0	1	0	0	1	23	229	2	0	254	7	91	1	0	99	377
Hourly Total	2	2	55	0	59	1	1	0	0	2	84	601	12	0	697	15	303	13	0	331	1089
8:00AM	1	0	17	0	18	0	0	1	0	1	19	179	9	0	207	8	83	4	0	95	321
8:15AM	0	0	9	0	9	0	0	0	0	0	24	179	8	0	211	5	84	2	0	91	311
8:30AM	1	0	19	0	20	0	1	1	0	2	28	175	10	0	213	2	101	1	0	104	339
8:45AM	0	0	11	0	11	0	1	0	0	1	17	233	7	0	257	2	106	3	0	111	380
Hourly Total	2	0	56	0	58	0	2	2	0	4	88	766	34	0	888	17	374	10	0	401	1351
4:00PM	0	0	26	0	26	5	0	3	0	8	15	205	0	0	220	0	227	3	0	230	484
4:15PM	1	0	20	0	21	2	0	0	0	2	28	198	0	0	226	0	219	3	0	222	471
4:30PM	0	0	29	0	29	1	0	8	0	9	34	196	2	0	232	0	261	0	0	261	531
4:45PM	0	0	23	0	23	1	0	6	0	7	31	259	1	0	291	2	200	5	0	207	528
Hourly Total	1	0	98	0	99	9	0	17	0	26	108	858	3	0	969	2	907	11	0	920	2014
5:00PM	1	0	28	0	29	8	0	4	0	12	25	202	1	0	228	0	253	8	0	261	530
5:15PM	1	0	28	0	29	0	2	3	0	5	35	259	4	0	298	3	227	10	0	240	572
5:30PM	0	0	32	0	32	4	1	1	0	6	31	236	2	1	270	1	219	13	0	233	541
5:45PM	0	0	25	0	25	0	0	1	0	1	30	254	0	0	284	0	179	13	0	192	502
Hourly Total	2	0	113	0	115	12	3	9	0	24	121	951	7	1	1080	4	878	44	0	926	2145
Total	7	2	322	0	331	22	6	28	0	56	401	3176	56	1	3634	38	2462	78	0	2578	6599
% Approach	2.1%	0.6%	97.3%	0%	-	39.3%	10.7%	50.0%	0%	-	11.0%	87.4%	1.5%	0%	-	1.5%	95.5%	3.0%	0%	-	-
% Total	0.1%	0%	4.9%	0%	5.0%	0.3%	0.1%	0.4%	0%	0.8%	6.1%	48.1%	0.8%	0%	55.1%	0.6%	37.3%	1.2%	0%	39.1%	-
Lights	7	2	319	0	328	22	6	27	0	55	396	3138	56	1	3591	38	2436	78	0	2552	6526
% Lights	100%	100%	99.1%	0%	99.1%	100%	100%	96.4%	0%	98.2%	98.8%	98.8%	100%	100%	98.8%	100%	98.9%	100%	0%	99.0%	98.9%
Articulated Trucks	0	0	1	0	1	0	0	0	0	0	2	7	0	0	9	0	4	0	0	4	14
% Articulated Trucks	0%	0%	0.3%	0%	0.3%	0%	0%	0%	0%	0%	0.5%	0.2%	0%	0%	0.2%	0%	0.2%	0%	0%	0.2%	0.2%
Buses and Single-Unit Trucks	0	0	2	0	2	0	0	1	0	1	3	31	0	0	34	0	22	0	0	22	59
% Buses and Single-Unit Trucks	0%	0%	0.6%	0%	0.6%	0%	0%	3.6%	0%	1.8%	0.7%	1.0%	0%	0%	0.9%	0%	0.9%	0%	0%	0.9%	0.9%

*L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and Northville Village Center ... - TMC
Tue May 16, 2023
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1066323, Location: 42.412767, -83.432494



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and Northville Village Center ... - TMC

Tue May 16, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066323, Location: 42.412767, -83.432494



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

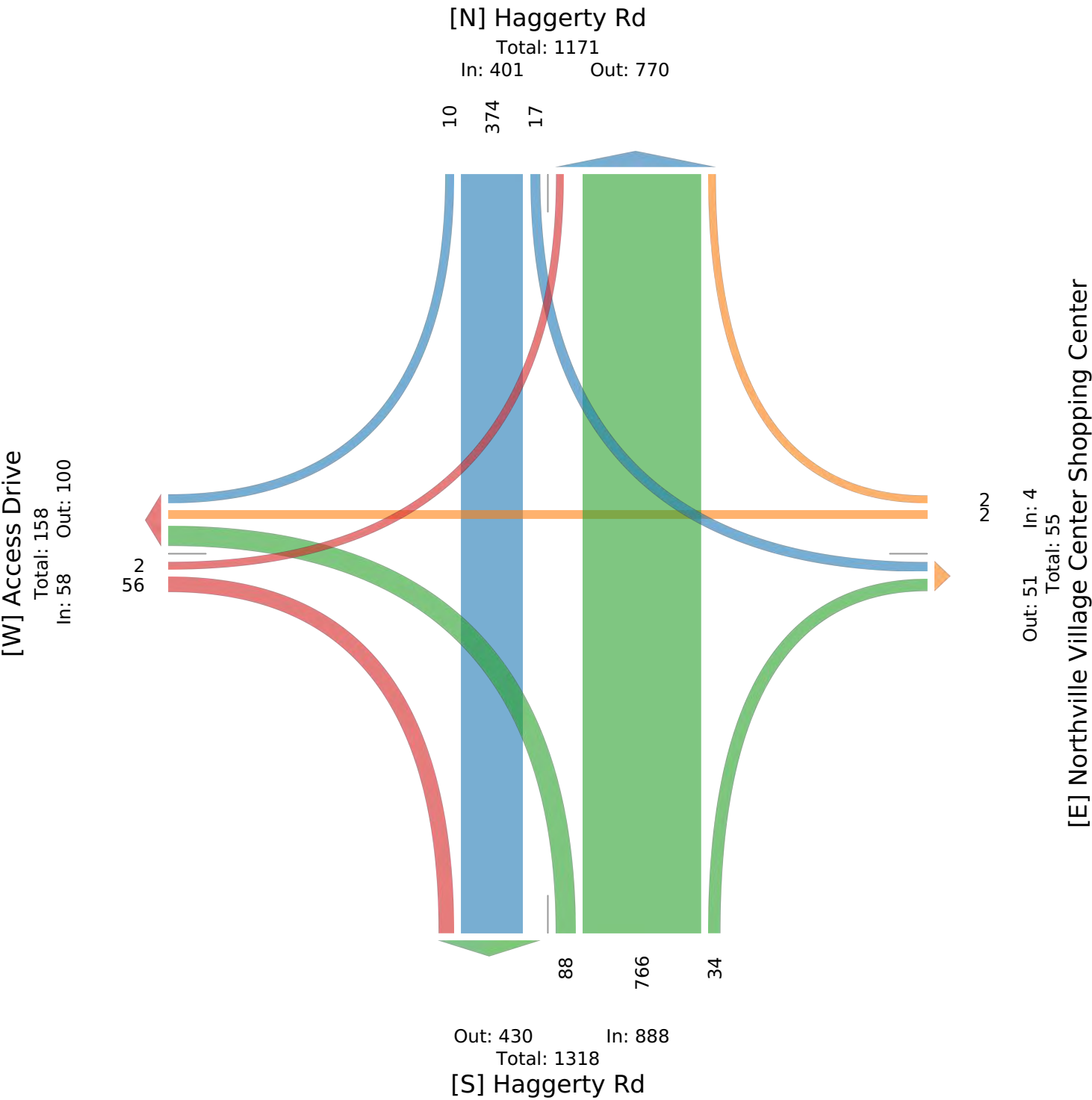
Leg	Access Drive					Northville Village Center Shopping Center					Haggerty Rd					Haggerty Rd					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 8:00AM	1	0	17	0	18	0	0	1	0	1	19	179	9	0	207	8	83	4	0	95	321
8:15AM	0	0	9	0	9	0	0	0	0	0	24	179	8	0	211	5	84	2	0	91	311
8:30AM	1	0	19	0	20	0	1	1	0	2	28	175	10	0	213	2	101	1	0	104	339
8:45AM	0	0	11	0	11	0	1	0	0	1	17	233	7	0	257	2	106	3	0	111	380
Total	2	0	56	0	58	0	2	2	0	4	88	766	34	0	888	17	374	10	0	401	1351
% Approach	3.4%	0%	96.6%	0%	-	0%	50.0%	50.0%	0%	-	9.9%	86.3%	3.8%	0%	-	4.2%	93.3%	2.5%	0%	-	-
% Total	0.1%	0%	4.1%	0%	4.3%	0%	0.1%	0.1%	0%	0.3%	6.5%	56.7%	2.5%	0%	65.7%	1.3%	27.7%	0.7%	0%	29.7%	-
PHF	0.500	-	0.737	-	0.725	-	0.500	0.500	-	0.500	0.786	0.822	0.850	-	0.864	0.531	0.882	0.625	-	0.903	0.889
Lights	2	0	55	0	57	0	2	2	0	4	87	753	34	0	874	17	364	10	0	391	1326
% Lights	100%	0%	98.2%	0%	98.3%	0%	100%	100%	0%	100%	98.9%	98.3%	100%	0%	98.4%	100%	97.3%	100%	0%	97.5%	98.1%
Articulated Trucks	0	0	1	0	1	0	0	0	0	0	0	2	0	0	2	0	2	0	0	2	5
% Articulated Trucks	0%	0%	1.8%	0%	1.7%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.2%	0%	0.5%	0%	0%	0.5%	0.4%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	1	11	0	0	12	0	8	0	0	8	20
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1.1%	1.4%	0%	0%	1.4%	0%	2.1%	0%	0%	2.0%	1.5%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and Northville Village Center ... - TMC
Tue May 16, 2023
AM Peak (8 AM - 9 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1066323, Location: 42.412767, -83.432494



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Haggerty Road and Northville Village Center ... - TMC

Tue May 16, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1066323, Location: 42.412767, -83.432494



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

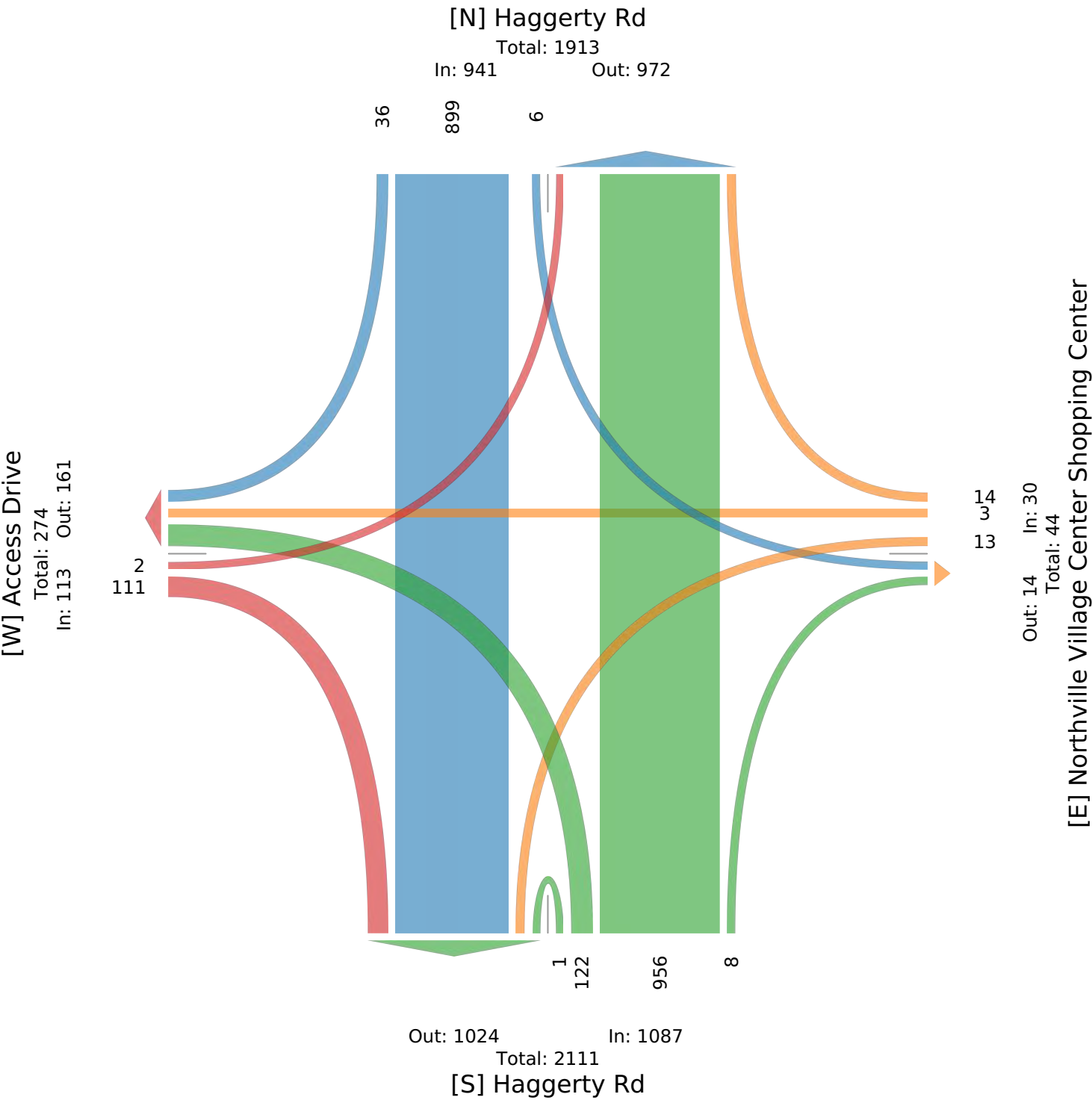
Leg Direction	Access Drive Eastbound					Northville Village Center Shopping Center Westbound					Haggerty Rd Northbound					Haggerty Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-05-16 4:45PM	0	0	23	0	23	1	0	6	0	7	31	259	1	0	291	2	200	5	0	207	528
5:00PM	1	0	28	0	29	8	0	4	0	12	25	202	1	0	228	0	253	8	0	261	530
5:15PM	1	0	28	0	29	0	2	3	0	5	35	259	4	0	298	3	227	10	0	240	572
5:30PM	0	0	32	0	32	4	1	1	0	6	31	236	2	1	270	1	219	13	0	233	541
Total	2	0	111	0	113	13	3	14	0	30	122	956	8	1	1087	6	899	36	0	941	2171
% Approach	1.8%	0%	98.2%	0%	-	43.3%	10.0%	46.7%	0%	-	11.2%	87.9%	0.7%	0.1%	-	0.6%	95.5%	3.8%	0%	-	-
% Total	0.1%	0%	5.1%	0%	5.2%	0.6%	0.1%	0.6%	0%	1.4%	5.6%	44.0%	0.4%	0%	50.1%	0.3%	41.4%	1.7%	0%	43.3%	-
PHF	0.500	-	0.867	-	0.883	0.406	0.375	0.583	-	0.625	0.871	0.923	0.500	0.250	0.912	0.500	0.888	0.692	-	0.901	0.949
Lights	2	0	111	0	113	13	3	14	0	30	122	951	8	1	1082	6	895	36	0	937	2162
% Lights	100%	0%	100%	0%	100%	100%	100%	100%	0%	100%	100%	99.5%	100%	100%	99.5%	100%	99.6%	100%	0%	99.6%	99.6%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Articulated Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.1%	0%	0%	0.1%	0%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	3	0	0	3	8
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.5%	0%	0%	0.5%	0%	0.3%	0%	0%	0.3%	0.4%

* L: Left, R: Right, T: Thru, U: U-Turn

Haggerty Road and Northville Village Center ... - TMC
Tue May 16, 2023
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1066323, Location: 42.412767, -83.432494



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Appendix 2

Existing LOS Output Reports

HCM 6th Signalized Intersection Summary 100: Haggerty Road & Six Mile Road

2023 Existing Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	696	36	283	384	255	94	558	358	139	249	50
Future Volume (veh/h)	124	696	36	283	384	255	94	558	358	139	249	50
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	1984	1984	1984	1984	1984	1984	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	133	748	39	298	404	268	111	656	421	156	280	56
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	2	2	2
Cap, veh/h	596	838	44	511	867	387	340	806	359	208	819	365
Arrive On Green	0.22	0.23	0.23	0.22	0.23	0.23	0.05	0.22	0.22	0.05	0.22	0.22
Sat Flow, veh/h	1890	3645	190	1890	3770	1682	1845	3681	1642	1875	3741	1668
Grp Volume(v), veh/h	133	387	400	298	404	268	111	656	421	156	280	56
Grp Sat Flow(s),veh/h/ln	1890	1885	1950	1890	1885	1682	1845	1841	1642	1875	1870	1668
Q Serve(g_s), s	0.0	17.9	17.9	7.5	8.3	13.1	0.0	15.2	19.7	2.2	5.7	2.4
Cycle Q Clear(g_c), s	0.0	17.9	17.9	7.5	8.3	13.1	0.0	15.2	19.7	2.2	5.7	2.4
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	596	434	449	511	867	387	340	806	359	208	819	365
V/C Ratio(X)	0.22	0.89	0.89	0.58	0.47	0.69	0.33	0.81	1.17	0.75	0.34	0.15
Avail Cap(c_a), veh/h	596	434	449	511	867	387	521	806	359	391	819	365
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	33.6	33.6	29.2	29.9	31.7	31.5	33.4	35.2	40.2	29.7	28.4
Incr Delay (d2), s/veh	0.2	23.2	22.7	1.7	1.8	9.8	0.6	8.8	102.8	5.4	1.1	0.9
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(50%),veh/ln	2.1	10.4	10.7	5.4	3.8	6.1	2.1	7.3	17.6	3.5	2.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	56.8	56.2	30.8	31.7	41.5	32.0	42.3	137.9	45.5	30.8	29.3
LnGrp LOS	C	E	E	C	C	D	C	D	F	D	C	C
Approach Vol, veh/h		920			970			1188			492	
Approach Delay, s/veh		51.6			34.1			75.2			35.3	
Approach LOS		D			C			E			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.8	27.0	11.2	26.0	25.8	27.0	11.2	26.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	10.7	20.7	13.7	19.7	10.7	20.7	13.7	19.7				
Max Q Clear Time (g_c+I1), s	2.0	15.1	2.0	7.7	9.5	19.9	4.2	21.7				
Green Ext Time (p_c), s	0.2	0.3	0.2	0.2	0.1	0.1	0.2	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			52.5									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	1179	1062	113	2	15
Future Vol, veh/h	6	1179	1062	113	2	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	94	94	61	61
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	6	1268	1130	120	3	25
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1250	0	-	0	1836	625
Stage 1	-	-	-	-	1190	-
Stage 2	-	-	-	-	646	-
Critical Hdwy	5.34	-	-	-	6.25	7.1
Critical Hdwy Stg 1	-	-	-	-	6.6	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	3.12	-	-	-	3.65	3.9
Pot Cap-1 Maneuver	296	-	-	-	90	370
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	475	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	296	-	-	-	88	370
Mov Cap-2 Maneuver	-	-	-	-	153	-
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	475	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		17.4		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	296	-	-	-	317	
HCM Lane V/C Ratio	0.022	-	-	-	0.088	
HCM Control Delay (s)	17.4	-	-	-	17.4	
HCM Lane LOS	C	-	-	-	C	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	

HCM 6th TWSC
300: Quakertown Lane & Six Mile Road

2023 Existing Conditions
a.m. Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑	↑↑↑	↑	
Traffic Vol, veh/h	1172	9	81	1172	3	57
Future Vol, veh/h	1172	9	81	1172	3	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	95	95	71	71
Heavy Vehicles, %	2	2	1	1	5	5
Mvmt Flow	1302	10	85	1234	4	80

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1312
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.21
Pot Cap-1 Maneuver	-	-	528
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	528
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

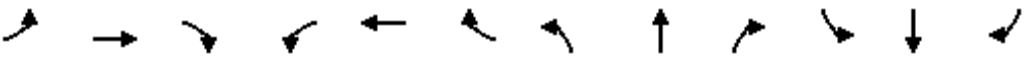
Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	17.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	368	-	-	528	-
HCM Lane V/C Ratio	0.23	-	-	0.161	-
HCM Control Delay (s)	17.7	-	-	13.1	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.9	-	-	0.6	-

HCM 6th Signalized Intersection Summary

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

2023 Existing Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↙		↗
Traffic Volume (veh/h)	0	873	356	0	766	0	0	0	0	245	0	487
Future Volume (veh/h)	0	873	356	0	766	0	0	0	0	245	0	487
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1969	1969	0	1969	0				1984	0	1984
Adj Flow Rate, veh/h	0	949	387	0	901	0				261	0	518
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	0	2	0				1	0	1
Cap, veh/h	0	2142	955	0	2142	0				520	0	462
Arrive On Green	0.00	0.57	0.57	0.00	1.00	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3839	1668	0	3938	0				1890	0	1682
Grp Volume(v), veh/h	0	949	387	0	901	0				261	0	518
Grp Sat Flow(s),veh/h/ln	0	1870	1668	0	1870	0				1890	0	1682
Q Serve(g_s), s	0.0	11.6	10.3	0.0	0.0	0.0				9.3	0.0	22.0
Cycle Q Clear(g_c), s	0.0	11.6	10.3	0.0	0.0	0.0				9.3	0.0	22.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2142	955	0	2142	0				520	0	462
V/C Ratio(X)	0.00	0.44	0.41	0.00	0.42	0.00				0.50	0.00	1.12
Avail Cap(c_a), veh/h	0	2142	955	0	2142	0				520	0	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.8	9.5	0.0	0.0	0.0				24.4	0.0	29.0
Incr Delay (d2), s/veh	0.0	0.7	1.3	0.0	0.6	0.0				3.4	0.0	78.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.0	3.3	0.0	0.2	0.0				4.6	0.0	18.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.5	10.8	0.0	0.6	0.0				27.8	0.0	107.9
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h		1336			901						779	
Approach Delay, s/veh		10.6			0.6						81.1	
Approach LOS		B			A						F	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				51.8		28.2		51.8				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 46		22.0		* 46				
Max Q Clear Time (g_c+I1), s				13.6		24.0		2.0				
Green Ext Time (p_c), s				8.9		0.0		6.9				
Intersection Summary												
HCM 6th Ctrl Delay			25.8									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

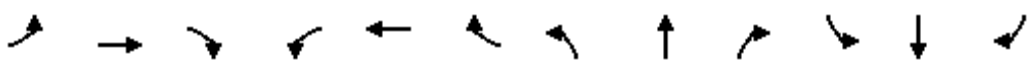
2023 Existing Conditions
a.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘	↗
Traffic Volume (vph)	653	0	0	1079	292	262
Future Volume (vph)	653	0	0	1079	292	262
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.96	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3689			5353	3535	1517
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3689			5353	3535	1517
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.90	0.90
Adj. Flow (vph)	687	0	0	1269	324	291
RTOR Reduction (vph)	0	0	0	0	56	108
Lane Group Flow (vph)	687	0	0	1269	367	84
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	56.3			56.3	11.2	11.2
Effective Green, g (s)	56.3			56.3	11.2	11.2
Actuated g/C Ratio	0.70			0.70	0.14	0.14
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2596			3767	494	212
v/s Ratio Prot	0.19			c0.24	c0.10	
v/s Ratio Perm						0.06
v/c Ratio	0.26			0.34	0.74	0.39
Uniform Delay, d1	4.3			4.6	33.0	31.3
Progression Factor	0.73			0.43	1.00	1.00
Incremental Delay, d2	0.2			0.2	5.2	0.4
Delay (s)	3.4			2.2	38.3	31.8
Level of Service	A			A	D	C
Approach Delay (s)	3.4			2.2	36.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			10.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.40			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			40.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

2023 Existing Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	905	101	2	311	0	0	0	172
Future Volume (vph)	0	0	0	0	905	101	2	311	0	0	0	172
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.98			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5272			1980				2905
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5272			1980				2905
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	0	0	0	0	984	110	2	349	0	0	0	200
RTOR Reduction (vph)	0	0	0	0	17	0	0	25	0	0	0	44
Lane Group Flow (vph)	0	0	0	0	1077	0	0	326	0	0	0	156
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type					NA		Perm	NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					33.2			35.0				35.0
Effective Green, g (s)					33.2			35.0				35.0
Actuated g/C Ratio					0.42			0.44				0.44
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2187			866				1270
v/s Ratio Prot					c0.20							0.05
v/s Ratio Perm								0.16				
v/c Ratio					0.49			0.38				0.12
Uniform Delay, d1					17.2			15.1				13.4
Progression Factor					0.29			0.94				1.00
Incremental Delay, d2					0.7			1.2				0.2
Delay (s)					5.7			15.5				13.6
Level of Service					A			B				B
Approach Delay (s)		0.0			5.7			15.5			13.6	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			8.7									
HCM 2000 Level of Service										A		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			80.0							11.8		
Intersection Capacity Utilization			58.4%									
ICU Level of Service										B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2023 Existing Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					  			 			 	
Traffic Volume (vph)	0	0	0	0	1032	138	0	823	0	0	519	145
Future Volume (vph)	0	0	0	0	1032	138	0	823	0	0	519	145
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5258			3689			3689	1650
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5258			3689			3689	1650
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	0	1160	155	0	885	0	0	618	173
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1294	0	0	885	0	0	618	147
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2214			1443			1535	686
v/s Ratio Prot					c0.25			c0.24			0.17	
v/s Ratio Perm												0.09
v/c Ratio					0.58			0.61			0.40	0.21
Uniform Delay, d1					17.8			19.5			16.4	15.0
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.1			1.6			0.8	0.7
Delay (s)					18.9			3.3			17.2	15.7
Level of Service					B			A			B	B
Approach Delay (s)		0.0			18.9			3.3			16.8	
Approach LOS		A			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.7									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			80.0									Sum of lost time (s) 15.0
Intersection Capacity Utilization			60.8%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2023 Existing Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗					↑↑	↗		↑↑	
Traffic Volume (vph)	0	392	234	0	0	0	0	823	271	0	519	0
Future Volume (vph)	0	392	234	0	0	0	0	823	271	0	519	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5353	1667					3689	1650		3689	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5353	1667					3689	1650		3689	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	431	257	0	0	0	0	885	291	0	618	0
RTOR Reduction (vph)	0	0	79	0	0	0	0	0	168	0	0	0
Lane Group Flow (vph)	0	431	178	0	0	0	0	885	123	0	618	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2254	702					1535	686		1443	
v/s Ratio Prot		0.08						c0.24			0.17	
v/s Ratio Perm			c0.11						0.07			
v/c Ratio		0.19	0.25					0.58	0.18		0.43	
Uniform Delay, d1		14.6	15.0					17.9	14.7		17.8	
Progression Factor		0.95	0.97					1.00	1.00		0.10	
Incremental Delay, d2		0.2	0.9					1.6	0.6		0.9	
Delay (s)		14.1	15.4					19.5	15.3		2.6	
Level of Service		B	B					B	B		A	
Approach Delay (s)		14.6			0.0			18.5			2.6	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			13.4		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					15.0		
Intersection Capacity Utilization			60.8%		ICU Level of Service					B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2023 Existing Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	10	42	30	3	10	32	750	37	14	337	71
Future Volume (veh/h)	66	10	42	30	3	10	32	750	37	14	337	71
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	1953	1953	1953	1890	1890	1890	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	79	12	50	42	4	14	39	915	45	16	396	84
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.82	0.82	0.82	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	206	31	129	167	35	121	68	2468	1101	35	2402	1072
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.04	0.66	0.66	0.04	1.00	1.00
Sat Flow, veh/h	1384	330	1375	1287	368	1290	1875	3741	1668	1875	3741	1668
Grp Volume(v), veh/h	79	0	62	42	0	18	39	915	45	16	396	84
Grp Sat Flow(s),veh/h/ln	1384	0	1706	1287	0	1658	1875	1870	1668	1875	1870	1668
Q Serve(g_s), s	4.4	0.0	2.7	2.5	0.0	0.8	1.6	8.8	0.8	0.7	0.0	0.0
Cycle Q Clear(g_c), s	5.2	0.0	2.7	5.3	0.0	0.8	1.6	8.8	0.8	0.7	0.0	0.0
Prop In Lane	1.00		0.81	1.00		0.78	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	0	160	167	0	156	68	2468	1101	35	2402	1072
V/C Ratio(X)	0.38	0.00	0.39	0.25	0.00	0.12	0.57	0.37	0.04	0.46	0.16	0.08
Avail Cap(c_a), veh/h	401	0	401	348	0	390	141	2468	1101	141	2402	1072
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	35.6	0.0	34.1	36.5	0.0	33.2	37.9	6.1	4.8	38.1	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.5	0.8	0.0	0.3	7.4	0.4	0.1	8.9	0.1	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(50%),veh/ln	1.5	0.0	1.2	0.8	0.0	0.3	0.9	2.6	0.2	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.7	0.0	35.6	37.3	0.0	33.5	45.4	6.6	4.8	47.0	0.1	0.1
LnGrp LOS	D	A	D	D	A	C	D	A	A	D	A	A
Approach Vol, veh/h	141		60			999			496			
Approach Delay, s/veh	36.2		36.2			8.0			1.7			
Approach LOS	D		D			A			A			
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	8.9	57.4	13.7		7.5	58.8	13.7					
Change Period (Y+Rc), s	* 6	* 6	* 6.2		* 6	* 6	* 6.2					
Max Green Setting (Gmax), s	* 6	* 37	* 19		* 6	* 37	* 19					
Max Q Clear Time (g_c+I1), s	3.6	2.0	7.2		2.7	10.8	7.3					
Green Ext Time (p_c), s	0.0	0.4	0.4		0.0	1.0	0.1					
Intersection Summary												
HCM 6th Ctrl Delay			9.5									
HCM 6th LOS			A									
Notes												

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2023 Existing Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	34	3	23	3	6	3	732	91	5	396	64
Future Volume (veh/h)	97	34	3	23	3	6	3	732	91	5	396	64
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	1969	1969	1969	1875	1875	1875	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	124	44	4	29	4	8	4	861	107	6	471	76
Peak Hour Factor	0.78	0.78	0.78	0.80	0.80	0.80	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	1	1	1
Cap, veh/h	458	476	43	412	149	299	535	2160	964	428	2177	971
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1402	1778	162	1293	558	1116	860	3741	1668	585	3770	1682
Grp Volume(v), veh/h	124	0	48	29	0	12	4	861	107	6	471	76
Grp Sat Flow(s),veh/h/ln	1402	0	1940	1293	0	1674	860	1870	1668	585	1885	1682
Q Serve(g_s), s	5.7	0.0	1.5	1.4	0.0	0.4	0.0	0.0	0.0	0.4	4.8	1.6
Cycle Q Clear(g_c), s	6.1	0.0	1.5	2.9	0.0	0.4	4.9	0.0	0.0	0.4	4.8	1.6
Prop In Lane	1.00		0.08	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	458	0	519	412	0	448	535	2160	964	428	2177	971
V/C Ratio(X)	0.27	0.00	0.09	0.07	0.00	0.03	0.01	0.40	0.11	0.01	0.22	0.08
Avail Cap(c_a), veh/h	458	0	519	412	0	448	535	2160	964	428	2177	971
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	22.0	23.1	0.0	21.6	0.3	0.0	0.0	7.2	8.2	7.5
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.3	0.0	0.1	0.0	0.6	0.2	0.1	0.2	0.2
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(50%),veh/ln	2.1	0.0	0.7	0.5	0.0	0.2	0.0	0.2	0.1	0.0	1.6	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.3	0.0	22.4	23.4	0.0	21.7	0.3	0.6	0.2	7.3	8.4	7.6
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	172			41			972			553		
Approach Delay, s/veh	24.5			22.9			0.5			8.3		
Approach LOS	C			C			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	6.9			8.1			6.8			4.9		
Green Ext Time (p_c), s	6.9			0.5			3.4			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	5.9											
HCM 6th LOS	A											

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	146	264	306	402	127	133	119	148	295	298	244	169
Average Queue (ft)	70	145	181	219	58	77	50	58	166	139	111	83
95th Queue (ft)	124	232	273	419	110	123	97	118	262	255	198	139
Link Distance (ft)		1376	1376	464	464	464	464		941	941		227
Upstream Blk Time (%)				5								0
Queuing Penalty (veh)				12								0
Storage Bay Dist (ft)	500							500			220	
Storage Blk Time (%)										1	1	
Queuing Penalty (veh)										4	3	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	116	129	66
Average Queue (ft)	54	61	18
95th Queue (ft)	101	114	49
Link Distance (ft)	227	227	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			210
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	28	5	9	40
Average Queue (ft)	5	0	0	13
95th Queue (ft)	23	4	5	38
Link Distance (ft)		264	30	838
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)	100			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	NB
Directions Served	T	TR	L	LR
Maximum Queue (ft)	15	25	83	130
Average Queue (ft)	1	1	37	42
95th Queue (ft)	6	12	71	98
Link Distance (ft)	30	30		777
Upstream Blk Time (%)	0	0		
Queuing Penalty (veh)	0	1		
Storage Bay Dist (ft)			100	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	182	226	82	167	194	223	372
Average Queue (ft)	69	107	31	75	103	118	164
95th Queue (ft)	144	191	63	135	174	190	297
Link Distance (ft)	516	516		179	179	548	548
Upstream Blk Time (%)				0	1		0
Queuing Penalty (veh)				1	3		0
Storage Bay Dist (ft)			240				
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	WB
Directions Served	T
Maximum Queue (ft)	4
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	1028
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	134	127	78	100	107	209	300	217
Average Queue (ft)	52	62	23	46	36	94	193	79
95th Queue (ft)	109	117	60	86	84	191	288	197
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	1						
Queuing Penalty (veh)	3	3						
Storage Bay Dist (ft)							275	
Storage Blk Time (%)							1	
Queuing Penalty (veh)							1	

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement								
Directions Served								
Maximum Queue (ft)								
Average Queue (ft)								
95th Queue (ft)								
Link Distance (ft)								
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	84	137	164	58	119	89
Average Queue (ft)	23	48	79	29	48	25
95th Queue (ft)	55	100	140	44	92	66
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				33		
Queuing Penalty (veh)				105		
Storage Bay Dist (ft)					125	
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	146
Average Queue (ft)	55
95th Queue (ft)	116
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	192	203	290	57	51	201	184	113
Average Queue (ft)	102	106	165	29	9	121	64	40
95th Queue (ft)	163	178	246	57	34	182	142	80
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				8	1			
Queuing Penalty (veh)				34	5			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	79	102	113	95	228	202	99	48	33
Average Queue (ft)	44	55	51	53	153	113	40	14	4
95th Queue (ft)	74	87	96	89	206	180	77	40	21
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								2	0
Queuing Penalty (veh)								6	1
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	100	82	72	44	83	151	167	42	46	76	63	48
Average Queue (ft)	46	24	21	8	28	37	61	6	11	28	16	10
95th Queue (ft)	92	63	55	29	66	99	133	28	35	63	48	34
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	15	1				0						
Queuing Penalty (veh)	8	1				0						

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	132	62	54	20	27	116	125	50	32	111	86	46
Average Queue (ft)	51	17	15	4	1	46	55	16	4	51	34	14
95th Queue (ft)	104	45	42	17	11	90	106	43	20	93	73	39
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												
Queuing Penalty (veh)												

Zone Summary

Zone wide Queuing Penalty: 191

HCM 6th Signalized Intersection Summary

100: Haggerty Road & Six Mile Road

2023 Existing Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	678	70	314	759	335	114	604	430	340	592	95
Future Volume (veh/h)	148	678	70	314	759	335	114	604	430	340	592	95
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	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	159	729	75	349	843	372	121	643	457	370	643	103
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	309	794	82	321	867	387	412	832	371	399	825	368
Arrive On Green	0.12	0.23	0.23	0.12	0.23	0.23	0.15	0.22	0.22	0.15	0.22	0.22
Sat Flow, veh/h	1890	3451	355	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	159	398	406	349	843	372	121	643	457	370	643	103
Grp Sat Flow(s),veh/h/ln	1890	1885	1921	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	2.9	18.6	18.6	10.7	20.0	19.7	0.0	14.3	19.7	12.0	14.5	4.6
Cycle Q Clear(g_c), s	2.9	18.6	18.6	10.7	20.0	19.7	0.0	14.3	19.7	12.0	14.5	4.6
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	309	434	442	321	867	387	412	832	371	399	825	368
V/C Ratio(X)	0.52	0.92	0.92	1.09	0.97	0.96	0.29	0.77	1.23	0.93	0.78	0.28
Avail Cap(c_a), veh/h	309	434	442	321	867	387	412	832	371	399	825	368
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	33.8	33.8	38.0	34.4	34.3	31.4	33.0	35.1	35.4	33.1	29.2
Incr Delay (d2), s/veh	1.5	26.9	26.7	75.8	24.5	37.1	0.4	6.9	125.7	27.9	7.2	1.9
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(50%),veh/ln	3.1	11.2	11.3	13.0	11.5	11.5	2.2	7.0	20.5	10.0	7.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	60.7	60.5	113.8	58.9	71.4	31.8	40.0	160.9	63.3	40.3	31.1
LnGrp LOS	D	E	E	F	E	E	C	D	F	E	D	C
Approach Vol, veh/h	963		1564				1221		1116			
Approach Delay, s/veh	56.7		74.1				84.4		47.1			
Approach LOS	E		E				F		D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	27.0	20.0	26.0	17.0	27.0	20.0	26.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	10.7	20.7	13.7	19.7	10.7	20.7	13.7	19.7				
Max Q Clear Time (g_c+I1), s	4.9	22.0	2.0	16.5	12.7	20.6	14.0	21.7				
Green Ext Time (p_c), s	0.2	0.0	0.2	0.3	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	67.0											
HCM 6th LOS	E											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	1532	1426	135	13	29
Future Vol, veh/h	8	1532	1426	135	13	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	88	88
Heavy Vehicles, %	1	1	0	0	0	0
Mvmt Flow	8	1613	1501	142	15	33
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1643	0	-	0	2395	822
Stage 1	-	-	-	-	1572	-
Stage 2	-	-	-	-	823	-
Critical Hdwy	5.32	-	-	-	6.25	7.1
Critical Hdwy Stg 1	-	-	-	-	6.6	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	3.11	-	-	-	3.65	3.9
Pot Cap-1 Maneuver	191	-	-	-	41	276
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	386	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	191	-	-	-	39	276
Mov Cap-2 Maneuver	-	-	-	-	87	-
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	386	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		35.5		
HCM LOS	E					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	191	-	-	-	165	
HCM Lane V/C Ratio	0.044	-	-	-	0.289	
HCM Control Delay (s)	24.7	-	-	-	35.5	
HCM Lane LOS	C	-	-	-	E	
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1	

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑↑	↵	
Traffic Vol, veh/h	1541	4	61	1553	8	82
Future Vol, veh/h	1541	4	61	1553	8	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	75	75
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1622	4	64	1635	11	109

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	1626	0	2406
Stage 1	-	-	-	-	1624
Stage 2	-	-	-	-	782
Critical Hdwy	-	-	4.1	-	6.25
Critical Hdwy Stg 1	-	-	-	-	5.8
Critical Hdwy Stg 2	-	-	-	-	6
Follow-up Hdwy	-	-	2.2	-	3.65
Pot Cap-1 Maneuver	-	-	405	-	40
Stage 1	-	-	-	-	147
Stage 2	-	-	-	-	388
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	405	-	34
Mov Cap-2 Maneuver	-	-	-	-	105
Stage 1	-	-	-	-	147
Stage 2	-	-	-	-	327

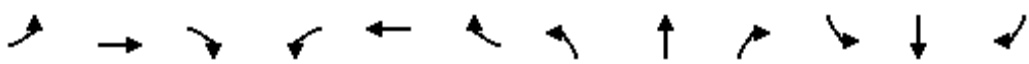
Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	27.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	275	-	-	405	-
HCM Lane V/C Ratio	0.436	-	-	0.159	-
HCM Control Delay (s)	27.9	-	-	15.6	-
HCM Lane LOS	D	-	-	C	-
HCM 95th %tile Q(veh)	2.1	-	-	0.6	-

HCM 6th Signalized Intersection Summary

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

2023 Existing Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↘		↗
Traffic Volume (veh/h)	0	1266	357	0	1105	0	0	0	0	301	0	509
Future Volume (veh/h)	0	1266	357	0	1105	0	0	0	0	301	0	509
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1984	1984	0	2000	0				1969	0	1969
Adj Flow Rate, veh/h	0	1361	384	0	1163	0				327	0	553
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95				0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	0	0	0				2	0	2
Cap, veh/h	0	2159	963	0	2176	0				516	0	459
Arrive On Green	0.00	0.57	0.57	0.00	1.00	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3870	1682	0	4000	0				1875	0	1668
Grp Volume(v), veh/h	0	1361	384	0	1163	0				327	0	553
Grp Sat Flow(s),veh/h/ln	0	1885	1682	0	1900	0				1875	0	1668
Q Serve(g_s), s	0.0	19.3	10.1	0.0	0.0	0.0				12.3	0.0	22.0
Cycle Q Clear(g_c), s	0.0	19.3	10.1	0.0	0.0	0.0				12.3	0.0	22.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2159	963	0	2176	0				516	0	459
V/C Ratio(X)	0.00	0.63	0.40	0.00	0.53	0.00				0.63	0.00	1.21
Avail Cap(c_a), veh/h	0	2159	963	0	2176	0				516	0	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.4	9.5	0.0	0.0	0.0				25.5	0.0	29.0
Incr Delay (d2), s/veh	0.0	1.4	1.2	0.0	0.9	0.0				5.8	0.0	111.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.7	3.3	0.0	0.3	0.0				6.2	0.0	22.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.9	10.7	0.0	0.9	0.0				31.3	0.0	140.4
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h		1745			1163						880	
Approach Delay, s/veh		12.4			0.9						99.9	
Approach LOS		B			A						F	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				51.8		28.2		51.8				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 46		22.0		* 46				
Max Q Clear Time (g_c+I1), s				21.3		24.0		2.0				
Green Ext Time (p_c), s				12.2		0.0		9.9				
Intersection Summary												
HCM 6th Ctrl Delay			29.2									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2023 Existing Conditions
p.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	1026	0	0	1515	300	261
Future Volume (vph)	1026	0	0	1515	300	261
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.97	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3762			5406	3612	1547
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3762			5406	3612	1547
Peak-hour factor, PHF	0.91	0.91	0.88	0.88	0.87	0.87
Adj. Flow (vph)	1127	0	0	1722	345	300
RTOR Reduction (vph)	0	0	0	0	38	66
Lane Group Flow (vph)	1127	0	0	1722	403	138
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	55.7			55.7	11.8	11.8
Effective Green, g (s)	55.7			55.7	11.8	11.8
Actuated g/C Ratio	0.70			0.70	0.15	0.15
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2619			3763	532	228
v/s Ratio Prot	0.30			c0.32	c0.11	
v/s Ratio Perm						0.09
v/c Ratio	0.43			0.46	0.76	0.60
Uniform Delay, d1	5.3			5.4	32.7	31.9
Progression Factor	0.60			1.35	1.00	1.00
Incremental Delay, d2	0.4			0.4	5.4	3.1
Delay (s)	3.6			7.7	38.1	35.0
Level of Service	A			A	D	C
Approach Delay (s)	3.6			7.7	37.1	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			11.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			49.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

2023 Existing Conditions
p.m. Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	1015	81	0	193	0	0	0	500
Future Volume (vph)	0	0	0	0	1015	81	0	193	0	0	0	500
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.99			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5346			1980				2992
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5346			1980				2992
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	0	0	0	0	1080	86	0	208	0	0	0	641
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	0	92
Lane Group Flow (vph)	0	0	0	0	1155	0	0	208	0	0	0	549
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type					NA			NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					43.2			25.0				25.0
Effective Green, g (s)					43.2			25.0				25.0
Actuated g/C Ratio					0.54			0.31				0.31
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2886			618				935
v/s Ratio Prot					c0.22			0.11				c0.18
v/s Ratio Perm												
v/c Ratio					0.40			0.34				0.59
Uniform Delay, d1					10.8			21.1				23.2
Progression Factor					0.63			0.77				1.00
Incremental Delay, d2					0.4			1.4				2.7
Delay (s)					7.2			17.5				25.9
Level of Service					A			B				C
Approach Delay (s)		0.0			7.2			17.5			25.9	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			14.2									
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			68.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2023 Existing Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					  			 			 	
Traffic Volume (vph)	0	0	0	0	962	204	0	832	0	0	1043	302
Future Volume (vph)	0	0	0	0	962	204	0	832	0	0	1043	302
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5264			3762			3762	1683
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5264			3762			3762	1683
Peak-hour factor, PHF	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	0	0	0	1013	215	0	876	0	0	1185	343
RTOR Reduction (vph)	0	0	0	0	31	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1197	0	0	876	0	0	1185	317
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2217			1471			1565	700
v/s Ratio Prot					c0.23			0.23			c0.31	
v/s Ratio Perm												0.19
v/c Ratio					0.54			0.60			0.76	0.45
Uniform Delay, d1					17.3			19.3			19.9	16.8
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					0.9			1.5			3.5	2.1
Delay (s)					18.3			3.2			23.4	18.9
Level of Service					B			A			C	B
Approach Delay (s)		0.0			18.3			3.2			22.4	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.4									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			80.0								15.0	Sum of lost time (s)
Intersection Capacity Utilization			66.6%									ICU Level of Service C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2023 Existing Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗					↑↑	↗		↑↑	
Traffic Volume (vph)	0	980	363	0	0	0	0	832	281	0	1043	0
Future Volume (vph)	0	980	363	0	0	0	0	832	281	0	1043	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5406	1683					3762	1683		3762	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5406	1683					3762	1683		3762	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	1032	382	0	0	0	0	876	296	0	1185	0
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	26	0	0	0
Lane Group Flow (vph)	0	1032	337	0	0	0	0	876	270	0	1185	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2277	708					1565	700		1471	
v/s Ratio Prot		0.19						0.23			c0.31	
v/s Ratio Perm			c0.20						0.16			
v/c Ratio		0.45	0.48					0.56	0.39		0.81	
Uniform Delay, d1		16.6	16.8					17.8	16.2		21.6	
Progression Factor		0.87	0.84					1.00	1.00		0.08	
Incremental Delay, d2		0.6	2.2					1.5	1.6		3.1	
Delay (s)		15.0	16.3					19.2	17.8		4.9	
Level of Service		B	B					B	B		A	
Approach Delay (s)		15.3			0.0			18.9			4.9	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			13.1		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					15.0		
Intersection Capacity Utilization			66.6%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2023 Existing Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	7	62	108	14	50	57	810	106	37	775	95
Future Volume (veh/h)	98	7	62	108	14	50	57	810	106	37	775	95
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	1984	1984	1984	1920	1920	1920	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	105	8	67	126	16	58	61	871	114	39	816	100
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	0	0	0
Cap, veh/h	256	30	249	251	59	215	88	2162	964	69	2140	955
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.57	0.57	0.07	1.00	1.00
Sat Flow, veh/h	1336	182	1527	1292	364	1319	1890	3770	1682	1905	3800	1695
Grp Volume(v), veh/h	105	0	75	126	0	74	61	871	114	39	816	100
Grp Sat Flow(s),veh/h/ln	1336	0	1710	1292	0	1683	1890	1885	1682	1905	1900	1695
Q Serve(g_s), s	6.0	0.0	3.1	7.6	0.0	3.1	2.5	10.3	2.5	1.6	0.0	0.0
Cycle Q Clear(g_c), s	9.1	0.0	3.1	10.6	0.0	3.1	2.5	10.3	2.5	1.6	0.0	0.0
Prop In Lane	1.00		0.89	1.00		0.78	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	256	0	278	251	0	274	88	2162	964	69	2140	955
V/C Ratio(X)	0.41	0.00	0.27	0.50	0.00	0.27	0.70	0.40	0.12	0.57	0.38	0.10
Avail Cap(c_a), veh/h	353	0	402	344	0	395	142	2162	964	143	2140	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	33.3	0.0	29.3	34.0	0.0	29.3	37.6	9.5	7.8	36.5	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.5	1.6	0.0	0.5	9.5	0.6	0.3	6.6	0.5	0.2
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(50%),veh/ln	2.0	0.0	1.3	2.5	0.0	1.3	1.3	3.5	0.8	0.8	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.3	0.0	29.8	35.5	0.0	29.8	47.1	10.0	8.1	43.1	0.5	0.2
LnGrp LOS	C	A	C	D	A	C	D	B	A	D	A	A
Approach Vol, veh/h	180			200			1046			955		
Approach Delay, s/veh	32.5			33.4			12.0			2.2		
Approach LOS	C			C			B			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	51.1		19.2	8.9	51.9		19.2				
Change Period (Y+Rc), s	* 6	* 6		* 6.2	* 6	* 6		* 6.2				
Max Green Setting (Gmax), s	* 6	* 37		* 19	* 6	* 37		* 19				
Max Q Clear Time (g_c+I1), s	4.5	2.0		11.1	3.6	12.3		12.6				
Green Ext Time (p_c), s	0.0	0.8		0.4	0.0	0.9		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			11.4									
HCM 6th LOS			B									
Notes												

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2023 Existing Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	33	12	82	27	22	2	893	63	4	813	163
Future Volume (veh/h)	117	33	12	82	27	22	2	893	63	4	813	163
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	2000	2000	2000	1920	1920	1920	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	158	45	16	108	36	29	2	971	68	4	865	173
Peak Hour Factor	0.74	0.74	0.74	0.76	0.76	0.76	0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	415	377	134	408	263	212	340	2194	979	409	2194	979
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1358	1409	501	1308	984	793	552	3800	1695	552	3800	1695
Grp Volume(v), veh/h	158	0	61	108	0	65	2	971	68	4	865	173
Grp Sat Flow(s),veh/h/ln	1358	0	1910	1308	0	1777	552	1900	1695	552	1900	1695
Q Serve(g_s), s	8.0	0.0	1.9	5.4	0.0	2.2	0.1	0.0	0.0	0.2	10.0	3.8
Cycle Q Clear(g_c), s	10.2	0.0	1.9	7.4	0.0	2.2	10.0	0.0	0.0	0.2	10.0	3.8
Prop In Lane	1.00		0.26	1.00		0.45	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	415	0	511	408	0	475	340	2195	979	409	2195	979
V/C Ratio(X)	0.38	0.00	0.12	0.26	0.00	0.14	0.01	0.44	0.07	0.01	0.39	0.18
Avail Cap(c_a), veh/h	415	0	511	408	0	475	340	2195	979	409	2195	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	22.2	25.0	0.0	22.3	1.1	0.0	0.0	7.2	9.2	8.0
Incr Delay (d2), s/veh	2.6	0.0	0.5	1.6	0.0	0.6	0.0	0.6	0.1	0.0	0.5	0.4
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(50%),veh/ln	2.8	0.0	0.9	1.8	0.0	1.0	0.0	0.2	0.0	0.0	3.4	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	0.0	22.6	26.5	0.0	22.9	1.1	0.6	0.1	7.2	9.8	8.3
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	219			173			1041			1042		
Approach Delay, s/veh	27.1			25.2			0.6			9.5		
Approach LOS	C			C			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	12.0			12.2			12.0			9.4		
Green Ext Time (p_c), s	7.6			0.5			7.1			0.5		
Intersection Summary												
HCM 6th Ctrl Delay	8.4											
HCM 6th LOS	A											

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	162	385	400	548	291	299	141	136	318	356	258	296
Average Queue (ft)	81	227	256	407	175	189	73	63	184	171	157	226
95th Queue (ft)	136	359	391	628	265	274	121	116	276	342	256	322
Link Distance (ft)		1376	1376	464	464	464	464		941	941		227
Upstream Blk Time (%)				32								33
Queuing Penalty (veh)				113								114
Storage Bay Dist (ft)	500							500			220	
Storage Blk Time (%)										0	8	
Queuing Penalty (veh)										1	24	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	230	223	144
Average Queue (ft)	133	144	38
95th Queue (ft)	207	211	89
Link Distance (ft)	227	227	
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	1	1	0
Storage Bay Dist (ft)			210
Storage Blk Time (%)		1	0
Queuing Penalty (veh)		1	0

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	WB	WB	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (ft)	38	16	7	4	680
Average Queue (ft)	6	7	0	0	418
95th Queue (ft)	27	44	4	3	784
Link Distance (ft)		30	30	30	838
Upstream Blk Time (%)		7	0	0	1
Queuing Penalty (veh)		38	0	0	0
Storage Bay Dist (ft)	100				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	WB	WB	WB	NB
Directions Served	TR	L	T	T	LR
Maximum Queue (ft)	29	104	162	106	628
Average Queue (ft)	1	45	22	13	299
95th Queue (ft)	11	100	143	105	727
Link Distance (ft)	30		516	516	777
Upstream Blk Time (%)	0		0	0	9
Queuing Penalty (veh)	1		0	0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		2	5	0	
Queuing Penalty (veh)		10	3	0	

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	202	254	75	229	235	405	463
Average Queue (ft)	106	137	33	126	148	170	254
95th Queue (ft)	184	223	63	205	231	344	471
Link Distance (ft)	516	516		179	179	548	548
Upstream Blk Time (%)				2	4	1	3
Queuing Penalty (veh)				9	21	0	0
Storage Bay Dist (ft)			240				
Storage Blk Time (%)		0					
Queuing Penalty (veh)		1					

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	29	37
Average Queue (ft)	1	3
95th Queue (ft)	12	20
Link Distance (ft)	1028	1028
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	135	148	135	173	142	191	282	225
Average Queue (ft)	61	73	68	96	65	72	172	86
95th Queue (ft)	118	127	124	154	122	143	259	205
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	2						
Queuing Penalty (veh)	6	8						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							0	0
Queuing Penalty (veh)							0	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	78	92	125	34	272	248
Average Queue (ft)	27	39	48	24	159	101
95th Queue (ft)	60	77	98	40	261	212
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				40	1	0
Queuing Penalty (veh)				78	0	0
Storage Bay Dist (ft)						125
Storage Blk Time (%)					16	1
Queuing Penalty (veh)					45	4

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	118
Average Queue (ft)	34
95th Queue (ft)	89
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	190	229	295	64	53	327	305	170
Average Queue (ft)	114	104	164	29	13	209	175	74
95th Queue (ft)	172	186	258	59	39	283	262	127
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				9	2			
Queuing Penalty (veh)				36	7			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	152	169	189	170	258	217	132	81	61
Average Queue (ft)	82	106	128	87	158	116	62	45	21
95th Queue (ft)	128	149	177	145	229	196	113	75	50
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								23	5
Queuing Penalty (veh)								122	28
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	131	98	144	82	91	172	205	56	89	133	117	53
Average Queue (ft)	55	31	60	29	38	74	97	21	32	61	49	15
95th Queue (ft)	102	73	112	59	76	155	182	49	68	113	98	43
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)							0					
Queuing Penalty (veh)							0					
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	21	1				0					0	
Queuing Penalty (veh)	15	1				0					0	

Intersection: 900: Haggerty Road & Cross Road/South Drive

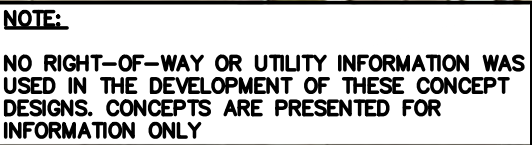
Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	130	74	103	55	20	111	138	43	37	191	164	53
Average Queue (ft)	54	18	40	18	2	51	66	13	4	98	71	26
95th Queue (ft)	102	49	81	43	10	96	113	38	20	155	131	51
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												0
Queuing Penalty (veh)												0

Zone Summary

Zone wide Queuing Penalty: 687

Appendix 3

Background Development Concept Signal Design



HRC
HUBBELL, ROTH & CLARK, INC.
CONSULTING ENGINEERS SINCE 1915

555 HULET DRIVE
BLOOMFIELD HILLS, MICH.

P.O. BOX 824
48303 - 0824

PHONE: (248) 454-6300
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WEB SITE: [http:// www.hrcengr.com](http://www.hrcengr.com)

[illegible]

CITY OF LIVONIA
SCHOOLCRAFT TIS
CONCEPTUAL ALTERNATIVES

6 MILE RD
FOX DR & QUAKERTOWN LN
CONCEPT ALTERNATIVE 1
SIGNAL

HRC JOB NO. 20211149	SCALE 1"=40'
DATE June 2022	SHEET NO. 1 OF 5

Appendix 4

Background LOS Output Reports

HCM 6th Signalized Intersection Summary 100: Haggerty Road & Six Mile Road

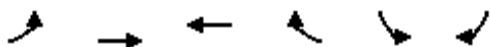
2025 Background Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	710	37	289	392	260	96	570	365	124	254	51
Future Volume (veh/h)	126	710	37	289	392	260	96	570	365	124	254	51
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	1984	1984	1984	1984	1984	1984	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	135	763	40	304	413	274	113	671	429	139	285	57
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	2	2	2
Cap, veh/h	594	838	44	508	867	387	337	806	359	204	819	365
Arrive On Green	0.22	0.23	0.23	0.22	0.23	0.23	0.05	0.22	0.22	0.05	0.22	0.22
Sat Flow, veh/h	1890	3644	191	1890	3770	1682	1845	3681	1642	1875	3741	1668
Grp Volume(v), veh/h	135	395	408	304	413	274	113	671	429	139	285	57
Grp Sat Flow(s),veh/h/ln	1890	1885	1950	1890	1885	1682	1845	1841	1642	1875	1870	1668
Q Serve(g_s), s	0.0	18.3	18.4	8.0	8.5	13.5	0.0	15.7	19.7	1.5	5.8	2.5
Cycle Q Clear(g_c), s	0.0	18.3	18.4	8.0	8.5	13.5	0.0	15.7	19.7	1.5	5.8	2.5
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	434	449	508	867	387	337	806	359	204	819	365
V/C Ratio(X)	0.23	0.91	0.91	0.60	0.48	0.71	0.34	0.83	1.19	0.68	0.35	0.16
Avail Cap(c_a), veh/h	594	434	449	508	867	387	519	806	359	388	819	365
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	33.7	33.7	29.3	30.0	31.9	31.7	33.6	35.2	40.1	29.7	28.4
Incr Delay (d2), s/veh	0.2	25.7	25.1	1.9	1.9	10.5	0.6	9.8	111.3	4.0	1.2	0.9
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(50%),veh/ln	2.1	10.9	11.2	5.6	3.9	6.3	2.1	7.6	18.5	3.0	2.6	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	59.4	58.9	31.3	31.8	42.3	32.3	43.4	146.4	44.1	30.9	29.3
LnGrp LOS	C	E	E	C	C	D	C	D	F	D	C	C
Approach Vol, veh/h	938			991			1213			481		
Approach Delay, s/veh	54.0			34.6			78.8			34.5		
Approach LOS	D			C			E			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.9	27.0	11.1	26.0	25.9	27.0	11.1	26.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	10.7	20.7	13.7	19.7	10.7	20.7	13.7	19.7				
Max Q Clear Time (g_c+l1), s	2.0	15.5	2.0	7.8	10.0	20.4	3.5	21.7				
Green Ext Time (p_c), s	0.2	0.3	0.2	0.2	0.1	0.0	0.2	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	54.4											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Background Conditions
a.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	1185	1084	115	20	15
Future Volume (vph)	6	1185	1084	115	20	15
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1863	3725	5328		1900	1700
Flt Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	403	3725	5328		1900	1700
Peak-hour factor, PHF	0.93	0.93	0.94	0.94	0.61	0.61
Adj. Flow (vph)	6	1274	1153	122	33	25
RTOR Reduction (vph)	0	0	22	0	0	22
Lane Group Flow (vph)	6	1274	1253	0	33	3
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	38.2	38.2	57.6		9.9	9.9
Effective Green, g (s)	38.2	38.2	49.8		9.9	9.9
Actuated g/C Ratio	0.48	0.48	0.62		0.12	0.12
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	192	1778	3316		235	210
v/s Ratio Prot		c0.34	c0.24		c0.02	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.03	0.72	0.38		0.14	0.01
Uniform Delay, d1	11.1	16.6	7.5		31.3	30.8
Progression Factor	1.00	1.00	0.02		1.00	1.00
Incremental Delay, d2	0.3	2.5	0.1		0.3	0.0
Delay (s)	11.4	19.1	0.2		31.5	30.8
Level of Service	B	B	A		C	C
Approach Delay (s)		19.1	0.2		31.2	
Approach LOS		B	A		C	
Intersection Summary						
HCM 2000 Control Delay			10.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			51.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Background Conditions
a.m. Peak Hour

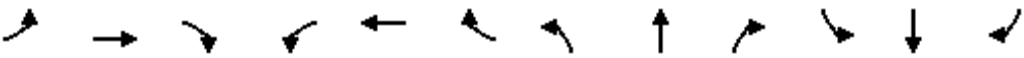
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1196	9	83	1196	3	58
Future Volume (vph)	1196	9	83	1196	3	58
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3721		1881	5406	1810	1619
Flt Permitted	1.00		0.20	1.00	0.95	1.00
Satd. Flow (perm)	3721		404	5406	1810	1619
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.71	0.71
Adj. Flow (vph)	1329	10	87	1259	4	82
RTOR Reduction (vph)	1	0	0	0	0	74
Lane Group Flow (vph)	1338	0	87	1259	4	8
Heavy Vehicles (%)	2%	2%	1%	1%	5%	5%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	58.2		38.2	38.2	7.6	7.6
Effective Green, g (s)	58.2		38.2	38.2	7.6	7.6
Actuated g/C Ratio	0.73		0.48	0.48	0.09	0.09
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2707		192	2581	171	153
v/s Ratio Prot	c0.36			0.23	0.00	
v/s Ratio Perm			0.22			c0.00
v/c Ratio	0.49		0.45	0.49	0.02	0.05
Uniform Delay, d1	4.6		13.9	14.2	32.8	32.9
Progression Factor	0.04		0.82	0.82	1.00	1.00
Incremental Delay, d2	0.1		5.9	0.5	0.1	0.1
Delay (s)	0.3		17.3	12.2	32.9	33.1
Level of Service	A		B	B	C	C
Approach Delay (s)	0.3			12.5	33.1	
Approach LOS	A			B	C	
Intersection Summary						
HCM 2000 Control Delay			7.2		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			66.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

2025 Background Conditions

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↙		↗
Traffic Volume (veh/h)	0	891	363	0	781	0	0	0	0	250	0	498
Future Volume (veh/h)	0	891	363	0	781	0	0	0	0	250	0	498
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1969	1969	0	1969	0				1984	0	1984
Adj Flow Rate, veh/h	0	968	395	0	919	0				266	0	530
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	0	2	0				1	0	1
Cap, veh/h	0	2142	955	0	2142	0				520	0	462
Arrive On Green	0.00	0.57	0.57	0.00	1.00	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3839	1668	0	3938	0				1890	0	1682
Grp Volume(v), veh/h	0	968	395	0	919	0				266	0	530
Grp Sat Flow(s),veh/h/ln	0	1870	1668	0	1870	0				1890	0	1682
Q Serve(g_s), s	0.0	11.9	10.6	0.0	0.0	0.0				9.5	0.0	22.0
Cycle Q Clear(g_c), s	0.0	11.9	10.6	0.0	0.0	0.0				9.5	0.0	22.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2142	955	0	2142	0				520	0	462
V/C Ratio(X)	0.00	0.45	0.41	0.00	0.43	0.00				0.51	0.00	1.15
Avail Cap(c_a), veh/h	0	2142	955	0	2142	0				520	0	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	9.9	9.6	0.0	0.0	0.0				24.5	0.0	29.0
Incr Delay (d2), s/veh	0.0	0.7	1.3	0.0	0.6	0.0				3.6	0.0	88.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.1	3.4	0.0	0.2	0.0				4.7	0.0	19.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.6	10.9	0.0	0.6	0.0				28.0	0.0	117.4
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h		1363			919						796	
Approach Delay, s/veh		10.7			0.6						87.5	
Approach LOS		B			A						F	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				51.8		28.2		51.8				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 46		22.0		* 46				
Max Q Clear Time (g_c+I1), s				13.9		24.0		2.0				
Green Ext Time (p_c), s				9.2		0.0		7.1				
Intersection Summary												
HCM 6th Ctrl Delay			27.5									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Background Conditions

a.m. Peak Hour

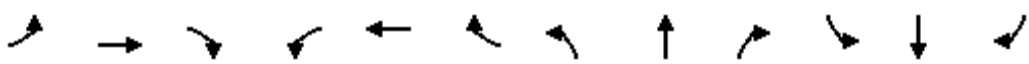
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘	↗
Traffic Volume (vph)	666	0	0	1101	298	267
Future Volume (vph)	666	0	0	1101	298	267
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.96	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3689			5353	3535	1517
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3689			5353	3535	1517
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.90	0.90
Adj. Flow (vph)	701	0	0	1295	331	297
RTOR Reduction (vph)	0	0	0	0	56	103
Lane Group Flow (vph)	701	0	0	1295	376	93
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	56.1			56.1	11.4	11.4
Effective Green, g (s)	56.1			56.1	11.4	11.4
Actuated g/C Ratio	0.70			0.70	0.14	0.14
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2586			3753	503	216
v/s Ratio Prot	0.19			c0.24	c0.11	
v/s Ratio Perm						0.06
v/c Ratio	0.27			0.35	0.75	0.43
Uniform Delay, d1	4.4			4.7	32.9	31.3
Progression Factor	0.61			0.43	1.00	1.00
Incremental Delay, d2	0.2			0.2	5.3	0.5
Delay (s)	2.9			2.3	38.2	31.8
Level of Service	A			A	D	C
Approach Delay (s)	2.9			2.3	36.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			10.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.41			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			41.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2025 Background Conditions

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

a.m. Peak Hour

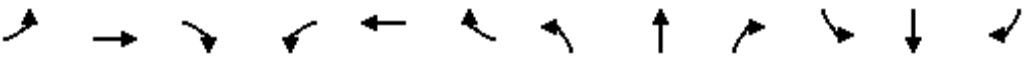
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	924	103	2	317	0	0	0	175
Future Volume (vph)	0	0	0	0	924	103	2	317	0	0	0	175
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.98			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5272			1980				2905
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5272			1980				2905
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	0	0	0	0	1004	112	2	356	0	0	0	203
RTOR Reduction (vph)	0	0	0	0	17	0	0	25	0	0	0	42
Lane Group Flow (vph)	0	0	0	0	1099	0	0	333	0	0	0	161
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type					NA		Perm	NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					33.2			35.0				35.0
Effective Green, g (s)					33.2			35.0				35.0
Actuated g/C Ratio					0.42			0.44				0.44
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2187			866				1270
v/s Ratio Prot					c0.21							0.06
v/s Ratio Perm								0.17				
v/c Ratio					0.50			0.38				0.13
Uniform Delay, d1					17.3			15.2				13.4
Progression Factor					0.29			0.77				1.00
Incremental Delay, d2					0.7			1.3				0.2
Delay (s)					5.7			13.0				13.6
Level of Service					A			B				B
Approach Delay (s)		0.0			5.7			13.0			13.6	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			8.2									
HCM 2000 Level of Service											A	
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			80.0								11.8	
Intersection Capacity Utilization			58.7%								B	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Background Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑			↑↑	↑
Traffic Volume (vph)	0	0	0	0	1053	141	0	840	0	0	529	148
Future Volume (vph)	0	0	0	0	1053	141	0	840	0	0	529	148
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5258			3689			3689	1650
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5258			3689			3689	1650
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	0	1183	158	0	903	0	0	630	176
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1320	0	0	903	0	0	630	150
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2214			1443			1535	686
v/s Ratio Prot					c0.25			c0.24			0.17	
v/s Ratio Perm												0.09
v/c Ratio					0.60			0.63			0.41	0.22
Uniform Delay, d1					17.9			19.6			16.4	15.0
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.2			1.7			0.8	0.7
Delay (s)					19.1			3.4			17.3	15.7
Level of Service					B			A			B	B
Approach Delay (s)		0.0			19.1			3.4			16.9	
Approach LOS		A			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.9									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			80.0								15.0	Sum of lost time (s)
Intersection Capacity Utilization			61.2%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Background Conditions

a.m. Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑					↑↑	↑		↑↑	
Traffic Volume (vph)	0	400	239	0	0	0	0	840	276	0	529	0
Future Volume (vph)	0	400	239	0	0	0	0	840	276	0	529	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5353	1667					3689	1650		3689	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5353	1667					3689	1650		3689	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	440	263	0	0	0	0	903	297	0	630	0
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	163	0	0	0
Lane Group Flow (vph)	0	440	188	0	0	0	0	903	134	0	630	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2254	702					1535	686		1443	
v/s Ratio Prot		0.08						c0.24			0.17	
v/s Ratio Perm			c0.11						0.08			
v/c Ratio		0.20	0.27					0.59	0.19		0.44	
Uniform Delay, d1		14.6	15.1					18.1	14.8		17.9	
Progression Factor		0.77	0.64					1.00	1.00		0.10	
Incremental Delay, d2		0.2	0.9					1.7	0.6		0.9	
Delay (s)		11.4	10.6					19.7	15.5		2.6	
Level of Service		B	B					B	B		A	
Approach Delay (s)		11.1			0.0			18.7			2.6	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.6									
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			61.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Background Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	10	43	20	3	10	32	765	38	14	336	72
Future Volume (veh/h)	67	10	43	20	3	10	32	765	38	14	336	72
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	1953	1953	1953	1890	1890	1890	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	80	12	51	28	4	14	39	933	46	16	395	85
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.82	0.82	0.82	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	31	130	167	35	122	68	2466	1100	35	2401	1071
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.04	0.66	0.66	0.04	1.00	1.00
Sat Flow, veh/h	1384	325	1380	1285	368	1290	1875	3741	1668	1875	3741	1668
Grp Volume(v), veh/h	80	0	63	28	0	18	39	933	46	16	395	85
Grp Sat Flow(s),veh/h/ln	1384	0	1705	1285	0	1658	1875	1870	1668	1875	1870	1668
Q Serve(g_s), s	4.5	0.0	2.8	1.7	0.0	0.8	1.6	9.1	0.8	0.7	0.0	0.0
Cycle Q Clear(g_c), s	5.3	0.0	2.8	4.5	0.0	0.8	1.6	9.1	0.8	0.7	0.0	0.0
Prop In Lane	1.00		0.81	1.00		0.78	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	207	0	161	167	0	157	68	2466	1100	35	2401	1071
V/C Ratio(X)	0.39	0.00	0.39	0.17	0.00	0.11	0.57	0.38	0.04	0.46	0.16	0.08
Avail Cap(c_a), veh/h	401	0	401	347	0	390	141	2466	1100	141	2401	1071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	35.6	0.0	34.1	36.1	0.0	33.2	37.9	6.2	4.8	38.1	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.5	0.5	0.0	0.3	7.4	0.4	0.1	8.9	0.1	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(50%),veh/ln	1.6	0.0	1.2	0.5	0.0	0.3	0.9	2.7	0.2	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.8	0.0	35.6	36.6	0.0	33.5	45.4	6.6	4.8	47.0	0.1	0.1
LnGrp LOS	D	A	D	D	A	C	D	A	A	D	A	A
Approach Vol, veh/h	143			46			1018			496		
Approach Delay, s/veh	36.2			35.4			8.0			1.7		
Approach LOS	D			D			A			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	57.3		13.8	7.5	58.7		13.8				
Change Period (Y+Rc), s	* 6	* 6		* 6.2	* 6	* 6		* 6.2				
Max Green Setting (Gmax), s	* 6	* 37		* 19	* 6	* 37		* 19				
Max Q Clear Time (g_c+I1), s	3.6	2.0		7.3	2.7	11.1		6.5				
Green Ext Time (p_c), s	0.0	0.4		0.4	0.0	1.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay 9.3

HCM 6th LOS A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Background Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	35	3	15	3	6	3	747	92	5	404	65
Future Volume (veh/h)	99	35	3	15	3	6	3	747	92	5	404	65
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	1969	1969	1969	1875	1875	1875	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	127	45	4	19	4	8	4	879	108	6	481	77
Peak Hour Factor	0.78	0.78	0.78	0.80	0.80	0.80	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	1	1	1
Cap, veh/h	458	477	42	411	149	299	529	2160	964	422	2177	971
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1402	1782	158	1292	558	1116	851	3741	1668	575	3770	1682
Grp Volume(v), veh/h	127	0	49	19	0	12	4	879	108	6	481	77
Grp Sat Flow(s),veh/h/ln	1402	0	1940	1292	0	1674	851	1870	1668	575	1885	1682
Q Serve(g_s), s	5.9	0.0	1.5	0.9	0.0	0.4	0.0	0.0	0.0	0.4	4.9	1.6
Cycle Q Clear(g_c), s	6.3	0.0	1.5	2.4	0.0	0.4	5.0	0.0	0.0	0.4	4.9	1.6
Prop In Lane	1.00		0.08	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	458	0	519	411	0	448	529	2160	964	422	2177	971
V/C Ratio(X)	0.28	0.00	0.09	0.05	0.00	0.03	0.01	0.41	0.11	0.01	0.22	0.08
Avail Cap(c_a), veh/h	458	0	519	411	0	448	529	2160	964	422	2177	971
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	22.0	22.9	0.0	21.6	0.3	0.0	0.0	7.2	8.2	7.5
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.2	0.0	0.1	0.0	0.6	0.2	0.1	0.2	0.2
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(50%),veh/ln	2.1	0.0	0.7	0.3	0.0	0.2	0.0	0.2	0.1	0.0	1.7	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	22.4	23.1	0.0	21.7	0.3	0.6	0.2	7.3	8.4	7.6
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	176			31			991			564		
Approach Delay, s/veh	24.6			22.6			0.5			8.3		
Approach LOS	C			C			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	7.0			8.3			6.9			4.4		
Green Ext Time (p_c), s	7.0			0.5			3.5			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	5.8											
HCM 6th LOS	A											

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	169	324	355	469	120	136	163	150	310	353	268	162
Average Queue (ft)	72	156	194	254	57	76	52	61	168	145	127	79
95th Queue (ft)	137	261	296	460	107	122	111	124	264	263	232	133
Link Distance (ft)		1376	1376	464	464	464	464		941	941		227
Upstream Blk Time (%)				2								
Queuing Penalty (veh)				6								
Storage Bay Dist (ft)	500							500			220	
Storage Blk Time (%)										1	2	
Queuing Penalty (veh)										5	6	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	108	121	67
Average Queue (ft)	51	59	21
95th Queue (ft)	96	106	50
Link Distance (ft)	227	227	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		210	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	T	TR	L	R
Maximum Queue (ft)	34	276	339	7	44	60	39
Average Queue (ft)	5	80	154	0	2	19	13
95th Queue (ft)	24	207	308	4	18	49	38
Link Distance (ft)		254	254	34	34		838
Upstream Blk Time (%)		0	2	0	0		
Queuing Penalty (veh)		2	15	0	1		
Storage Bay Dist (ft)	100					100	
Storage Blk Time (%)		4					
Queuing Penalty (veh)		0					

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	62	72	110	238	171	210	35	92
Average Queue (ft)	9	12	55	69	55	95	3	36
95th Queue (ft)	37	43	104	180	129	187	17	71
Link Distance (ft)	34	34		507	507			778
Upstream Blk Time (%)	0	1		0				
Queuing Penalty (veh)	2	6		2				
Storage Bay Dist (ft)			100			160	100	
Storage Blk Time (%)			5	2	0	1		1
Queuing Penalty (veh)			22	2	1	6		0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	171	200	66	174	200	218	374
Average Queue (ft)	67	95	27	79	105	123	165
95th Queue (ft)	136	177	56	147	176	195	297
Link Distance (ft)	507	507		179	179	548	548
Upstream Blk Time (%)				0	1		
Queuing Penalty (veh)				1	3		
Storage Bay Dist (ft)			240				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	146	127	78	110	116	248	337	270
Average Queue (ft)	52	63	21	50	35	76	184	84
95th Queue (ft)	108	117	58	99	86	177	287	207
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	1					0	
Queuing Penalty (veh)	2	5					0	
Storage Bay Dist (ft)								275
Storage Blk Time (%)							1	0
Queuing Penalty (veh)							2	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement	EB	WB
Directions Served	T	T
Maximum Queue (ft)	6	7
Average Queue (ft)	0	0
95th Queue (ft)	4	5
Link Distance (ft)	1028	105
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	78	123	170	35	121	76
Average Queue (ft)	25	48	81	27	48	23
95th Queue (ft)	60	98	149	39	100	60
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				34		
Queuing Penalty (veh)				110		
Storage Bay Dist (ft)						125
Storage Blk Time (%)					0	
Queuing Penalty (veh)					0	

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	133
Average Queue (ft)	51
95th Queue (ft)	114
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	183	253	316	57	38	218	191	123
Average Queue (ft)	108	112	175	29	10	133	72	42
95th Queue (ft)	168	198	277	61	32	196	154	89
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				10	1			
Queuing Penalty (veh)				41	3			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	90	98	103	111	241	202	87	53	32
Average Queue (ft)	42	57	49	51	154	116	40	19	5
95th Queue (ft)	75	88	88	90	218	190	73	49	22
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								4	0
Queuing Penalty (veh)								12	1
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	104	84	45	28	69	142	159	40	50	77	60	46
Average Queue (ft)	47	25	12	7	25	32	54	7	11	27	12	10
95th Queue (ft)	91	60	36	23	59	94	121	27	37	62	42	33
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)							0					
Queuing Penalty (veh)							0					
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	17	1				0						
Queuing Penalty (veh)	9	1				0						

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	114	60	43	24	21	125	146	52	31	110	78	43
Average Queue (ft)	46	16	7	5	1	43	54	18	3	50	35	15
95th Queue (ft)	89	45	26	19	11	95	116	46	16	95	73	40
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300			215	250			190
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Zone Summary

Zone wide Queuing Penalty: 263

HCM 6th Signalized Intersection Summary

100: Haggerty Road & Six Mile Road

2025 Background Conditions

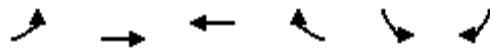
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	151	692	71	320	774	342	116	616	438	286	604	97
Future Volume (veh/h)	151	692	71	320	774	342	116	616	438	286	604	97
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	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	162	744	76	356	860	380	123	655	466	311	657	105
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	352	794	81	363	867	387	362	832	371	350	825	368
Arrive On Green	0.14	0.23	0.23	0.14	0.23	0.23	0.13	0.22	0.22	0.13	0.22	0.22
Sat Flow, veh/h	1890	3453	353	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	162	406	414	356	860	380	123	655	466	311	657	105
Grp Sat Flow(s),veh/h/ln	1890	1885	1921	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	3.0	19.0	19.0	12.5	20.5	20.2	0.0	14.6	19.7	9.3	14.8	4.7
Cycle Q Clear(g_c), s	3.0	19.0	19.0	12.5	20.5	20.2	0.0	14.6	19.7	9.3	14.8	4.7
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	352	434	442	363	867	387	362	832	371	350	825	368
V/C Ratio(X)	0.46	0.94	0.94	0.98	0.99	0.98	0.34	0.79	1.26	0.89	0.80	0.29
Avail Cap(c_a), veh/h	352	434	442	363	867	387	409	832	371	396	825	368
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.6	34.0	34.0	36.7	34.6	34.5	33.5	33.2	35.1	36.4	33.3	29.3
Incr Delay (d2), s/veh	0.9	29.9	29.6	41.8	28.6	41.6	0.6	7.4	135.5	19.5	7.8	1.9
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(50%),veh/ln	3.1	11.7	11.9	11.5	12.2	12.2	2.3	7.2	21.5	8.1	7.3	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.5	63.9	63.7	78.5	63.2	76.0	34.0	40.6	170.6	56.0	41.1	31.2
LnGrp LOS	C	E	E	E	E	E	C	D	F	E	D	C
Approach Vol, veh/h	982		1596				1244		1073			
Approach Delay, s/veh	58.9		69.7				88.7		44.4			
Approach LOS	E		E				F		D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.2	27.0	17.8	26.0	19.2	27.0	17.8	26.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	10.7	20.7	13.7	19.7	10.7	20.7	13.7	19.7				
Max Q Clear Time (g_c+I1), s	5.0	22.5	2.0	16.8	14.5	21.0	11.3	21.7				
Green Ext Time (p_c), s	0.2	0.0	0.2	0.3	0.0	0.0	0.2	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	66.8											
HCM 6th LOS	E											

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Background Conditions
p.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	1502	1454	138	74	30
Future Volume (vph)	8	1502	1454	138	74	30
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1881	3762	5389		1900	1700
Flt Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	266	3762	5389		1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.88	0.88
Adj. Flow (vph)	8	1581	1531	145	84	34
RTOR Reduction (vph)	0	0	19	0	0	30
Lane Group Flow (vph)	8	1581	1657	0	84	4
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	39.2	39.2	58.6		8.9	8.9
Effective Green, g (s)	39.2	39.2	50.8		8.9	8.9
Actuated g/C Ratio	0.49	0.49	0.63		0.11	0.11
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	130	1843	3422		211	189
v/s Ratio Prot		c0.42	c0.31		c0.04	
v/s Ratio Perm	0.03					0.00
v/c Ratio	0.06	0.86	0.48		0.40	0.02
Uniform Delay, d1	10.7	17.9	7.7		33.1	31.7
Progression Factor	1.00	1.00	0.03		1.00	1.00
Incremental Delay, d2	0.9	5.4	0.1		1.2	0.0
Delay (s)	11.6	23.4	0.3		34.3	31.7
Level of Service	B	C	A		C	C
Approach Delay (s)		23.3	0.3		33.5	
Approach LOS		C	A		C	
Intersection Summary						
HCM 2000 Control Delay			12.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			60.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Background Conditions
p.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1572	4	62	1584	8	84
Future Volume (vph)	1572	4	62	1584	8	84
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3799		1900	5460	1900	1700
Flt Permitted	1.00		0.15	1.00	0.95	1.00
Satd. Flow (perm)	3799		295	5460	1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.75	0.75
Adj. Flow (vph)	1655	4	65	1667	11	112
RTOR Reduction (vph)	0	0	0	0	0	52
Lane Group Flow (vph)	1659	0	65	1667	11	60
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	58.2		39.2	39.2	7.6	7.6
Effective Green, g (s)	58.2		39.2	39.2	7.6	7.6
Actuated g/C Ratio	0.73		0.49	0.49	0.09	0.09
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2763		144	2675	180	161
v/s Ratio Prot	c0.44			0.31	0.01	
v/s Ratio Perm			0.22			c0.04
v/c Ratio	0.60		0.45	0.62	0.06	0.38
Uniform Delay, d1	5.3		13.4	15.0	33.0	34.0
Progression Factor	0.03		0.98	1.12	1.00	1.00
Incremental Delay, d2	0.2		6.7	0.7	0.1	1.5
Delay (s)	0.3		19.8	17.5	33.1	35.4
Level of Service	A		B	B	C	D
Approach Delay (s)	0.3			17.6	35.2	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			10.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			69.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

2025 Background Conditions

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↘		↗
Traffic Volume (veh/h)	0	1292	364	0	1127	0	0	0	0	307	0	519
Future Volume (veh/h)	0	1292	364	0	1127	0	0	0	0	307	0	519
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1984	1984	0	2000	0				1969	0	1969
Adj Flow Rate, veh/h	0	1389	391	0	1186	0				334	0	564
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95				0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	0	0	0				2	0	2
Cap, veh/h	0	2159	963	0	2176	0				516	0	459
Arrive On Green	0.00	0.57	0.57	0.00	1.00	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3870	1682	0	4000	0				1875	0	1668
Grp Volume(v), veh/h	0	1389	391	0	1186	0				334	0	564
Grp Sat Flow(s),veh/h/ln	0	1885	1682	0	1900	0				1875	0	1668
Q Serve(g_s), s	0.0	19.9	10.4	0.0	0.0	0.0				12.6	0.0	22.0
Cycle Q Clear(g_c), s	0.0	19.9	10.4	0.0	0.0	0.0				12.6	0.0	22.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2159	963	0	2176	0				516	0	459
V/C Ratio(X)	0.00	0.64	0.41	0.00	0.55	0.00				0.65	0.00	1.23
Avail Cap(c_a), veh/h	0	2159	963	0	2176	0				516	0	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.6	9.5	0.0	0.0	0.0				25.6	0.0	29.0
Incr Delay (d2), s/veh	0.0	1.5	1.3	0.0	1.0	0.0				6.2	0.0	121.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.0	3.3	0.0	0.3	0.0				6.3	0.0	23.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.1	10.8	0.0	1.0	0.0				31.8	0.0	150.1
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h		1780			1186						898	
Approach Delay, s/veh		12.6			1.0						106.1	
Approach LOS		B			A						F	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				51.8		28.2		51.8				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 46		22.0		* 46				
Max Q Clear Time (g_c+I1), s				21.9		24.0		2.0				
Green Ext Time (p_c), s				12.3		0.0		10.2				
Intersection Summary												
HCM 6th Ctrl Delay			30.7									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Background Conditions
p.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘	↗
Traffic Volume (vph)	1047	0	0	1546	306	266
Future Volume (vph)	1047	0	0	1546	306	266
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.97	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3762			5406	3612	1547
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3762			5406	3612	1547
Peak-hour factor, PHF	0.91	0.91	0.88	0.88	0.87	0.87
Adj. Flow (vph)	1151	0	0	1757	352	306
RTOR Reduction (vph)	0	0	0	0	38	63
Lane Group Flow (vph)	1151	0	0	1757	412	145
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	55.4			55.4	12.1	12.1
Effective Green, g (s)	55.4			55.4	12.1	12.1
Actuated g/C Ratio	0.69			0.69	0.15	0.15
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2605			3743	546	233
v/s Ratio Prot	0.31			c0.33	c0.11	
v/s Ratio Perm						0.09
v/c Ratio	0.44			0.47	0.75	0.62
Uniform Delay, d1	5.4			5.6	32.5	31.8
Progression Factor	0.35			1.37	1.00	1.00
Incremental Delay, d2	0.4			0.4	5.2	3.7
Delay (s)	2.4			8.1	37.7	35.5
Level of Service	A			A	D	D
Approach Delay (s)	2.4			8.1	37.0	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			11.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			49.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2025 Background Conditions

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

p.m. Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	1036	83	0	197	0	0	0	510
Future Volume (vph)	0	0	0	0	1036	83	0	197	0	0	0	510
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.99			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5346			1980				2992
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5346			1980				2992
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	0	0	0	0	1102	88	0	212	0	0	0	654
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	0	87
Lane Group Flow (vph)	0	0	0	0	1179	0	0	212	0	0	0	567
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type					NA			NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					43.2			25.0				25.0
Effective Green, g (s)					43.2			25.0				25.0
Actuated g/C Ratio					0.54			0.31				0.31
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2886			618				935
v/s Ratio Prot					c0.22			0.11				c0.19
v/s Ratio Perm												
v/c Ratio					0.41			0.34				0.61
Uniform Delay, d1					10.9			21.2				23.3
Progression Factor					0.63			0.78				1.00
Incremental Delay, d2					0.4			1.4				2.9
Delay (s)					7.2			17.8				26.3
Level of Service					A			B				C
Approach Delay (s)		0.0			7.2			17.8			26.3	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			14.4									
HCM 2000 Level of Service												B
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			80.0									
Sum of lost time (s)											11.8	
Intersection Capacity Utilization			69.1%									
ICU Level of Service												C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Background Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↓			↑↑			↑↑	
Traffic Volume (vph)	0	0	0	0	981	208	0	849	0	0	1064	308
Future Volume (vph)	0	0	0	0	981	208	0	849	0	0	1064	308
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5264			3762			3762	1683
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5264			3762			3762	1683
Peak-hour factor, PHF	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	0	0	0	1033	219	0	894	0	0	1209	350
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1222	0	0	894	0	0	1209	324
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	
Effective Green, g (s)					33.7			31.3			33.3	
Actuated g/C Ratio					0.42			0.39			0.42	
Clearance Time (s)					6.3			8.7			6.7	
Lane Grp Cap (vph)					2217			1471			1565	
v/s Ratio Prot					c0.23			0.24			c0.32	
v/s Ratio Perm												0.19
v/c Ratio					0.55			0.61			0.77	
Uniform Delay, d1					17.5			19.4			20.1	
Progression Factor					1.00			0.09			1.00	
Incremental Delay, d2					1.0			1.6			3.8	
Delay (s)					18.4			3.3			23.9	
Level of Service					B			A			C	
Approach Delay (s)		0.0			18.4			3.3			22.8	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.6	HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			80.0	Sum of lost time (s)					15.0			
Intersection Capacity Utilization			67.1%	ICU Level of Service					C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Background Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗					↑↑	↗		↑↑	
Traffic Volume (vph)	0	1000	370	0	0	0	0	849	287	0	1064	0
Future Volume (vph)	0	1000	370	0	0	0	0	849	287	0	1064	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5406	1683					3762	1683		3762	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5406	1683					3762	1683		3762	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	1053	389	0	0	0	0	894	302	0	1209	0
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	26	0	0	0
Lane Group Flow (vph)	0	1053	344	0	0	0	0	894	276	0	1209	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2277	708					1565	700		1471	
v/s Ratio Prot		0.19						0.24			c0.32	
v/s Ratio Perm			c0.20						0.16			
v/c Ratio		0.46	0.49					0.57	0.39		0.82	
Uniform Delay, d1		16.6	16.8					17.9	16.3		21.8	
Progression Factor		0.96	0.96					1.00	1.00		0.09	
Incremental Delay, d2		0.6	2.3					1.5	1.7		3.3	
Delay (s)		16.6	18.4					19.4	18.0		5.3	
Level of Service		B	B					B	B		A	
Approach Delay (s)		17.1			0.0			19.0			5.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			14.0		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					15.0		
Intersection Capacity Utilization			67.1%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Background Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	7	63	75	14	51	59	826	108	37	765	97
Future Volume (veh/h)	100	7	63	75	14	51	59	826	108	37	765	97
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	1984	1984	1984	1920	1920	1920	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	108	8	68	87	16	59	63	888	116	39	805	102
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	0	0	0
Cap, veh/h	235	27	227	230	53	196	89	2217	989	69	2193	978
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.59	0.59	0.07	1.00	1.00
Sat Flow, veh/h	1335	180	1529	1291	359	1323	1890	3770	1682	1905	3800	1695
Grp Volume(v), veh/h	108	0	76	87	0	75	63	888	116	39	805	102
Grp Sat Flow(s),veh/h/ln	1335	0	1709	1291	0	1682	1890	1885	1682	1905	1900	1695
Q Serve(g_s), s	6.3	0.0	3.2	5.2	0.0	3.2	2.6	10.2	2.4	1.6	0.0	0.0
Cycle Q Clear(g_c), s	9.5	0.0	3.2	8.3	0.0	3.2	2.6	10.2	2.4	1.6	0.0	0.0
Prop In Lane	1.00		0.89	1.00		0.79	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	235	0	253	230	0	249	89	2217	989	69	2193	978
V/C Ratio(X)	0.46	0.00	0.30	0.38	0.00	0.30	0.71	0.40	0.12	0.57	0.37	0.10
Avail Cap(c_a), veh/h	351	0	402	342	0	395	142	2217	989	143	2193	978
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	34.6	0.0	30.4	34.1	0.0	30.4	37.6	8.9	7.3	36.5	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.7	1.0	0.0	0.7	9.9	0.5	0.2	6.6	0.4	0.2
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(50%),veh/ln	2.1	0.0	1.3	1.7	0.0	1.3	1.4	3.4	0.8	0.8	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.0	31.0	35.1	0.0	31.0	47.4	9.4	7.5	43.1	0.4	0.2
LnGrp LOS	D	A	C	D	A	C	D	A	A	D	A	A
Approach Vol, veh/h	184			162			1067			946		
Approach Delay, s/veh	33.9			33.2			11.5			2.2		
Approach LOS	C			C			B			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	52.2		18.1	8.9	53.0		18.1				
Change Period (Y+Rc), s	* 6	* 6		* 6.2	* 6	* 6		* 6.2				
Max Green Setting (Gmax), s	* 6	* 37		* 19	* 6	* 37		* 19				
Max Q Clear Time (g_c+I1), s	4.6	2.0		11.5	3.6	12.2		10.3				
Green Ext Time (p_c), s	0.0	0.8		0.4	0.0	0.9		0.4				
Intersection Summary												
HCM 6th Ctrl Delay	11.0											
HCM 6th LOS	B											
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Background Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	34	12	58	28	22	2	911	64	4	829	166
Future Volume (veh/h)	119	34	12	58	28	22	2	911	64	4	829	166
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	2000	2000	2000	1920	1920	1920	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	161	46	16	76	37	29	2	990	70	4	882	177
Peak Hour Factor	0.74	0.74	0.74	0.76	0.76	0.76	0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	415	379	132	408	267	209	333	2194	979	402	2194	979
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1357	1418	493	1307	997	782	541	3800	1695	541	3800	1695
Grp Volume(v), veh/h	161	0	62	76	0	66	2	990	70	4	882	177
Grp Sat Flow(s),veh/h/ln	1357	0	1911	1307	0	1779	541	1900	1695	541	1900	1695
Q Serve(g_s), s	8.2	0.0	2.0	3.7	0.0	2.3	0.1	0.0	0.0	0.3	10.2	3.9
Cycle Q Clear(g_c), s	10.5	0.0	2.0	5.7	0.0	2.3	10.3	0.0	0.0	0.3	10.2	3.9
Prop In Lane	1.00		0.26	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	415	0	511	408	0	476	333	2195	979	402	2195	979
V/C Ratio(X)	0.39	0.00	0.12	0.19	0.00	0.14	0.01	0.45	0.07	0.01	0.40	0.18
Avail Cap(c_a), veh/h	415	0	511	408	0	476	333	2195	979	402	2195	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	22.2	24.3	0.0	22.3	1.1	0.0	0.0	7.2	9.3	8.0
Incr Delay (d2), s/veh	2.7	0.0	0.5	1.0	0.0	0.6	0.0	0.7	0.1	0.0	0.6	0.4
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(50%),veh/ln	2.9	0.0	0.9	1.3	0.0	1.0	0.0	0.2	0.0	0.0	3.5	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	22.7	25.4	0.0	22.9	1.2	0.7	0.1	7.2	9.8	8.4
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	223				142				1062		1063	
Approach Delay, s/veh	27.2				24.2				0.6		9.6	
Approach LOS	C				C				A		A	
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	12.3			12.5			12.2			7.7		
Green Ext Time (p_c), s	7.8			0.5			7.2			0.4		
Intersection Summary												
HCM 6th Ctrl Delay	8.2											
HCM 6th LOS	A											

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	195	415	445	556	367	374	193	161	304	296	261	274
Average Queue (ft)	87	213	247	510	201	212	91	68	184	159	156	169
95th Queue (ft)	156	352	396	626	337	345	167	127	270	263	251	263
Link Distance (ft)		1376	1376	464	464	464	464		941	941		227
Upstream Blk Time (%)				69	0	0						6
Queuing Penalty (veh)				249	0	0						20
Storage Bay Dist (ft)	500							500			220	
Storage Blk Time (%)										1	4	
Queuing Penalty (veh)										4	12	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	226	247	221
Average Queue (ft)	137	150	44
95th Queue (ft)	214	228	119
Link Distance (ft)	227	227	
Upstream Blk Time (%)	0	1	0
Queuing Penalty (veh)	1	3	0
Storage Bay Dist (ft)			210
Storage Blk Time (%)		1	0
Queuing Penalty (veh)		1	0

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	TR	L	R
Maximum Queue (ft)	87	323	338	84	25	33	120	150
Average Queue (ft)	11	191	240	32	1	2	58	35
95th Queue (ft)	49	308	355	95	16	16	107	106
Link Distance (ft)		252	252	30	30	30		838
Upstream Blk Time (%)		2	8	27	0	0		
Queuing Penalty (veh)		16	63	140	0	1		
Storage Bay Dist (ft)	100						100	
Storage Blk Time (%)		19					7	3
Queuing Penalty (veh)		1					2	2

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	88	84	125	420	424	235	39	124
Average Queue (ft)	24	26	73	211	201	153	8	46
95th Queue (ft)	72	74	140	414	401	246	30	87
Link Distance (ft)	30	30		505	505			778
Upstream Blk Time (%)	1	2		0	0			
Queuing Penalty (veh)	9	19		3	0			
Storage Bay Dist (ft)			100			160	100	
Storage Blk Time (%)			4	36	8	6		1
Queuing Penalty (veh)			22	22	44	30		0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	130	149	82	227	235	390	522
Average Queue (ft)	39	57	23	140	158	212	335
95th Queue (ft)	96	122	53	220	238	479	593
Link Distance (ft)	505	505		179	179	548	548
Upstream Blk Time (%)				3	5	9	13
Queuing Penalty (veh)				19	28	0	0
Storage Bay Dist (ft)			240				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	17	54
Average Queue (ft)	1	4
95th Queue (ft)	8	28
Link Distance (ft)	1028	1028
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	137	163	155	196	150	213	286	243
Average Queue (ft)	60	76	78	105	68	78	190	103
95th Queue (ft)	115	135	135	169	124	159	279	227
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	2						
Queuing Penalty (veh)	5	13						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							0	0
Queuing Penalty (veh)							1	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement								
Directions Served								
Maximum Queue (ft)								
Average Queue (ft)								
95th Queue (ft)								
Link Distance (ft)								
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	77	117	148	32	272	256
Average Queue (ft)	28	39	51	22	174	118
95th Queue (ft)	63	83	111	40	272	237
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				41	4	0
Queuing Penalty (veh)				82	0	0
Storage Bay Dist (ft)						125
Storage Blk Time (%)					23	2
Queuing Penalty (veh)					63	7

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	103
Average Queue (ft)	29
95th Queue (ft)	80
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	200	219	299	61	44	359	331	168
Average Queue (ft)	108	108	172	28	11	224	185	72
95th Queue (ft)	168	184	268	60	35	313	278	132
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				9	1			
Queuing Penalty (veh)				38	4			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	141	164	199	203	234	199	161	78	76
Average Queue (ft)	84	111	132	103	158	114	62	46	22
95th Queue (ft)	127	153	183	176	216	189	119	79	57
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								25	6
Queuing Penalty (veh)								138	35
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	166	100	111	68	89	166	192	65	88	126	112	52
Average Queue (ft)	58	32	42	27	40	67	88	21	32	60	50	16
95th Queue (ft)	118	75	85	57	75	143	167	52	68	109	96	43
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	23	1				0					0	
Queuing Penalty (veh)	16	1				0					0	

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	143	57	69	67	8	115	131	38	27	185	148	55
Average Queue (ft)	58	17	27	18	0	51	67	10	3	95	72	27
95th Queue (ft)	115	43	59	45	4	96	116	33	16	156	131	54
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												
Queuing Penalty (veh)												

Zone Summary

Zone wide Queuing Penalty: 1115

Appendix 5

Background Improvement LOS Output Reports

HCM 6th Signalized Intersection Summary

100: Haggerty Road & Six Mile Road

2025 Background Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	710	37	289	392	260	96	570	365	124	254	51
Future Volume (veh/h)	126	710	37	289	392	260	96	570	365	124	254	51
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	1984	1984	1984	1984	1984	1984	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	135	763	40	304	413	274	113	671	429	139	285	57
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	2	2	2
Cap, veh/h	534	852	45	457	881	493	339	769	643	218	781	653
Arrive On Green	0.18	0.23	0.23	0.06	0.08	0.08	0.06	0.21	0.21	0.02	0.07	0.07
Sat Flow, veh/h	1890	3644	191	1890	3770	1682	1845	3681	1642	1875	3741	1668
Grp Volume(v), veh/h	135	395	408	304	413	274	113	671	429	139	285	57
Grp Sat Flow(s),veh/h/ln	1890	1885	1950	1890	1885	1682	1845	1841	1642	1875	1870	1668
Q Serve(g_s), s	0.0	16.2	16.2	7.8	8.4	7.7	0.0	14.1	2.6	1.3	5.8	0.0
Cycle Q Clear(g_c), s	0.0	16.2	16.2	7.8	8.4	7.7	0.0	14.1	2.6	1.3	5.8	0.0
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	534	441	456	457	881	493	339	769	643	218	781	653
V/C Ratio(X)	0.25	0.90	0.90	0.67	0.47	0.56	0.33	0.87	0.67	0.64	0.36	0.09
Avail Cap(c_a), veh/h	534	441	456	457	881	493	430	769	643	311	781	653
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	29.7	29.7	32.9	32.2	29.5	29.1	30.6	20.0	36.9	32.2	18.2
Incr Delay (d2), s/veh	0.2	23.4	22.9	3.7	1.8	4.5	0.6	13.1	5.4	3.1	1.3	0.3
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(50%),veh/ln	2.0	9.6	9.8	6.2	4.1	5.6	1.9	7.1	6.7	2.7	2.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	53.1	52.6	36.5	33.9	34.0	29.7	43.7	25.5	39.9	33.5	18.4
LnGrp LOS	C	D	D	D	C	C	C	D	C	D	C	B
Approach Vol, veh/h	938			991			1213			481		
Approach Delay, s/veh	48.6			34.8			36.0			33.6		
Approach LOS	D			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.9	25.0	11.1	23.0	20.9	25.0	11.1	23.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	10.7	18.7	8.7	16.7	10.7	18.7	8.7	16.7				
Max Q Clear Time (g_c+I1), s	2.0	10.4	2.0	7.8	9.8	18.2	3.3	16.1				
Green Ext Time (p_c), s	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.1				

Intersection Summary

HCM 6th Ctrl Delay 38.6

HCM 6th LOS D

Notes

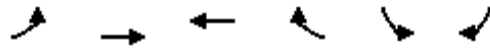
User approved pedestrian interval to be less than phase max green.

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Background Improvement Conditions

a.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	1185	1084	115	20	15
Future Volume (vph)	6	1185	1084	115	20	15
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1863	3725	5328		1900	1700
Flt Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	403	3725	5328		1900	1700
Peak-hour factor, PHF	0.93	0.93	0.94	0.94	0.61	0.61
Adj. Flow (vph)	6	1274	1153	122	33	25
RTOR Reduction (vph)	0	0	22	0	0	22
Lane Group Flow (vph)	6	1274	1253	0	33	3
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	38.2	38.2	57.6		9.9	9.9
Effective Green, g (s)	38.2	38.2	49.8		9.9	9.9
Actuated g/C Ratio	0.48	0.48	0.62		0.12	0.12
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	192	1778	3316		235	210
v/s Ratio Prot		c0.34	c0.24		c0.02	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.03	0.72	0.38		0.14	0.01
Uniform Delay, d1	11.1	16.6	7.5		31.3	30.8
Progression Factor	0.71	0.61	0.02		1.00	1.00
Incremental Delay, d2	0.2	1.7	0.1		0.3	0.0
Delay (s)	8.0	11.8	0.2		31.5	30.8
Level of Service	A	B	A		C	C
Approach Delay (s)		11.7	0.2		31.2	
Approach LOS		B	A		C	
Intersection Summary						
HCM 2000 Control Delay			6.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			51.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Background Improvement Conditions

a.m. Peak Hour

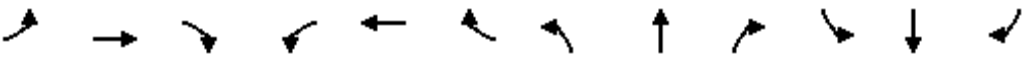
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1196	9	83	1196	3	58
Future Volume (vph)	1196	9	83	1196	3	58
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3721		1881	5406	1810	1619
Flt Permitted	1.00		0.20	1.00	0.95	1.00
Satd. Flow (perm)	3721		404	5406	1810	1619
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.71	0.71
Adj. Flow (vph)	1329	10	87	1259	4	82
RTOR Reduction (vph)	1	0	0	0	0	74
Lane Group Flow (vph)	1338	0	87	1259	4	8
Heavy Vehicles (%)	2%	2%	1%	1%	5%	5%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	58.2		38.2	38.2	7.6	7.6
Effective Green, g (s)	58.2		38.2	38.2	7.6	7.6
Actuated g/C Ratio	0.73		0.48	0.48	0.09	0.09
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2707		192	2581	171	153
v/s Ratio Prot	c0.36			0.23	0.00	
v/s Ratio Perm			0.22			c0.00
v/c Ratio	0.49		0.45	0.49	0.02	0.05
Uniform Delay, d1	4.6		13.9	14.2	32.8	32.9
Progression Factor	0.05		0.75	0.75	1.00	1.00
Incremental Delay, d2	0.1		6.0	0.5	0.1	0.1
Delay (s)	0.3		16.5	11.2	32.9	33.1
Level of Service	A		B	B	C	C
Approach Delay (s)	0.3			11.6	33.1	
Approach LOS	A			B	C	
Intersection Summary						
HCM 2000 Control Delay			6.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			66.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

2025 Background Improvement Conditions

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↙		↗
Traffic Volume (veh/h)	0	891	363	0	781	0	0	0	0	250	0	498
Future Volume (veh/h)	0	891	363	0	781	0	0	0	0	250	0	498
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1969	1969	0	1969	0				1984	0	1984
Adj Flow Rate, veh/h	0	968	395	0	919	0				266	0	530
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	0	2	0				1	0	1
Cap, veh/h	0	1870	834	0	1870	0				657	0	584
Arrive On Green	0.00	0.50	0.50	0.00	1.00	0.00				0.35	0.00	0.35
Sat Flow, veh/h	0	3839	1668	0	3938	0				1890	0	1682
Grp Volume(v), veh/h	0	968	395	0	919	0				266	0	530
Grp Sat Flow(s),veh/h/ln	0	1870	1668	0	1870	0				1890	0	1682
Q Serve(g_s), s	0.0	14.0	12.4	0.0	0.0	0.0				8.6	0.0	24.0
Cycle Q Clear(g_c), s	0.0	14.0	12.4	0.0	0.0	0.0				8.6	0.0	24.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1870	834	0	1870	0				657	0	584
V/C Ratio(X)	0.00	0.52	0.47	0.00	0.49	0.00				0.41	0.00	0.91
Avail Cap(c_a), veh/h	0	1870	834	0	1870	0				657	0	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	13.5	13.1	0.0	0.0	0.0				19.8	0.0	24.9
Incr Delay (d2), s/veh	0.0	1.0	1.9	0.0	0.9	0.0				1.9	0.0	20.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.2	4.3	0.0	0.2	0.0				4.0	0.0	12.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	14.5	15.0	0.0	0.9	0.0				21.7	0.0	45.1
LnGrp LOS	A	B	B	A	A	A				C	A	D
Approach Vol, veh/h		1363			919						796	
Approach Delay, s/veh		14.7			0.9						37.3	
Approach LOS		B			A						D	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				46.0		34.0		46.0				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 40		27.8		* 40				
Max Q Clear Time (g_c+I1), s				16.0		26.0		2.0				
Green Ext Time (p_c), s				8.4		0.6		6.9				
Intersection Summary												
HCM 6th Ctrl Delay			16.4									
HCM 6th LOS			B									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Background Improvement Conditions

a.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	666	0	0	1101	298	267
Future Volume (vph)	666	0	0	1101	298	267
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.96	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3689			5353	3535	1517
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3689			5353	3535	1517
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.90	0.90
Adj. Flow (vph)	701	0	0	1295	331	297
RTOR Reduction (vph)	0	0	0	0	56	103
Lane Group Flow (vph)	701	0	0	1295	376	93
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	56.1			56.1	11.4	11.4
Effective Green, g (s)	56.1			56.1	11.4	11.4
Actuated g/C Ratio	0.70			0.70	0.14	0.14
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2586			3753	503	216
v/s Ratio Prot	0.19			c0.24	c0.11	
v/s Ratio Perm						0.06
v/c Ratio	0.27			0.35	0.75	0.43
Uniform Delay, d1	4.4			4.7	32.9	31.3
Progression Factor	0.61			0.43	1.00	1.00
Incremental Delay, d2	0.2			0.2	5.3	0.5
Delay (s)	2.9			2.3	38.2	31.8
Level of Service	A			A	D	C
Approach Delay (s)	2.9			2.3	36.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			10.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.41			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			41.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2025 Background Improvement Conditions

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	924	103	2	317	0	0	0	175
Future Volume (vph)	0	0	0	0	924	103	2	317	0	0	0	175
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.98			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5272			1980				2905
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5272			1980				2905
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	0	0	0	0	1004	112	2	356	0	0	0	203
RTOR Reduction (vph)	0	0	0	0	17	0	0	25	0	0	0	42
Lane Group Flow (vph)	0	0	0	0	1099	0	0	333	0	0	0	161
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type					NA		Perm	NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					33.2			35.0				35.0
Effective Green, g (s)					33.2			35.0				35.0
Actuated g/C Ratio					0.42			0.44				0.44
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2187			866				1270
v/s Ratio Prot					c0.21							0.06
v/s Ratio Perm								0.17				
v/c Ratio					0.50			0.38				0.13
Uniform Delay, d1					17.3			15.2				13.4
Progression Factor					0.29			0.81				1.00
Incremental Delay, d2					0.7			1.3				0.2
Delay (s)					5.7			13.6				13.6
Level of Service					A			B				B
Approach Delay (s)		0.0			5.7			13.6			13.6	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			8.3									
HCM 2000 Level of Service											A	
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			80.0									
Sum of lost time (s)											11.8	
Intersection Capacity Utilization			58.7%									
ICU Level of Service											B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Background Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑			↑↑	↑
Traffic Volume (vph)	0	0	0	0	1053	141	0	840	0	0	529	148
Future Volume (vph)	0	0	0	0	1053	141	0	840	0	0	529	148
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5258			3689			3689	1650
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5258			3689			3689	1650
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	0	1183	158	0	903	0	0	630	176
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1320	0	0	903	0	0	630	150
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2214			1443			1535	686
v/s Ratio Prot					c0.25			c0.24			0.17	
v/s Ratio Perm												0.09
v/c Ratio					0.60			0.63			0.41	0.22
Uniform Delay, d1					17.9			19.6			16.4	15.0
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.2			1.7			0.8	0.7
Delay (s)					19.1			3.4			17.3	15.7
Level of Service					B			A			B	B
Approach Delay (s)		0.0			19.1			3.4			16.9	
Approach LOS		A			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.9									
HCM 2000 Level of Service											B	
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			80.0								15.0	
Intersection Capacity Utilization			61.2%									
ICU Level of Service											B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Background Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑					↑↑	↑		↑↑	
Traffic Volume (vph)	0	400	239	0	0	0	0	840	276	0	529	0
Future Volume (vph)	0	400	239	0	0	0	0	840	276	0	529	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5353	1667					3689	1650		3689	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5353	1667					3689	1650		3689	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	440	263	0	0	0	0	903	297	0	630	0
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	163	0	0	0
Lane Group Flow (vph)	0	440	188	0	0	0	0	903	134	0	630	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2254	702					1535	686		1443	
v/s Ratio Prot		0.08						c0.24			0.17	
v/s Ratio Perm			c0.11						0.08			
v/c Ratio		0.20	0.27					0.59	0.19		0.44	
Uniform Delay, d1		14.6	15.1					18.1	14.8		17.9	
Progression Factor		0.80	0.70					1.00	1.00		0.10	
Incremental Delay, d2		0.2	0.9					1.7	0.6		0.9	
Delay (s)		11.9	11.5					19.7	15.5		2.6	
Level of Service		B	B					B	B		A	
Approach Delay (s)		11.7			0.0			18.7			2.6	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.8									
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			61.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Background Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	10	43	20	3	10	32	765	38	14	336	72
Future Volume (veh/h)	67	10	43	20	3	10	32	765	38	14	336	72
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	1953	1953	1953	1890	1890	1890	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	80	12	51	28	4	14	39	933	46	16	395	85
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.82	0.82	0.82	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	31	130	167	35	122	68	2466	1100	35	2401	1071
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.05	0.88	0.88	0.04	1.00	1.00
Sat Flow, veh/h	1384	325	1380	1285	368	1290	1875	3741	1668	1875	3741	1668
Grp Volume(v), veh/h	80	0	63	28	0	18	39	933	46	16	395	85
Grp Sat Flow(s),veh/h/ln	1384	0	1705	1285	0	1658	1875	1870	1668	1875	1870	1668
Q Serve(g_s), s	4.5	0.0	2.8	1.7	0.0	0.8	1.6	3.7	0.3	0.7	0.0	0.0
Cycle Q Clear(g_c), s	5.3	0.0	2.8	4.5	0.0	0.8	1.6	3.7	0.3	0.7	0.0	0.0
Prop In Lane	1.00		0.81	1.00		0.78	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	207	0	161	167	0	157	68	2466	1100	35	2401	1071
V/C Ratio(X)	0.39	0.00	0.39	0.17	0.00	0.11	0.57	0.38	0.04	0.46	0.16	0.08
Avail Cap(c_a), veh/h	401	0	401	347	0	390	141	2466	1100	141	2401	1071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	35.6	0.0	34.1	36.1	0.0	33.2	37.5	1.9	1.7	38.1	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.5	0.5	0.0	0.3	7.4	0.4	0.1	8.9	0.1	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(50%),veh/ln	1.6	0.0	1.2	0.5	0.0	0.3	0.8	0.9	0.1	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.8	0.0	35.6	36.6	0.0	33.5	44.9	2.3	1.8	47.0	0.1	0.1
LnGrp LOS	D	A	D	D	A	C	D	A	A	D	A	A
Approach Vol, veh/h	143			46			1018			496		
Approach Delay, s/veh	36.2			35.4			4.0			1.7		
Approach LOS	D			D			A			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	57.3		13.8	7.5	58.7		13.8				
Change Period (Y+Rc), s	* 6	* 6		* 6.2	* 6	* 6		* 6.2				
Max Green Setting (Gmax), s	* 6	* 37		* 19	* 6	* 37		* 19				
Max Q Clear Time (g_c+I1), s	3.6	2.0		7.3	2.7	5.7		6.5				
Green Ext Time (p_c), s	0.0	0.4		0.4	0.0	1.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay 6.8

HCM 6th LOS A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Background Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	35	3	15	3	6	3	747	92	5	404	65
Future Volume (veh/h)	99	35	3	15	3	6	3	747	92	5	404	65
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	1969	1969	1969	1875	1875	1875	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	127	45	4	19	4	8	4	879	108	6	481	77
Peak Hour Factor	0.78	0.78	0.78	0.80	0.80	0.80	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	1	1	1
Cap, veh/h	458	477	42	411	149	299	529	2160	964	422	2177	971
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1402	1782	158	1292	558	1116	851	3741	1668	575	3770	1682
Grp Volume(v), veh/h	127	0	49	19	0	12	4	879	108	6	481	77
Grp Sat Flow(s),veh/h/ln	1402	0	1940	1292	0	1674	851	1870	1668	575	1885	1682
Q Serve(g_s), s	5.9	0.0	1.5	0.9	0.0	0.4	0.0	0.0	0.0	0.4	4.9	1.6
Cycle Q Clear(g_c), s	6.3	0.0	1.5	2.4	0.0	0.4	5.0	0.0	0.0	0.4	4.9	1.6
Prop In Lane	1.00		0.08	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	458	0	519	411	0	448	529	2160	964	422	2177	971
V/C Ratio(X)	0.28	0.00	0.09	0.05	0.00	0.03	0.01	0.41	0.11	0.01	0.22	0.08
Avail Cap(c_a), veh/h	458	0	519	411	0	448	529	2160	964	422	2177	971
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	22.0	22.9	0.0	21.6	0.3	0.0	0.0	7.2	8.2	7.5
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.2	0.0	0.1	0.0	0.6	0.2	0.1	0.2	0.2
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(50%),veh/ln	2.1	0.0	0.7	0.3	0.0	0.2	0.0	0.2	0.1	0.0	1.7	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	22.4	23.1	0.0	21.7	0.3	0.6	0.2	7.3	8.4	7.6
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	176			31			991			564		
Approach Delay, s/veh	24.6			22.6			0.5			8.3		
Approach LOS	C			C			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	7.0			8.3			6.9			4.4		
Green Ext Time (p_c), s	7.0			0.5			3.5			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	5.8											
HCM 6th LOS	A											

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	138	366	417	287	136	151	132	120	262	210	216	138
Average Queue (ft)	70	201	245	157	56	75	56	54	164	132	102	69
95th Queue (ft)	123	333	384	257	107	122	112	103	239	207	177	121
Link Distance (ft)		1376	1376	464	464	464	464		941	941		227
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500							500			220	
Storage Blk Time (%)										0	0	
Queuing Penalty (veh)										1	1	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	105	110	47
Average Queue (ft)	43	50	16
95th Queue (ft)	83	93	40
Link Distance (ft)	227	227	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			210
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	TR	L	R
Maximum Queue (ft)	32	142	227	22	6	17	55	36
Average Queue (ft)	3	40	91	1	0	1	17	13
95th Queue (ft)	19	102	183	10	4	10	47	38
Link Distance (ft)		254	254	34	34	34		838
Upstream Blk Time (%)			0	0	0	0		
Queuing Penalty (veh)			1	0	0	1		
Storage Bay Dist (ft)	100						100	
Storage Blk Time (%)			1					
Queuing Penalty (veh)			0					

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	56	75	119	176	189	220	31	86
Average Queue (ft)	12	15	55	68	62	105	2	35
95th Queue (ft)	44	52	104	147	139	200	15	70
Link Distance (ft)	34	34		507	507			778
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	2	7						
Storage Bay Dist (ft)			100			160	100	
Storage Blk Time (%)			5	3	0	2		0
Queuing Penalty (veh)			18	3	1	9		0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	121	172	82	220	228	200	339
Average Queue (ft)	44	71	27	104	130	98	150
95th Queue (ft)	93	135	58	178	206	168	268
Link Distance (ft)	507	507		179	179	548	548
Upstream Blk Time (%)				1	2		
Queuing Penalty (veh)				4	10		
Storage Bay Dist (ft)			240				
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	6	28
Average Queue (ft)	0	1
95th Queue (ft)	5	12
Link Distance (ft)	1028	1028
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	134	152	89	133	82	275	356	262
Average Queue (ft)	57	67	24	51	34	89	192	77
95th Queue (ft)	112	122	61	106	72	200	298	199
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	2						
Queuing Penalty (veh)	2	5						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							1	0
Queuing Penalty (veh)							2	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement								
Directions Served								
Maximum Queue (ft)								
Average Queue (ft)								
95th Queue (ft)								
Link Distance (ft)								
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	100	131	159	40	146	92
Average Queue (ft)	28	49	87	27	51	22
95th Queue (ft)	70	101	152	43	104	61
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				34		
Queuing Penalty (veh)				108		
Storage Bay Dist (ft)						125
Storage Blk Time (%)					1	0
Queuing Penalty (veh)					1	0

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	157
Average Queue (ft)	54
95th Queue (ft)	123
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	188	244	306	66	47	215	183	92
Average Queue (ft)	107	116	178	29	10	125	63	40
95th Queue (ft)	165	202	278	60	35	188	142	79
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				9	2			
Queuing Penalty (veh)				37	7			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	88	106	99	116	266	233	119	62	40
Average Queue (ft)	40	55	50	56	169	128	42	17	6
95th Queue (ft)	75	86	86	100	238	208	83	44	28
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								3	1
Queuing Penalty (veh)								7	2
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	104	83	50	43	71	88	102	27	51	81	56	44
Average Queue (ft)	44	23	14	8	26	22	40	4	13	28	13	10
95th Queue (ft)	85	60	41	27	57	63	81	19	39	68	44	33
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	16	1				0						
Queuing Penalty (veh)	8	1				0						

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	113	55	52	24	12	62	76	34	28	111	102	40
Average Queue (ft)	45	17	9	5	1	29	35	10	4	51	35	16
95th Queue (ft)	91	46	32	20	7	58	73	32	20	95	85	40
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												
Queuing Penalty (veh)												

Zone Summary

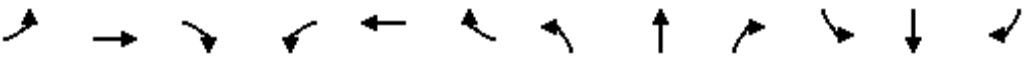
Zone wide Queuing Penalty: 241

HCM 6th Signalized Intersection Summary

100: Haggerty Road & Six Mile Road

2025 Background Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	151	692	71	320	774	342	116	616	438	286	604	97
Future Volume (veh/h)	151	692	71	320	774	342	116	616	438	286	604	97
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	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	162	744	76	356	860	380	123	655	466	311	657	105
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	299	807	82	358	976	660	236	698	538	345	928	597
Arrive On Green	0.11	0.23	0.23	0.04	0.09	0.09	0.07	0.18	0.18	0.04	0.08	0.08
Sat Flow, veh/h	1890	3453	353	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	162	406	414	356	860	380	123	655	466	311	657	105
Grp Sat Flow(s),veh/h/ln	1890	1885	1921	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	2.3	16.8	16.8	10.6	18.0	6.3	0.6	13.6	10.0	9.2	13.6	0.0
Cycle Q Clear(g_c), s	2.3	16.8	16.8	10.6	18.0	6.3	0.6	13.6	10.0	9.2	13.6	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	299	441	449	358	976	660	236	698	538	345	928	597
V/C Ratio(X)	0.54	0.92	0.92	0.99	0.88	0.58	0.52	0.94	0.87	0.90	0.71	0.18
Avail Cap(c_a), veh/h	299	441	449	358	976	660	236	698	538	345	928	597
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	29.9	29.9	36.6	35.4	25.0	34.5	32.2	25.7	36.1	33.9	22.0
Incr Delay (d2), s/veh	2.0	27.1	26.9	45.7	11.3	3.6	2.1	21.9	16.9	25.4	4.5	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(50%),veh/ln	2.8	10.3	10.5	11.2	10.4	7.1	2.2	7.9	10.0	8.6	7.3	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	57.0	56.8	82.2	46.7	28.6	36.6	54.1	42.6	61.6	38.5	22.6
LnGrp LOS	C	E	E	F	D	C	D	D	D	E	D	C
Approach Vol, veh/h					1596				1244			
Approach Delay, s/veh	53.1				50.3				48.0			
Approach LOS	D				D				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	27.0	12.0	26.0	17.0	25.0	17.0	21.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	8.7	20.7	5.7	19.7	10.7	18.7	10.7	14.7				
Max Q Clear Time (g_c+I1), s	4.3	20.0	2.6	15.6	12.6	18.8	11.2	15.6				
Green Ext Time (p_c), s	0.1	0.1	0.1	0.4	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 48.8

HCM 6th LOS D

Notes

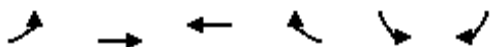
User approved pedestrian interval to be less than phase max green.

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Background Improvement Conditions

p.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↑		↰	↰
Traffic Volume (vph)	8	1502	1454	138	74	30
Future Volume (vph)	8	1502	1454	138	74	30
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1881	3762	5389		1900	1700
Flt Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	266	3762	5389		1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.88	0.88
Adj. Flow (vph)	8	1581	1531	145	84	34
RTOR Reduction (vph)	0	0	19	0	0	30
Lane Group Flow (vph)	8	1581	1657	0	84	4
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	39.2	39.2	58.6		8.9	8.9
Effective Green, g (s)	39.2	39.2	50.8		8.9	8.9
Actuated g/C Ratio	0.49	0.49	0.63		0.11	0.11
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	130	1843	3422		211	189
v/s Ratio Prot		c0.42	c0.31		c0.04	
v/s Ratio Perm	0.03					0.00
v/c Ratio	0.06	0.86	0.48		0.40	0.02
Uniform Delay, d1	10.7	17.9	7.7		33.1	31.7
Progression Factor	0.74	0.79	0.02		1.00	1.00
Incremental Delay, d2	0.6	3.5	0.1		1.2	0.0
Delay (s)	8.5	17.6	0.3		34.3	31.7
Level of Service	A	B	A		C	C
Approach Delay (s)		17.6	0.3		33.5	
Approach LOS		B	A		C	
Intersection Summary						
HCM 2000 Control Delay			9.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			60.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Background Improvement Conditions

p.m. Peak Hour

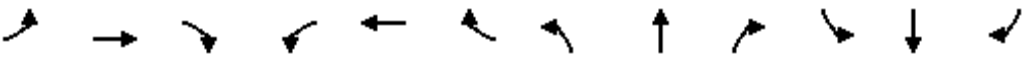
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1572	4	62	1584	8	84
Future Volume (vph)	1572	4	62	1584	8	84
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3799		1900	5460	1900	1700
Flt Permitted	1.00		0.15	1.00	0.95	1.00
Satd. Flow (perm)	3799		295	5460	1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.75	0.75
Adj. Flow (vph)	1655	4	65	1667	11	112
RTOR Reduction (vph)	0	0	0	0	0	52
Lane Group Flow (vph)	1659	0	65	1667	11	60
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	58.2		39.2	39.2	7.6	7.6
Effective Green, g (s)	58.2		39.2	39.2	7.6	7.6
Actuated g/C Ratio	0.73		0.49	0.49	0.09	0.09
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2763		144	2675	180	161
v/s Ratio Prot	c0.44			0.31	0.01	
v/s Ratio Perm			0.22			c0.04
v/c Ratio	0.60		0.45	0.62	0.06	0.38
Uniform Delay, d1	5.3		13.4	15.0	33.0	34.0
Progression Factor	0.03		0.92	1.08	1.00	1.00
Incremental Delay, d2	0.2		6.8	0.8	0.1	1.5
Delay (s)	0.3		19.0	16.9	33.1	35.4
Level of Service	A		B	B	C	D
Approach Delay (s)	0.3			17.0	35.2	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			9.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			69.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

2025 Background Improvement Conditions

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↘		↗
Traffic Volume (veh/h)	0	1292	364	0	1127	0	0	0	0	307	0	519
Future Volume (veh/h)	0	1292	364	0	1127	0	0	0	0	307	0	519
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1984	1984	0	2000	0				1969	0	1969
Adj Flow Rate, veh/h	0	1389	391	0	1186	0				334	0	564
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95				0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	0	0	0				2	0	2
Cap, veh/h	0	1979	883	0	1995	0				605	0	538
Arrive On Green	0.00	0.52	0.52	0.00	1.00	0.00				0.32	0.00	0.32
Sat Flow, veh/h	0	3870	1682	0	4000	0				1875	0	1668
Grp Volume(v), veh/h	0	1389	391	0	1186	0				334	0	564
Grp Sat Flow(s),veh/h/ln	0	1885	1682	0	1900	0				1875	0	1668
Q Serve(g_s), s	0.0	22.2	11.5	0.0	0.0	0.0				11.7	0.0	25.8
Cycle Q Clear(g_c), s	0.0	22.2	11.5	0.0	0.0	0.0				11.7	0.0	25.8
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1979	883	0	1995	0				605	0	538
V/C Ratio(X)	0.00	0.70	0.44	0.00	0.59	0.00				0.55	0.00	1.05
Avail Cap(c_a), veh/h	0	1979	883	0	1995	0				605	0	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	14.3	11.8	0.0	0.0	0.0				22.3	0.0	27.1
Incr Delay (d2), s/veh	0.0	2.1	1.6	0.0	1.3	0.0				3.6	0.0	52.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.3	3.9	0.0	0.4	0.0				5.6	0.0	17.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	16.4	13.4	0.0	1.3	0.0				25.9	0.0	79.1
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h		1780			1186						898	
Approach Delay, s/veh		15.7			1.3						59.3	
Approach LOS		B			A						E	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				48.0		32.0		48.0				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 42		25.8		* 42				
Max Q Clear Time (g_c+I1), s				24.2		27.8		2.0				
Green Ext Time (p_c), s				10.4		0.0		10.1				
Intersection Summary												
HCM 6th Ctrl Delay			21.4									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Background Improvement Conditions

p.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	1047	0	0	1546	306	266
Future Volume (vph)	1047	0	0	1546	306	266
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.97	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3762			5406	3612	1547
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3762			5406	3612	1547
Peak-hour factor, PHF	0.91	0.91	0.88	0.88	0.87	0.87
Adj. Flow (vph)	1151	0	0	1757	352	306
RTOR Reduction (vph)	0	0	0	0	38	63
Lane Group Flow (vph)	1151	0	0	1757	412	145
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	55.4			55.4	12.1	12.1
Effective Green, g (s)	55.4			55.4	12.1	12.1
Actuated g/C Ratio	0.69			0.69	0.15	0.15
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2605			3743	546	233
v/s Ratio Prot	0.31			c0.33	c0.11	
v/s Ratio Perm						0.09
v/c Ratio	0.44			0.47	0.75	0.62
Uniform Delay, d1	5.4			5.6	32.5	31.8
Progression Factor	0.43			1.37	1.00	1.00
Incremental Delay, d2	0.4			0.4	5.2	3.7
Delay (s)	2.8			8.1	37.7	35.5
Level of Service	A			A	D	D
Approach Delay (s)	2.8			8.1	37.0	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			11.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			49.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis 2025 Background Improvement Conditions

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					  			 				  
Traffic Volume (vph)	0	0	0	0	1036	83	0	197	0	0	0	510
Future Volume (vph)	0	0	0	0	1036	83	0	197	0	0	0	510
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.99			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5346			1980				2992
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5346			1980				2992
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	0	0	0	0	1102	88	0	212	0	0	0	654
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	0	87
Lane Group Flow (vph)	0	0	0	0	1179	0	0	212	0	0	0	567
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type					NA			NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					43.2			25.0				25.0
Effective Green, g (s)					43.2			25.0				25.0
Actuated g/C Ratio					0.54			0.31				0.31
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2886			618				935
v/s Ratio Prot					c0.22			0.11				c0.19
v/s Ratio Perm												
v/c Ratio					0.41			0.34				0.61
Uniform Delay, d1					10.9			21.2				23.3
Progression Factor					0.63			0.78				1.00
Incremental Delay, d2					0.4			1.4				2.9
Delay (s)					7.2			17.9				26.3
Level of Service					A			B				C
Approach Delay (s)		0.0			7.2			17.9			26.3	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			14.4		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					11.8		
Intersection Capacity Utilization			69.1%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Background Improvement Conditions

p.m. Peak Hour

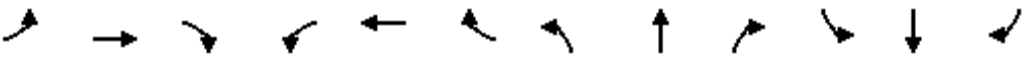
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑			↑↑	↑
Traffic Volume (vph)	0	0	0	0	981	208	0	849	0	0	1064	308
Future Volume (vph)	0	0	0	0	981	208	0	849	0	0	1064	308
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5264			3762			3762	1683
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5264			3762			3762	1683
Peak-hour factor, PHF	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	0	0	0	1033	219	0	894	0	0	1209	350
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1222	0	0	894	0	0	1209	324
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2217			1471			1565	700
v/s Ratio Prot					c0.23			0.24			c0.32	
v/s Ratio Perm												0.19
v/c Ratio					0.55			0.61			0.77	0.46
Uniform Delay, d1					17.5			19.4			20.1	16.9
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.0			1.6			3.8	2.2
Delay (s)					18.4			3.3			23.9	19.1
Level of Service					B			A			C	B
Approach Delay (s)		0.0			18.4			3.3			22.8	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.6									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			80.0								15.0	Sum of lost time (s)
Intersection Capacity Utilization			67.1%									ICU Level of Service C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Background Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑					↑↑	↑		↑↑	
Traffic Volume (vph)	0	1000	370	0	0	0	0	849	287	0	1064	0
Future Volume (vph)	0	1000	370	0	0	0	0	849	287	0	1064	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5406	1683					3762	1683		3762	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5406	1683					3762	1683		3762	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	1053	389	0	0	0	0	894	302	0	1209	0
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	26	0	0	0
Lane Group Flow (vph)	0	1053	344	0	0	0	0	894	276	0	1209	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2277	708					1565	700		1471	
v/s Ratio Prot		0.19						0.24			c0.32	
v/s Ratio Perm			c0.20						0.16			
v/c Ratio		0.46	0.49					0.57	0.39		0.82	
Uniform Delay, d1		16.6	16.8					17.9	16.3		21.8	
Progression Factor		0.96	0.96					1.00	1.00		0.09	
Incremental Delay, d2		0.6	2.3					1.5	1.7		3.3	
Delay (s)		16.7	18.5					19.4	18.0		5.3	
Level of Service		B	B					B	B		A	
Approach Delay (s)		17.2			0.0			19.0			5.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			14.0									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			67.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Background Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	7	63	75	14	51	59	826	108	37	765	97
Future Volume (veh/h)	100	7	63	75	14	51	59	826	108	37	765	97
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	1984	1984	1984	1920	1920	1920	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	108	8	68	87	16	59	63	888	116	39	805	102
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	0	0	0
Cap, veh/h	235	27	227	230	53	196	89	2217	989	69	2193	978
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.59	0.59	0.07	1.00	1.00
Sat Flow, veh/h	1335	180	1529	1291	359	1323	1890	3770	1682	1905	3800	1695
Grp Volume(v), veh/h	108	0	76	87	0	75	63	888	116	39	805	102
Grp Sat Flow(s),veh/h/ln	1335	0	1709	1291	0	1682	1890	1885	1682	1905	1900	1695
Q Serve(g_s), s	6.3	0.0	3.2	5.2	0.0	3.2	2.6	10.2	2.4	1.6	0.0	0.0
Cycle Q Clear(g_c), s	9.5	0.0	3.2	8.3	0.0	3.2	2.6	10.2	2.4	1.6	0.0	0.0
Prop In Lane	1.00		0.89	1.00		0.79	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	235	0	253	230	0	249	89	2217	989	69	2193	978
V/C Ratio(X)	0.46	0.00	0.30	0.38	0.00	0.30	0.71	0.40	0.12	0.57	0.37	0.10
Avail Cap(c_a), veh/h	351	0	402	342	0	395	142	2217	989	143	2193	978
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	34.6	0.0	30.4	34.1	0.0	30.4	37.6	8.9	7.3	36.5	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.7	1.0	0.0	0.7	9.9	0.5	0.2	6.6	0.4	0.2
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(50%),veh/ln	2.1	0.0	1.3	1.7	0.0	1.3	1.4	3.4	0.8	0.8	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.0	31.0	35.1	0.0	31.0	47.4	9.4	7.5	43.1	0.4	0.2
LnGrp LOS	D	A	C	D	A	C	D	A	A	D	A	A
Approach Vol, veh/h	184			162			1067			946		
Approach Delay, s/veh	33.9			33.2			11.5			2.2		
Approach LOS	C			C			B			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	52.2		18.1	8.9	53.0		18.1				
Change Period (Y+Rc), s	* 6	* 6		* 6.2	* 6	* 6		* 6.2				
Max Green Setting (Gmax), s	* 6	* 37		* 19	* 6	* 37		* 19				
Max Q Clear Time (g_c+I1), s	4.6	2.0		11.5	3.6	12.2		10.3				
Green Ext Time (p_c), s	0.0	0.8		0.4	0.0	0.9		0.4				
Intersection Summary												
HCM 6th Ctrl Delay	11.0											
HCM 6th LOS	B											
Notes												

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Background Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	34	12	58	28	22	2	911	64	4	829	166
Future Volume (veh/h)	119	34	12	58	28	22	2	911	64	4	829	166
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	2000	2000	2000	1920	1920	1920	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	161	46	16	76	37	29	2	990	70	4	882	177
Peak Hour Factor	0.74	0.74	0.74	0.76	0.76	0.76	0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	415	379	132	408	267	209	333	2194	979	402	2194	979
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1357	1418	493	1307	997	782	541	3800	1695	541	3800	1695
Grp Volume(v), veh/h	161	0	62	76	0	66	2	990	70	4	882	177
Grp Sat Flow(s),veh/h/ln	1357	0	1911	1307	0	1779	541	1900	1695	541	1900	1695
Q Serve(g_s), s	8.2	0.0	2.0	3.7	0.0	2.3	0.1	0.0	0.0	0.3	10.2	3.9
Cycle Q Clear(g_c), s	10.5	0.0	2.0	5.7	0.0	2.3	10.3	0.0	0.0	0.3	10.2	3.9
Prop In Lane	1.00		0.26	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	415	0	511	408	0	476	333	2195	979	402	2195	979
V/C Ratio(X)	0.39	0.00	0.12	0.19	0.00	0.14	0.01	0.45	0.07	0.01	0.40	0.18
Avail Cap(c_a), veh/h	415	0	511	408	0	476	333	2195	979	402	2195	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	22.2	24.3	0.0	22.3	1.1	0.0	0.0	7.2	9.3	8.0
Incr Delay (d2), s/veh	2.7	0.0	0.5	1.0	0.0	0.6	0.0	0.7	0.1	0.0	0.6	0.4
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(50%),veh/ln	2.9	0.0	0.9	1.3	0.0	1.0	0.0	0.2	0.0	0.0	3.5	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	22.7	25.4	0.0	22.9	1.2	0.7	0.1	7.2	9.8	8.4
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	223				142				1062		1063	
Approach Delay, s/veh	27.2				24.2				0.6		9.6	
Approach LOS	C				C				A		A	
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	52.0		28.0		52.0		28.0					
Change Period (Y+Rc), s	5.8		6.6		5.8		6.6					
Max Green Setting (Gmax), s	46.2		21.4		46.2		21.4					
Max Q Clear Time (g_c+I1), s	12.3		12.5		12.2		7.7					
Green Ext Time (p_c), s	7.8		0.5		7.2		0.4					
Intersection Summary												
HCM 6th Ctrl Delay	8.2											
HCM 6th LOS	A											

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	162	440	494	545	318	326	213	189	300	367	266	267
Average Queue (ft)	86	229	265	398	197	206	102	89	199	178	154	167
95th Queue (ft)	145	401	441	606	291	297	188	166	290	295	253	264
Link Distance (ft)		1376	1376	464	464	464	464		941	941		227
Upstream Blk Time (%)				22								8
Queuing Penalty (veh)				76								27
Storage Bay Dist (ft)	500							500			220	
Storage Blk Time (%)		0								3	3	
Queuing Penalty (veh)		0								13	8	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	180	175	72
Average Queue (ft)	95	105	27
95th Queue (ft)	153	157	57
Link Distance (ft)	227	227	
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			210
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	TR	L	R
Maximum Queue (ft)	38	253	296	28	21	34	108	87
Average Queue (ft)	8	114	167	2	1	3	49	26
95th Queue (ft)	29	210	270	13	11	21	95	69
Link Distance (ft)		252	252	30	30	30		838
Upstream Blk Time (%)		0	1	0	0	0		
Queuing Penalty (veh)		1	9	2	0	2		
Storage Bay Dist (ft)	100						100	
Storage Blk Time (%)		7					3	
Queuing Penalty (veh)		1					1	

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	80	84	124	242	256	227	43	121
Average Queue (ft)	23	27	64	144	137	132	7	46
95th Queue (ft)	64	75	120	222	213	211	28	89
Link Distance (ft)	30	30		505	505			778
Upstream Blk Time (%)	2	2						
Queuing Penalty (veh)	14	17						
Storage Bay Dist (ft)			100			160	100	
Storage Blk Time (%)			8	15	3	4		1
Queuing Penalty (veh)			43	9	16	21		0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	150	173	76	235	236	287	429
Average Queue (ft)	57	75	28	160	178	135	220
95th Queue (ft)	119	139	59	233	250	231	371
Link Distance (ft)	505	505		179	179	548	548
Upstream Blk Time (%)				6	9		0
Queuing Penalty (veh)				33	50		0
Storage Bay Dist (ft)			240				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	55	84
Average Queue (ft)	4	9
95th Queue (ft)	29	46
Link Distance (ft)	1028	1028
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	138	168	142	177	155	198	323	277
Average Queue (ft)	58	77	73	103	68	73	181	94
95th Queue (ft)	118	143	131	164	132	149	282	226
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	2						
Queuing Penalty (veh)	7	13						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							1	0
Queuing Penalty (veh)							1	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement	EB
Directions Served	T
Maximum Queue (ft)	5
Average Queue (ft)	0
95th Queue (ft)	4
Link Distance (ft)	1028
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	83	102	122	44	272	256
Average Queue (ft)	30	39	46	25	170	112
95th Queue (ft)	64	80	94	41	269	228
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				44	4	0
Queuing Penalty (veh)				87	0	0
Storage Bay Dist (ft)						125
Storage Blk Time (%)					23	2
Queuing Penalty (veh)					63	7

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	107
Average Queue (ft)	31
95th Queue (ft)	82
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	192	226	302	62	57	345	311	166
Average Queue (ft)	112	106	164	30	16	225	181	70
95th Queue (ft)	168	182	262	61	44	310	272	123
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				9	2			
Queuing Penalty (veh)				40	9			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	138	164	191	195	247	204	142	76	70
Average Queue (ft)	86	112	131	101	165	124	58	46	22
95th Queue (ft)	126	152	180	172	225	191	107	76	55
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								23	6
Queuing Penalty (veh)								127	34
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	135	98	101	81	96	116	134	50	81	108	96	53
Average Queue (ft)	61	33	42	27	43	49	66	14	34	60	47	16
95th Queue (ft)	114	77	85	59	81	101	120	39	68	100	88	42
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	22	1				0						
Queuing Penalty (veh)	16	1				0						

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	154	74	76	50	20	77	98	39	29	158	156	61
Average Queue (ft)	61	16	27	18	2	33	44	7	4	95	69	28
95th Queue (ft)	122	47	62	43	10	66	88	28	19	144	127	55
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												0
Queuing Penalty (veh)												0

Zone Summary

Zone wide Queuing Penalty: 750

Appendix 6

Trip Generation Calculations

Building	ITE Land Use	Land Use Code	Units	AM Peak Hour			PM Peak Hour			Weekday
				In	Out	Total	In	Out	Total	
Retail A	Medical-Dental Office Building	720	6,249 SF	16	4	20	7	15	22	225
Retail B	Small Office Building	712	5,600 SF	8	1	9	4	8	12	81
Grocery and Retail C	Shopping Plaza (40-150K), Supermarket - Yes	821	47,708 SF	104	64	168	233	252	485	4,508
Retail D-E	Furniture Store	890	21,003 SF	4	2	6	5	6	11	132
Restaurant A	High-Turnover (Sit-Down) Restaurant	932	6,249 SF	33	27	60	35	22	57	670
Restaurant B	Fine Dining Restaurant	931	10,000 SF	7	0	7	52	26	78	838
Food Service with Drive Through Window	Coffee/Donut Shop with Drive-Through Window	937	2,556 SF	112	108	220	50	50	100	1,366
Food Service	Fast Casual Restaurant	930	9,140 SF	7	6	13	63	52	115	888
Gym	Health/Fitness Club	492	35,292 SF	24	22	46	69	53	122	1,017
Hotel	Hotel	310	101 Rooms	24	19	43	24	23	47	807
Residential	Multifamily Housing (Mid-Rise)	221	170 DU	15	48	63	41	26	67	772
Total				354	301	655	583	533	1,116	11,304
Internal Capture Reductions: 14% a.m. (13% In, 15% Out), 37% p.m. (35% In, 38% Out)				221	2	11	13	26	17	43
				310	1	6	7	17	14	31
				712	2	1	3	2	5	-
				720	4	3	7	4	4	8
				821	12	9	21	79	83	162
				890	0	0	0	2	2	4
				930	1	1	2	23	29	52
				931	1	0	1	19	14	33
				932	5	3	8	13	12	25
				937	17	11	28	19	28	47
Total Internal Capture				45	45	90	205	205	410	-
Total External Trips				309	256	565	378	328	706	11,304
Pass-By Rates, LUC 821: 40% PM				-	-	-	62	68	130	-
Pass-By Rates, LUC 890: 53% PM				-	-	-	2	2	4	-
Pass-By Rates, LUC 930 ¹ : 43% PM				-	-	-	17	10	27	-
Pass-By Rates, LUC 931: 44% PM				-	-	-	15	5	20	-
Pass-By Rates, LUC 932: 43% PM				-	-	-	9	4	13	-
Pass-By Rates, LUC 937 ² : 50% AM; 55% PM				48	49	97	17	12	29	-
Total New Trips				261	207	468	256	227	483	11,304
Total Pass-By Trips				48	49	97	122	101	223	-

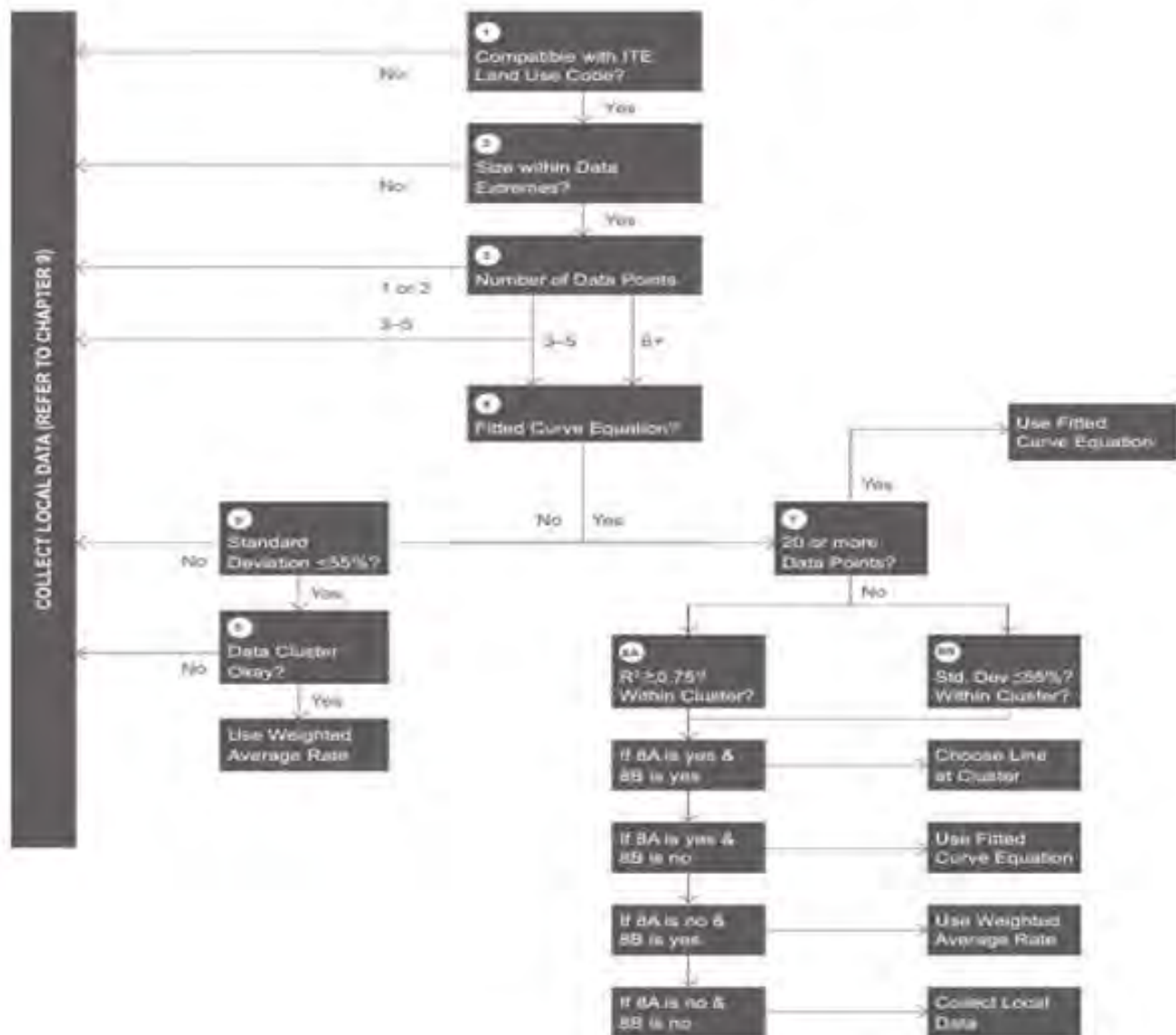
¹Used Pass-By Rates for LUC 932 - High-Turnover (Sit-Down) Restaurant

²Used Pass-By Rates for for LUC 934 - Fast-Food Restaurant with Drive-Through Window

Building	ITE Land Use	Land Use Code	Units	Time Period	Equation	R2	Rate	Pass-By	Studies	Notes
Retail A	Medical-Dental Office Building	720	6,249 SF	AM	$\ln(T)=.90\ln(X)+1.34$	0.8	3.10	-	24	# Studies>20, Use Fitted Curve
				PM	$T=4.07(X)-3.17$	0.77	3.93	-	30	# Studies>20, Use Fitted Curve
				Weekday	$T=42.97(X)-108.01$	0.92	36	-	18	Choose line at closer. Average rate higher.
				AM	-	-	1.67	-	21	Use Average Rate.
Retail B	Small Office Building	712	5,600 SF	PM	-	-	2.61	-	21	Use Average Rate.
				Weekday	-	-	14.39	-	21	Use Average Rate.
				AM	-	-	3.53	-	16	Use average rate.
				PM	$T=7.67(X)+118.86$	0.62	9.03	40	51	# Studies>20, Use Fitted Curve
Grocery and Retail C	Shopping Plaza (40-150K), Supermarket - Yes	821	47,708 SF	Weekday	$T=76.96(X)+1412.79$	0.5	94.49	-	17	Use average rate.
				AM	$T=0.24(X)+0.94$	0.58	0.26	-	20	# Studies>20, Use Fitted Curve
				PM	$\ln(T)=0.85\ln(X)-0.18$	0.52	0.52	53	26	# Studies>20, Use Fitted Curve
				Weekday	$T=5.17(X)+46.56$	0.67	6.30	-	19	Use Average Rate.
Restaurant A	High-Turnover (Sit-Down) Restaurant	932	6,249 SF	AM	-	-	9.57	-	37	Use Average Rate.
				PM	-	-	9.05	43	104	Use Average Rate.
				Weekday	-	-	107.2	-	50	Use Average Rate.
				AM	-	-	0.73	-	7	Use Average Rate.
Restaurant B	Fine Dining Restaurant	931	10,000 SF	PM	-	-	7.8	44	19	Use Average Rate.
				Weekday	-	-	83.84	-	10	Use Average Rate.
				AM	-	-	85.88	50	78	Use Average Rate.
				PM	-	-	38.99	55	36	Use Average Rate.
Food Service with Drive Through Window	Coffee/Donut Shop with Drive-Through Window	937	2,556 SF	Weekday	-	-	533.57	-	6	Use Average Rate.
				AM	-	-	1.43	-	1	Use Average Rate.
				PM	$T=17.96(X)-15.94$	0.65	12.55	43	15	Use Average Rate.
				Weekday	-	-	97.14	-	1	Use Average Rate.
Gym	Health/Fitness Club	492	35,292 SF	AM	-	-	1.31	-	6	Use Average Rate.
				PM	$\ln(T)=0.67\ln(X)+2.44$	0.67	3.45	-	8	Use Average Rate.
				Weekday ¹	$\ln(T)=0.98\ln(X)+3.42$	0.74	28.82	-	4	Use Average Rate.
				AM	$T=0.50(X)-7.45$	0.84	0.46	-	28	# Studies>20, Use Fitted Curve
Hotel	Hotel	310	101 Rooms	PM	$T=0.74(X)-27.89$	0.78	0.59	-	31	# Studies>20, Use Fitted Curve
				Weekday	$T=10.84(X)-423.51$	0.85	7.99	-	7	Choose line at closer. Average rate higher.
				AM	$T=0.44(X)-11.61$	0.91	0.37	-	30	# Studies>20, Use Fitted Curve
				PM	$T=0.39(X)+0.34$	0.91	0.39	-	31	# Studies>20, Use Fitted Curve
Residential	Multifamily Housing (Mid-Rise)	221	170 DU	Weekday	$T=4.77(X)-46.46$	0.93	4.54	-	11	Choose line at closer. Average rate slightly higher.

¹Used Weekday Calculations for LUC 495 - Recreational Community Center

**Figure 4.2 Process for Selecting Average Rate or Equation
in Trip Generation Manual Data**



NCHRP 8-51 Internal Trip Capture Estimation Tool					
Project Name:	NEC Six Mile Road and Haggerty Road			Organization:	Fishbeck
Project Location:	Livonia, MI			Performed By:	AMW
Scenario Description:	Future - Shopping Plaza LUC			Date:	5/11/2023
Analysis Year:	2023			Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				29	24	5
Retail				174	108	66
Restaurant				300	159	141
Cinema/Entertainment				0		
Residential				63	15	48
Hotel				43	24	19
All Other Land Uses ²				46	24	22
Total				655	354	301

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses ²						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	3	0	0	0
Retail	1		9	0	0	0
Restaurant	3	9		0	1	1
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	10	0		0
Hotel	1	3	2	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	655	354	301
Internal Capture Percentage	14%	13%	15%
External Vehicle-Trips ³	565	309	256
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	25%	80%
Retail	12%	15%
Restaurant	15%	10%
Cinema/Entertainment	N/A	N/A
Residential	7%	23%
Hotel	4%	32%

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool					
Project Name:	NEC Six Mile Road and Haggerty Road			Organization:	Fishbeck
Project Location:	Livonia, MI			Performed By:	AMW
Scenario Description:	Future - Shopping Plaza LUC			Date:	5/11/2023
Analysis Year:	2023			Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				34	11	23
Retail				496	238	258
Restaurant				350	200	150
Cinema/Entertainment				0		
Residential				67	41	26
Hotel				47	24	23
All Other Land Uses ²				122	69	53
Total				1116	583	533

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	1	0	0	0
Retail	3		58	0	19	4
Restaurant	3	62		0	7	11
Cinema/Entertainment	0	0	0		0	0
Residential	1	11	5	0		1
Hotel	0	4	10	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,116	583	533
Internal Capture Percentage	37%	35%	38%
External Vehicle-Trips ³	706	378	328
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	64%	26%
Retail	34%	33%
Restaurant	37%	55%
Cinema/Entertainment	N/A	N/A
Residential	63%	69%
Hotel	67%	61%

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

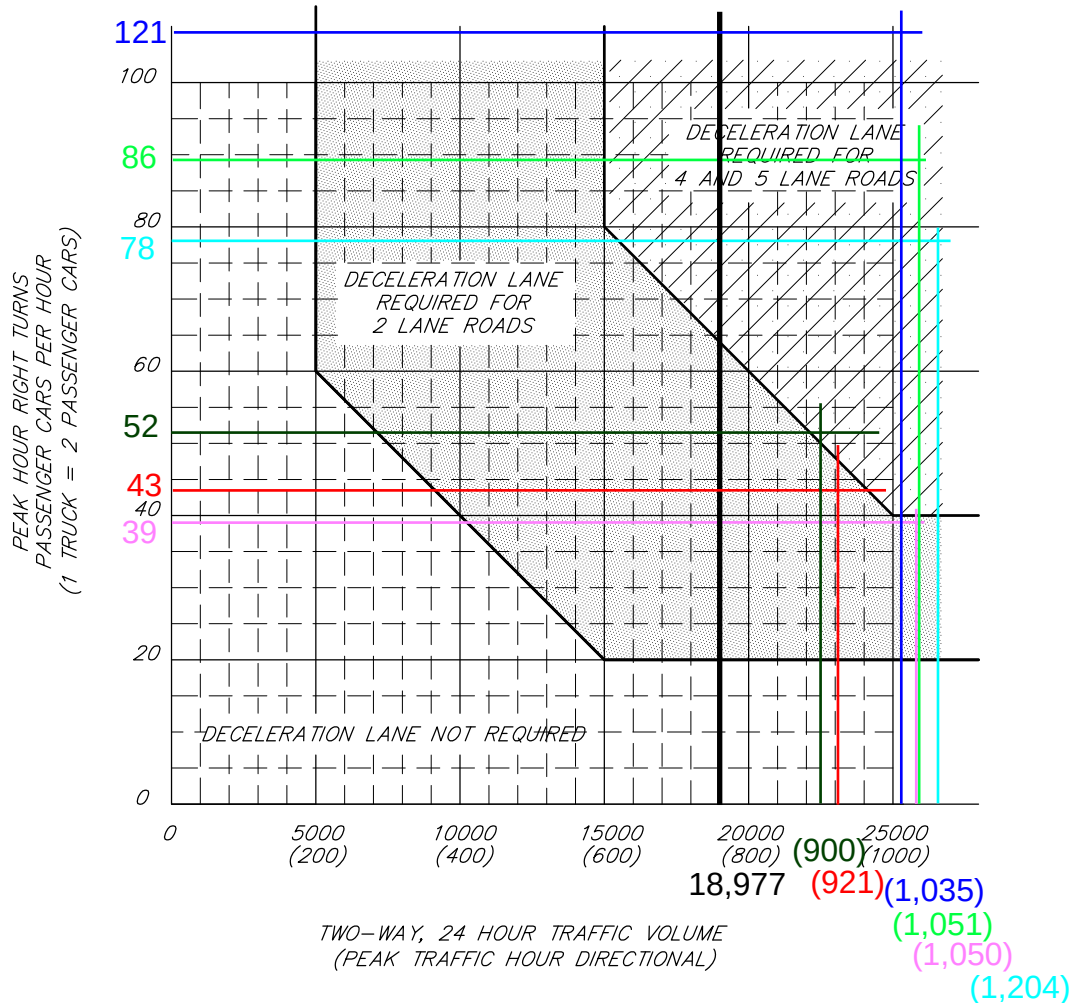
Appendix 7

Turn Lane Warrants

Haggerty Road and College Parkway a.m. Peak Hour
Haggerty Road and College Parkway p.m. Peak Hour
Haggerty Road and North Site Driveway a.m. Peak Hour
Haggerty Road and North Site Driveway p.m. Peak Hour
Haggerty Road and Middle Site Driveway a.m. Peak Hour
Haggerty Road and Middle Site Driveway p.m. Peak Hour

WARRANT FOR RIGHT TURN DECELERATION LANE

(BASED ON ULTIMATE DEVELOPMENT)



REVISION DATE:

DIRECTOR OF ENGINEERING

DIVISION PERMIT ENGINEER

WAYNE COUNTY DEPARTMENT OF PUBLIC SERVICES
ENGINEERING DIVISION/PERMIT OFFICE
PERMIT STANDARDS

WARRANT FOR RIGHT TURN DECELERATION LANE

SCALE
NOT TO SCALE

AL-4

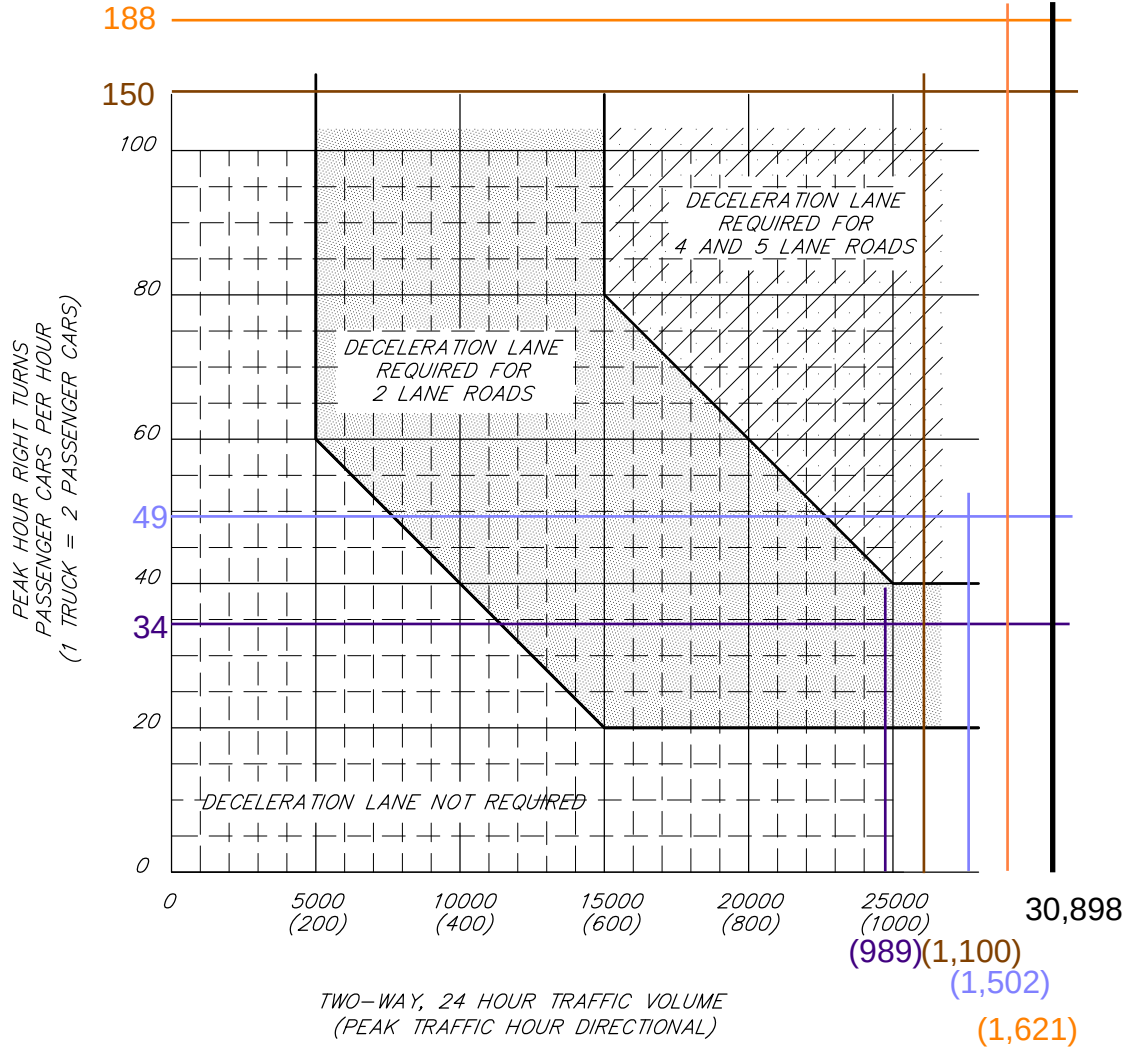
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1 OF 1

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Six Mile Road and East Site Driveway a.m. Peak Hour
 Six Mile Road and East Site Driveway p.m. Peak Hour
 Six Mile Road and Fox Drive a.m. Peak Hour
 Six Mile Road and Fox Drive p.m. Peak Hour

WARRANT FOR RIGHT TURN DECELERATION LANE

(BASED ON ULTIMATE DEVELOPMENT)



REVISION DATE:

DIRECTOR OF ENGINEERING

DIVISION PERMIT ENGINEER

WAYNE COUNTY DEPARTMENT OF PUBLIC SERVICES
 ENGINEERING DIVISION/PERMIT OFFICE
 PERMIT STANDARDS

WARRANT FOR RIGHT TURN DECELERATION LANE

SCALE
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Appendix 8

Future LOS Output Reports

HCM 6th Signalized Intersection Summary 100: Haggerty Road & Six Mile Road

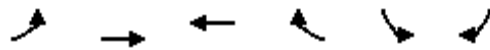
2025 Future Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	729	37	303	412	263	96	611	386	139	276	65
Future Volume (veh/h)	177	729	37	303	412	263	96	611	386	139	276	65
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	1984	1984	1984	1984	1984	1984	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	190	784	40	319	434	277	113	719	454	156	310	73
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	2	2	2
Cap, veh/h	585	839	43	502	867	387	327	806	359	197	819	365
Arrive On Green	0.22	0.23	0.23	0.22	0.23	0.23	0.05	0.22	0.22	0.05	0.22	0.22
Sat Flow, veh/h	1890	3650	186	1890	3770	1682	1845	3681	1642	1875	3741	1668
Grp Volume(v), veh/h	190	405	419	319	434	277	113	719	454	156	310	73
Grp Sat Flow(s),veh/h/ln	1890	1885	1951	1890	1885	1682	1845	1841	1642	1875	1870	1668
Q Serve(g_s), s	0.0	19.0	19.0	9.0	9.0	13.7	0.0	17.1	19.7	2.8	6.4	3.2
Cycle Q Clear(g_c), s	0.0	19.0	19.0	9.0	9.0	13.7	0.0	17.1	19.7	2.8	6.4	3.2
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	585	434	449	502	867	387	327	806	359	197	819	365
V/C Ratio(X)	0.32	0.93	0.93	0.64	0.50	0.72	0.35	0.89	1.26	0.79	0.38	0.20
Avail Cap(c_a), veh/h	585	434	449	502	867	387	507	806	359	379	819	365
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	34.0	34.0	29.8	30.2	31.9	32.3	34.1	35.2	40.6	29.9	28.7
Incr Delay (d2), s/veh	0.3	29.4	28.8	2.6	2.1	10.8	0.6	14.3	138.9	7.0	1.3	1.2
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(50%),veh/ln	3.1	11.6	12.0	6.0	4.1	6.4	2.1	8.7	21.2	3.6	2.8	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	63.4	62.8	32.5	32.2	42.8	32.9	48.4	174.1	47.6	31.3	29.9
LnGrp LOS	C	E	E	C	C	D	C	D	F	D	C	C
Approach Vol, veh/h	1014			1030			1286			539		
Approach Delay, s/veh	56.0			35.1			91.4			35.8		
Approach LOS	E			D			F			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.8	27.0	11.2	26.0	25.8	27.0	11.2	26.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	10.7	20.7	13.7	19.7	10.7	20.7	13.7	19.7				
Max Q Clear Time (g_c+l1), s	2.0	15.7	2.0	8.4	11.0	21.0	4.8	21.7				
Green Ext Time (p_c), s	0.3	0.3	0.2	0.3	0.0	0.0	0.2	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	59.4											
HCM 6th LOS	E											

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Future Conditions
a.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	62	1184	950	150	99	39
Future Volume (vph)	62	1184	950	150	99	39
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1863	3725	5295		1900	1700
Flt Permitted	0.23	1.00	1.00		0.95	1.00
Satd. Flow (perm)	450	3725	5295		1900	1700
Peak-hour factor, PHF	0.93	0.93	0.94	0.94	0.61	0.61
Adj. Flow (vph)	67	1273	1011	160	162	64
RTOR Reduction (vph)	0	0	36	0	0	56
Lane Group Flow (vph)	67	1273	1135	0	162	8
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	38.2	38.2	57.6		9.9	9.9
Effective Green, g (s)	38.2	38.2	49.8		9.9	9.9
Actuated g/C Ratio	0.48	0.48	0.62		0.12	0.12
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	214	1778	3296		235	210
v/s Ratio Prot		c0.34	c0.21		c0.09	
v/s Ratio Perm	0.15					0.00
v/c Ratio	0.31	0.72	0.34		0.69	0.04
Uniform Delay, d1	12.8	16.6	7.3		33.6	30.9
Progression Factor	1.00	1.00	0.03		1.00	1.00
Incremental Delay, d2	3.8	2.5	0.1		8.2	0.1
Delay (s)	16.6	19.1	0.2		41.7	30.9
Level of Service	B	B	A		D	C
Approach Delay (s)		19.0	0.2		38.7	
Approach LOS		B	A		D	
Intersection Summary						
HCM 2000 Control Delay			12.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			55.0%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Future Conditions
a.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1274	9	83	1097	3	58
Future Volume (vph)	1274	9	83	1097	3	58
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3722		1881	5406	1810	1619
Flt Permitted	1.00		0.19	1.00	0.95	1.00
Satd. Flow (perm)	3722		370	5406	1810	1619
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.71	0.71
Adj. Flow (vph)	1416	10	87	1155	4	82
RTOR Reduction (vph)	1	0	0	0	0	74
Lane Group Flow (vph)	1425	0	87	1155	4	8
Heavy Vehicles (%)	2%	2%	1%	1%	5%	5%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	58.2		38.2	38.2	7.6	7.6
Effective Green, g (s)	58.2		38.2	38.2	7.6	7.6
Actuated g/C Ratio	0.73		0.48	0.48	0.09	0.09
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2707		176	2581	171	153
v/s Ratio Prot	c0.38			0.21	0.00	
v/s Ratio Perm			0.24			c0.00
v/c Ratio	0.53		0.49	0.45	0.02	0.05
Uniform Delay, d1	4.8		14.3	13.9	32.8	32.9
Progression Factor	0.00		0.85	0.85	1.00	1.00
Incremental Delay, d2	0.1		8.1	0.5	0.1	0.1
Delay (s)	0.1		20.1	12.3	32.9	33.1
Level of Service	A		C	B	C	C
Approach Delay (s)	0.1			12.8	33.1	
Approach LOS	A			B	C	
Intersection Summary						
HCM 2000 Control Delay			6.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			68.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

2025 Future Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↗		↗
Traffic Volume (veh/h)	0	947	385	0	721	0	0	0	0	250	0	459
Future Volume (veh/h)	0	947	385	0	721	0	0	0	0	250	0	459
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1969	1969	0	1969	0				1984	0	1984
Adj Flow Rate, veh/h	0	1029	418	0	848	0				266	0	488
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	0	2	0				1	0	1
Cap, veh/h	0	2142	955	0	2142	0				520	0	462
Arrive On Green	0.00	0.57	0.57	0.00	1.00	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3839	1668	0	3938	0				1890	0	1682
Grp Volume(v), veh/h	0	1029	418	0	848	0				266	0	488
Grp Sat Flow(s),veh/h/ln	0	1870	1668	0	1870	0				1890	0	1682
Q Serve(g_s), s	0.0	13.0	11.4	0.0	0.0	0.0				9.5	0.0	22.0
Cycle Q Clear(g_c), s	0.0	13.0	11.4	0.0	0.0	0.0				9.5	0.0	22.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2142	955	0	2142	0				520	0	462
V/C Ratio(X)	0.00	0.48	0.44	0.00	0.40	0.00				0.51	0.00	1.06
Avail Cap(c_a), veh/h	0	2142	955	0	2142	0				520	0	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.1	9.8	0.0	0.0	0.0				24.5	0.0	29.0
Incr Delay (d2), s/veh	0.0	0.8	1.5	0.0	0.5	0.0				3.6	0.0	57.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.4	3.7	0.0	0.2	0.0				4.7	0.0	15.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.9	11.2	0.0	0.5	0.0				28.0	0.0	86.2
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h		1447			848						754	
Approach Delay, s/veh		11.0			0.5						65.7	
Approach LOS		B			A						E	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				51.8		28.2		51.8				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 46		22.0		* 46				
Max Q Clear Time (g_c+I1), s				15.0		24.0		2.0				
Green Ext Time (p_c), s				9.9		0.0		6.3				
Intersection Summary												
HCM 6th Ctrl Delay			21.6									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Future Conditions
a.m. Peak Hour

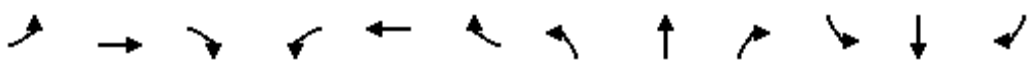
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘	↗
Traffic Volume (vph)	699	0	0	1053	286	267
Future Volume (vph)	699	0	0	1053	286	267
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.96	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3689			5353	3530	1517
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3689			5353	3530	1517
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.90	0.90
Adj. Flow (vph)	736	0	0	1239	318	297
RTOR Reduction (vph)	0	0	0	0	61	92
Lane Group Flow (vph)	736	0	0	1239	361	101
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	56.4			56.4	11.1	11.1
Effective Green, g (s)	56.4			56.4	11.1	11.1
Actuated g/C Ratio	0.70			0.70	0.14	0.14
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2600			3773	489	210
v/s Ratio Prot	0.20			c0.23	c0.10	
v/s Ratio Perm						0.07
v/c Ratio	0.28			0.33	0.74	0.48
Uniform Delay, d1	4.3			4.5	33.1	31.8
Progression Factor	0.69			0.44	1.00	1.00
Incremental Delay, d2	0.2			0.2	5.0	0.6
Delay (s)	3.2			2.2	38.0	32.4
Level of Service	A			A	D	C
Approach Delay (s)	3.2			2.2	36.3	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			10.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.40			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			40.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

2025 Future Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	876	103	2	317	0	0	0	175
Future Volume (vph)	0	0	0	0	876	103	2	317	0	0	0	175
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.98			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5268			1980				2905
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5268			1980				2905
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	0	0	0	0	952	112	2	356	0	0	0	203
RTOR Reduction (vph)	0	0	0	0	18	0	0	25	0	0	0	50
Lane Group Flow (vph)	0	0	0	0	1046	0	0	333	0	0	0	154
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type					NA		Perm	NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					33.2			35.0				35.0
Effective Green, g (s)					33.2			35.0				35.0
Actuated g/C Ratio					0.42			0.44				0.44
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2186			866				1270
v/s Ratio Prot					c0.20							0.05
v/s Ratio Perm								0.17				
v/c Ratio					0.48			0.38				0.12
Uniform Delay, d1					17.1			15.2				13.4
Progression Factor					0.29			0.78				1.00
Incremental Delay, d2					0.6			1.3				0.2
Delay (s)					5.6			13.1				13.6
Level of Service					A			B				B
Approach Delay (s)		0.0			5.6			13.1			13.6	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			8.3									
HCM 2000 Level of Service										A		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			80.0							11.8		
Intersection Capacity Utilization			58.7%									
ICU Level of Service										B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Future Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑			↑↑	↑
Traffic Volume (vph)	0	0	0	0	1011	145	0	840	0	0	529	142
Future Volume (vph)	0	0	0	0	1011	145	0	840	0	0	529	142
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5252			3689			3689	1650
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5252			3689			3689	1650
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	0	1136	163	0	903	0	0	630	169
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1276	0	0	903	0	0	630	143
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2212			1443			1535	686
v/s Ratio Prot					c0.24			c0.24			0.17	
v/s Ratio Perm												0.09
v/c Ratio					0.58			0.63			0.41	0.21
Uniform Delay, d1					17.7			19.6			16.4	14.9
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.1			1.7			0.8	0.7
Delay (s)					18.8			3.4			17.3	15.6
Level of Service					B			A			B	B
Approach Delay (s)		0.0			18.8			3.4			16.9	
Approach LOS		A			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.7		HCM 2000 Level of Service						B	
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)						15.0	
Intersection Capacity Utilization			61.2%		ICU Level of Service						B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Future Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑					↑↑	↑		↑↑	
Traffic Volume (vph)	0	421	251	0	0	0	0	840	282	0	529	0
Future Volume (vph)	0	421	251	0	0	0	0	840	282	0	529	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5353	1667					3689	1650		3689	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5353	1667					3689	1650		3689	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	463	276	0	0	0	0	903	303	0	630	0
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	152	0	0	0
Lane Group Flow (vph)	0	463	201	0	0	0	0	903	151	0	630	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2254	702					1535	686		1443	
v/s Ratio Prot		0.09						c0.24			0.17	
v/s Ratio Perm			c0.12						0.09			
v/c Ratio		0.21	0.29					0.59	0.22		0.44	
Uniform Delay, d1		14.7	15.2					18.1	15.0		17.9	
Progression Factor		0.76	0.66					1.00	1.00		0.10	
Incremental Delay, d2		0.2	1.0					1.7	0.7		0.9	
Delay (s)		11.4	11.0					19.7	15.7		2.6	
Level of Service		B	B					B	B		A	
Approach Delay (s)		11.3			0.0			18.7			2.6	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.6									
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			61.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Future Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	10	43	26	3	17	32	816	52	19	349	72
Future Volume (veh/h)	67	10	43	26	3	17	32	816	52	19	349	72
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	1953	1953	1953	1890	1890	1890	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	80	12	51	36	4	24	39	995	63	22	411	85
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.82	0.82	0.82	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	33	139	175	24	142	68	2421	1080	45	2376	1060
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.04	0.65	0.65	0.05	1.00	1.00
Sat Flow, veh/h	1371	325	1380	1285	234	1404	1875	3741	1668	1875	3741	1668
Grp Volume(v), veh/h	80	0	63	36	0	28	39	995	63	22	411	85
Grp Sat Flow(s),veh/h/ln	1371	0	1705	1285	0	1637	1875	1870	1668	1875	1870	1668
Q Serve(g_s), s	4.5	0.0	2.8	2.2	0.0	1.3	1.6	10.2	1.1	0.9	0.0	0.0
Cycle Q Clear(g_c), s	5.8	0.0	2.8	4.9	0.0	1.3	1.6	10.2	1.1	0.9	0.0	0.0
Prop In Lane	1.00		0.81	1.00		0.86	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	207	0	172	175	0	165	68	2421	1080	45	2376	1060
V/C Ratio(X)	0.39	0.00	0.37	0.21	0.00	0.17	0.57	0.41	0.06	0.49	0.17	0.08
Avail Cap(c_a), veh/h	391	0	401	348	0	385	141	2421	1080	141	2376	1060
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98
Uniform Delay (d), s/veh	35.5	0.0	33.6	35.9	0.0	32.9	37.9	6.8	5.2	37.6	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.3	0.6	0.0	0.5	7.4	0.5	0.1	7.7	0.2	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(50%),veh/ln	1.6	0.0	1.2	0.7	0.0	0.5	0.9	3.1	0.3	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.7	0.0	34.9	36.4	0.0	33.4	45.4	7.3	5.3	45.3	0.2	0.1
LnGrp LOS	D	A	C	D	A	C	D	A	A	D	A	A
Approach Vol, veh/h	143		64				1097				518	
Approach Delay, s/veh	35.9		35.1				8.5				2.1	
Approach LOS	D		D				A				A	
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	8.9	56.8	14.3		7.9	57.8	14.3					
Change Period (Y+Rc), s	* 6	* 6	* 6.2		* 6	* 6	* 6.2					
Max Green Setting (Gmax), s	* 6	* 37	* 19		* 6	* 37	* 19					
Max Q Clear Time (g_c+I1), s	3.6	2.0	7.8		2.9	12.2	6.9					
Green Ext Time (p_c), s	0.0	0.4	0.4		0.0	1.1	0.1					
Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									
Notes												

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Future Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	35	3	15	3	6	3	805	92	5	422	65
Future Volume (veh/h)	99	35	3	15	3	6	3	805	92	5	422	65
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	1969	1969	1969	1875	1875	1875	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	127	45	4	19	4	8	4	947	108	6	502	77
Peak Hour Factor	0.78	0.78	0.78	0.80	0.80	0.80	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	1	1	1
Cap, veh/h	458	477	42	411	149	299	518	2160	964	401	2177	971
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1402	1782	158	1292	558	1116	835	3741	1668	539	3770	1682
Grp Volume(v), veh/h	127	0	49	19	0	12	4	947	108	6	502	77
Grp Sat Flow(s),veh/h/ln	1402	0	1940	1292	0	1674	835	1870	1668	539	1885	1682
Q Serve(g_s), s	5.9	0.0	1.5	0.9	0.0	0.4	0.0	0.0	0.0	0.4	5.2	1.6
Cycle Q Clear(g_c), s	6.3	0.0	1.5	2.4	0.0	0.4	5.2	0.0	0.0	0.4	5.2	1.6
Prop In Lane	1.00		0.08	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	458	0	519	411	0	448	518	2160	964	401	2177	971
V/C Ratio(X)	0.28	0.00	0.09	0.05	0.00	0.03	0.01	0.44	0.11	0.01	0.23	0.08
Avail Cap(c_a), veh/h	458	0	519	411	0	448	518	2160	964	401	2177	971
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	22.0	22.9	0.0	21.6	0.3	0.0	0.0	7.2	8.2	7.5
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.2	0.0	0.1	0.0	0.6	0.2	0.1	0.2	0.2
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(50%),veh/ln	2.1	0.0	0.7	0.3	0.0	0.2	0.0	0.2	0.1	0.0	1.8	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	22.4	23.1	0.0	21.7	0.3	0.6	0.2	7.3	8.5	7.6
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	176			31			1059			585		
Approach Delay, s/veh	24.6			22.6			0.6			8.4		
Approach LOS	C			C			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	7.2			8.3			7.2			4.4		
Green Ext Time (p_c), s	7.8			0.5			3.6			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	5.7											
HCM 6th LOS	A											

HCM Unsignalized Intersection Capacity Analysis

1000: East Site Driveway & Six Mile Road

2025 Future Conditions
a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1246	8	0	955	34	0	0	0	0	0	23
Future Volume (Veh/h)	0	1246	8	0	955	34	0	0	0	0	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1340	9	0	1005	36	0	0	0	0	0	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLT			TWLT							
Median storage (veh)		2			2							
Upstream signal (ft)		568			325							
pX, platoon unblocked	0.94			0.80			0.83	0.83	0.80	0.83	0.83	0.94
vC, conflicting volume	1041			1349			1621	2386	674	1693	2372	269
vC1, stage 1 conf vol							1344	1344		1023	1023	
vC2, stage 2 conf vol							276	1041		670	1349	
vCu, unblocked vol	727			926			789	1715	79	877	1699	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	98
cM capacity (veh/h)	820			589			226	232	768	348	233	1020
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1				
Volume Total	893	456	168	335	335	204	0	25				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	9	0	0	0	36	0	25				
cSH	1700	1700	589	1700	1700	1700	1700	1020				
Volume to Capacity	0.53	0.27	0.00	0.20	0.20	0.12	0.00	0.02				
Queue Length 95th (ft)	0	0	0	0	0	0	0	2				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6				
Lane LOS							A	A				
Approach Delay (s)	0.0		0.0				0.0	8.6				
Approach LOS							A	A				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			36.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM 6th TWSC
1200: Haggerty Road & Middle Site Driveway

2025 Future Conditions
a.m. Peak Hour

Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	2	0	57	35	0	44	90	875	86	25	388	10
Future Vol, veh/h	2	0	57	35	0	44	90	875	86	25	388	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	100	-	150	100	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	60	60	60	86	86	86	90	90	90
Heavy Vehicles, %	2	2	2	0	0	0	2	2	2	3	3	3
Mvmt Flow	3	0	78	58	0	73	105	1017	100	28	431	11

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1206	1814	216	1499	1725	509	442	0	0	1117	0	0
Stage 1	487	487	-	1227	1227	-	-	-	-	-	-	-
Stage 2	719	1327	-	272	498	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.5	6.5	6.9	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.5	4	3.3	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	139	77	789	86	90	515	1114	-	-	615	-	-
Stage 1	531	549	-	192	253	-	-	-	-	-	-	-
Stage 2	386	223	-	716	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	107	67	789	69	78	515	1114	-	-	615	-	-
Mov Cap-2 Maneuver	107	67	-	69	78	-	-	-	-	-	-	-
Stage 1	481	524	-	174	229	-	-	-	-	-	-	-
Stage 2	300	202	-	616	523	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.3		81.5		0.7		0.7	
HCM LOS	B		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1114	-	-	649 69 515	615	-	-
HCM Lane V/C Ratio	0.094	-	-	0.125 0.845 0.142	0.045	-	-
HCM Control Delay (s)	8.6	-	-	11.3 167.5 13.1	11.1	-	-
HCM Lane LOS	A	-	-	B F B	B	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.4 4.1 0.5	0.1	-	-

HCM 6th TWSC
1300: Haggerty Road & North Site Driveway

2025 Future Conditions
a.m. Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	22	878	43	11	407
Future Vol, veh/h	16	22	878	43	11	407
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	195	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	84	84	88	88
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	17	24	1045	51	13	463

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1303	523	0	0	1096	0
Stage 1	1045	-	-	-	-	-
Stage 2	258	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	152	499	-	-	627	-
Stage 1	300	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	149	499	-	-	627	-
Mov Cap-2 Maneuver	246	-	-	-	-	-
Stage 1	300	-	-	-	-	-
Stage 2	745	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 246 499	627	-
HCM Lane V/C Ratio	-	- 0.071 0.048	0.02	-
HCM Control Delay (s)	-	- 20.7 12.6	10.9	-
HCM Lane LOS	-	- C B	B	-
HCM 95th %tile Q(veh)	-	- 0.2 0.2	0.1	-

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	188	301	325	475	144	160	163	129	335	392	270	167
Average Queue (ft)	94	162	199	279	68	81	62	61	176	162	143	81
95th Queue (ft)	159	264	293	467	123	138	128	110	279	307	256	145
Link Distance (ft)		1376	1376	464	464	464	464		941	941		
Upstream Blk Time (%)				3								
Queuing Penalty (veh)				8								
Storage Bay Dist (ft)	500							500			220	350
Storage Blk Time (%)									0	4	2	
Queuing Penalty (veh)									0	16	8	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	114	127	60
Average Queue (ft)	55	62	24
95th Queue (ft)	98	115	50
Link Distance (ft)	673	673	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		210	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	TR	L	R
Maximum Queue (ft)	123	299	348	54	41	68	144	58
Average Queue (ft)	44	126	207	8	6	10	60	23
95th Queue (ft)	94	264	349	36	26	38	115	51
Link Distance (ft)		254	254	34	34	34		838
Upstream Blk Time (%)		1	5	0	0	0		
Queuing Penalty (veh)		5	33	2	1	2		
Storage Bay Dist (ft)	100						200	
Storage Blk Time (%)	1	7						
Queuing Penalty (veh)	8	5						

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	76	80	130	201	167	189	52	111
Average Queue (ft)	19	25	58	86	75	101	4	41
95th Queue (ft)	58	68	116	160	135	176	27	84
Link Distance (ft)	34	34		507	507			778
Upstream Blk Time (%)	1	1						
Queuing Penalty (veh)	4	9						
Storage Bay Dist (ft)			250			160	100	
Storage Blk Time (%)				0	0	2		1
Queuing Penalty (veh)				0	1	6		0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	129	150	62	170	186	201	231
Average Queue (ft)	45	65	21	72	88	116	127
95th Queue (ft)	105	132	47	135	157	185	206
Link Distance (ft)	507	507		179	179	548	548
Upstream Blk Time (%)				0	1		
Queuing Penalty (veh)				1	2		
Storage Bay Dist (ft)			240				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	116	157	82	115	89	241	317	238
Average Queue (ft)	54	70	25	51	36	81	180	67
95th Queue (ft)	104	130	63	98	76	185	279	178
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	2						
Queuing Penalty (veh)	2	7						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							1	0
Queuing Penalty (veh)							1	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement	EB
Directions Served	T
Maximum Queue (ft)	4
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	1028
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	84	118	165	45	122	86
Average Queue (ft)	22	43	75	26	54	23
95th Queue (ft)	56	89	142	42	103	62
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				34		
Queuing Penalty (veh)				108		
Storage Bay Dist (ft)						125
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	148
Average Queue (ft)	50
95th Queue (ft)	117
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	175	237	329	65	41	199	171	107
Average Queue (ft)	101	113	181	30	11	126	65	43
95th Queue (ft)	153	204	290	62	34	185	141	86
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				10	0			
Queuing Penalty (veh)				44	2			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	89	96	109	112	269	245	119	57	42
Average Queue (ft)	45	53	50	54	161	126	51	18	5
95th Queue (ft)	80	86	92	94	235	216	94	49	25
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								4	0
Queuing Penalty (veh)								12	1
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	125	82	58	35	78	154	168	43	54	78	60	43
Average Queue (ft)	45	23	20	10	26	45	67	8	15	26	13	10
95th Queue (ft)	88	57	48	29	60	115	144	30	42	65	42	33
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)							0					
Queuing Penalty (veh)							0					
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	14	1				0						
Queuing Penalty (veh)	8	1				0						

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	124	61	47	28	18	112	134	58	32	114	96	42
Average Queue (ft)	49	16	8	5	1	46	57	15	3	54	37	14
95th Queue (ft)	97	48	28	19	9	90	109	42	17	98	77	38
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 1000: East Site Driveway & Six Mile Road

Movement	EB	EB	WB	WB	SB
Directions Served	T	TR	LT	TR	R
Maximum Queue (ft)	33	88	5	9	33
Average Queue (ft)	1	6	0	0	16
95th Queue (ft)	16	41	4	5	39
Link Distance (ft)	464	464		254	388
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 1200: Haggerty Road & Middle Site Driveway

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	LT	R	L	L	R
Maximum Queue (ft)	60	76	60	69	32	3
Average Queue (ft)	23	24	22	23	9	0
95th Queue (ft)	45	54	47	52	28	2
Link Distance (ft)	287	248				
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			150	100	100	10
Storage Blk Time (%)				0		0
Queuing Penalty (veh)				1		0

Intersection: 1300: Haggerty Road & North Site Driveway

Movement	WB	WB	NB	SB
Directions Served	L	R	R	L
Maximum Queue (ft)	49	48	4	30
Average Queue (ft)	13	19	0	7
95th Queue (ft)	40	45	3	27
Link Distance (ft)		366		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50		195	100
Storage Blk Time (%)	1	0		
Queuing Penalty (veh)	0	0		

Zone Summary

Zone wide Queuing Penalty: 297

HCM 6th Signalized Intersection Summary

100: Haggerty Road & Six Mile Road

2025 Future Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	705	71	340	797	355	116	661	455	297	622	116
Future Volume (veh/h)	188	705	71	340	797	355	116	661	455	297	622	116
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	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	202	758	76	378	886	394	123	703	484	323	676	126
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	332	796	80	341	867	387	376	832	371	360	825	368
Arrive On Green	0.13	0.23	0.23	0.13	0.23	0.23	0.14	0.22	0.22	0.14	0.22	0.22
Sat Flow, veh/h	1890	3460	347	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	202	413	421	378	886	394	123	703	484	323	676	126
Grp Sat Flow(s),veh/h/ln	1890	1885	1922	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	5.1	19.4	19.4	12.0	20.7	20.7	0.0	16.0	19.7	10.3	15.4	5.7
Cycle Q Clear(g_c), s	5.1	19.4	19.4	12.0	20.7	20.7	0.0	16.0	19.7	10.3	15.4	5.7
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	332	434	442	341	867	387	376	832	371	360	825	368
V/C Ratio(X)	0.61	0.95	0.95	1.11	1.02	1.02	0.33	0.85	1.30	0.90	0.82	0.34
Avail Cap(c_a), veh/h	332	434	442	341	867	387	403	832	371	387	825	368
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.0	34.2	34.2	37.4	34.7	34.6	32.9	33.7	35.1	36.2	33.5	29.7
Incr Delay (d2), s/veh	3.2	32.8	32.5	81.3	36.2	50.6	0.5	10.3	155.4	21.7	8.9	2.5
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(50%),veh/ln	4.2	12.2	12.4	14.7	13.2	13.3	2.3	8.1	23.6	8.7	7.6	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.2	66.9	66.6	118.7	70.8	85.2	33.4	44.0	190.5	57.9	42.4	32.2
LnGrp LOS	D	E	E	F	F	F	C	D	F	E	D	C
Approach Vol, veh/h	1036			1658			1310			1125		
Approach Delay, s/veh	61.2			85.2			97.1			45.7		
Approach LOS	E			F			F			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.3	27.0	18.7	26.0	18.3	27.0	18.7	26.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	10.7	20.7	13.7	19.7	10.7	20.7	13.7	19.7				
Max Q Clear Time (g_c+I1), s	7.1	22.7	2.0	17.4	14.0	21.4	12.3	21.7				
Green Ext Time (p_c), s	0.2	0.0	0.2	0.3	0.0	0.0	0.2	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	74.7											
HCM 6th LOS	E											

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Future Conditions
p.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	73	1478	1433	188	161	69
Future Volume (vph)	73	1478	1433	188	161	69
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1881	3762	5365		1900	1700
Flt Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	258	3762	5365		1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.88	0.88
Adj. Flow (vph)	77	1556	1508	198	183	78
RTOR Reduction (vph)	0	0	28	0	0	62
Lane Group Flow (vph)	77	1556	1678	0	183	16
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	39.2	39.2	58.6		8.9	8.9
Effective Green, g (s)	39.2	39.2	50.8		8.9	8.9
Actuated g/C Ratio	0.49	0.49	0.63		0.11	0.11
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	126	1843	3406		211	189
v/s Ratio Prot		c0.41	c0.31		c0.10	
v/s Ratio Perm	0.30					0.01
v/c Ratio	0.61	0.84	0.49		0.87	0.08
Uniform Delay, d1	14.9	17.7	7.8		35.0	31.9
Progression Factor	1.00	1.00	0.03		1.00	1.00
Incremental Delay, d2	20.1	4.9	0.1		29.1	0.2
Delay (s)	35.0	22.7	0.3		64.1	32.1
Level of Service	C	C	A		E	C
Approach Delay (s)		23.3	0.3		54.5	
Approach LOS		C	A		D	
Intersection Summary						
HCM 2000 Control Delay			14.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			67.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Future Conditions
p.m. Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↔	↑↑↑	↔	↔
Traffic Volume (vph)	1635	4	62	1613	8	84
Future Volume (vph)	1635	4	62	1613	8	84
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3799		1900	5460	1900	1700
Flt Permitted	1.00		0.13	1.00	0.95	1.00
Satd. Flow (perm)	3799		268	5460	1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.75	0.75
Adj. Flow (vph)	1721	4	65	1698	11	112
RTOR Reduction (vph)	0	0	0	0	0	45
Lane Group Flow (vph)	1725	0	65	1698	11	67
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	58.2		39.2	39.2	7.6	7.6
Effective Green, g (s)	58.2		39.2	39.2	7.6	7.6
Actuated g/C Ratio	0.73		0.49	0.49	0.09	0.09
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2763		131	2675	180	161
v/s Ratio Prot	c0.45			0.31	0.01	
v/s Ratio Perm			0.24			c0.04
v/c Ratio	0.62		0.50	0.63	0.06	0.41
Uniform Delay, d1	5.4		13.7	15.1	33.0	34.1
Progression Factor	0.00		0.97	1.11	1.00	1.00
Incremental Delay, d2	0.2		8.5	0.8	0.1	1.7
Delay (s)	0.2		21.9	17.5	33.1	35.8
Level of Service	A		C	B	C	D
Approach Delay (s)	0.2			17.6	35.6	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			9.9		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			69.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary
400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

2025 Future Conditions
p.m. Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑					↑		↑
Traffic Volume (veh/h)	0	1339	380	0	1146	0	0	0	0	307	0	529
Future Volume (veh/h)	0	1339	380	0	1146	0	0	0	0	307	0	529
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1984	1984	0	2000	0				1969	0	1969
Adj Flow Rate, veh/h	0	1440	409	0	1206	0				334	0	575
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95				0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	0	0	0				2	0	2
Cap, veh/h	0	2159	963	0	2176	0				516	0	459
Arrive On Green	0.00	0.57	0.57	0.00	1.00	0.00				0.28	0.00	0.28
Sat Flow, veh/h	0	3870	1682	0	4000	0				1875	0	1668
Grp Volume(v), veh/h	0	1440	409	0	1206	0				334	0	575
Grp Sat Flow(s),veh/h/ln	0	1885	1682	0	1900	0				1875	0	1668
Q Serve(g_s), s	0.0	21.1	11.0	0.0	0.0	0.0				12.6	0.0	22.0
Cycle Q Clear(g_c), s	0.0	21.1	11.0	0.0	0.0	0.0				12.6	0.0	22.0
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2159	963	0	2176	0				516	0	459
V/C Ratio(X)	0.00	0.67	0.42	0.00	0.55	0.00				0.65	0.00	1.25
Avail Cap(c_a), veh/h	0	2159	963	0	2176	0				516	0	459
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.8	9.7	0.0	0.0	0.0				25.6	0.0	29.0
Incr Delay (d2), s/veh	0.0	1.7	1.4	0.0	1.0	0.0				6.2	0.0	130.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.4	3.6	0.0	0.3	0.0				6.3	0.0	25.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	13.5	11.0	0.0	1.0	0.0				31.8	0.0	159.8
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h	1849				1206					909		
Approach Delay, s/veh	12.9				1.0					112.8		
Approach LOS	B				A					F		
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				51.8		28.2		51.8				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 46		22.0		* 46				
Max Q Clear Time (g_c+I1), s				23.1		24.0		2.0				
Green Ext Time (p_c), s				12.6		0.0		10.5				
Intersection Summary												
HCM 6th Ctrl Delay			32.2									
HCM 6th LOS			C									
Notes												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Future Conditions
p.m. Peak Hour

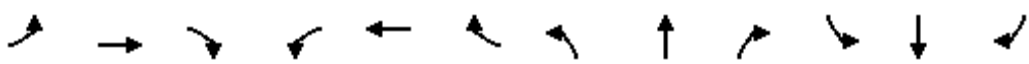
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	1076	0	0	1562	309	266
Future Volume (vph)	1076	0	0	1562	309	266
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.97	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3762			5406	3613	1547
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3762			5406	3613	1547
Peak-hour factor, PHF	0.91	0.91	0.88	0.88	0.87	0.87
Adj. Flow (vph)	1182	0	0	1775	355	306
RTOR Reduction (vph)	0	0	0	0	38	59
Lane Group Flow (vph)	1182	0	0	1775	415	149
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	55.4			55.4	12.1	12.1
Effective Green, g (s)	55.4			55.4	12.1	12.1
Actuated g/C Ratio	0.69			0.69	0.15	0.15
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2605			3743	546	233
v/s Ratio Prot	0.31			c0.33	c0.11	
v/s Ratio Perm						0.10
v/c Ratio	0.45			0.47	0.76	0.64
Uniform Delay, d1	5.5			5.6	32.6	31.9
Progression Factor	0.37			1.37	1.00	1.00
Incremental Delay, d2	0.4			0.4	5.4	4.5
Delay (s)	2.5			8.1	37.9	36.4
Level of Service	A			A	D	D
Approach Delay (s)	2.5			8.1	37.4	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			11.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			50.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

2025 Future Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	1052	83	0	197	0	0	0	510
Future Volume (vph)	0	0	0	0	1052	83	0	197	0	0	0	510
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.99			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5347			1980				2992
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5347			1980				2992
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	0	0	0	0	1119	88	0	212	0	0	0	654
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	0	83
Lane Group Flow (vph)	0	0	0	0	1196	0	0	212	0	0	0	571
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type					NA			NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					43.2			25.0				25.0
Effective Green, g (s)					43.2			25.0				25.0
Actuated g/C Ratio					0.54			0.31				0.31
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2887			618				935
v/s Ratio Prot					c0.22			0.11				c0.19
v/s Ratio Perm												
v/c Ratio					0.41			0.34				0.61
Uniform Delay, d1					10.9			21.2				23.4
Progression Factor					0.63			0.79				1.00
Incremental Delay, d2					0.4			1.4				3.0
Delay (s)					7.3			18.1				26.3
Level of Service					A			B				C
Approach Delay (s)		0.0			7.3			18.1			26.3	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			14.4									
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			69.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Future Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					  			 			 	
Traffic Volume (vph)	0	0	0	0	993	213	0	849	0	0	1064	312
Future Volume (vph)	0	0	0	0	993	213	0	849	0	0	1064	312
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5263			3762			3762	1683
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5263			3762			3762	1683
Peak-hour factor, PHF	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	0	0	0	1045	224	0	894	0	0	1209	355
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1239	0	0	894	0	0	1209	329
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2217			1471			1565	700
v/s Ratio Prot					c0.24			0.24			c0.32	
v/s Ratio Perm												0.20
v/c Ratio					0.56			0.61			0.77	0.47
Uniform Delay, d1					17.5			19.4			20.1	16.9
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.0			1.6			3.8	2.3
Delay (s)					18.5			3.3			23.9	19.2
Level of Service					B			A			C	B
Approach Delay (s)		0.0			18.5			3.3			22.8	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.7		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					15.0		
Intersection Capacity Utilization			67.1%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Future Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↗					↑↑	↗		↑↑	
Traffic Volume (vph)	0	1020	379	0	0	0	0	849	295	0	1064	0
Future Volume (vph)	0	1020	379	0	0	0	0	849	295	0	1064	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5406	1683					3762	1683		3762	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5406	1683					3762	1683		3762	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	1074	399	0	0	0	0	894	311	0	1209	0
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	26	0	0	0
Lane Group Flow (vph)	0	1074	354	0	0	0	0	894	285	0	1209	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2277	708					1565	700		1471	
v/s Ratio Prot		0.20						0.24			c0.32	
v/s Ratio Perm			c0.21						0.17			
v/c Ratio		0.47	0.50					0.57	0.41		0.82	
Uniform Delay, d1		16.7	17.0					17.9	16.4		21.8	
Progression Factor		0.98	0.98					1.00	1.00		0.09	
Incremental Delay, d2		0.7	2.4					1.5	1.8		3.3	
Delay (s)		17.0	19.0					19.4	18.2		5.3	
Level of Service		B	B					B	B		A	
Approach Delay (s)		17.6			0.0			19.1			5.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			14.2		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					15.0		
Intersection Capacity Utilization			67.1%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Future Conditions
p.m. Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	7	63	83	14	58	59	855	121	45	810	97
Future Volume (veh/h)	100	7	63	83	14	58	59	855	121	45	810	97
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			
Adj Sat Flow, veh/h/ln	1984	1984	1984	1920	1920	1920	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	108	8	68	97	16	67	63	919	130	47	853	102
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	0	0	0
Cap, veh/h	234	28	234	237	49	207	89	2183	974	77	2175	970
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.05	0.58	0.58	0.08	1.00	1.00
Sat Flow, veh/h	1325	180	1529	1291	323	1353	1890	3770	1682	1905	3800	1695
Grp Volume(v), veh/h	108	0	76	97	0	83	63	919	130	47	853	102
Grp Sat Flow(s),veh/h/ln	1325	0	1709	1291	0	1676	1890	1885	1682	1905	1900	1695
Q Serve(g_s), s	6.3	0.0	3.2	5.8	0.0	3.5	2.6	10.9	2.8	1.9	0.0	0.0
Cycle Q Clear(g_c), s	9.9	0.0	3.2	8.9	0.0	3.5	2.6	10.9	2.8	1.9	0.0	0.0
Prop In Lane	1.00		0.89	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	234	0	261	237	0	256	89	2183	974	77	2175	970
V/C Ratio(X)	0.46	0.00	0.29	0.41	0.00	0.32	0.71	0.42	0.13	0.61	0.39	0.11
Avail Cap(c_a), veh/h	343	0	402	342	0	394	142	2183	974	143	2175	970
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	34.6	0.0	30.0	34.0	0.0	30.2	37.6	9.4	7.7	36.1	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.6	1.1	0.0	0.7	9.9	0.6	0.3	7.0	0.5	0.2
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(50%),veh/ln	2.1	0.0	1.3	1.9	0.0	1.5	1.4	3.7	0.9	1.0	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.0	30.6	35.1	0.0	30.9	47.4	10.0	8.0	43.1	0.5	0.2
LnGrp LOS	D	A	C	D	A	C	D	A	A	D	A	A
Approach Vol, veh/h	184				180		1112				1002	
Approach Delay, s/veh	33.8				33.2		11.9				2.5	
Approach LOS	C				C		B				A	
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	51.8			18.4	9.2	52.3	18.4					
Change Period (Y+Rc), s * 6	* 6			* 6.2	* 6	* 6	* 6.2					
Max Green Setting (Gmax), s * 6	* 37			* 19	* 6	* 37	* 19					
Max Q Clear Time (g_c+14, s)	2.0			11.9	3.9	12.9	10.9					
Green Ext Time (p_c), s	0.0	0.9	0.4		0.0	1.0	0.4					

Intersection Summary

HCM 6th Ctrl Delay 11.2
HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Future Conditions
p.m. Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	34	12	58	28	22	2	947	64	4	882	166
Future Volume (veh/h)	119	34	12	58	28	22	2	947	64	4	882	166
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	2000	2000	2000	1920	1920	1920	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	161	46	16	76	37	29	2	1029	70	4	938	177
Peak Hour Factor	0.74	0.74	0.74	0.76	0.76	0.76	0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	415	379	132	408	267	209	315	2194	979	391	2194	979
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1357	1418	493	1307	997	782	513	3800	1695	521	3800	1695
Grp Volume(v), veh/h	161	0	62	76	0	66	2	1029	70	4	938	177
Grp Sat Flow(s), veh/h/ln	1357	0	1911	1307	0	1779	513	1900	1695	521	1900	1695
Q Serve(g_s), s	8.2	0.0	2.0	3.7	0.0	2.3	0.1	0.0	0.0	0.3	11.1	3.9
Cycle Q Clear(g_c), s	10.5	0.0	2.0	5.7	0.0	2.3	11.2	0.0	0.0	0.3	11.1	3.9
Prop In Lane	1.00		0.26	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	415	0	511	408	0	476	315	2195	979	391	2195	979
V/C Ratio(X)	0.39	0.00	0.12	0.19	0.00	0.14	0.01	0.47	0.07	0.01	0.43	0.18
Avail Cap(c_a), veh/h	415	0	511	408	0	476	315	2195	979	391	2195	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	22.2	24.3	0.0	22.3	1.3	0.0	0.0	7.2	9.5	8.0
Incr Delay (d2), s/veh	2.7	0.0	0.5	1.0	0.0	0.6	0.0	0.7	0.1	0.0	0.6	0.4
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(50%),veh/ln	2.9	0.0	0.9	1.3	0.0	1.0	0.0	0.2	0.0	0.0	3.8	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	22.7	25.4	0.0	22.9	1.4	0.7	0.1	7.2	10.1	8.4
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	B	A
Approach Vol, veh/h	223			142			1101			1119		
Approach Delay, s/veh	27.2			24.2			0.7			9.8		
Approach LOS	C			C			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	13.2			12.5			13.1			7.7		
Green Ext Time (p_c), s	8.2			0.5			7.8			0.4		

Intersection Summary

HCM 6th Ctrl Delay 8.2
HCM 6th LOS A

HCM Unsignalized Intersection Capacity Analysis

1000: East Site Driveway & Six Mile Road

2025 Future Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1457	0	0	1453	49	0	0	94	0	0	39
Future Volume (Veh/h)	0	1457	0	0	1453	49	0	0	94	0	0	39
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1550	0	0	1562	53	0	0	102	0	0	42
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	568			325								
pX, platoon unblocked	0.86			0.79			0.85	0.85	0.79	0.85	0.85	0.86
vC, conflicting volume	1615			1550			1982	3165	775	2466	3138	417
vC1, stage 1 conf vol							1550	1550		1588	1588	
vC2, stage 2 conf vol							432	1615		877	1550	
vCu, unblocked vol	926			1157			617	2001	172	1183	1970	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	85	100	100	96
cM capacity (veh/h)	640			476			172	175	663	236	177	937
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1				
Volume Total	1033	517	260	521	521	313	102	42				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	0	0	53	102	42				
cSH	1700	1700	476	1700	1700	1700	663	937				
Volume to Capacity	0.61	0.30	0.00	0.31	0.31	0.18	0.15	0.04				
Queue Length 95th (ft)	0	0	0	0	0	0	14	4				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	11.4	9.0				
Lane LOS							B	A				
Approach Delay (s)	0.0		0.0				11.4	9.0				
Approach LOS							B	A				
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	50.5%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM 6th TWSC
1200: Haggerty Road & Middle Site Driveway

2025 Future Conditions
p.m. Peak Hour

Intersection												
Int Delay, s/veh	48.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↕	↕	↔	↕	↔
Traffic Vol, veh/h	2	0	114	52	0	46	124	1002	78	50	869	37
Future Vol, veh/h	2	0	114	52	0	46	124	1002	78	50	869	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	100	-	150	100	-	10
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	63	63	63	91	91	91	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	0	0	0
Mvmt Flow	2	0	130	83	0	73	136	1101	86	56	966	41

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1901	2537	483	1968	2492	551	1007	0	0	1187	0	0
Stage 1	1078	1078	-	1373	1373	-	-	-	-	-	-	-
Stage 2	823	1459	-	595	1119	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	43	28	535	~ 38	30	483	690	-	-	595	-	-
Stage 1	237	297	-	156	215	-	-	-	-	-	-	-
Stage 2	338	196	-	463	285	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	29	20	535	~ 23	22	483	690	-	-	595	-	-
Mov Cap-2 Maneuver	29	20	-	~ 23	22	-	-	-	-	-	-	-
Stage 1	190	269	-	125	173	-	-	-	-	-	-	-
Stage 2	230	157	-	318	258	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	\$ 809.5	1.2	0.6
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	690	-	-	411 23 483	595	-	-
HCM Lane V/C Ratio	0.197	-	-	0.321 3.589 0.151	0.093	-	-
HCM Control Delay (s)	11.5	-	-	17.8 1513.4 13.8	11.7	-	-
HCM Lane LOS	B	-	-	C F B	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-	1.4 10.4 0.5	0.3	-	-

Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon						

HCM 6th TWSC
1300: Haggerty Road & North Site Driveway

2025 Future Conditions
p.m. Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	24	1011	39	26	930
Future Vol, veh/h	26	24	1011	39	26	930
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	195	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	93	93
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	28	26	1099	42	28	1000
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1655	550	0	0	1141	0
Stage 1	1099	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.1	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.2	-
Pot Cap-1 Maneuver	89	479	-	-	620	-
Stage 1	281	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	85	479	-	-	620	-
Mov Cap-2 Maneuver	200	-	-	-	-	-
Stage 1	281	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	19.7	0	0.3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 200 479	620	-		
HCM Lane V/C Ratio	-	- 0.141 0.054	0.045	-		
HCM Control Delay (s)	-	- 25.9 12.9	11.1	-		
HCM Lane LOS	-	- D B	B	-		
HCM 95th %tile Q(veh)	-	- 0.5 0.2	0.1	-		

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	346	647	646	545	478	472	305	126	356	402	270	332
Average Queue (ft)	153	337	366	493	243	255	99	62	197	200	169	185
95th Queue (ft)	390	759	763	654	412	416	215	114	298	348	279	303
Link Distance (ft)		1376	1376	464	464	464	464		941	941		
Upstream Blk Time (%)		0		69	1	0	0					
Queuing Penalty (veh)		0		257	4	1	0					
Storage Bay Dist (ft)	500							500			220	350
Storage Blk Time (%)	0	7							0	3	8	0
Queuing Penalty (veh)	1	13							0	16	26	1

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	283	232	79
Average Queue (ft)	140	148	38
95th Queue (ft)	228	220	70
Link Distance (ft)	673	673	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			210
Storage Blk Time (%)	0	1	
Queuing Penalty (veh)	0	1	

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	TR	L	R
Maximum Queue (ft)	125	343	345	102	79	80	210	380
Average Queue (ft)	86	244	282	53	27	29	134	131
95th Queue (ft)	146	365	376	105	74	76	230	424
Link Distance (ft)		252	252	30	30	30		838
Upstream Blk Time (%)		15	20	28	1	1		0
Queuing Penalty (veh)		117	156	149	6	8		0
Storage Bay Dist (ft)	100						200	
Storage Blk Time (%)	29	24					16	4
Queuing Penalty (veh)	210	17					10	6

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	75	90	247	453	487	235	39	109
Average Queue (ft)	21	30	115	239	223	171	9	48
95th Queue (ft)	66	79	271	488	455	246	31	88
Link Distance (ft)	30	30		505	505			778
Upstream Blk Time (%)	1	3		6	1			
Queuing Penalty (veh)	11	25		53	7			
Storage Bay Dist (ft)			250			160	100	
Storage Blk Time (%)			1	26	8	8		1
Queuing Penalty (veh)			3	16	43	45		0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	140	132	73	227	235	525	543
Average Queue (ft)	34	52	25	143	170	245	338
95th Queue (ft)	82	105	57	225	248	547	599
Link Distance (ft)	505	505		179	179	548	548
Upstream Blk Time (%)				5	8	12	17
Queuing Penalty (veh)				31	46	0	0
Storage Bay Dist (ft)			240				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	38	66
Average Queue (ft)	2	6
95th Queue (ft)	20	33
Link Distance (ft)	1028	1028
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	132	146	147	189	134	197	276	226
Average Queue (ft)	55	72	68	105	71	74	171	81
95th Queue (ft)	108	130	125	161	125	150	262	200
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	2						
Queuing Penalty (veh)	4	11						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							1	
Queuing Penalty (veh)							1	

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement	WB
Directions Served	T
Maximum Queue (ft)	5
Average Queue (ft)	0
95th Queue (ft)	4
Link Distance (ft)	105
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	85	119	126	31	272	251
Average Queue (ft)	29	43	51	25	167	102
95th Queue (ft)	67	90	101	41	250	200
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				43	1	0
Queuing Penalty (veh)				84	0	0
Storage Bay Dist (ft)						125
Storage Blk Time (%)					19	1
Queuing Penalty (veh)					50	3

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	114
Average Queue (ft)	38
95th Queue (ft)	94
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	191	242	287	62	39	343	330	178
Average Queue (ft)	113	105	170	27	9	222	184	77
95th Queue (ft)	169	183	259	57	31	305	272	144
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				8	1			
Queuing Penalty (veh)				32	3			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	150	177	194	216	241	217	148	81	54
Average Queue (ft)	85	111	130	103	159	115	66	45	20
95th Queue (ft)	132	160	181	177	223	196	119	76	50
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								23	5
Queuing Penalty (veh)								122	29
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	142	97	110	78	120	174	192	66	90	140	125	49
Average Queue (ft)	59	32	47	30	41	70	92	23	37	63	49	15
95th Queue (ft)	110	77	88	62	86	146	168	54	77	117	99	41
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	22	1			0	1					0	
Queuing Penalty (veh)	15	1			0	0					0	

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	152	56	69	67	21	109	126	39	32	199	181	59
Average Queue (ft)	54	17	26	19	1	54	69	10	4	110	76	29
95th Queue (ft)	111	45	58	50	9	96	114	34	20	172	146	52
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												0
Queuing Penalty (veh)												0

Intersection: 1000: East Site Driveway & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	T	TR	LT	T	T	TR	LTR	R
Maximum Queue (ft)	252	290	125	338	265	122	325	64
Average Queue (ft)	45	59	81	175	83	4	152	23
95th Queue (ft)	241	263	177	413	273	51	329	49
Link Distance (ft)	464	464		252	252	252	332	388
Upstream Blk Time (%)	0	0		33	1	0	17	
Queuing Penalty (veh)	3	3		164	4	0	0	
Storage Bay Dist (ft)			100					
Storage Blk Time (%)			57	1				
Queuing Penalty (veh)			205	2				

Intersection: 1200: Haggerty Road & Middle Site Driveway

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	R	L	R	L	T	R
Maximum Queue (ft)	108	216	167	100	15	51	14	8
Average Queue (ft)	42	84	43	42	0	21	0	0
95th Queue (ft)	87	214	152	80	7	48	5	5
Link Distance (ft)	287	248					316	
Upstream Blk Time (%)		6	0					
Queuing Penalty (veh)		0	0					
Storage Bay Dist (ft)			150	100	150	100		10
Storage Blk Time (%)		18	0	1			0	0
Queuing Penalty (veh)		10	0	2			0	0

Intersection: 1300: Haggerty Road & North Site Driveway

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (ft)	62	68	51
Average Queue (ft)	22	20	16
95th Queue (ft)	53	50	42
Link Distance (ft)		366	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	50		100
Storage Blk Time (%)	6	0	
Queuing Penalty (veh)	1	0	

Zone Summary

Zone wide Queuing Penalty: 2029

Appendix 9

Signal Warrants

TRAFFIC SIGNAL WARRANT ANALYSIS DATA ENTRY
ONLY ENTER DATA IN YELLOW CELLS

Spot Number

	MAJOR STREET		MINOR STREET				
Intersection of	Haggerty Road	at	Middle Site DW		Analysis Date	8/9/2023	by Fishbeck
DIRECTION	N-S		E-W		Data Collection Date	5/16/2023	
City/Twp	Livonia						

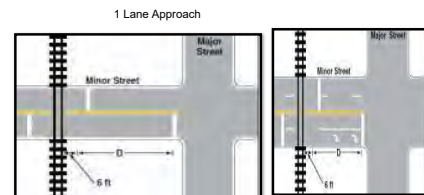
Is the intersection within an isolated community? Yes or No	NO
DO NOT ENTER ANY VALUE IN THIS BOX	
Discount for Right Turn Volume (or Lefts at Crossovers)?	YES
Percent Reduction in NB Right Turn Volumes	50%
Percent Reduction in SB Right Turn Volumes	0%
Percent Reduction in EB Right Turn Volumes	0%
Percent Reduction in WB Right Turn Volumes	0%
Have Other Remedial Measures Been Tried (Warrant 1 A&B)?	
Have Other Remedial Measures Been Tried AND Have Crashes Been Entered on the CRASH INPUT tab (Warrant 7)?	
Are there 5 or more Crashes Susceptible to Correction by Signalization in a 12 Month Period?	See Crash Input Tab
Review Peak Hour Warrant?	YES
Peak Hour Stop Delay (Vehicle Hours)	22.0
Number of Intersection Approaches	4
Peak Hour	17:00 - 18:00
Has a Study been Conducted that Demonstrates a Need for Signalization Based on a Lack of Signal Coordination (Warrant 6)?	
Has a Study been Conducted that Demonstrates a Need for Signalization Based on a the Need to Encourage Concentration and Organization of Traffic Flow (Warrant 8)?	

Confirm Percentage Reduction with MDOT Signals Unit.
Confirm Percentage Reduction with MDOT Signals Unit.
USE RT REDUCTION CALCULATION TAB TO DETERMINE PERCENTAGE.
USE RT REDUCTION CALCULATION TAB TO DETERMINE PERCENTAGE.

Pedestrian Warrant Information	
Distance to nearest Signal or Stop Sign on Major Road (ft)	
Is the 15th Percentile Speed of Pedestrians Less than 3.5ft/sec?	
DO NOT ENTER ANY VALUE IN THIS BOX	
Number of Gaps for School Crossings	
Duration of Gap Study (minutes)	
Width of Street (feet)	
Number of School Children per Group	
Number of School Children	
Crosswalk Length	
Is Pedestrian Sight Distance Sufficient?	

Grade Crossing Information	
Clear Storage Distance (Enter Greater than 140 if no Railroad Present)	
Number of Approach Lanes Crossing Tracks	
Peak Hour for Train Crossings (If not known, use Peak Vehicle Hour)	
Trains Crossings per Day? (Use 3-5 if Unknown)	
Percentage of High Occupancy Buses(Use 0% if Unknown)?	
Percentage of Tractor Trailers? (Use 7.6% to 12.5% if Unknown)	

Issue to Be Addressed by Signalization:
Minor Street Delays



Check Machine Counts = A ZERO has been input during at least one of the hours, if volumes are correct, ignore this error. Ratio may need to be hand calculated.
 Check Manual Counts = A ZERO has been input for at least one hour, if volumes are correct, ignore this error. Ratio may need to be hand calculated.
 Confirm Volumes - The ratio between the manual counts and machine counts is out of normal range. Please check volumes. If volumes are correct, ignore this error.

Michigan Manual of Uniform Traffic Control Devices
Volume Summary
Prepared by MDOT for the 2011 Edition of the MMUTCD

Spot Number:	0		
Major Street:	Haggerty Road	Minor Street:	Middle Site DW
Intersection:	Haggerty Road @ Middle Site DW		
City/Twp:	Livonia		
Date Performed:	8/9/2023	Performed By:	Fishbeck
Date Volumes Collected:			5/16/2023

Use the Discounted Volume Table to the Right

	Major	Major	Minor	Minor	Total	Highest	Total
	NB	SB	EB	WB	Major	Minor	
00:01 - 01:00	41	30	0	3	71	3	74
01:00 - 02:00	22	18	0	2	40	2	42
02:00 - 03:00	9	11	0	1	20	1	21
03:00 - 04:00	25	23	0	1	48	1	49
04:00 - 05:00	50	41	0	4	91	4	95
05:00 - 06:00	130	150	0	16	280	16	296
06:00 - 07:00	255	254	0	34	509	34	543
07:00 - 08:00	730	346	58	54	1076	58	1188
08:00 - 09:00	933	421	59	61	1354	61	1474
09:00 - 10:00	620	566	0	67	1186	67	1253
10:00 - 11:00	658	582	0	73	1240	73	1313
11:00 - 12:00	752	654	0	96	1406	96	1502
12:00 - 13:00	781	783	0	118	1564	118	1682
13:00 - 14:00	814	728	0	117	1542	117	1659
14:00 - 15:00	876	723	0	95	1599	95	1694
15:00 - 16:00	900	778	0	96	1678	96	1774
16:00 - 17:00	1039	951	99	92	1990	99	2181
17:00 - 18:00	1164	964	116	106	2128	116	2350
18:00 - 19:00	708	667	0	93	1375	93	1468
19:00 - 20:00	602	557	0	101	1159	101	1260
20:00 - 21:00	382	415	0	84	797	84	881
21:00 - 22:00	224	257	0	49	481	49	530
22:00 - 23:00	127	139	0	19	266	19	285
23:00 - 00:00	76	75	0	9	151	9	160
Total	11918	10133	332	1391	22051	1412	23774

Where manual counts were taken on the same day as the machine counts, the spreadsheet will look at the difference between manual and machine counts and adjust the hours without manual counts. This spreadsheet places a higher level of credibility on the manual counts.

In order or Preference the following volumes will be used (Each hour is reviewed independently).

- 1: Manual Turning Movement Count
- 2: Machine Counts Adjusted by the Count Ratio for that Approach if Manual Counts are taken on the same Day
- 3: Machine Counts Unadjusted if there are no manual counts or if the manual counts are taken on a different Day

Calculations below - DO NOT CHANGE (Rows 62-91)

Michigan Manual of Uniform Traffic Control Devices							
Volumes Discounted for Right Turn Volumes (Left Turns at Crossovers)							
Prepared by MDOT for the 2011 Edition of the MMUTCD							
Spot Number:	0						
Major Street:	Haggerty Road	Minor Street:	Middle Site DW				
Intersection:	Haggerty Road @ Middle Site DW						
City/Twp:	Livonia						
Date Performed:	8/9/2023	Performed By:	Fishbeck				
Date Volumes Collected:			5/16/2023				
Percent Discount	50%	0%	0%	0%			
	Major	Major	Minor	Minor	Total	Highest	Total
	NB	SB	EB	WB	Major	Minor	
Turn Percentage	7%	0%	98%	51%			
00:01 - 01:00	41	30	0	3	71	3	74
01:00 - 02:00	22	18	0	2	40	2	42
02:00 - 03:00	9	11	0	1	20	1	21
03:00 - 04:00	25	23	0	1	48	1	49
04:00 - 05:00	48	41	0	4	89	4	93
05:00 - 06:00	123	150	0	16	273	16	289
06:00 - 07:00	244	254	0	34	498	34	532
07:00 - 08:00	714	346	58	54	1060	58	1172
08:00 - 09:00	911	421	59	61	1332	61	1452
09:00 - 10:00	595	566	0	67	1161	67	1228
10:00 - 11:00	629	582	0	73	1211	73	1284
11:00 - 12:00	715	654	0	96	1369	96	1465
12:00 - 13:00	736	783	0	118	1519	118	1637
13:00 - 14:00	777	728	0	117	1505	117	1622
14:00 - 15:00	846	723	0	95	1569	95	1664
15:00 - 16:00	870	778	0	96	1648	96	1744
16:00 - 17:00	1004	951	99	92	1955	99	2146
17:00 - 18:00	1122	964	116	106	2086	116	2308
18:00 - 19:00	670	667	0	93	1337	93	1430
19:00 - 20:00	572	557	0	101	1129	101	1230
20:00 - 21:00	360	415	0	84	775	84	859
21:00 - 22:00	215	257	0	49	472	49	521
22:00 - 23:00	122	139	0	19	261	19	280
23:00 - 00:00	74	75	0	9	149	9	158
Total	11438	10133	332	1391	21571	1412	23294

Where manual counts were taken on the same day as the machine counts, the spreadsheet will look at the difference between manual and machine counts and adjust the hours without manual counts. This spreadsheet places a higher level of credibility on the manual counts.

In order of Preference the following volumes will be used (Each Hour is reviewed independently).

- 1: Reduce the manual turn movement count by the percentage requested.
- 2: Where no turning movement counts are available, use the average turn percentage to calculate an assumed turn volume and reduce that by the percentage requested.

Summary of Warrants			
Spot Number:	0		
Major Street:	Haggerty Road	Minor Street:	Middle Site DW
Intersection:	Haggerty Road at Middle Site DW		
City/Twp:	Livonia		
Date Performed:	8/9/2023	Performed By:	Fishbeck
Date Volumes Collected:	5/16/2023		
Warrant	Condition	Is Warrant Met	
Data Has Been Validated		YES	
WARRANT 1: Eight-Hour Vehicular Volume		YES	
	Condition A	NO	
	Condition B	YES	
	Condition A&B	N/A	
WARRANT 2: Four-Hour Vehicular Volume	(70%)	YES	
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	YES	
	Condition A	NO	
	Condition B	YES	
WARRANT 4: Pedestrian Volume	(70%)	NO	
	Four Hour	N/A	
	Peak Hour	N/A	
	(Threshold) HAWK	NO	
	(Threshold) RRFB	NO	
WARRANT 5: School Crossing		NO	
WARRANT 6: Coordinated Signal System		0	
WARRANT 7: Crash Experience		NO	
	Condition A	NO	
	Condition B	NO	
WARRANT 8: Roadway Network		0	
WARRANT 9: Intersection Near a Grade Crossing		#N/A	
Issue to Be Addressed by Signalization:			
Minor Street Delays			

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 1: Eight-Hour Vehicular Volume

Intersection:	Haggerty Road @ Middle Site DW		
Date	8/9/2023	by	Fishbeck

4	: No. of Lanes on Major St?
2	: No. of Lanes on Minor St?
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
0	: if answer 4 is Yes, then what is the of the population isolated community?
0%	: Have other remedial measures been tried?

USE 70% WARRANTS 1A AND 1B. DO NOT USE COMBINATION OF A & B

Time	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
00:01 - 01:00	71	3	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
01:00 - 02:00	40	2	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
02:00 - 03:00	20	1	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
03:00 - 04:00	48	1	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
04:00 - 05:00	89	4	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
05:00 - 06:00	273	16	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
06:00 - 07:00	498	34	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
07:00 - 08:00	1060	58	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
08:00 - 09:00	1332	61	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
09:00 - 10:00	1161	67	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
10:00 - 11:00	1211	73	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
11:00 - 12:00	1369	96	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
12:00 - 13:00	1519	118	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
13:00 - 14:00	1505	117	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
14:00 - 15:00	1569	95	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
15:00 - 16:00	1648	96	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
16:00 - 17:00	1955	99	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
17:00 - 18:00	2086	116	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
18:00 - 19:00	1337	93	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
19:00 - 20:00	1129	101	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
20:00 - 21:00	775	84	420	140	NO	630	70	YES	N/A	N/A	N/A	N/A	NO
21:00 - 22:00	472	49	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
22:00 - 23:00	261	19	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO
23:00 - 00:00	149	9	420	140	NO	630	70	NO	N/A	N/A	N/A	N/A	NO

Number of Hours that met the warrant 1A = **0**

Number of Hours that met the warrant 1B = **11**

Number of Hours that met the warrant 1 A & B = **0**

A. Is the Minimum Vehicular Volume Warrant Met? (Condition A)

NO

B. Is the Interruption of Continuous Traffic Met? (Condition B)

YES

C. Combination of Warrants A and B Criteria Met?

N/A

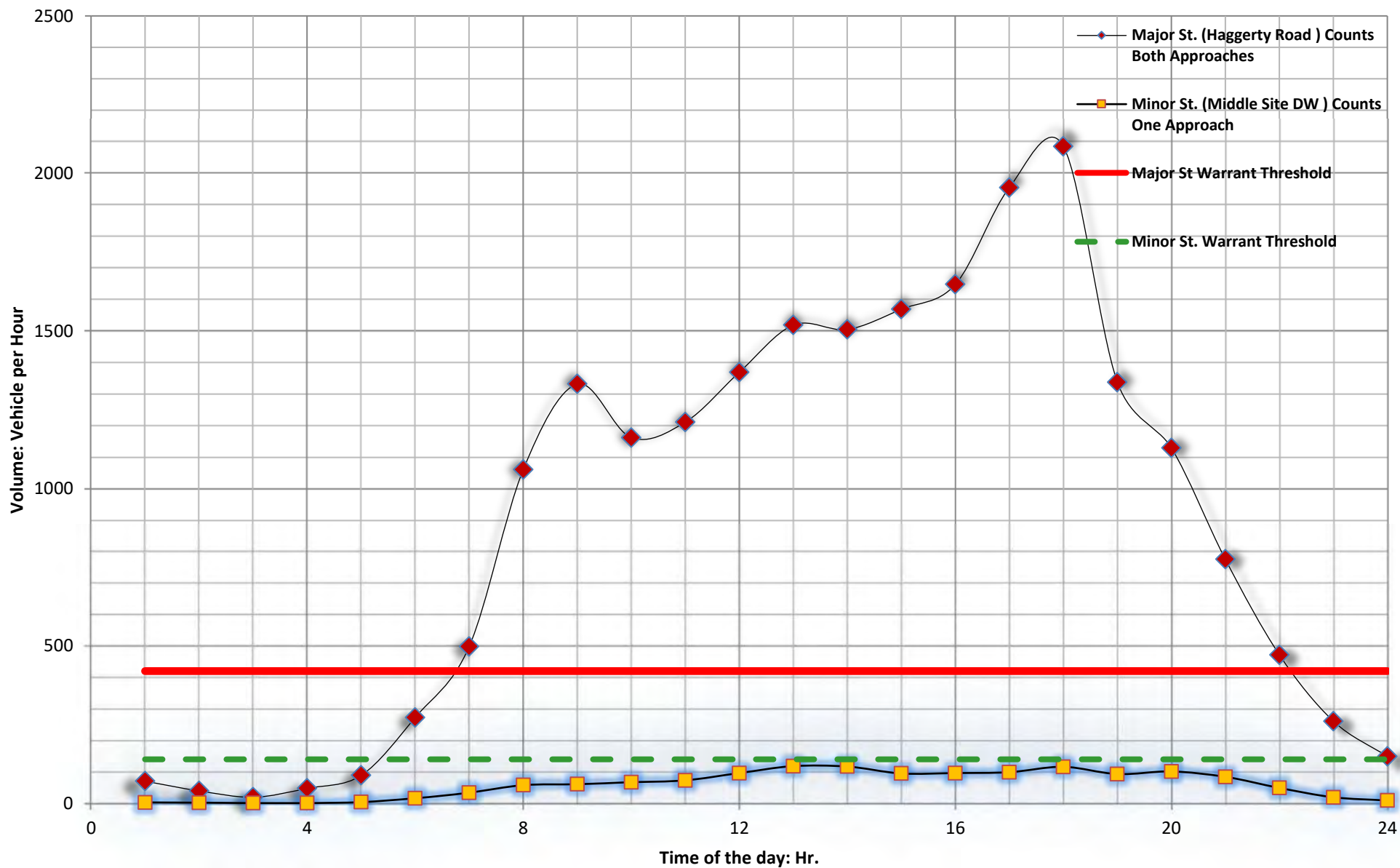


FIGURE 1: WARRANT 1A

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number:

Haggerty Road @ Middle Site DW

NO. OF LANES ON MAJOR ST.? 4

NO. OF LANES ON MINOR ST.? 2

Number of Hours that met the Warrant: 0

Does this intersection meet Warrant 1A for signal installation? NO

Data Collection Date: 5/16/2023

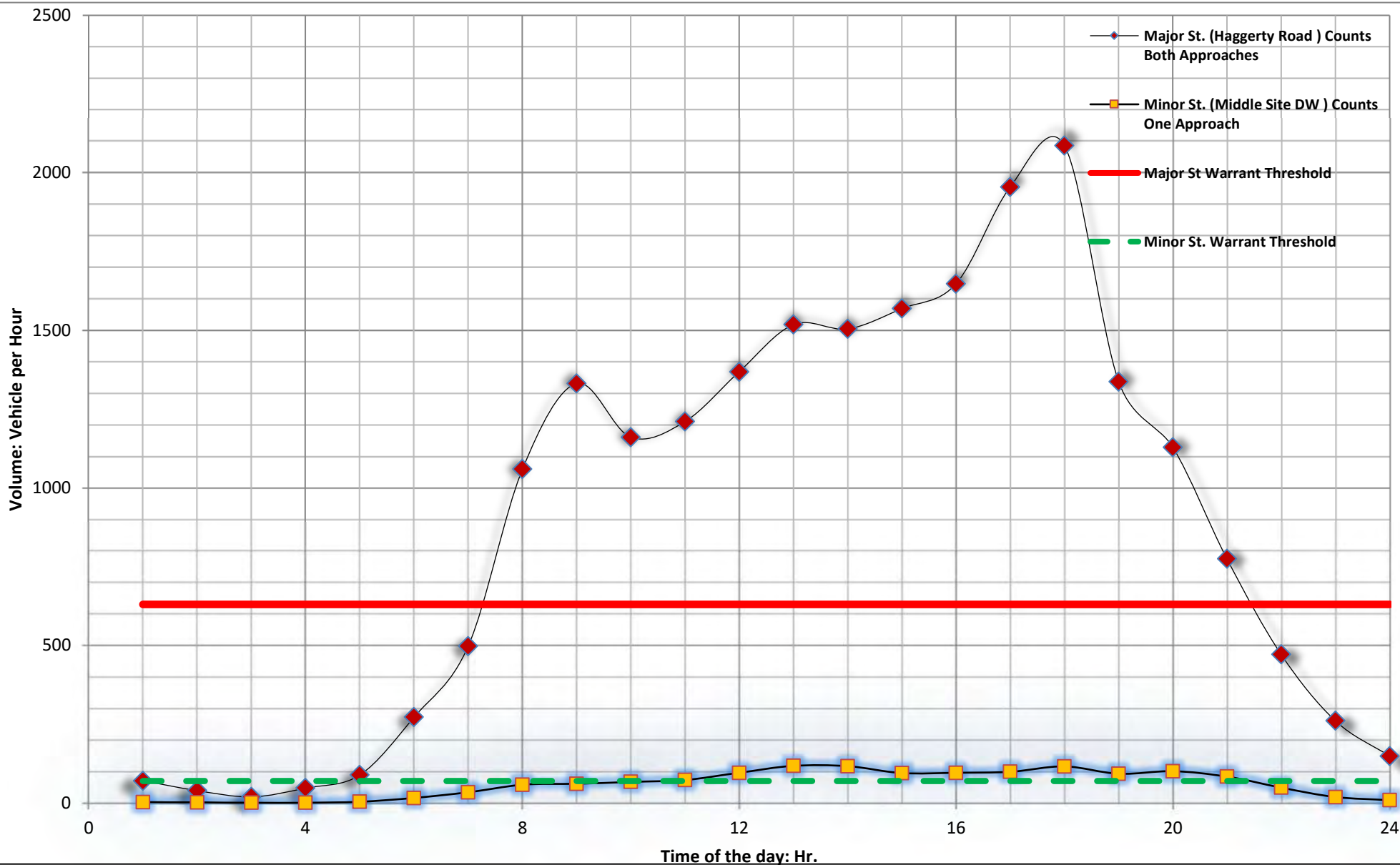


FIGURE 1: WARRANT 1B

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number:

Haggerty Road @ Middle Site DW

NO. OF LANES ON MAJOR ST.? 4

NO. OF LANES ON MINOR ST.? 2

Number of Hours that met the Warrant: 11

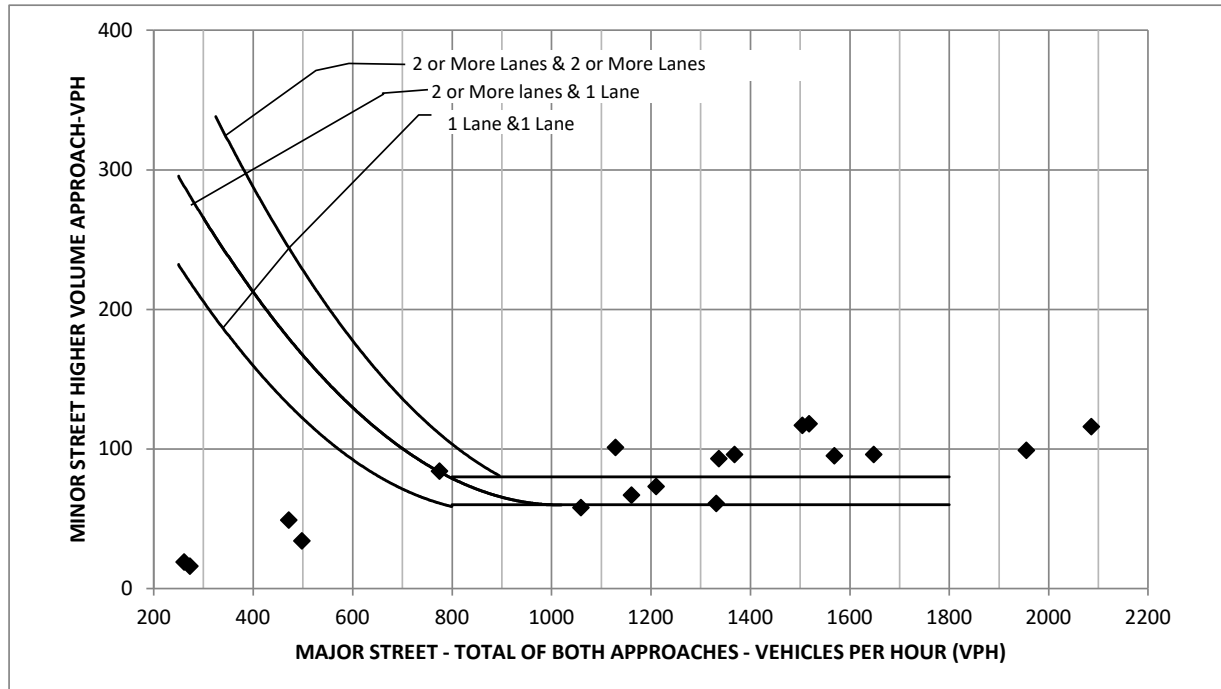
Does this intersection meet Warrant 1B for signal installation? YES

Data Collection Date: 5/16/2023

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 2: Four-Hour Vehicular Volume

Spot Number:	0
Intersection:	Haggerty Road @ Middle Site DW
Date	8/9/2023 by Fishbeck

4	: No. of Lanes on Major St.
2	: No. of Lanes on Minor St.
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
0	: What is the of the population isolated community?



How Many Hours Are Met

9

Is Warrant (70%) Met?

YES

Michigan Manual of Uniform Traffic Control Devices Worksheet for Signal Warrants (Section 4C) WARRANT 3 A: Peak-Hour Vehicular Volume															
Spot Number:	0														
Intersection:	Haggerty Road @ Middle Site DW														
Date	8/9/2023	by	Fishbeck												
NOT MET	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">22.04</td> <td style="padding: 2px 5px;">: Total Stop Time Delay (hrs)</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="padding: 2px 5px;">: Minor Street Approach Lanes</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="padding: 2px 5px;">: Total Approaches</td> </tr> <tr> <td style="text-align: center;">116</td> <td style="padding: 2px 5px;">: Minor Approach Volume</td> </tr> <tr> <td style="text-align: center;">2308</td> <td style="padding: 2px 5px;">: Total Entering Volume</td> </tr> <tr> <td style="text-align: center;">17:00 - 18:00</td> <td style="padding: 2px 5px;">: Peak Hour</td> </tr> </table>			22.04	: Total Stop Time Delay (hrs)	2	: Minor Street Approach Lanes	4	: Total Approaches	116	: Minor Approach Volume	2308	: Total Entering Volume	17:00 - 18:00	: Peak Hour
22.04	: Total Stop Time Delay (hrs)														
2	: Minor Street Approach Lanes														
4	: Total Approaches														
116	: Minor Approach Volume														
2308	: Total Entering Volume														
17:00 - 18:00	: Peak Hour														
Is Warrant 3 A Met?			NO												

Michigan Manual of Uniform Traffic Control Devices

Worksheet for Signal Warrants (Section 4C)

WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number: 0

Intersection: Haggerty Road @ Middle Site DW

Date: 8/9/2023

by: Fishbeck

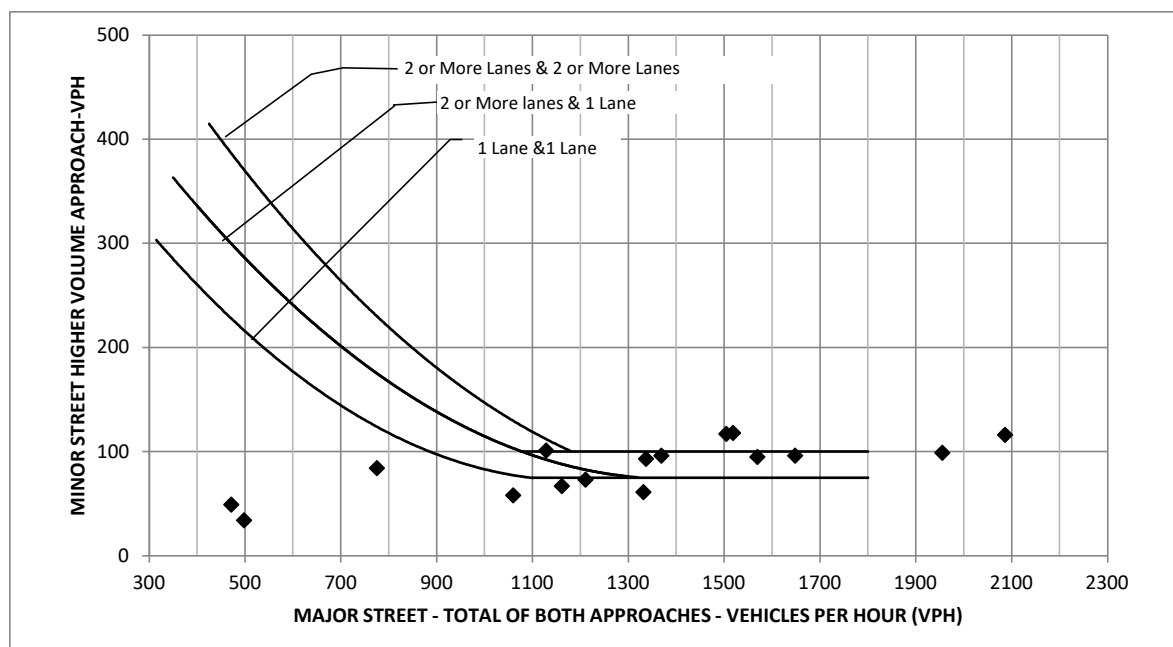
4 : No. of Lanes on Major St.

2 : No. of Lanes on Minor St.

45 : Speed limit or 85th Percentile? (MPH)

NO : Is the intersection within an isolated community?

0 : What is the of the population isolated community?



How Many Hours Are Met

4

Is Warrant (70%) Met?

YES

Appendix 10

Future Improvement LOS Output Reports

HCM 6th Signalized Intersection Summary

100: Haggerty Road & Six Mile Road

2025 Future Improvement Conditions

a.m. Peak Hour

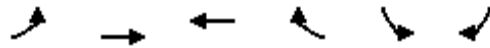
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	729	37	303	412	263	96	611	386	139	276	65
Future Volume (veh/h)	177	729	37	303	412	263	96	611	386	139	276	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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	1984	1984	1984	1984	1984	1984	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	190	784	40	319	434	277	113	719	454	156	310	73
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.85	0.85	0.85	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	4	4	4	2	2	2
Cap, veh/h	376	1025	52	397	1342	765	326	942	673	274	1175	656
Arrive On Green	0.08	0.28	0.28	0.26	0.59	0.59	0.04	0.26	0.26	0.10	0.31	0.31
Sat Flow, veh/h	1890	3650	186	1890	3770	1682	1845	3681	1642	1875	3741	1668
Grp Volume(v), veh/h	190	405	419	319	434	277	113	719	454	156	310	73
Grp Sat Flow(s),veh/h/ln	1890	1885	1951	1890	1885	1682	1845	1841	1642	1875	1870	1668
Q Serve(g_s), s	0.0	23.6	23.6	11.6	6.9	0.0	0.0	21.7	8.5	3.7	7.4	0.0
Cycle Q Clear(g_c), s	0.0	23.6	23.6	11.6	6.9	0.0	0.0	21.7	8.5	3.7	7.4	0.0
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	376	529	548	397	1342	765	326	942	673	274	1175	656
V/C Ratio(X)	0.51	0.76	0.77	0.80	0.32	0.36	0.35	0.76	0.67	0.57	0.26	0.11
Avail Cap(c_a), veh/h	376	529	548	397	1342	765	338	942	673	286	1175	656
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	39.2	39.5	39.5	39.5	17.1	12.5	39.7	41.3	28.9	48.7	30.8	23.1
Incr Delay (d2), s/veh	1.1	10.1	9.8	11.4	0.6	1.3	0.6	5.8	5.3	2.4	0.5	0.3
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(50%),veh/ln	5.1	12.0	12.4	8.7	2.8	3.1	2.9	10.2	11.1	4.4	3.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	49.6	49.3	50.9	17.7	13.9	40.3	47.1	34.2	51.1	31.3	23.4
LnGrp LOS	D	D	D	D	B	B	D	D	C	D	C	C
Approach Vol, veh/h	1014			1030			1286			539		
Approach Delay, s/veh	47.7			27.0			42.0			36.0		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.8	49.0	11.2	44.0	24.8	40.0	18.2	37.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	8.7	42.7	5.7	37.7	17.7	33.7	12.7	30.7				
Max Q Clear Time (g_c+I1), s	2.0	8.9	2.0	9.4	13.6	25.6	5.7	23.7				
Green Ext Time (p_c), s	0.3	0.4	0.1	0.3	0.4	0.5	0.2	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	38.7											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Future Improvement Conditions

a.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	62	1184	950	150	99	39
Future Volume (vph)	62	1184	950	150	99	39
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1863	3725	5295		1900	1700
Flt Permitted	0.23	1.00	1.00		0.95	1.00
Satd. Flow (perm)	450	3725	5295		1900	1700
Peak-hour factor, PHF	0.93	0.93	0.94	0.94	0.61	0.61
Adj. Flow (vph)	67	1273	1011	160	162	64
RTOR Reduction (vph)	0	0	22	0	0	54
Lane Group Flow (vph)	67	1273	1149	0	162	10
Heavy Vehicles (%)	2%	2%	1%	1%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	67.2	67.2	88.6		18.9	18.9
Effective Green, g (s)	67.2	67.2	80.8		18.9	18.9
Actuated g/C Ratio	0.56	0.56	0.67		0.16	0.16
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	252	2086	3565		299	267
v/s Ratio Prot		c0.34	c0.22		c0.09	
v/s Ratio Perm	0.15					0.01
v/c Ratio	0.27	0.61	0.32		0.54	0.04
Uniform Delay, d1	13.6	17.6	8.2		46.6	42.8
Progression Factor	0.53	0.53	0.02		1.00	1.00
Incremental Delay, d2	1.9	1.0	0.0		2.0	0.1
Delay (s)	9.1	10.3	0.2		48.6	42.9
Level of Service	A	B	A		D	D
Approach Delay (s)		10.2	0.2		47.0	
Approach LOS		B	A		D	
Intersection Summary						
HCM 2000 Control Delay			9.0		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.57			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			55.0%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Future Improvement Conditions

a.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1274	9	83	1097	3	58
Future Volume (vph)	1274	9	83	1097	3	58
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3722		1881	5406	1810	1619
Flt Permitted	1.00		0.19	1.00	0.95	1.00
Satd. Flow (perm)	3722		370	5406	1810	1619
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.71	0.71
Adj. Flow (vph)	1416	10	87	1155	4	82
RTOR Reduction (vph)	0	0	0	0	0	75
Lane Group Flow (vph)	1426	0	87	1155	4	7
Heavy Vehicles (%)	2%	2%	1%	1%	5%	5%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	96.2		67.2	67.2	9.6	9.6
Effective Green, g (s)	96.2		67.2	67.2	9.6	9.6
Actuated g/C Ratio	0.80		0.56	0.56	0.08	0.08
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2983		207	3027	144	129
v/s Ratio Prot	c0.38			0.21	0.00	
v/s Ratio Perm			0.24			c0.00
v/c Ratio	0.48		0.42	0.38	0.03	0.05
Uniform Delay, d1	3.8		15.2	14.8	50.9	51.0
Progression Factor	0.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		6.2	0.4	0.1	0.2
Delay (s)	0.1		21.4	15.1	51.0	51.2
Level of Service	A		C	B	D	D
Approach Delay (s)	0.1			15.6	51.1	
Approach LOS	A			B	D	
Intersection Summary						
HCM 2000 Control Delay			8.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.49			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			68.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

2025 Future Improvement Conditions

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↗		↗
Traffic Volume (veh/h)	0	947	385	0	721	0	0	0	0	250	0	459
Future Volume (veh/h)	0	947	385	0	721	0	0	0	0	250	0	459
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1969	1969	0	1969	0				1984	0	1984
Adj Flow Rate, veh/h	0	1029	418	0	848	0				266	0	488
Peak Hour Factor	0.92	0.92	0.92	0.85	0.85	0.85				0.94	0.94	0.94
Percent Heavy Veh, %	0	2	2	0	2	0				1	0	1
Cap, veh/h	0	1870	834	0	1870	0				657	0	584
Arrive On Green	0.00	0.50	0.50	0.00	0.67	0.00				0.35	0.00	0.35
Sat Flow, veh/h	0	3839	1668	0	3938	0				1890	0	1682
Grp Volume(v), veh/h	0	1029	418	0	848	0				266	0	488
Grp Sat Flow(s),veh/h/ln	0	1870	1668	0	1870	0				1890	0	1682
Q Serve(g_s), s	0.0	15.2	13.4	0.0	8.7	0.0				8.6	0.0	21.3
Cycle Q Clear(g_c), s	0.0	15.2	13.4	0.0	8.7	0.0				8.6	0.0	21.3
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1870	834	0	1870	0				657	0	584
V/C Ratio(X)	0.00	0.55	0.50	0.00	0.45	0.00				0.41	0.00	0.84
Avail Cap(c_a), veh/h	0	1870	834	0	1870	0				657	0	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	13.8	13.3	0.0	8.2	0.0				19.8	0.0	24.0
Incr Delay (d2), s/veh	0.0	1.2	2.1	0.0	0.8	0.0				1.9	0.0	13.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.7	4.7	0.0	2.7	0.0				4.0	0.0	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	15.0	15.5	0.0	9.0	0.0				21.7	0.0	37.2
LnGrp LOS	A	B	B	A	A	A				C	A	D
Approach Vol, veh/h		1447			848						754	
Approach Delay, s/veh		15.1			9.0						31.7	
Approach LOS		B			A						C	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				46.0		34.0		46.0				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 40		27.8		* 40				
Max Q Clear Time (g_c+I1), s				17.2		23.3		10.7				
Green Ext Time (p_c), s				8.9		1.3		6.0				
Intersection Summary												
HCM 6th Ctrl Delay			17.5									
HCM 6th LOS			B									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Future Improvement Conditions

a.m. Peak Hour

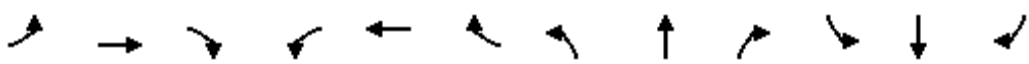
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘	↗
Traffic Volume (vph)	699	0	0	1053	286	267
Future Volume (vph)	699	0	0	1053	286	267
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.96	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3689			5353	3530	1517
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3689			5353	3530	1517
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.90	0.90
Adj. Flow (vph)	736	0	0	1239	318	297
RTOR Reduction (vph)	0	0	0	0	61	92
Lane Group Flow (vph)	736	0	0	1239	361	101
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	56.4			56.4	11.1	11.1
Effective Green, g (s)	56.4			56.4	11.1	11.1
Actuated g/C Ratio	0.70			0.70	0.14	0.14
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2600			3773	489	210
v/s Ratio Prot	0.20			c0.23	c0.10	
v/s Ratio Perm						0.07
v/c Ratio	0.28			0.33	0.74	0.48
Uniform Delay, d1	4.3			4.5	33.1	31.8
Progression Factor	0.77			0.44	1.00	1.00
Incremental Delay, d2	0.2			0.2	5.0	0.6
Delay (s)	3.6			2.2	38.0	32.4
Level of Service	A			A	D	C
Approach Delay (s)	3.6			2.2	36.3	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			10.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.40			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			40.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2025 Future Improvement Conditions

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	876	103	2	317	0	0	0	175
Future Volume (vph)	0	0	0	0	876	103	2	317	0	0	0	175
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.98			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5268			1980				2905
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5268			1980				2905
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.86	0.86	0.86
Adj. Flow (vph)	0	0	0	0	952	112	2	356	0	0	0	203
RTOR Reduction (vph)	0	0	0	0	18	0	0	25	0	0	0	50
Lane Group Flow (vph)	0	0	0	0	1046	0	0	333	0	0	0	154
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type					NA		Perm	NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					33.2			35.0				35.0
Effective Green, g (s)					33.2			35.0				35.0
Actuated g/C Ratio					0.42			0.44				0.44
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2186			866				1270
v/s Ratio Prot					c0.20							0.05
v/s Ratio Perm								0.17				
v/c Ratio					0.48			0.38				0.12
Uniform Delay, d1					17.1			15.2				13.4
Progression Factor					0.29			0.91				1.00
Incremental Delay, d2					0.6			1.3				0.2
Delay (s)					5.6			15.1				13.6
Level of Service					A			B				B
Approach Delay (s)		0.0			5.6			15.1			13.6	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			8.7									
HCM 2000 Level of Service											A	
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			80.0								11.8	
Intersection Capacity Utilization			58.7%								B	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Future Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑			↑↑	↗
Traffic Volume (vph)	0	0	0	0	1011	145	0	840	0	0	529	142
Future Volume (vph)	0	0	0	0	1011	145	0	840	0	0	529	142
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.98			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5252			3689			3689	1650
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5252			3689			3689	1650
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	0	1136	163	0	903	0	0	630	169
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1276	0	0	903	0	0	630	143
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2212			1443			1535	686
v/s Ratio Prot					c0.24			c0.24			0.17	
v/s Ratio Perm												0.09
v/c Ratio					0.58			0.63			0.41	0.21
Uniform Delay, d1					17.7			19.6			16.4	14.9
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.1			1.7			0.8	0.7
Delay (s)					18.8			3.4			17.3	15.6
Level of Service					B			A			B	B
Approach Delay (s)		0.0			18.8			3.4			16.9	
Approach LOS		A			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			13.7		HCM 2000 Level of Service						B	
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)						15.0	
Intersection Capacity Utilization			61.2%		ICU Level of Service						B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Future Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑					↑↑	↑		↑↑	
Traffic Volume (vph)	0	421	251	0	0	0	0	840	282	0	529	0
Future Volume (vph)	0	421	251	0	0	0	0	840	282	0	529	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5353	1667					3689	1650		3689	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5353	1667					3689	1650		3689	
Peak-hour factor, PHF	0.91	0.91	0.91	0.92	0.92	0.92	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	0	463	276	0	0	0	0	903	303	0	630	0
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	152	0	0	0
Lane Group Flow (vph)	0	463	201	0	0	0	0	903	151	0	630	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2254	702					1535	686		1443	
v/s Ratio Prot		0.09						c0.24			0.17	
v/s Ratio Perm			c0.12						0.09			
v/c Ratio		0.21	0.29					0.59	0.22		0.44	
Uniform Delay, d1		14.7	15.2					18.1	15.0		17.9	
Progression Factor		0.89	0.86					1.00	1.00		0.10	
Incremental Delay, d2		0.2	1.0					1.7	0.7		0.9	
Delay (s)		13.3	14.1					19.7	15.7		2.6	
Level of Service		B	B					B	B		A	
Approach Delay (s)		13.6			0.0			18.7			2.6	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			13.3									
HCM 2000 Level of Service											B	
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			80.0								15.0	
Intersection Capacity Utilization			61.2%								B	
ICU Level of Service												
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Future Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	10	43	26	3	17	32	816	52	19	349	72
Future Volume (veh/h)	67	10	43	26	3	17	32	816	52	19	349	72
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	1953	1953	1953	1890	1890	1890	1969	1969	1969	1969	1969	1969
Adj Flow Rate, veh/h	80	12	51	36	4	24	39	995	63	22	411	85
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.82	0.82	0.82	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	2	2	2
Cap, veh/h	207	33	139	175	24	142	68	2421	1080	45	2376	1060
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.01	0.21	0.21	0.05	1.00	1.00
Sat Flow, veh/h	1371	325	1380	1285	234	1404	1875	3741	1668	1875	3741	1668
Grp Volume(v), veh/h	80	0	63	36	0	28	39	995	63	22	411	85
Grp Sat Flow(s),veh/h/ln	1371	0	1705	1285	0	1637	1875	1870	1668	1875	1870	1668
Q Serve(g_s), s	4.5	0.0	2.8	2.2	0.0	1.3	1.7	18.3	2.4	0.9	0.0	0.0
Cycle Q Clear(g_c), s	5.8	0.0	2.8	4.9	0.0	1.3	1.7	18.3	2.4	0.9	0.0	0.0
Prop In Lane	1.00		0.81	1.00		0.86	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	207	0	172	175	0	165	68	2421	1080	45	2376	1060
V/C Ratio(X)	0.39	0.00	0.37	0.21	0.00	0.17	0.57	0.41	0.06	0.49	0.17	0.08
Avail Cap(c_a), veh/h	391	0	401	348	0	385	141	2421	1080	141	2376	1060
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98
Uniform Delay (d), s/veh	35.5	0.0	33.6	35.9	0.0	32.9	38.9	18.3	12.0	37.6	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.3	0.6	0.0	0.5	7.4	0.5	0.1	7.7	0.2	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(50%),veh/ln	1.6	0.0	1.2	0.7	0.0	0.5	0.9	9.1	0.7	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.7	0.0	34.9	36.4	0.0	33.4	46.3	18.8	12.1	45.3	0.2	0.1
LnGrp LOS	D	A	C	D	A	C	D	B	B	D	A	A
Approach Vol, veh/h	143		64			1097			518			
Approach Delay, s/veh	35.9		35.1			19.4			2.1			
Approach LOS	D		D			B			A			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	56.8		14.3	7.9	57.8		14.3				
Change Period (Y+Rc), s	* 6	* 6		* 6.2	* 6	* 6		* 6.2				
Max Green Setting (Gmax), s	* 6	* 37		* 19	* 6	* 37		* 19				
Max Q Clear Time (g_c+I1), s	3.7	2.0		7.8	2.9	20.3		6.9				
Green Ext Time (p_c), s	0.0	0.4		0.4	0.0	1.1		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			16.3									
HCM 6th LOS			B									
Notes												

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Future Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	35	3	15	3	6	3	805	92	5	422	65
Future Volume (veh/h)	99	35	3	15	3	6	3	805	92	5	422	65
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	1969	1969	1969	1875	1875	1875	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	127	45	4	19	4	8	4	947	108	6	502	77
Peak Hour Factor	0.78	0.78	0.78	0.80	0.80	0.80	0.85	0.85	0.85	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	3	3	3	2	2	2	1	1	1
Cap, veh/h	458	477	42	411	149	299	518	2160	964	401	2177	971
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1402	1782	158	1292	558	1116	835	3741	1668	539	3770	1682
Grp Volume(v), veh/h	127	0	49	19	0	12	4	947	108	6	502	77
Grp Sat Flow(s),veh/h/ln	1402	0	1940	1292	0	1674	835	1870	1668	539	1885	1682
Q Serve(g_s), s	5.9	0.0	1.5	0.9	0.0	0.4	0.0	0.0	0.0	0.4	5.2	1.6
Cycle Q Clear(g_c), s	6.3	0.0	1.5	2.4	0.0	0.4	5.2	0.0	0.0	0.4	5.2	1.6
Prop In Lane	1.00		0.08	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	458	0	519	411	0	448	518	2160	964	401	2177	971
V/C Ratio(X)	0.28	0.00	0.09	0.05	0.00	0.03	0.01	0.44	0.11	0.01	0.23	0.08
Avail Cap(c_a), veh/h	458	0	519	411	0	448	518	2160	964	401	2177	971
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	22.0	22.9	0.0	21.6	0.3	0.0	0.0	7.2	8.2	7.5
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.2	0.0	0.1	0.0	0.6	0.2	0.1	0.2	0.2
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(50%),veh/ln	2.1	0.0	0.7	0.3	0.0	0.2	0.0	0.2	0.1	0.0	1.8	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	22.4	23.1	0.0	21.7	0.3	0.6	0.2	7.3	8.5	7.6
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	A	A
Approach Vol, veh/h	176			31			1059			585		
Approach Delay, s/veh	24.6			22.6			0.6			8.4		
Approach LOS	C			C			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	7.2			8.3			7.2			4.4		
Green Ext Time (p_c), s	7.8			0.5			3.6			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	5.7											
HCM 6th LOS	A											

HCM Unsignalized Intersection Capacity Analysis

1000: East Site Driveway & Six Mile Road

2025 Future Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1246	8	0	955	34	0	0	0	0	0	23
Future Volume (Veh/h)	0	1246	8	0	955	34	0	0	0	0	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1340	9	0	1005	36	0	0	0	0	0	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh)	2			2								
Upstream signal (ft)	568			325								
pX, platoon unblocked	0.94			0.80			0.83	0.83	0.80	0.83	0.83	0.94
vC, conflicting volume	1041			1349			1621	2386	674	1693	2372	269
vC1, stage 1 conf vol							1344	1344		1023	1023	
vC2, stage 2 conf vol							276	1041		670	1349	
vCu, unblocked vol	718			933			784	1707	89	872	1690	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	98
cM capacity (veh/h)	825			588			225	232	760	351	233	1018
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1				
Volume Total	893	456	168	335	335	204	0	25				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	9	0	0	0	36	0	25				
cSH	1700	1700	588	1700	1700	1700	1700	1018				
Volume to Capacity	0.53	0.27	0.00	0.20	0.20	0.12	0.00	0.02				
Queue Length 95th (ft)	0	0	0	0	0	0	0	2				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6				
Lane LOS							A	A				
Approach Delay (s)	0.0		0.0				0.0	8.6				
Approach LOS							A	A				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			36.3%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM 6th Signalized Intersection Summary

1200: Haggerty Road & Middle Site Driveway

2025 Future Improvement Conditions

a.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	57	35	0	44	90	875	86	25	388	10
Future Volume (veh/h)	2	0	57	35	0	44	90	875	86	25	388	10
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	1969	1969	1969	2000	2000	2000	1969	1969	1969	1953	1953	1953
Adj Flow Rate, veh/h	3	0	78	58	0	73	105	1017	100	28	431	11
Peak Hour Factor	0.73	0.73	0.73	0.60	0.60	0.60	0.86	0.86	0.86	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	0	0	0	2	2	2	3	3	3
Cap, veh/h	49	3	139	232	0	147	811	2846	1269	426	2823	1259
Arrive On Green	0.09	0.00	0.09	0.09	0.00	0.09	0.76	0.76	0.76	1.00	1.00	1.00
Sat Flow, veh/h	27	35	1605	1643	0	1695	947	3741	1668	500	3711	1655
Grp Volume(v), veh/h	81	0	0	58	0	73	105	1017	100	28	431	11
Grp Sat Flow(s),veh/h/ln	1667	0	0	1643	0	1695	947	1870	1668	500	1856	1655
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	3.3	2.4	7.1	1.2	0.6	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	2.3	0.0	3.3	2.4	7.1	1.2	7.7	0.0	0.0
Prop In Lane	0.04		0.96	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	191	0	0	232	0	147	811	2846	1269	426	2823	1259
V/C Ratio(X)	0.42	0.00	0.00	0.25	0.00	0.50	0.13	0.36	0.08	0.07	0.15	0.01
Avail Cap(c_a), veh/h	554	0	0	527	0	519	811	2846	1269	426	2823	1259
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	0.0	0.0	34.4	0.0	34.9	2.6	3.1	2.4	0.5	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.6	0.0	2.6	0.2	0.3	0.1	0.3	0.1	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(50%),veh/ln	1.6	0.0	0.0	1.1	0.0	1.4	0.3	1.3	0.2	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.5	0.0	0.0	35.0	0.0	37.4	2.8	3.4	2.5	0.7	0.1	0.0
LnGrp LOS	D	A	A	C	A	D	A	A	A	A	A	A
Approach Vol, veh/h	81		131				1222				470	
Approach Delay, s/veh	36.5		36.3				3.3				0.2	
Approach LOS	D		D				A				A	
Timer - Assigned Phs	2		4				6				8	
Phs Duration (G+Y+Rc), s	66.6		13.4				66.6				13.4	
Change Period (Y+Rc), s	* 5.7		6.5				* 5.7				6.5	
Max Green Setting (Gmax), s	* 43		24.5				* 43				24.5	
Max Q Clear Time (g_c+I1), s	9.1		5.7				9.7				5.3	
Green Ext Time (p_c), s	9.1		0.4				3.2				0.5	
Intersection Summary												
HCM 6th Ctrl Delay			6.2									
HCM 6th LOS			A									
Notes												

HCM 6th TWSC
1300: Haggerty Road & North Site Driveway

2025 Future Improvement Conditions
a.m. Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	22	878	43	11	407
Future Vol, veh/h	16	22	878	43	11	407
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	195	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	84	84	88	88
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	17	24	1045	51	13	463

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1303	523	0	0	1096
Stage 1	1045	-	-	-	-
Stage 2	258	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23
Pot Cap-1 Maneuver	152	499	-	-	627
Stage 1	300	-	-	-	-
Stage 2	761	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	149	499	-	-	627
Mov Cap-2 Maneuver	246	-	-	-	-
Stage 1	300	-	-	-	-
Stage 2	745	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 246 499	627	-
HCM Lane V/C Ratio	-	- 0.071 0.048	0.02	-
HCM Control Delay (s)	-	- 20.7 12.6	10.9	-
HCM Lane LOS	-	- C B	B	-
HCM 95th %tile Q(veh)	-	- 0.2 0.2	0.1	-

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	263	385	405	401	127	130	198	136	319	378	268	241
Average Queue (ft)	100	212	241	231	56	70	75	63	193	173	127	108
95th Queue (ft)	196	348	372	413	110	123	162	119	278	275	226	193
Link Distance (ft)		1376	1376	464	464	464	464		941	941		
Upstream Blk Time (%)				3								
Queuing Penalty (veh)				8								
Storage Bay Dist (ft)	500							500			220	350
Storage Blk Time (%)										2	1	
Queuing Penalty (veh)										10	4	

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	146	157	54
Average Queue (ft)	63	73	20
95th Queue (ft)	117	126	46
Link Distance (ft)	673	673	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		210	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	TR	L	R
Maximum Queue (ft)	82	146	200	44	41	54	160	50
Average Queue (ft)	34	33	81	3	3	7	72	20
95th Queue (ft)	71	99	168	24	20	31	128	48
Link Distance (ft)		254	254	34	34	34		838
Upstream Blk Time (%)			0	0	0	0		
Queuing Penalty (veh)			0	1	0	2		
Storage Bay Dist (ft)	100						200	
Storage Blk Time (%)	1	1					0	
Queuing Penalty (veh)	3	0					0	

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	63	81	138	199	256	232	31	96
Average Queue (ft)	8	18	61	87	81	98	4	39
95th Queue (ft)	36	60	123	175	176	192	19	79
Link Distance (ft)	34	34		507	507			778
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	2	5						
Storage Bay Dist (ft)			250			160	100	
Storage Blk Time (%)				0	0	2		1
Queuing Penalty (veh)				0	1	8		0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	291	402	295	174	198	208	252
Average Queue (ft)	112	177	65	103	118	100	126
95th Queue (ft)	233	331	192	169	180	175	218
Link Distance (ft)	507	507		179	179	548	548
Upstream Blk Time (%)				0	1		
Queuing Penalty (veh)				1	4		
Storage Bay Dist (ft)			240				
Storage Blk Time (%)		3	0				
Queuing Penalty (veh)		11	0				

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	EB	WB
Directions Served	T	T
Maximum Queue (ft)	11	12
Average Queue (ft)	0	0
95th Queue (ft)	8	8
Link Distance (ft)	179	1028
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	139	175	86	107	97	243	316	244
Average Queue (ft)	67	81	23	46	36	68	184	74
95th Queue (ft)	123	146	61	92	78	163	281	191
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	1	3						
Queuing Penalty (veh)	5	12						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							1	0
Queuing Penalty (veh)							1	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement	EB
Directions Served	T
Maximum Queue (ft)	4
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	1028
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	72	126	183	39	123	78
Average Queue (ft)	24	49	87	29	49	25
95th Queue (ft)	58	101	149	39	100	61
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				36		
Queuing Penalty (veh)				115		
Storage Bay Dist (ft)						125
Storage Blk Time (%)					0	
Queuing Penalty (veh)					0	

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	158
Average Queue (ft)	59
95th Queue (ft)	125
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	182	222	292	56	43	206	155	106
Average Queue (ft)	104	107	163	26	10	118	60	44
95th Queue (ft)	163	184	256	56	32	177	127	87
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				7	1			
Queuing Penalty (veh)				28	4			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	97	108	105	118	227	200	96	52	22
Average Queue (ft)	45	59	52	57	158	116	42	15	4
95th Queue (ft)	82	92	92	99	212	183	78	38	18
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								2	
Queuing Penalty (veh)								6	
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	112	95	69	42	94	227	220	42	67	78	69	56
Average Queue (ft)	44	25	17	9	25	73	96	12	17	24	14	11
95th Queue (ft)	86	62	47	30	71	173	202	36	46	62	45	37
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	14	1				1						
Queuing Penalty (veh)	7	1				0						

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	111	67	60	29	18	134	152	51	26	106	101	42
Average Queue (ft)	45	17	10	5	1	52	63	16	3	56	37	14
95th Queue (ft)	90	47	38	19	10	108	122	41	17	98	81	38
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 1000: East Site Driveway & Six Mile Road

Movement	EB	WB	WB	WB	WB	SB
Directions Served	TR	LT	T	T	TR	R
Maximum Queue (ft)	10	25	68	50	21	55
Average Queue (ft)	0	4	5	2	1	15
95th Queue (ft)	8	37	62	36	11	41
Link Distance (ft)	464		254	254	254	388
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			1	0		
Storage Bay Dist (ft)		100				
Storage Blk Time (%)		2	0			
Queuing Penalty (veh)		4	0			

Intersection: 1200: Haggerty Road & Middle Site Driveway

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	66	62	55	115	142	175	53	59	71	62	16
Average Queue (ft)	24	25	21	30	34	45	7	13	10	8	1
95th Queue (ft)	51	58	46	77	116	136	29	41	45	35	8
Link Distance (ft)	287	248			673	673			316	316	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			150	100			150	100			10
Storage Blk Time (%)				0	1	0			0	2	0
Queuing Penalty (veh)				1	1	0			0	0	0

Intersection: 1300: Haggerty Road & North Site Driveway

Movement	WB	WB	SB
Directions Served	L	R	L
Maximum Queue (ft)	38	52	30
Average Queue (ft)	13	17	6
95th Queue (ft)	38	45	24
Link Distance (ft)		366	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	50		100
Storage Blk Time (%)	0	1	
Queuing Penalty (veh)	0	0	

Zone Summary

Zone wide Queuing Penalty: 248

HCM 6th Signalized Intersection Summary 100: Haggerty Road & Six Mile Road

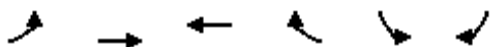
2025 Future Improvement Conditions
p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	705	71	340	797	355	116	661	455	297	622	116
Future Volume (veh/h)	188	705	71	340	797	355	116	661	455	297	622	116
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	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	202	758	76	378	886	394	123	703	484	323	676	126
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.92	0.92	0.92
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	312	885	89	415	1216	797	239	782	649	350	1059	658
Arrive On Green	0.11	0.26	0.26	0.35	0.64	0.64	0.08	0.21	0.21	0.15	0.28	0.28
Sat Flow, veh/h	1890	3460	347	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	202	413	421	378	886	394	123	703	484	323	676	126
Grp Sat Flow(s),veh/h/ln	1890	1885	1922	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	5.5	25.0	25.1	17.4	18.9	0.0	1.4	21.6	8.3	16.1	18.9	0.0
Cycle Q Clear(g_c), s	5.5	25.0	25.1	17.4	18.9	0.0	1.4	21.6	8.3	16.1	18.9	0.0
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	312	482	492	415	1216	797	239	782	649	350	1059	658
V/C Ratio(X)	0.65	0.86	0.86	0.91	0.73	0.49	0.52	0.90	0.75	0.92	0.64	0.19
Avail Cap(c_a), veh/h	312	482	492	415	1216	797	248	782	649	359	1059	658
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	47.3	42.5	42.6	35.6	17.8	9.9	50.5	46.4	32.0	48.4	37.8	24.0
Incr Delay (d2), s/veh	4.6	17.5	17.2	24.0	3.9	2.2	1.7	15.3	7.6	27.3	2.8	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(50%),veh/ln	5.9	13.6	13.8	10.7	5.7	3.8	3.5	11.5	12.9	11.8	8.8	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.9	60.0	59.8	59.5	21.6	12.1	52.2	61.7	39.6	75.7	40.6	24.6
LnGrp LOS	D	E	E	E	C	B	D	E	D	E	D	C
Approach Vol, veh/h	1036			1658			1310			1125		
Approach Delay, s/veh	58.3			28.0			52.7			48.9		
Approach LOS	E			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.6	45.0	15.4	40.0	27.6	37.0	24.4	31.0				
Change Period (Y+Rc), s	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3				
Max Green Setting (Gmax), s	12.7	38.7	9.7	33.7	20.7	30.7	18.7	24.7				
Max Q Clear Time (g_c+I1), s	7.5	20.9	3.4	20.9	19.4	27.1	18.1	23.6				
Green Ext Time (p_c), s	0.2	0.8	0.1	0.6	0.2	0.4	0.1	0.2				
Intersection Summary												
HCM 6th Ctrl Delay	45.0											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis

200: Six Mile Road & Fox Drive

2025 Future Improvement Conditions
p.m. Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	73	1478	1433	188	161	69
Future Volume (vph)	73	1478	1433	188	161	69
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	11.8	11.8	6.4		6.1	6.1
Lane Util. Factor	1.00	0.95	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1881	3762	5365		1900	1700
Flt Permitted	0.13	1.00	1.00		0.95	1.00
Satd. Flow (perm)	258	3762	5365		1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.88	0.88
Adj. Flow (vph)	77	1556	1508	198	183	78
RTOR Reduction (vph)	0	0	15	0	0	58
Lane Group Flow (vph)	77	1556	1691	0	183	20
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	1 8		2	
Permitted Phases	4					2
Actuated Green, G (s)	68.2	68.2	86.5		19.6	19.6
Effective Green, g (s)	68.2	68.2	86.5		19.6	19.6
Actuated g/C Ratio	0.57	0.57	0.72		0.16	0.16
Clearance Time (s)	11.8	11.8			6.1	6.1
Vehicle Extension (s)	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	146	2138	3867		310	277
v/s Ratio Prot		c0.41	c0.32		c0.10	
v/s Ratio Perm	0.30					0.01
v/c Ratio	0.53	0.73	0.44		0.59	0.07
Uniform Delay, d1	16.0	19.1	6.8		46.5	42.5
Progression Factor	0.76	0.80	0.02		1.00	1.00
Incremental Delay, d2	8.8	1.5	0.1		3.0	0.1
Delay (s)	20.9	16.8	0.2		49.5	42.6
Level of Service	C	B	A		D	D
Approach Delay (s)		17.0	0.2		47.4	
Approach LOS		B	A		D	
Intersection Summary						
HCM 2000 Control Delay			11.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			67.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

300: Quakertown Lane & Six Mile Road

2025 Future Improvement Conditions
p.m. Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Volume (vph)	1635	4	62	1613	8	84
Future Volume (vph)	1635	4	62	1613	8	84
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.1		11.8	11.8	6.4	6.4
Lane Util. Factor	0.95		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3799		1900	5460	1900	1700
Flt Permitted	1.00		0.14	1.00	0.95	1.00
Satd. Flow (perm)	3799		276	5460	1900	1700
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.75	0.75
Adj. Flow (vph)	1721	4	65	1698	11	112
RTOR Reduction (vph)	0	0	0	0	0	64
Lane Group Flow (vph)	1725	0	65	1698	11	48
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2 8			4	1	
Permitted Phases			4			1
Actuated Green, G (s)	99.6		68.2	68.2	7.9	7.9
Effective Green, g (s)	91.8		68.2	68.2	7.9	7.9
Actuated g/C Ratio	0.76		0.57	0.57	0.07	0.07
Clearance Time (s)			11.8	11.8	6.4	6.4
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2906		156	3103	125	111
v/s Ratio Prot	c0.45			0.31	0.01	
v/s Ratio Perm			0.24			c0.03
v/c Ratio	0.59		0.42	0.55	0.09	0.43
Uniform Delay, d1	6.1		14.6	16.2	52.7	53.9
Progression Factor	0.01		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		8.0	0.7	0.3	2.6
Delay (s)	0.3		22.6	16.9	53.0	56.5
Level of Service	A		C	B	D	E
Approach Delay (s)	0.3			17.1	56.2	
Approach LOS	A			B	E	
Intersection Summary						
HCM 2000 Control Delay			10.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	24.3
Intersection Capacity Utilization			69.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM 6th Signalized Intersection Summary

2025 Future Improvement Conditions

400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↗		↗
Traffic Volume (veh/h)	0	1339	380	0	1146	0	0	0	0	307	0	529
Future Volume (veh/h)	0	1339	380	0	1146	0	0	0	0	307	0	529
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1984	1984	0	2000	0				1969	0	1969
Adj Flow Rate, veh/h	0	1440	409	0	1206	0				334	0	575
Peak Hour Factor	0.93	0.93	0.93	0.95	0.95	0.95				0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	0	0	0				2	0	2
Cap, veh/h	0	1979	883	0	1995	0				605	0	538
Arrive On Green	0.00	0.52	0.52	0.00	1.00	0.00				0.32	0.00	0.32
Sat Flow, veh/h	0	3870	1682	0	4000	0				1875	0	1668
Grp Volume(v), veh/h	0	1440	409	0	1206	0				334	0	575
Grp Sat Flow(s),veh/h/ln	0	1885	1682	0	1900	0				1875	0	1668
Q Serve(g_s), s	0.0	23.5	12.2	0.0	0.0	0.0				11.7	0.0	25.8
Cycle Q Clear(g_c), s	0.0	23.5	12.2	0.0	0.0	0.0				11.7	0.0	25.8
Prop In Lane	0.00		1.00	0.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	1979	883	0	1995	0				605	0	538
V/C Ratio(X)	0.00	0.73	0.46	0.00	0.60	0.00				0.55	0.00	1.07
Avail Cap(c_a), veh/h	0	1979	883	0	1995	0				605	0	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	14.6	11.9	0.0	0.0	0.0				22.3	0.0	27.1
Incr Delay (d2), s/veh	0.0	2.4	1.7	0.0	1.4	0.0				3.6	0.0	58.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.8	4.2	0.0	0.4	0.0				5.6	0.0	18.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.0	13.7	0.0	1.4	0.0				25.9	0.0	85.5
LnGrp LOS	A	B	B	A	A	A				C	A	F
Approach Vol, veh/h		1849			1206						909	
Approach Delay, s/veh		16.3			1.4						63.6	
Approach LOS		B			A						E	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				48.0		32.0		48.0				
Change Period (Y+Rc), s				* 6		6.2		* 6				
Max Green Setting (Gmax), s				* 42		25.8		* 42				
Max Q Clear Time (g_c+I1), s				25.5		27.8		2.0				
Green Ext Time (p_c), s				10.3		0.0		10.3				
Intersection Summary												
HCM 6th Ctrl Delay			22.6									
HCM 6th LOS			C									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

500: I-275 NB Off-Ramp & Six Mile Road

2025 Future Improvement Conditions

p.m. Peak Hour

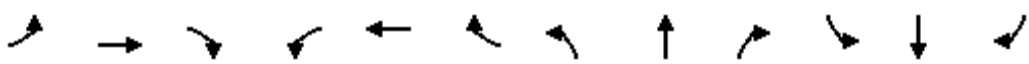
	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↘↘	↗
Traffic Volume (vph)	1076	0	0	1562	309	266
Future Volume (vph)	1076	0	0	1562	309	266
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.4			6.4	6.1	6.1
Lane Util. Factor	0.95			0.91	0.97	0.91
Frt	1.00			1.00	0.97	0.85
Flt Protected	1.00			1.00	0.96	1.00
Satd. Flow (prot)	3762			5406	3613	1547
Flt Permitted	1.00			1.00	0.96	1.00
Satd. Flow (perm)	3762			5406	3613	1547
Peak-hour factor, PHF	0.91	0.91	0.88	0.88	0.87	0.87
Adj. Flow (vph)	1182	0	0	1775	355	306
RTOR Reduction (vph)	0	0	0	0	38	59
Lane Group Flow (vph)	1182	0	0	1775	415	149
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Turn Type	NA			NA	Prot	Perm
Protected Phases	8			4	2	
Permitted Phases						2
Actuated Green, G (s)	55.4			55.4	12.1	12.1
Effective Green, g (s)	55.4			55.4	12.1	12.1
Actuated g/C Ratio	0.69			0.69	0.15	0.15
Clearance Time (s)	6.4			6.4	6.1	6.1
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	2605			3743	546	233
v/s Ratio Prot	0.31			c0.33	c0.11	
v/s Ratio Perm						0.10
v/c Ratio	0.45			0.47	0.76	0.64
Uniform Delay, d1	5.5			5.6	32.6	31.9
Progression Factor	0.61			1.37	1.00	1.00
Incremental Delay, d2	0.4			0.4	5.4	4.5
Delay (s)	3.8			8.1	37.9	36.4
Level of Service	A			A	D	D
Approach Delay (s)	3.8			8.1	37.4	
Approach LOS	A			A	D	
Intersection Summary						
HCM 2000 Control Delay			12.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	12.5
Intersection Capacity Utilization			50.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2025 Future Improvement Conditions

600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑				↑↑
Traffic Volume (vph)	0	0	0	0	1052	83	0	197	0	0	0	510
Future Volume (vph)	0	0	0	0	1052	83	0	197	0	0	0	510
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			5.5				5.5
Lane Util. Factor					0.91			1.00				0.88
Frt					0.99			1.00				0.85
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					5347			1980				2992
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					5347			1980				2992
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	0	0	0	0	1119	88	0	212	0	0	0	654
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	0	83
Lane Group Flow (vph)	0	0	0	0	1196	0	0	212	0	0	0	571
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type					NA			NA				Prot
Protected Phases					8			2				6
Permitted Phases							2					
Actuated Green, G (s)					43.2			25.0				25.0
Effective Green, g (s)					43.2			25.0				25.0
Actuated g/C Ratio					0.54			0.31				0.31
Clearance Time (s)					6.3			5.5				5.5
Lane Grp Cap (vph)					2887			618				935
v/s Ratio Prot					c0.22			0.11				c0.19
v/s Ratio Perm												
v/c Ratio					0.41			0.34				0.61
Uniform Delay, d1					10.9			21.2				23.4
Progression Factor					0.63			0.78				1.00
Incremental Delay, d2					0.4			1.4				3.0
Delay (s)					7.3			17.9				26.3
Level of Service					A			B				C
Approach Delay (s)		0.0			7.3			17.9			26.3	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			14.4									
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			69.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

700: Newburgh Road & Six Mile Road

2025 Future Improvement Conditions

p.m. Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑			↑↑	↑
Traffic Volume (vph)	0	0	0	0	993	213	0	849	0	0	1064	312
Future Volume (vph)	0	0	0	0	993	213	0	849	0	0	1064	312
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3			8.7			6.7	6.7
Lane Util. Factor					0.91			0.95			0.95	1.00
Frt					0.97			1.00			1.00	0.85
Flt Protected					1.00			1.00			1.00	1.00
Satd. Flow (prot)					5263			3762			3762	1683
Flt Permitted					1.00			1.00			1.00	1.00
Satd. Flow (perm)					5263			3762			3762	1683
Peak-hour factor, PHF	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	0	0	0	1045	224	0	894	0	0	1209	355
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	0	26
Lane Group Flow (vph)	0	0	0	0	1239	0	0	894	0	0	1209	329
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type					NA			NA			NA	Perm
Protected Phases					8			6			2	
Permitted Phases												2
Actuated Green, G (s)					33.7			31.3			33.3	33.3
Effective Green, g (s)					33.7			31.3			33.3	33.3
Actuated g/C Ratio					0.42			0.39			0.42	0.42
Clearance Time (s)					6.3			8.7			6.7	6.7
Lane Grp Cap (vph)					2217			1471			1565	700
v/s Ratio Prot					c0.24			0.24			c0.32	
v/s Ratio Perm												0.20
v/c Ratio					0.56			0.61			0.77	0.47
Uniform Delay, d1					17.5			19.4			20.1	16.9
Progression Factor					1.00			0.09			1.00	1.00
Incremental Delay, d2					1.0			1.6			3.8	2.3
Delay (s)					18.5			3.3			23.9	19.2
Level of Service					B			A			C	B
Approach Delay (s)		0.0			18.5			3.3			22.8	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.7									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			80.0								15.0	Sum of lost time (s)
Intersection Capacity Utilization			67.1%									ICU Level of Service C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

710: Newburgh Road & Six Mile Road

2025 Future Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑					↑↑	↑		↑↑	
Traffic Volume (vph)	0	1020	379	0	0	0	0	849	295	0	1064	0
Future Volume (vph)	0	1020	379	0	0	0	0	849	295	0	1064	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Util. Factor		0.91	1.00					0.95	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		5406	1683					3762	1683		3762	
Flt Permitted		1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		5406	1683					3762	1683		3762	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	0	1074	399	0	0	0	0	894	311	0	1209	0
RTOR Reduction (vph)	0	0	45	0	0	0	0	0	26	0	0	0
Lane Group Flow (vph)	0	1074	354	0	0	0	0	894	285	0	1209	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type		NA	Perm					NA	Perm		NA	
Protected Phases		4						2			6	
Permitted Phases			4						2			
Actuated Green, G (s)		33.7	33.7					33.3	33.3		31.3	
Effective Green, g (s)		33.7	33.7					33.3	33.3		31.3	
Actuated g/C Ratio		0.42	0.42					0.42	0.42		0.39	
Clearance Time (s)		6.3	6.3					6.7	6.7		8.7	
Lane Grp Cap (vph)		2277	708					1565	700		1471	
v/s Ratio Prot		0.20						0.24			c0.32	
v/s Ratio Perm			c0.21						0.17			
v/c Ratio		0.47	0.50					0.57	0.41		0.82	
Uniform Delay, d1		16.7	17.0					17.9	16.4		21.8	
Progression Factor		0.93	0.93					1.00	1.00		0.09	
Incremental Delay, d2		0.7	2.4					1.5	1.8		3.3	
Delay (s)		16.3	18.1					19.4	18.2		5.3	
Level of Service		B	B					B	B		A	
Approach Delay (s)		16.8			0.0			19.1			5.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			13.9									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			80.0									
Intersection Capacity Utilization			67.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary

800: Haggerty Road & College Parkway

2025 Future Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	7	63	83	14	58	59	855	121	45	810	97
Future Volume (veh/h)	100	7	63	83	14	58	59	855	121	45	810	97
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	1984	1984	1984	1920	1920	1920	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	108	8	68	97	16	67	63	919	130	47	853	102
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	0	0	0
Cap, veh/h	234	28	234	237	49	207	89	2183	974	77	2175	970
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.02	0.19	0.19	0.08	1.00	1.00
Sat Flow, veh/h	1325	180	1529	1291	323	1353	1890	3770	1682	1905	3800	1695
Grp Volume(v), veh/h	108	0	76	97	0	83	63	919	130	47	853	102
Grp Sat Flow(s),veh/h/ln	1325	0	1709	1291	0	1676	1890	1885	1682	1905	1900	1695
Q Serve(g_s), s	6.3	0.0	3.2	5.8	0.0	3.5	2.7	17.2	5.1	1.9	0.0	0.0
Cycle Q Clear(g_c), s	9.9	0.0	3.2	8.9	0.0	3.5	2.7	17.2	5.1	1.9	0.0	0.0
Prop In Lane	1.00		0.89	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	234	0	261	237	0	256	89	2183	974	77	2175	970
V/C Ratio(X)	0.46	0.00	0.29	0.41	0.00	0.32	0.71	0.42	0.13	0.61	0.39	0.11
Avail Cap(c_a), veh/h	343	0	402	342	0	394	142	2183	974	143	2175	970
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	34.6	0.0	30.0	34.0	0.0	30.2	38.8	20.6	15.7	36.1	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.6	1.1	0.0	0.7	9.9	0.6	0.3	7.0	0.5	0.2
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(50%),veh/ln	2.1	0.0	1.3	1.9	0.0	1.5	1.4	8.6	1.8	1.0	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	0.0	30.6	35.1	0.0	30.9	48.7	21.2	16.0	43.1	0.5	0.2
LnGrp LOS	D	A	C	D	A	C	D	C	B	D	A	A
Approach Vol, veh/h	184			180			1112			1002		
Approach Delay, s/veh	33.8			33.2			22.1			2.5		
Approach LOS	C			C			C			A		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	51.8		18.4	9.2	52.3		18.4				
Change Period (Y+Rc), s	* 6	* 6		* 6.2	* 6	* 6		* 6.2				
Max Green Setting (Gmax), s	* 6	* 37		* 19	* 6	* 37		* 19				
Max Q Clear Time (g_c+I1), s	4.7	2.0		11.9	3.9	19.2		10.9				
Green Ext Time (p_c), s	0.0	0.9		0.4	0.0	0.9		0.4				

Intersection Summary

HCM 6th Ctrl Delay 15.8

HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

900: Haggerty Road & Cross Road/South Drive

2025 Future Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	119	34	12	58	28	22	2	947	64	4	882	166
Future Volume (veh/h)	119	34	12	58	28	22	2	947	64	4	882	166
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	2000	2000	2000	1920	1920	1920	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	161	46	16	76	37	29	2	1029	70	4	938	177
Peak Hour Factor	0.74	0.74	0.74	0.76	0.76	0.76	0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	415	379	132	408	267	209	315	2194	979	391	2194	979
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.58	0.58	0.58
Sat Flow, veh/h	1357	1418	493	1307	997	782	513	3800	1695	521	3800	1695
Grp Volume(v), veh/h	161	0	62	76	0	66	2	1029	70	4	938	177
Grp Sat Flow(s),veh/h/ln	1357	0	1911	1307	0	1779	513	1900	1695	521	1900	1695
Q Serve(g_s), s	8.2	0.0	2.0	3.7	0.0	2.3	0.1	0.0	0.0	0.3	11.1	3.9
Cycle Q Clear(g_c), s	10.5	0.0	2.0	5.7	0.0	2.3	11.2	0.0	0.0	0.3	11.1	3.9
Prop In Lane	1.00		0.26	1.00		0.44	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	415	0	511	408	0	476	315	2195	979	391	2195	979
V/C Ratio(X)	0.39	0.00	0.12	0.19	0.00	0.14	0.01	0.47	0.07	0.01	0.43	0.18
Avail Cap(c_a), veh/h	415	0	511	408	0	476	315	2195	979	391	2195	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	22.2	24.3	0.0	22.3	1.3	0.0	0.0	7.2	9.5	8.0
Incr Delay (d2), s/veh	2.7	0.0	0.5	1.0	0.0	0.6	0.0	0.7	0.1	0.0	0.6	0.4
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(50%),veh/ln	2.9	0.0	0.9	1.3	0.0	1.0	0.0	0.2	0.0	0.0	3.8	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	22.7	25.4	0.0	22.9	1.4	0.7	0.1	7.2	10.1	8.4
LnGrp LOS	C	A	C	C	A	C	A	A	A	A	B	A
Approach Vol, veh/h	223				142				1101		1119	
Approach Delay, s/veh	27.2				24.2				0.7		9.8	
Approach LOS	C				C				A		A	
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			28.0			52.0			28.0		
Change Period (Y+Rc), s	5.8			6.6			5.8			6.6		
Max Green Setting (Gmax), s	46.2			21.4			46.2			21.4		
Max Q Clear Time (g_c+I1), s	13.2			12.5			13.1			7.7		
Green Ext Time (p_c), s	8.2			0.5			7.8			0.4		
Intersection Summary												
HCM 6th Ctrl Delay	8.2											
HCM 6th LOS	A											

HCM Unsignalized Intersection Capacity Analysis

1000: East Site Driveway & Six Mile Road

2025 Future Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1457	0	0	1453	49	0	0	94	0	0	39
Future Volume (Veh/h)	0	1457	0	0	1453	49	0	0	94	0	0	39
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1550	0	0	1562	53	0	0	102	0	0	42
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLT			TWLT							
Median storage veh)		2			2							
Upstream signal (ft)		568			325							
pX, platoon unblocked	0.89			0.79			0.84	0.84	0.79	0.84	0.84	0.89
vC, conflicting volume	1615			1550			1982	3165	775	2466	3138	417
vC1, stage 1 conf vol							1550	1550		1588	1588	
vC2, stage 2 conf vol							432	1615		877	1550	
vCu, unblocked vol	1088			1165			841	2242	185	1414	2211	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	84	100	100	96
cM capacity (veh/h)	574			475			159	162	653	196	164	968
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1				
Volume Total	1033	517	260	521	521	313	102	42				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	0	0	53	102	42				
cSH	1700	1700	475	1700	1700	1700	653	968				
Volume to Capacity	0.61	0.30	0.00	0.31	0.31	0.18	0.16	0.04				
Queue Length 95th (ft)	0	0	0	0	0	0	14	3				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	11.5	8.9				
Lane LOS							B	A				
Approach Delay (s)	0.0		0.0				11.5	8.9				
Approach LOS							B	A				
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			50.5%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM 6th Signalized Intersection Summary

1200: Haggerty Road & Middle Site Driveway

2025 Future Improvement Conditions

p.m. Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	114	52	0	46	124	1002	78	50	869	37
Future Volume (veh/h)	2	0	114	52	0	46	124	1002	78	50	869	37
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	2000	2000	2000	2000	2000	2000	1984	1984	1984	2000	2000	2000
Adj Flow Rate, veh/h	2	0	130	83	0	73	136	1101	86	56	966	41
Peak Hour Factor	0.88	0.88	0.88	0.63	0.63	0.63	0.91	0.91	0.91	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	0	0	0
Cap, veh/h	47	2	180	222	0	182	504	2790	1244	393	2812	1254
Arrive On Green	0.11	0.00	0.11	0.11	0.00	0.11	0.74	0.74	0.74	0.98	0.98	0.98
Sat Flow, veh/h	9	17	1670	1226	0	1695	564	3770	1682	479	3800	1695
Grp Volume(v), veh/h	132	0	0	83	0	73	136	1101	86	56	966	41
Grp Sat Flow(s),veh/h/ln	1695	0	0	1226	0	1695	564	1885	1682	479	1900	1695
Q Serve(g_s), s	0.4	0.0	0.0	0.0	0.0	3.2	6.8	8.6	1.1	1.8	0.5	0.0
Cycle Q Clear(g_c), s	6.0	0.0	0.0	5.3	0.0	3.2	7.3	8.6	1.1	10.3	0.5	0.0
Prop In Lane	0.02		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	228	0	0	222	0	182	504	2790	1244	393	2812	1254
V/C Ratio(X)	0.58	0.00	0.00	0.37	0.00	0.40	0.27	0.39	0.07	0.14	0.34	0.03
Avail Cap(c_a), veh/h	521	0	0	444	0	477	504	2790	1244	393	2812	1254
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	0.61	0.61	0.61	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	0.0	0.0	34.2	0.0	33.3	3.7	3.8	2.9	1.1	0.2	0.2
Incr Delay (d2), s/veh	2.3	0.0	0.0	1.0	0.0	1.4	0.8	0.3	0.1	0.8	0.3	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(50%),veh/ln	2.6	0.0	0.0	1.6	0.0	1.4	0.5	1.8	0.2	0.1	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	0.0	0.0	35.3	0.0	34.7	4.5	4.1	2.9	1.8	0.5	0.2
LnGrp LOS	D	A	A	D	A	C	A	A	A	A	A	A
Approach Vol, veh/h	132			156			1323			1063		
Approach Delay, s/veh	36.9			35.0			4.0			0.6		
Approach LOS	D			D			A			A		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	64.9			15.1			64.9			15.1		
Change Period (Y+Rc), s	* 5.7			6.5			* 5.7			6.5		
Max Green Setting (Gmax), s	* 45			22.5			* 45			22.5		
Max Q Clear Time (g_c+I1), s	10.6			8.0			12.3			7.3		
Green Ext Time (p_c), s	11.4			0.6			8.4			0.6		

Intersection Summary

HCM 6th Ctrl Delay	6.1
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
1300: Haggerty Road & North Site Driveway

2025 Future Improvement Conditions
p.m. Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	24	1011	39	26	930
Future Vol, veh/h	26	24	1011	39	26	930
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	-	195	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	93	93
Heavy Vehicles, %	2	2	1	1	0	0
Mvmt Flow	28	26	1099	42	28	1000
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1655	550	0	0	1141	0
Stage 1	1099	-	-	-	-	-
Stage 2	556	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.1	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.2	-
Pot Cap-1 Maneuver	89	479	-	-	620	-
Stage 1	281	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	85	479	-	-	620	-
Mov Cap-2 Maneuver	200	-	-	-	-	-
Stage 1	281	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	19.7	0	0.3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 200 479 620	-	-		
HCM Lane V/C Ratio	-	- 0.141 0.054 0.045	-	-		
HCM Control Delay (s)	-	- 25.9 12.9 11.1	-	-		
HCM Lane LOS	-	- D B B	-	-		
HCM 95th %tile Q(veh)	-	- 0.5 0.2 0.1	-	-		

Intersection: 100: Haggerty Road & Six Mile Road

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	R	L
Maximum Queue (ft)	418	557	580	500	350	372	334	203	440	482	270	361
Average Queue (ft)	161	298	326	276	187	195	153	89	241	249	194	250
95th Queue (ft)	350	546	576	485	303	307	272	156	374	438	306	389
Link Distance (ft)		1376	1376	464	464	464	464		941	941		
Upstream Blk Time (%)				7		0						
Queuing Penalty (veh)				25		0						
Storage Bay Dist (ft)	500							500			220	350
Storage Blk Time (%)		3							11		7	9
Queuing Penalty (veh)		6							48		23	27

Intersection: 100: Haggerty Road & Six Mile Road

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	457	385	151
Average Queue (ft)	203	183	39
95th Queue (ft)	417	343	96
Link Distance (ft)	673	673	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			210
Storage Blk Time (%)	0	3	
Queuing Penalty (veh)	0	3	

Intersection: 200: Six Mile Road & Fox Drive

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	TR	L	R
Maximum Queue (ft)	124	274	315	75	75	77	208	143
Average Queue (ft)	62	117	155	17	16	19	117	40
95th Queue (ft)	116	254	294	59	57	61	184	103
Link Distance (ft)		252	252	30	30	30		838
Upstream Blk Time (%)		3	3	1	1	1		
Queuing Penalty (veh)		25	23	3	3	8		
Storage Bay Dist (ft)	100						200	
Storage Blk Time (%)	9	7					1	
Queuing Penalty (veh)	69	5					0	

Intersection: 300: Quakertown Lane & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	T	L	R
Maximum Queue (ft)	64	86	176	305	370	235	60	132
Average Queue (ft)	20	25	93	146	159	147	7	61
95th Queue (ft)	60	69	204	272	310	261	34	114
Link Distance (ft)	30	30		505	505			778
Upstream Blk Time (%)	1	2			0			
Queuing Penalty (veh)	6	17			0			
Storage Bay Dist (ft)			350			160	100	
Storage Blk Time (%)				0	4	8	0	4
Queuing Penalty (veh)				0	20	44	0	0

Intersection: 400: I-275 SB On-Ramp (EB)/I-275 SB Off-Ramp & Six Mile Road

Movement	EB	EB	EB	WB	WB	SB	SB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (ft)	363	457	340	233	236	385	467
Average Queue (ft)	169	237	102	157	187	156	256
95th Queue (ft)	331	435	296	234	260	331	458
Link Distance (ft)	505	505		179	179	548	548
Upstream Blk Time (%)	0	0		5	11	2	3
Queuing Penalty (veh)	0	3		32	65	0	0
Storage Bay Dist (ft)			240				
Storage Blk Time (%)		6					
Queuing Penalty (veh)		23					

Intersection: 410: Six Mile Road & I-275 SB On-Ramp (WB)

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	33	76
Average Queue (ft)	2	12
95th Queue (ft)	16	47
Link Distance (ft)	1028	1028
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 500: I-275 NB Off-Ramp & Six Mile Road

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	T	T	L	LR	R
Maximum Queue (ft)	176	177	167	197	149	198	337	250
Average Queue (ft)	73	88	74	105	70	78	185	93
95th Queue (ft)	143	160	136	169	128	153	288	223
Link Distance (ft)	105	105	321	321	321	452	452	
Upstream Blk Time (%)	2	4						
Queuing Penalty (veh)	13	22						
Storage Bay Dist (ft)								275
Storage Blk Time (%)							1	0
Queuing Penalty (veh)							2	0

Intersection: 510: I-275 NB On-Ramp (EB)/I-275 NB On-Ramp (WB) & Six Mile Road

Movement	WB
Directions Served	T
Maximum Queue (ft)	11
Average Queue (ft)	0
95th Queue (ft)	0
Link Distance (ft)	105
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 600: EB to WB Crossover/North Laurel Park Drive & Six Mile Road

Movement	WB	WB	WB	NB	SB	SB
Directions Served	T	T	TR	LT	R	R
Maximum Queue (ft)	97	110	110	35	272	256
Average Queue (ft)	30	39	46	23	169	110
95th Queue (ft)	71	82	89	41	267	229
Link Distance (ft)	695	695	695	1	257	
Upstream Blk Time (%)				39	2	0
Queuing Penalty (veh)				77	0	0
Storage Bay Dist (ft)						125
Storage Blk Time (%)					21	2
Queuing Penalty (veh)					58	6

Intersection: 610: Six Mile Road & EB to WB Crossover

Movement	EB
Directions Served	L
Maximum Queue (ft)	121
Average Queue (ft)	32
95th Queue (ft)	90
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	175
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 700: Newburgh Road & Six Mile Road

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	T	T	TR	T	T	T	T	R
Maximum Queue (ft)	198	262	323	58	47	336	312	176
Average Queue (ft)	109	117	179	29	12	220	179	76
95th Queue (ft)	169	206	280	62	37	306	274	140
Link Distance (ft)	737	737	737	48	48	713	713	713
Upstream Blk Time (%)				9	1			
Queuing Penalty (veh)				40	4			
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 710: Newburgh Road & Six Mile Road

Movement	EB	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	T	T	T	R	T	T	R	T	T
Maximum Queue (ft)	166	188	201	210	251	206	150	76	67
Average Queue (ft)	92	118	137	99	160	119	66	46	20
95th Queue (ft)	145	169	189	168	223	195	123	77	53
Link Distance (ft)	541	541	541		997	997		48	48
Upstream Blk Time (%)								23	4
Queuing Penalty (veh)								126	25
Storage Bay Dist (ft)				265			520		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 800: Haggerty Road & College Parkway

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	135	100	120	94	174	266	266	80	90	123	113	44
Average Queue (ft)	66	37	49	32	47	124	142	25	34	61	49	19
95th Queue (ft)	119	89	93	66	118	238	247	61	74	107	95	44
Link Distance (ft)	301		239	239		241	241	241		634	634	
Upstream Blk Time (%)						1	1					
Queuing Penalty (veh)						2	3					
Storage Bay Dist (ft)		50			150				300			140
Storage Blk Time (%)	26	1				5					0	
Queuing Penalty (veh)	18	1				3					0	

Intersection: 900: Haggerty Road & Cross Road/South Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	132	52	91	62	17	107	113	44	30	193	157	57
Average Queue (ft)	58	17	26	18	1	48	60	11	3	102	73	29
95th Queue (ft)	107	43	59	46	8	88	106	36	16	165	134	54
Link Distance (ft)	330	330	467	467		634	634			1374	1374	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300		215	250				190
Storage Blk Time (%)												0
Queuing Penalty (veh)												0

Intersection: 1000: East Site Driveway & Six Mile Road

Movement	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	T	TR	LT	T	T	TR	LTR	R
Maximum Queue (ft)	94	105	40	48	32	22	202	63
Average Queue (ft)	11	12	6	5	2	2	86	23
95th Queue (ft)	115	118	49	55	26	17	201	49
Link Distance (ft)	464	464		252	252	252	332	388
Upstream Blk Time (%)	0	0		0			3	
Queuing Penalty (veh)	0	1		0			0	
Storage Bay Dist (ft)			100					
Storage Blk Time (%)			1					
Queuing Penalty (veh)			4					

Intersection: 1200: Haggerty Road & Middle Site Driveway

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	89	84	63	124	195	204	48	94	159	160	80
Average Queue (ft)	39	35	22	56	49	63	8	24	41	39	8
95th Queue (ft)	68	71	48	112	153	172	32	57	111	106	44
Link Distance (ft)	287	248			673	673			316	316	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)			150	100			150	100			10
Storage Blk Time (%)				2	2	1		0	1	7	0
Queuing Penalty (veh)				8	3	1		0	0	3	2

Intersection: 1300: Haggerty Road & North Site Driveway

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	T	L
Maximum Queue (ft)	69	62	6	6	43
Average Queue (ft)	26	17	0	0	13
95th Queue (ft)	61	48	5	5	40
Link Distance (ft)		366	316	316	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	50			100	
Storage Blk Time (%)	12	0			
Queuing Penalty (veh)	3	0			

Zone Summary

Zone wide Queuing Penalty: 904

Appendix 11

Parking Generation Calculations

CITY OF LIVONIA ZONING ORDINANCE PARKING REQUIREMENTS			
USE	AMOUNT	RATE	TOTALS
1 BEDROOM APTS	80 UNITS	2 SPACES PER UNIT	160 SPACES
2 BEDROOMS APTS	85 UNITS	2 SPACES PER UNIT	170 SPACES
3 BEDROOM APTS	5 UNITS	2.5 SPACES PER UNIT	13 SPACES
HOTEL ROOMS	101 UNITS	1 SPACE PER UNIT	101 SPACES
HOTEL EMPLOYEES	5 PEOPLE	1 SPACE PER PERSON	5 SPACES
GROCERY	44,064 GSF	250 GLA PER SPACE	177 SPACES
RETAIL A	6,249 GSF	150 SF PER SPACE	42 SPACES
RETAIL B	6,560 GSF	150 SF PER SPACE	44 SPACES
RETAIL C	4,600 GSF	150 SF PER SPACE	38 SPACES
RETAIL D	10,004 GSF	150 SF PER SPACE	67 SPACES
RETAIL E	15,480 GSF	150 SF PER SPACE	104 SPACES
RESTAURANT A	6,249 GSF	75 SF PER SPACE	84 SPACES
RESTAURANT B	10,000 GSF	75 SF PER SPACE	134 SPACES
FOOD SERVICE	5,136 GSF	125 SF PER SPACE	42 SPACES
GYM	35,292 GSF	200 SF PER SPACE	177 SPACES
			1358 SPACES REQUIRED

Building	ITE Land Use	Land Use Code	Units	Weekday	Saturday	Sunday
Retail A	Medical-Dental Office Building	720	6,249 SF	16	4	17
Retail B	Small Office Building	712	5,600 SF	14	-	-
Grocery and Retail C ¹	Shopping Plaza (40-150K), Supermarket - Yes	821	47,708 SF	171	172	111
Retail D-E	Furniture Store	890	21,003 SF	10	25	30
Restaurant A	High-Turnover (Sit-Down) Restaurant	932	6,249 SF	59	77	70
Restaurant B	Fine Dining Restaurant	931	10,000 SF	105	180	180
Food Service with Drive Through Window	Coffee/Donut Shop with Drive-Through Window	937	2,556 SF	13	22	22
Food Service	Fast Casual Restaurant	930	9,140 SF	91	80	80
Gym	Health/Fitness Club	492	35,292 SF	160	115	115
Hotel	Hotel	310	101 Rooms	83	116	116
Residential	Multifamily Housing (Mid-Rise)	221	170 DU	219	207	349
Total				941	998	1,090
Occupancy				91%	97%	106%

¹Used Rates for LUC 820 - Shopping Center

Building	ITE Land Use	Land Use Code	Units	Time Period	Equation	Rate	Studies	Notes
Retail A	Medical-Dental Office Building	720	6,249 SF	Weekday	$P=3.34(X)-5.21$	3.23	117	# Studies>20, Use Fitted Curve
				Saturday	-	0.56	4	Use Average Rate.
				Sunday	-	2.66	2	Use Average Rate.
Retail B	Small Office Building	712	5,600 SF	Weekday	-	2.56	19	Use Average Rate.
				Saturday	-	-	-	-
				Sunday	-	-	-	-
Grocery and Retail C1	Shopping Plaza (40-150K), Supermarket - Yes	821	47,708 SF	Weekday	$P=1.49(X)+100.32$	1.95	46	# Studies>20, Use Fitted Curve
				Saturday	$P=2.78(X)+39.26$	2.91	58	# Studies>20, Use Fitted Curve
				Sunday	$P=1.75(X)+27.11$	1.89	11	Choose Line at Cluster. Fitted Curve Higher.
Retail D-E	Furniture Store	890	21,003 SF	Weekday	$P=0.39(X)+2.07$	0.48	7	Choose Line at Cluster. Both methods equal.
				Saturday	$P=0.72(X)+10.16$	0.96	7	Choose Line at Cluster. Fitted Curve Higher.
				Sunday	-	1.43	1	Use Average Rate.
Restaurant A	High-Turnover (Sit-Down) Restaurant	932	6,249 SF	Weekday	-	9.44	51	Use Average Rate.
				Saturday	-	12.28	14	Use Average Rate.
				Sunday	$\ln(P)=0.64\ln(X)+3.03$	11.25	5	Choose Line at Cluster. Average Rate Higher.
Restaurant B	Fine Dining Restaurant	931	10,000 SF	Weekday	-	10.52	3	Use Average Rate.
				Saturday	$P=19.19(X)-11.51$	17	4	Choose Line at Cluster. Fitted Curve Higher.
				Sunday ¹	$P=19.19(X)-11.51$	17	4	Choose Line at Cluster. Fitted Curve Higher.
Food Service with Drive Through Window	Coffee/Donut Shop with Drive-Through Window	937	2,556 SF	Weekday	-	5.22	11	Use Average Rate.
				Saturday	-	8.7	2	Use Average Rate.
				Sunday ¹	-	8.7	2	Use Average Rate.
Food Service	Fast Casual Restaurant	930	9,140 SF	Weekday	$P=8.92(X)+3.08$	9.93	4	Choose Line at Cluster. Average Rate Higher.
				Saturday	-	8.75	2	Use Average Rate.
				Sunday ¹	-	-	-	-
Gym	Health/Fitness Club	492	35,292 SF	Weekday	$P=3.33(X)+42.58$	4.73	26	# Studies>20, Use Fitted Curve
				Saturday	$\ln(P)=0.89\ln(X)+1.56$	3.26	6	Choose Line at Cluster. Average Rate Higher.
				Sunday ¹	$\ln(P)=0.89\ln(X)+1.56$	3.26	6	Choose Line at Cluster. Average Rate Higher.
Hotel	Hotel	310	101 Rooms	Weekday	$\ln(P)=0.90\ln(X)+0.26$	0.74	22	# Studies>20, Use Fitted Curve
				Saturday	-	1.15	1	Use Average Rate.
				Sunday ¹	-	1.15	1	Use Average Rate.
Residential	Multifamily Housing (Mid-Rise)	221	170 DU	Weekday	$P=1.34(X)-8.73$	1.31	73	# Studies>20, Use Fitted Curve
				Saturday	-	1.22	3	Use Average Rate.
				Sunday	-	2.05	1	Use Average Rate.

¹Used Saturday Rates for Sunday

Project: NEC Six Mile Road and Haggerty Road
Description:

Shared Parking Demand Summary																		
Peak Month: DECEMBER -- Peak Period: 6 PM, WEEKDAY																		
Land Use	Project Data		Weekday					Weekend					Weekday			Weekend		
			Base Ratio	Driving Adj	Non-Captive Ratio	Project Ratio	Unit For Ratio	Base Ratio	Driving Adj	Non-Captive Ratio	Project Ratio	Unit For Ratio	Peak Hr Adj	Peak Mo Adj	Estimated Parking Demand	Peak Hr Adj	Peak Mo Adj	Estimated Parking Demand
	Quantity	Unit											6 PM	December	12 PM	December		
Retail																		
Retail (<400 ksf)	25,754	sf GLA	2.90	100%	98%	2.85	ksf GLA	3.20	100%	99%	3.16	ksf GLA	90%	100%	66	100%	100%	82
Employee			0.70	100%	99%	0.69		0.80	100%	99%	0.79		100%	100%	19	100%	100%	21
Supermarket/Grocery	38,020	sf GLA	4.00	100%	98%	3.93	ksf GLA	4.00	100%	99%	3.95	ksf GLA	100%	100%	150	100%	100%	151
Employee			0.75	100%	99%	0.74		0.75	100%	99%	0.74		80%	100%	23	100%	100%	29
Food and Beverage																		
Fine/Casual Dining	8,000	sf GLA	13.25	100%	92%	12.24	ksf GLA	15.25	100%	89%	13.62	ksf GLA	95%	100%	93	50%	100%	54
Employee			2.25	100%	99%	2.23		2.50	100%	99%	2.48		100%	100%	18	75%	100%	15
Family Restaurant	4,999	sf GLA	15.25	100%	92%	14.09	ksf GLA	15.00	100%	89%	13.39	ksf GLA	80%	100%	57	100%	100%	67
Employee			2.15	100%	99%	2.13		2.10	100%	99%	2.09		95%	100%	10	100%	100%	11
Fast Casual/Fast Food	9,357	sf GLA	12.40	100%	57%	7.07	ksf GLA	12.70	100%	60%	7.65	ksf GLA	85%	96%	55	100%	96%	69
Employee			2.00	100%	99%	1.98		2.00	100%	99%	1.99		90%	100%	17	100%	100%	19
Entertainment and Institutions																		
Health Club	28,234	sf GLA	6.60	100%	95%	6.25	ksf GLA	5.50	100%	79%	4.33	ksf GLA	100%	100%	177	50%	100%	61
Employee			0.40	100%	99%	0.40		0.25	100%	99%	0.25		100%	100%	12	50%	100%	4
Hotel and Residential																		
Hotel-Business		keys	1.00	59%	100%	0.59	key	1.00	69%	100%	0.69	key	75%	60%	-	55%	60%	-
Hotel-Leisure	101	keys	1.00	50%	100%	0.50	key	1.00	50%	100%	0.50	key	85%	50%	21	65%	50%	16
Hotel Employees	101	keys	0.15	100%	100%	0.15	key	0.15	100%	100%	0.15	key	40%	50%	3	100%	50%	8
Restaurant/Lounge		sf GLA	6.67	63%	90%	3.78	ksf GLA	7.67	54%	30%	1.24	ksf GLA	55%	100%	-	100%	100%	-
Meeting/Banquet (0 to 20 sq ft/key)		sf GLA	0.00	68%	60%	0.00	ksf GLA	0.00	68%	70%	0.00	ksf GLA	100%	100%	-	65%	100%	-
Meeting/Banquet (20 to 50 sq ft/key)		sf GLA	0.00	68%	60%	0.00	ksf GLA	0.00	68%	70%	0.00	ksf GLA	100%	100%	-	65%	100%	-
Meeting/Banquet (50 to 100 sq ft/key)		sf GLA	0.00	68%	60%	0.00	ksf GLA	0.00	68%	70%	0.00	ksf GLA	100%	100%	-	65%	100%	-
Convention (100 to 200 sq ft/key)		sf GLA	0.00	68%	60%	0.00	ksf GLA	5.50	68%	70%	2.62	ksf GLA	50%	100%	-	100%	100%	-
Convention (> 200 sq ft/key)		sf GLA	5.50	68%	60%	2.24	ksf GLA	5.50	68%	70%	2.62	ksf GLA	50%	100%	-	100%	100%	-
Restaurant/Meeting Employees		sf GLA	0.00	100%	100%	0.00	ksf GLA	0.00	100%	100%	0.00	ksf GLA	60%	100%	-	100%	100%	-
Residential, Suburban																		
Studio Efficiency		units	0.00	100%	100%	0.00	unit	0.00	100%	100%	0.00	unit	60%	100%	-	68%	100%	-
1 Bedroom	80	units	0.00	100%	100%	0.00	unit	0.00	100%	100%	0.00	unit	60%	100%	-	68%	100%	-
2 Bedrooms	85	units	0.00	100%	100%	0.00	unit	0.00	100%	100%	0.00	unit	60%	100%	-	68%	100%	-
3+ Bedrooms	5	units	0.00	100%	100%	0.00	unit	0.00	100%	100%	0.00	unit	60%	100%	-	68%	100%	-
Reserved	100%	res spaces	1.32	100%	100%	1.32	unit	1.32	100%	100%	1.32	unit	100%	100%	225	100%	100%	225
Visitor	170	units	0.10	100%	100%	0.10	unit	0.15	100%	100%	0.15	unit	60%	100%	10	20%	100%	5
Office																		
Office <25 ksf	5,600	sf GFA	0.30	100%	100%	0.30	ksf GFA	0.03	100%	100%	0.03	ksf GFA	5%	100%	-	90%	100%	1
Reserved		empl	0.00	100%	100%	0.00		0.00	100%	100%	0.00		100%	100%	-	100%	100%	-
Employee			3.50	100%	84%	2.95		0.35	100%	84%	0.30		25%	100%	4	90%	100%	2
Medical/Dental Office	6,249	sf GFA	3.00	100%	98%	2.95	ksf GFA	0.00	100%	100%	0.00	ksf GFA	67%	100%	13	30%	100%	-
Employee			1.60	100%	84%	1.35		0.00	100%	84%	0.00		67%	100%	6	100%	100%	-
Additional Land Uses																		
													Customer/Visitor		642	Customer		508
													Employee/Resident		112	Employee/Resident		107
													Reserved		225	Reserved		225
													Total		979	Total		840

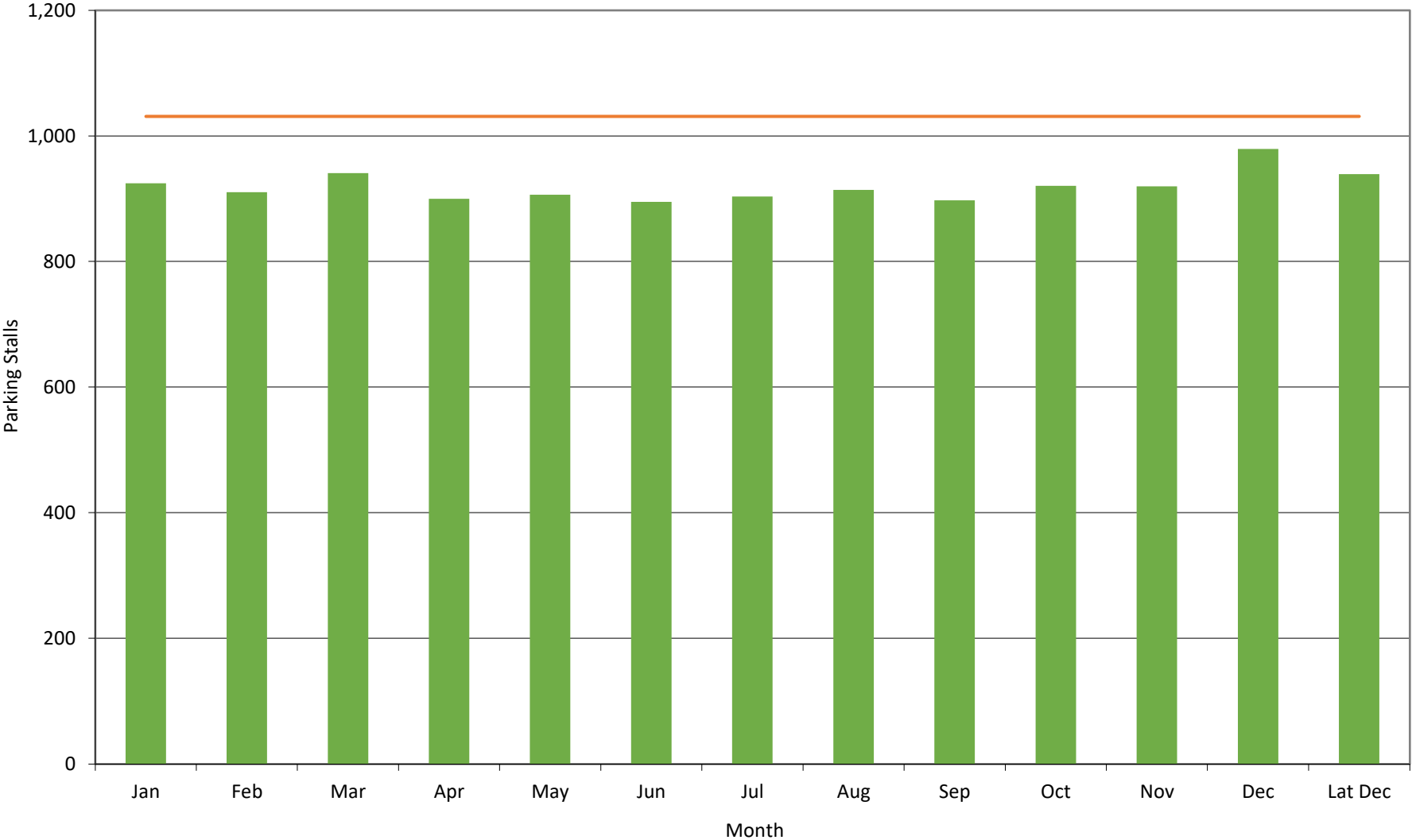
Project: NEC Six Mile Road and Haggerty Road

Description:

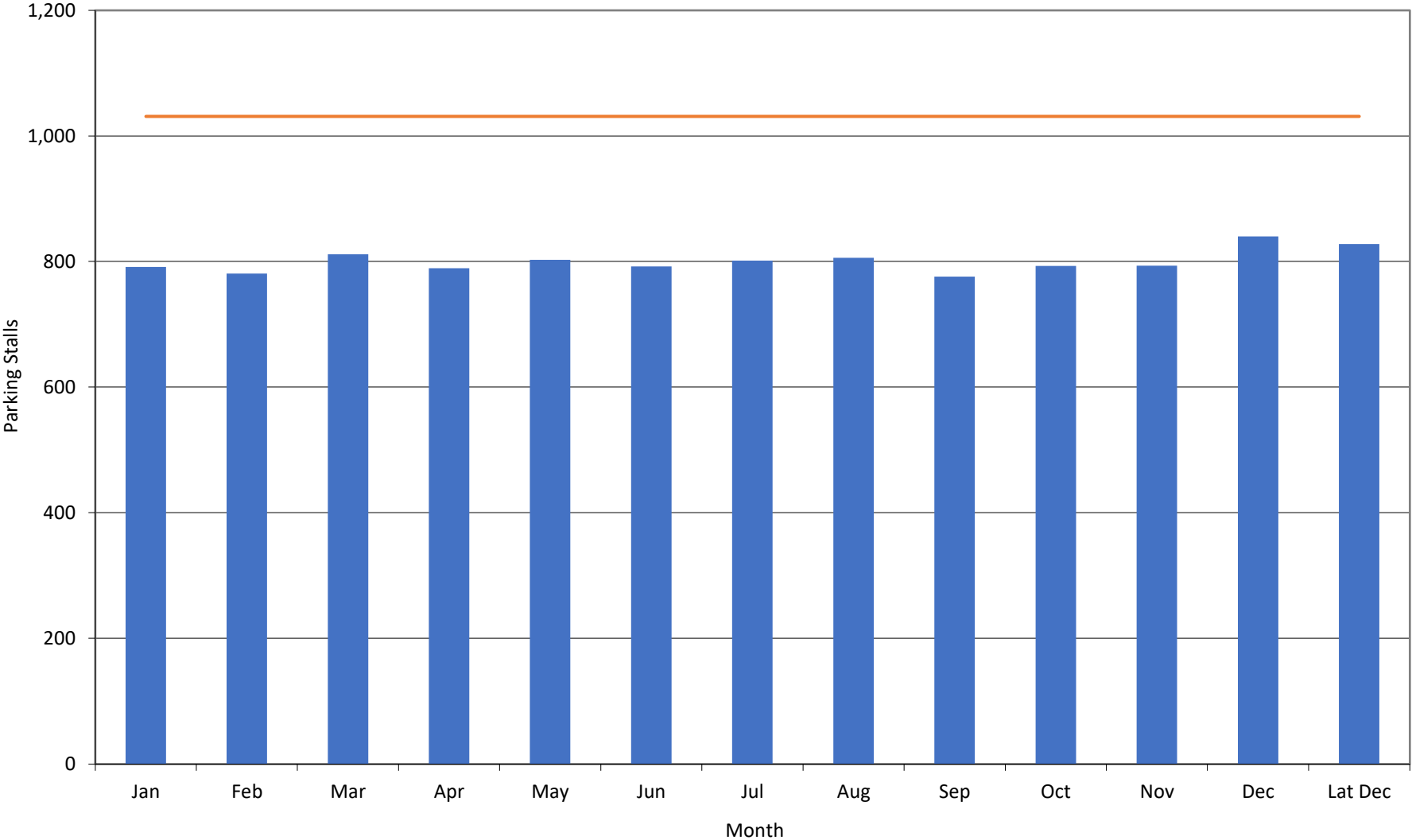
Monthly Comparison Summary								
Month	Weekday							
	Overall Pk		AM Peak Hr		PM Peak Hr		Eve Peak Hr	
	Time	Demand	Time	Demand	Time	Demand	Time	Demand
January	6 PM	925	11 AM	816	5 PM	882	6 PM	925
February	6 PM	910	11 AM	807	5 PM	868	6 PM	910
March	6 PM	941	11 AM	832	1 PM	899	6 PM	941
April	6 PM	900	11 AM	800	1 PM	867	6 PM	900
May	6 PM	906	11 AM	803	1 PM	876	6 PM	906
June	6 PM	895	11 AM	795	1 PM	865	6 PM	895
July	6 PM	903	11 AM	801	1 PM	873	6 PM	903
August	6 PM	914	11 AM	810	1 PM	810	6 PM	914
September	6 PM	897	11 AM	795	1 PM	859	6 PM	897
October	6 PM	921	11 AM	814	1 PM	880	6 PM	921
November	6 PM	920	11 AM	813	1 PM	879	6 PM	920
December	6 PM	979	11 AM	856	1 PM	931	6 PM	979
Late December	6 PM	939	11 AM	830	1 PM	905	6 PM	939

Monthly Comparison Summary								
Month	Weekend							
	Overall Pk		AM Peak Hr		PM Peak Hr		Eve Peak Hr	
	Time	Demand	Time	Demand	Time	Demand	Time	Demand
January	5 PM	791	11 AM	728	5 PM	791	6 PM	782
February	5 PM	781	11 AM	720	5 PM	781	6 PM	775
March	12 PM	811	11 AM	756	12 PM	811	6 PM	803
April	12 PM	789	11 AM	736	12 PM	789	6 PM	771
May	12 PM	802	11 AM	746	12 PM	802	6 PM	777
June	12 PM	792	11 AM	738	12 PM	792	6 PM	767
July	12 PM	801	11 AM	747	12 PM	801	6 PM	775
August	12 PM	806	11 AM	751	12 PM	806	6 PM	783
September	12 PM	776	11 AM	725	12 PM	776	6 PM	764
October	12 PM	793	11 AM	740	12 PM	793	6 PM	783
November	12 PM	793	11 AM	742	12 PM	793	6 PM	781
December	12 PM	840	11 AM	773	12 PM	840	6 PM	820
Late December	5 PM	828	11 AM	750	5 PM	828	6 PM	813

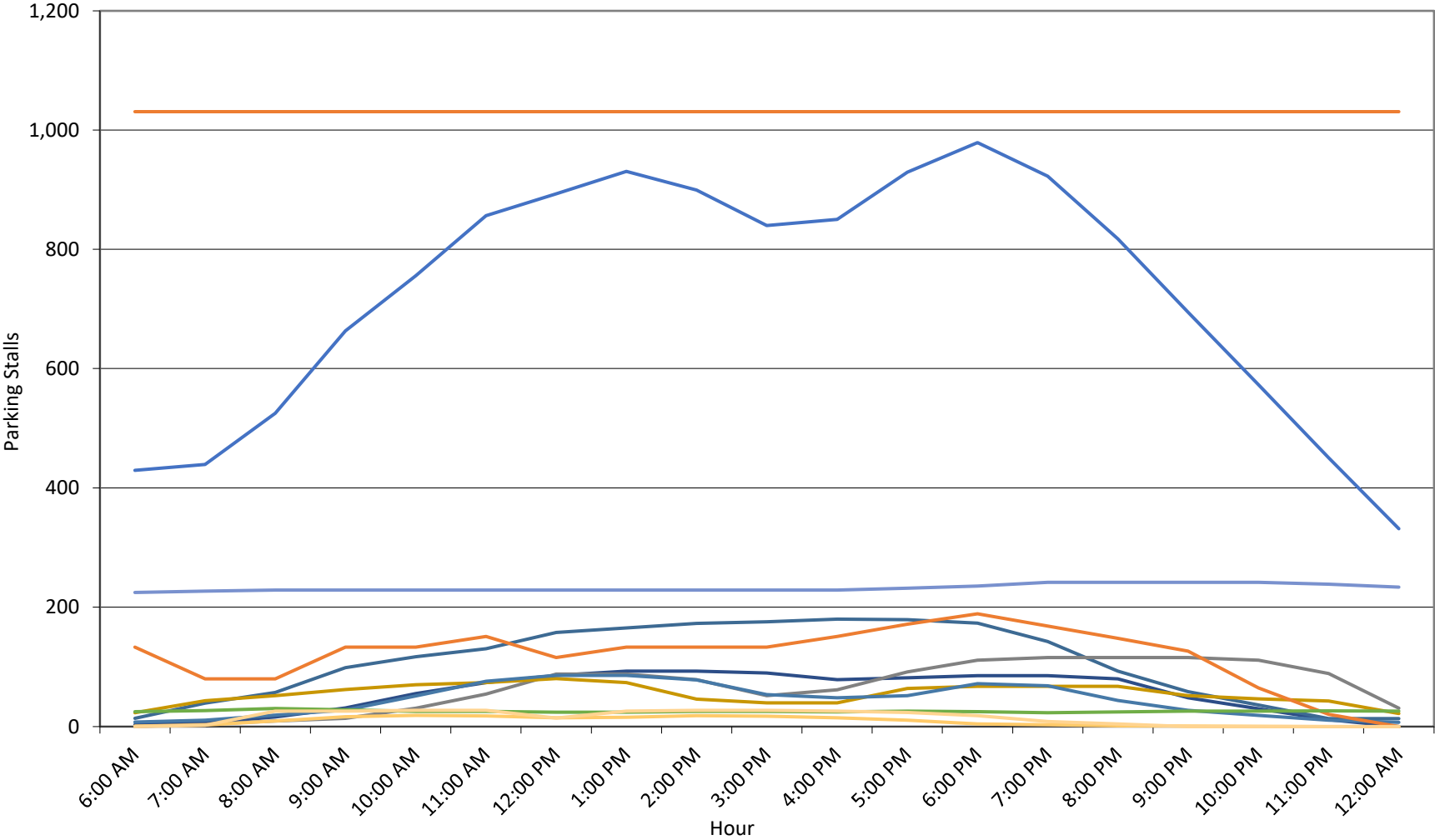
Weekday Month-by-Month Estimated Parking Demand



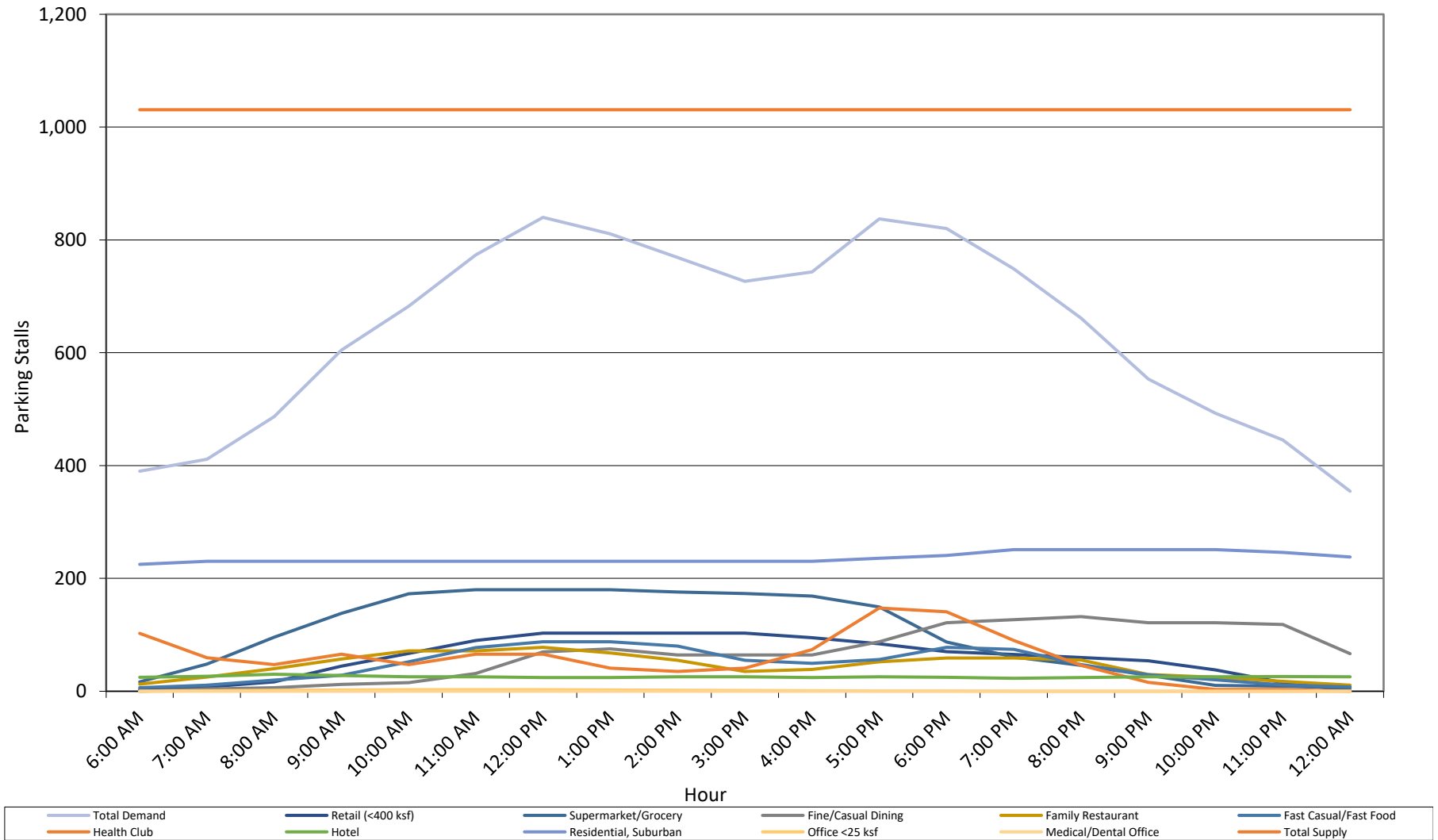
Weekend Month-by-Month Estimated Parking Demand



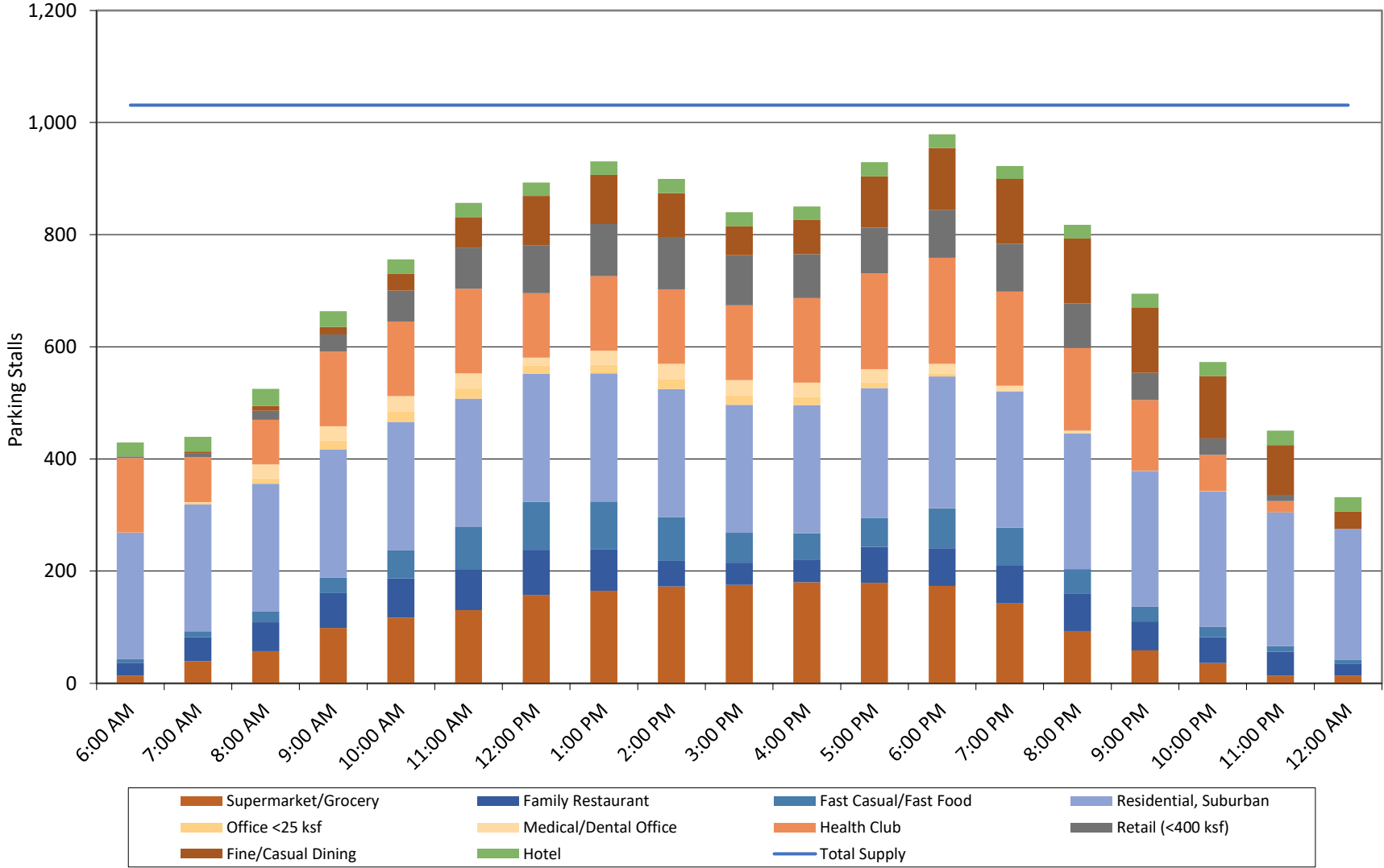
Peak Month Daily Parking Demand by Hour (Weekday)



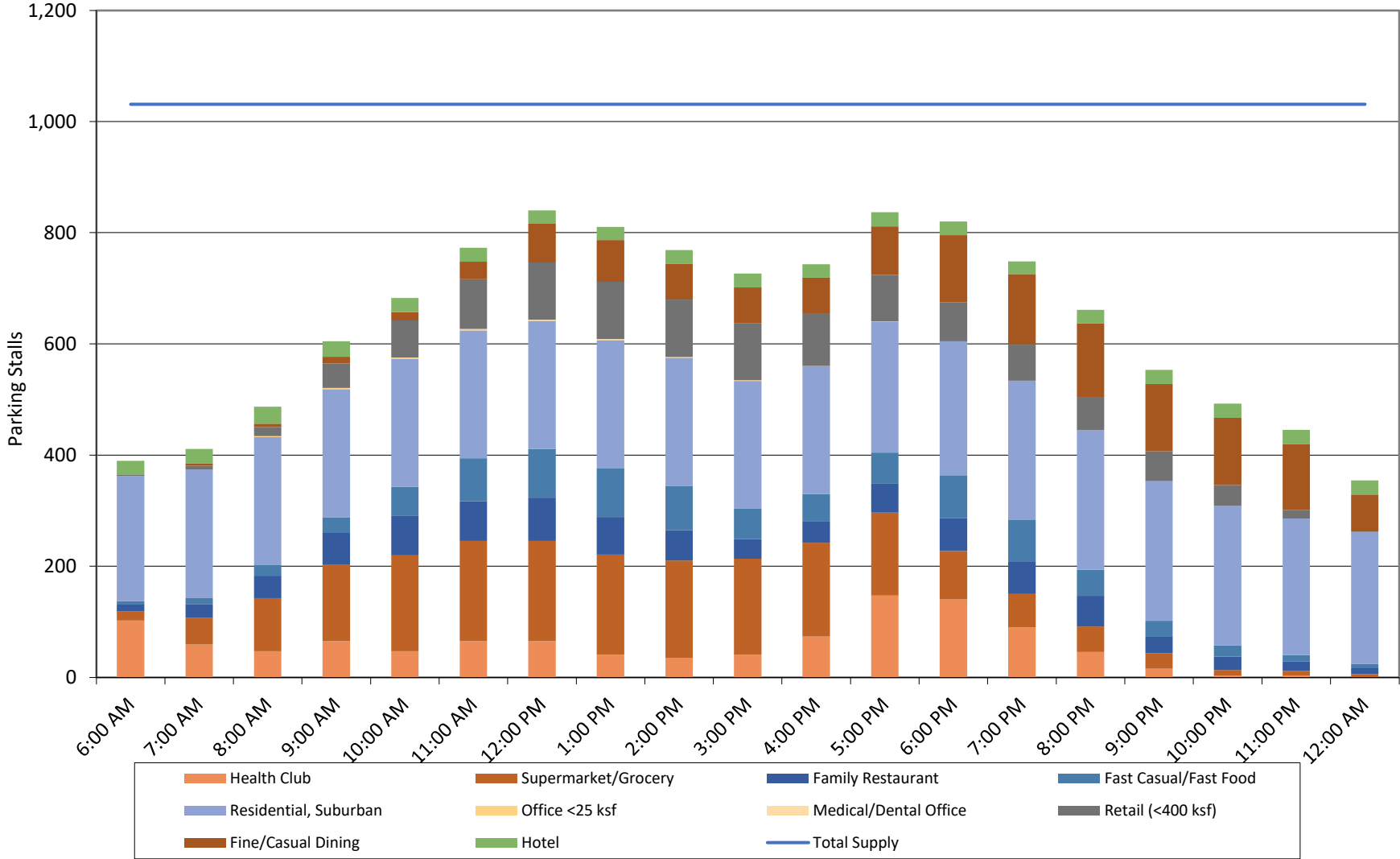
Peak Month Daily Parking Demand by Hour (Weekend)



Peak Month Daily Parking Demand by Hour (Weekday)



Peak Month Daily Parking Demand by Hour (Weekend)



**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

3.

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President
Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City
Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

3. REAPPOINTMENT OF DAVID CASH TO THE LOCAL OFFICERS COMPENSATION
COMMISSION: Office of the Mayor, re: for a seven-year term, which will expire on
April 2, 2031.

Lori Miller, City Clerk, presented the request to Council.

Mr. Cash said he is honored to be reappointed.

Vice President Ptashnik offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

3.

Mayor's Office
March 15, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Janice Nowicki, Executive Assistant to the Mayor - Program Supervisor,

AGENDA ITEM

REAPPOINTMENT OF DAVID CASH TO THE LOCAL OFFICERS COMPENSATION COMMISSION: Office of the Mayor, re: for a seven year term, which will expire on April 2, 2031.

BACKGROUND DETAILS

Honorable Members of the City Council, City of Livonia

RE: Reappointment of David Cash to the Local Officers Compensation Commission

Dear Council Members:

I am herewith submitting to you, for your consideration and approval, the reappointment of Mr. David Cash, 14429 Yale, Livonia, Michigan 48154, as a member of the Local Officers Compensation Commission that will expire on April 2, 2031.

Your approval on this reappointment is respectfully requested.

Sincerely,

Maureen Miller Brosnan, Mayor

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

Reappoint David Cash to the Local Officers Compensation Commission for a seven-year term.

ATTACHMENTS

None

APPROVED BY

Maureen Miller Brosnan, Mayor

Date: March 22, 2024

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President
Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City
Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

4. REAPPOINTMENT OF MARTHA FOLEY TO THE LOCAL OFFICERS
COMPENSATION COMMISSION: Office of the Mayor, re: for a seven-year term,
which will expire on April 2, 2031.

Lori Miller, City Clerk, presented the request to Council.

Vice President Ptashnik offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

4.

Mayor's Office
March 15, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Janice Nowicki, Executive Assistant to the Mayor - Program Supervisor,

AGENDA ITEM

REAPPOINTMENT OF MARTHA FOLEY TO THE LOCAL OFFICERS COMPENSATION COMMISSION: Office of the Mayor, re: for a seven-year term, which will expire on April 2, 2031.

BACKGROUND DETAILS

Honorable Members of the City Council, City of Livonia

RE: Reappointment of Martha Foley to the Local Officers Compensation Commission

Dear Council Members:

I am herewith submitting to you, for your consideration and approval, the reappointment of Ms. Martha Foley, 15412 Fairfield, Livonia, Michigan 48154, as a member of the Local Officers Compensation Commission that will expire on April 2, 2031.

Your approval on this reappointment is respectfully requested.

Sincerely,

Maureen Miller Brosnan, Mayor

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

Reappoint Martha Foley to the Local Officers Compensation Commission for a seven-year term.

ATTACHMENTS

None

APPROVED BY

Maureen Miller Brosnan, Mayor

Date: March 22, 2024

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President
Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City
Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

6. REQUEST TO APPROVE AN ADDITIONAL EXPENDITURE: Parks and Recreation,
re: for Alexander Blue House Chimney Repair and Replacement with an additional
not-to-exceed amount of \$4,500 and the new total not-to-exceed amount of \$22,500.

Ted Davis, Superintendent of Parks and Recreation, presented the request to Council.

Councilmember Jolly offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

6.

Parks and Recreation March 8, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Ann Cox, Program Supervisor,

AGENDA ITEM

REQUEST TO APPROVE AN ADDITIONAL EXPENDITURE: Parks and Recreation, re: for Alexander Blue House Chimney Repair and Replacement with an additional not-to-exceed amount of \$4,500 and the new total not-to-exceed amount of \$22,500.

BACKGROUND DETAILS

On behalf of Greenmead Historical Park, we respectfully request the approval of additional expenditures for the repair and replacement of the chimneys at the Alexander Blue House to be paid to Grit Services, LLC.

Once work began on the replacement and repair of the chimneys, it was found that the wood under the bricks on chimney 4 was decayed. This required the chimney to be taken down so that the rotten wood could be replaced. To prevent future damage, a waterproof barrier was then installed on the wood, and the brick courses would be reinstalled. With these additional needs, the original cost of \$18,000 increased to \$22,500.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

In accordance with Section 3.04.140.E.1 of the Livonia Code of Ordinances, as amended, we hereby notify you of this emergency. We are requesting the following payments be made:

-Authorize payment in the amount not to exceed \$22,500.00 to Grit Services, LLC, 48575 Downing St., Wixom, MI, 48393

- Authorize an expenditure in the amount not to exceed \$22,500.00 from budgeted funds in the Greenmead-Maintenance account no. 101-821-931-220.

SPECIFIC NAME OF PRODUCT AND NUMBER TO BE PURCHASED (if more than one)

N/A

CONTRACT: Amount and/or purchase price and length of contract (with dates if applicable)

Additional amount not to exceed \$4,500 with a total amount not to exceed \$22,500.

DETAILED WORK BEING PERFORMED

Repair and replacement of Alexander Blue House Chimney

FISCAL CONSIDERATIONS (Amount requested and Account(s) used. If applicable, Grant Funding information)

Additional amount not to exceed \$4,500 with a total amount not to exceed \$22,500 from account 101-821-931-220.

ACCEPTANCE OF BID (Please detail the following: Why accepted, why not lowest bidder, company name, contact person, full address)

N/A

REASON TO WAIVE BID PROCESS (Emergency, Professional services, No advantage to City and why, Consortium package, etc): N/A

ATTACHMENTS

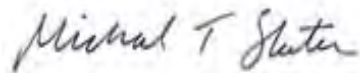
1. 2024 Alexander Blue House Chimney Addt'l exp
2. 2024 ABH Chimney Addt'l

APPROVED BY



Ted Davis, CPRP, Superintendent of Parks and Recreation

Date: March 08, 2024



Michael Slater, Finance Director

Date: March 08, 2024



Maureen Miller Brosnan, Mayor

Date: March 15, 2024



48575 Downing St. Wixom, MI 48393
(248) 264.2500

February 29, 2024
Emily Tchorz-Fielder
City of Livonia
33000 Civic Center Dr
Livonia, MI 48154

Re: Alexander Blue House Chimneys

Dear Emily,

Hope this letter finds you well. Thank you for choosing us for your project. Our team discovered that the wood under the bricks of the chimneys at the Alexander Blue house was decayed, and this necessitates extra work.

Our revised scope of work includes:

- Removal and replacement of rotten wood.
- Cover wood with waterproof barrier.
- Removal of drywall for attic access.
- Work done on an additional fourth chimney.

This scope of work would be completed on a T&M basis. Our charges are based on labor rates for which all Foreman labor will be charged at the rate of \$95.00 man/hour and all Journeyman labor rates at \$93.78 man/hour. All equipment which is not considered hand tools, and which are owned/rented by Grit Services, LLC, such as pneumatic and electric tools and equipment, scaffolding, etc., and materials, will be charged at current rental/invoice rates, 15% O&P will be added to all T&M invoices.

The additional work is expected to be completed within four days. Our proposed dollar amount is \$4,500. A daily T&M sheet will need to be signed by your firm daily. We kindly request your signature below if you agree to the above scope and proposed rates. If you have any questions regarding this letter, please feel free to contact me. Any drywall repairs, roofing repairs or mold remediation work to be done by others.

Sincerely,
Grit Services, LLC

Contractor:

Name: John Mazur

February 29, 2024

Approved By:

Name/Title:



48575 Downing St. Wixom, MI 48393
(248) 264.2500

Date:

Date:

Rebuild and Repair of Chimneys on the Alexander Blue House

Project Location

Greenmead Historical Park
20501 Newburgh Road
Livonia, MI 48152
(248) 477-7375

Important Dates

Project shall be completed by May 31, 2024

Mandatory Site Visit: Please call to schedule Monday, Jan. 29 - Friday, Feb. 2

Response Due Date: Tuesday, Feb. 6

Questions contact Emily Tchorz-Fielder (248) 477-7375 or etchorz@livonia.gov

Responsive Bids

All pages and the information requested herein shall be furnished completely in compliance with instructions. The manner and format of submission is essential to permit prompt evaluation of all bids on a fair and uniform basis. Accordingly, the City reserves the right to declare as non-responsive and reject an incomplete bid if material information requested is not furnished, or where indirect or incomplete answers or information is not provided. Any exceptions on the specification must be noted on the bid form.

Instructions to Bidders

Please provide at least three (3) references, with contact name and phone number of similar projects you have completed.

Project Scope

1. Bid submission must include total work time needed to complete project, including any prep time.

2. All required permits, licenses, inspections, approvals and fees for installation and demolition work shall be secured, submitted, and paid for by the contractor, to any and all agencies. All work shall conform to all applicable codes, rules, and regulations.
3. Each contractor is responsible for taking their own measurements.
4. Contractor must provide all materials, equipment, and personnel necessary to perform the required services.
5. Contractor must haul away all refuse and clean site after completion of project.
6. Contractor must have experience with cedar shake/CeDur roofing material.

Project shall include, but not limited to:

1. Set up scaffolding to prevent damage to new CeDur roof.
2. Chimney 1:
 - a. Remove wash collar and crown.
 - b. Remove brick 11 courses to a sound level.
 - c. Rebuild chimney to existing specs (replace in kind)
 - d. Rebuild top using substrate with vapor barrier.
 - e. Measure, fabricate and install new chase cover.
 - f. Install pan flashing
 - g. Close off chimney.
 - h. Apply breathable masonry sealer to chimney roofline up.
 - i. Reseal flashing.
3. Chimney 2:
 - a. Remove wash collar and crown.
 - b. Remove brick 22 courses to a sound level.
 - c. Rebuild chimney to existing specs (replace in kind)
 - d. Rebuild top using substrate with vapor barrier.
 - e. Measure, fabricate and install new chase cover.
 - f. Install pan flashing.
 - g. Close off chimney.
 - h. Apply breathable masonry sealer to chimney roofline up.
 - i. Reseal flashing.
4. Chimney 3:
 - a. Remove wash collar and crown.
 - b. Remove brick 11 courses to a sound level.
 - c. Rebuild chimney to existing specs (replace in kind)
 - d. Rebuild top using substrate with vapor barrier.
 - e. Measure, fabricate and install new chase cover.

- f. Include 3" skirt with drip edge and cross break.
- g. Install pan flashing.
- h. Close off chimney.
- i. Apply breathable masonry sealer to chimney roofline up.
- j. Reseal flashing.

5. Chimney 4:

- a. Remove wash collar and crown.
- b. Measure, fabricate and install new chase cover.
- c. Include 3" skirt with drip edge and cross break.
- d. Install pan flashing.
- e. Seal cracks in bricks.
- f. Apply breathable masonry sealer to chimney roofline up.
- g. Reseal flashing.

6. If you have additional recommendations for this project, please include these items as an add on cost in your quote.

7. Contractor must schedule work around programing and rentals.





Building Codes:

Building codes vary widely in the USA. It is the owner's responsibility to check with code officials to see that the structure conforms.

Bonding and Insurance:

Company awarded the bid will provide the City of Livonia with the following:

- a. Certificate of Insurance
- b. If subcontractors are used, material and labor bond required.

Commented [ET1]: I'm not sure if this is correct in terms of bonds and insurance.

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President
Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City
Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

7. **AWARD OF CONTRACT:** Department of Public Works, re: for the City's Cross-
Connection Control Program, in the amount of \$76,536.00 annually, for a period of
three (3) years, with an optional two-year extension, from budgeted funds.

Don Rohraff, Director of Public Works, presented the request to Council.

Councilmember Morgan asked if this is something they maintain to be sure we have
clean drinking water.

Mr. Rohraff said they check all commercial properties to make sure there are no
siphonage or back flow issues that would contaminate the drinking water. This is
required by the State of Michigan. If there is a problem, they will bring in a plumber
and handle the repairs.

Councilmember Morgan offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

7.

DPW
March 14, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Jill Russell, Secretary III,

AGENDA ITEM

AWARD OF CONTRACT: Department of Public Works, re: for the City's Cross-Connection Control Program, in the amount of \$76,536.00 annually, for a period of three (3) years, with an optional two-year extension, from budgeted funds.

BACKGROUND DETAILS

The Public Works Division has been diligently working to protect drinking water against contamination and is required by statute to have a cross connection control program. This program is necessary to reduce the risk of pollution of the public water supply, which could occur if questionable water leaves a private facility's plumbing and enters the public water system through backflow. Examples of these private facilities include industrial/commercial process water, pools, and irrigation systems. Through this program, the City is required to conduct periodic on-site inspections, backflow assembly testing, enforcement, awareness, education and training of over 3,300 non-residential water accounts connected to Livonia water mains.

At their April 20, 2015, meeting, per resolution #97-15, the Council awarded a five-year contract to HydroCorp Services for work required in connection with the cross connection control program. Council granted a 1-year extension of Hydro-Corp's contract at their May 11, 2020, meeting (#128-20) and a 3-year extension at their May 10, 2021, meeting (#150-21). At their April 18, 2022, meeting, Council agreed to extend the contract another two years and include repairs and additional testing to City-owned facilities. (#125-22)

Hydro-Corp has managed the City's cross connection control program since 2010 and has extensive knowledge of our system. Hydro-Corp has provided the City with a high-quality program that meets or exceeds the statutory requirements and has gained an excellent reputation for managing facilities that require annual inspections and testing. Hydro-Corp has been very responsive to the needs of the City.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

In order to continue with the excellent service that we are currently receiving to meet our cross connection control program requirements, it is the recommendation of the Department of Public Works that council proceed as follows:

1. Approve a three-year contract with the option to extend an additional two years to Hydro-

Corp Services, 5700 Crooks Rd, Suite 100, Troy, MI 48098 for the period from May 1, 2024 – April 30, 2027, in an amount not to exceed \$76,536.00 annually (\$6,378.00/monthly) to perform all work necessary to complete the program requirements; with an optional two-year extension upon mutual consent.

2. Authorize an annual expenditure from approved budgeted funds account #592-559-818-000 in the annual amount not-to-exceed \$76,536.00 for the three years from May 1, 2024, to April 30, 2027, to perform all necessary work to complete the program.

SPECIFIC NAME OF PRODUCT AND NUMBER TO BE PURCHASED (if more than one)

Cross-Connection Inspection Program

CONTRACT: Amount and/or purchase price and length of contract (with dates if applicable)

\$76,536.00.00 annually

DETAILED WORK BEING PERFORMED

Administration of the City of Livonia's Cross-Connection Control program, providing the City with the necessary data and information to maintain compliance with the Michigan Department of Environment, Great Lakes and Energy (EGLE) Water Bureau Cross Connection Control Regulations.

FISCAL CONSIDERATIONS (Amount requested and Account(s) used. If applicable, Grant Funding information)

\$76,536.00 annually (\$6,378.00/monthly)
592-559-818-000 (Water and Sewer Contractual Services)

ACCEPTANCE OF BID (Please detail the following: Why accepted, why not lowest bidder, company name, contact person, full address)

Hydro-Corp Services is a provider for a project of this magnitude. This program was competitively bid last year and Hydro-Corp is extending the term of the bid contract.

REASON TO WAIVE BID PROCESS (Emergency, Professional services, No advantage to City and why, Consortium package, etc): n/a

ATTACHMENTS

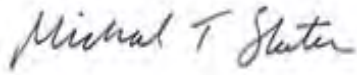
1. Hydro Corp Proposal 2024-2027

APPROVED BY



Don Rohraff, Director of Public Works

Date: March 21, 2024



Michael Slater, Finance Director

Date: March 22, 2024



Paul Bernier, City Attorney

Date: March 22, 2024



Maureen Miller Brosnan, Mayor

Date: March 22, 2024

CROSS CONNECTION CONTROL PROGRAM PROPOSAL

DEVELOPED FOR

Don Rohraff

City of Livonia

12973 Farmington Road

Livonia, MI 48150

February 19, 2024

KEEPING DRINKING WATER SAFE FOR INDUSTRIES AND MUNICIPALITIES

For over 30 years, HydroCorp™ has been dedicated to safe drinking water for companies and communities across North America. Fortune 500 firms, metropolitan centers, utilities, small towns and businesses – all rely on HydroCorp to protect their water systems, averting backflow contamination and the acute health risks and financial liabilities it incurs.



CROSS-CONNECTION
CONTROL / BACKFLOW
PREVENTION

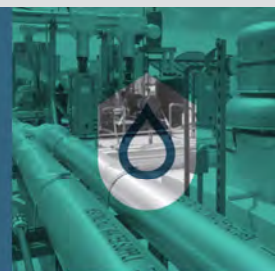
WATER SYSTEM
SURVEYS / AUDITS

PIPE SYSTEM MAPPING
AND LABELING

WATER SAMPLING
AND ANALYSIS / RISK
ASSESSMENTS

PROGRAM
AND PROJECT
MANAGEMENT

COMPLIANCE
ASSISTANCE /
DOCUMENTATION



MICHIGAN CORPORATE OFFICE
5700 Crooks Road, Suite 100
Troy, MI 48098
800.690.6651 TOLL FREE
248.250.5000 PHONE
248.786.1788 FAX GENERAL
info@hydrocorpinc.com EMAIL

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PROFESSIONAL SERVICE AGREEMENT.....	4-10
QUALIFICATIONS.....	11

SCOPE OF WORK

Based your current program, HydroCorp™ will provide the following services to the City of Livonia. This project is a continued effort for an ongoing Cross-Connection Control Program and will provide the City with the necessary data and information to maintain compliance with the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Water Bureau Cross Connection Control Regulations. Once this project has been approved and accepted by the City and HydroCorp, you may expect completion of the following elements within a three (3) year period. The components of the project include:

- 1. Annually, perform a minimum of 750 initial inspections, compliance inspections, and re-inspections at individual industrial, commercial, institutional facilities and miscellaneous water users within the City served by the public water supply for cross-connections. Inspections will be conducted in accordance with the EGLE Water Bureau Cross Connection Control regulations.
- 2. Generate all backflow prevention assembly test notices, non-compliance notices and coordinate/monitor backflow prevention assembly testing compliance for all backflow prevention assemblies.
- 3. Perform administrative functions including: answering water user telephone calls, scheduling of inspections, mailing of all notices, verification of backflow prevention assembly tester credentials & proper testing results, and general customer service and program education inquiries.
- 4. Generate and document the required program data for the facilities using the HydroCorp Software Data Management Program.
- 5. Submit comprehensive management reports on a quarterly basis.
- 6. Conduct an annual review meeting to discuss the overall program status and recommendations.
- 7. Provide up to six- (6) ASSE-approved hose bibb vacuum breakers or anti-frost hose bibb vacuum breakers (i.e., combination) per facility as required in order to place a facility into immediate compliance at the time of inspection.
- 8. Prepare the annual State of Michigan EGLE Water Bureau Cross Connection Report.
- 9. Assist the City with a community-wide public relations program, including general awareness brochures and customized website cross-connection control program overview content and resources.
- 10. Provide ongoing support via phone, fax, internet, text or email.

The above services will be provided for:

Monthly Amount: \$ 6,378.00	Annual Amount: \$ 76,536.00	Contract Total: \$ 229,608.00
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Contract Amount is based upon a 36-month period. HydroCorp will invoice in 36 equal amounts of \$ 6,378.00. Pricing is valid for 120 days from the date of the proposal.

PROFESSIONAL SERVICE AGREEMENT

This agreement, made and entered into this INSERT DATE by and between the City of Livonia, organized and existing under the laws of the State of Michigan, referred to as “Utility”, and HydroCorp™ a Michigan Corporation, referred to as “HydroCorp”.

WHEREAS, the Utility supplies potable water throughout its corporate boundary to property owners; and desires to enter into a professional services contract for cross-connection control program inspection, reporting, and management services.

WHEREAS, HydroCorp is experienced in and capable of supplying professional inspection of potable water distribution systems and cross-connection control program management to the Utility, and the Utility desires to engage HydroCorp to act as its independent contractor in its cross-connection control program.

WHEREAS, the Utility has the authority under the laws of the State of Michigan and its local governing body to enter into this professional services contract.

NOW THEREFORE, in consideration of the mutual agreements herein contained, and subject to the terms and conditions herein stated, the parties agree as follows:

ARTICLE I. Purpose

During the term of this Agreement, the Utility agrees to engage HydroCorp as an independent contractor to inspect and document its findings on its potable water distribution system in public, commercial and industrial facilities within the community. Each party to this Agreement agrees that it will cooperate in good faith with the other, its agents, and subcontractors to facilitate the performance of the mutual obligations set forth in this Agreement. Both Parties to this Agreement recognize and acknowledge that the information presented to them is complete and accurate, yet due to the inaccessible nature of water piping or due to access constraints within water users’ facilities, complete and accurate data is not always available.

ARTICLE II. Scope of Services

The scope of services to be provided by HydroCorp under this Agreement will include the inspections/surveys, program administration, answering telephone call inquiries, scheduling of inspections, program compliance review, public education materials, preparation of quarterly management reports, and annual cross connection reports with respect to the facilities to the extent specifically set forth in this Article II (hereinafter the “Scope of Services”). Should other reports/services be included within the Scope of Services, the same shall be appended to this Agreement as Exhibit 1.

2.1 PROGRAM REVIEW/PROGRAM START UP MEETING. HydroCorp will conduct a Program Startup Meeting for the Cross-Connection Control/Backflow Prevention Program. Items for discussion/review will include the following:

- Review state & local regulations
- Review and/or provide assistance in establishing local Cross-Connection Control Ordinance
- Review/establish wording and timeliness for program notifications including:
 - Inspection Notice
 - Compliance Notice
 - Non-Compliance Notices 1-2, Penalty Notices
- Special Program Notices
- Electronic use of notices/program information
- Obtain updated facility listing, address information and existing program data from Utility.
- Prioritize Inspections (Utility owned buildings, schools, high hazard facilities, special circumstances.)
- Review/establish procedure for vacant facilities.



- Establish facility inspection schedule.
- Review/establish procedures and protocols for addressing specific hazards.
- Review/establish high-hazard, complex facilities and large industrial facility inspection/containment procedures including supplemental information/notification that may be requested from these types of facilities in order to achieve program compliance.
- Review/establish program reporting procedures including electronic reporting tools.
- Review/establish educational and public awareness brochures.

2.2 INSPECTIONS. HydroCorp will perform initial inspections, compliance inspections, and re-inspections at individual industrial, commercial, institutional facilities and miscellaneous water users within the utility served by the public water supply for cross-connections. Inspections will be conducted in accordance with the Department of Environment, Great Lakes and Energy Cross Connection Control Rules.

- *Initial Inspection* – the first time a HydroCorp representative inspects a facility for cross-connections. The degree of hazard will be assigned and/or verified during this facility visit. The Degree of Hazard will dictate future re-inspection frequency/schedule of facility, (facility will be either compliant or non-compliant after this inspection).
- *Compliance Inspection* – subsequent visit by a HydroCorp representative to a facility that was non-compliant during the *Initial Inspection* to verify that corrective action was completed and meets the program requirements.
- *Re-Inspection* – Revisit by a HydroCorp representative to a facility that was previously inspected. The re-inspection frequency/schedule is based on the degree of hazard assigned to the facility during the initial inspection (one or five year re-inspection cycle, as agreed to by the parties).

2.3 INSPECTION SCHEDULE. HydroCorp shall determine and coordinate the inspection schedule. Inspection personnel will check in/out on a daily basis with the Utility's designated contact person. The initial check in will include a list of inspections scheduled. An exit interview will include a list of inspections completed.

2.4 PROGRAM DATA. HydroCorp will generate and document the required program data for the Facility Types listed in the Scope of Services using the HydroCorp Software Data Management Program. Program Data shall remain property of the Utility; however, the HydroCorp Software Data Management program shall remain the property of HydroCorp and can be purchased for an additional fee. Data services will include:

- Prioritize and schedule inspections.
- Notify users of inspections, backflow device installation and testing requirements if applicable.
- Monitor inspection compliance using the HydroCorp online software management program.
- Maintain the program to comply with all EGLE regulations.

2.5 MANAGEMENT REPORTS. HydroCorp will submit comprehensive management reports in electronic, downloadable format on a quarterly & annual basis to the Utility. Reports to include the following information:

- Name, location, and date of inspections
- Number of facilities inspected/surveyed
- Number of facilities compliant/non-compliant

2.6 REVIEW OF CROSS-CONNECTION CONTROL ORDINANCE. HydroCorp will review or assist in the development of a cross-connection control ordinance. Items for review include:

- Code adoption references, standard operational procedures, program notice documentation, reporting procedures, and reference standards.
- Penalties for noncompliance.



2.7 VACUUM BREAKERS. HydroCorp will provide up to six (6) ASSE-approved hose bibb vacuum breakers or anti-frost hose bibb vacuum breakers per facility as required, in order to place a facility into immediate compliance at the time of inspection if no other cross-connections are identified.

2.8 PUBLIC RELATIONS PROGRAM. HydroCorp will assist the Utility with a community-wide public relations program, including general awareness brochures and website cross-connection control program content.

2.9 SUPPORT. HydroCorp will provide ongoing support via phone, fax, text, website, or email for the contract period.

2.10 FACILITY TYPES. The facility types included in the program are as follows:

- Industrial
- Institutional
- Commercial
- Miscellaneous Water users
- Multifamily

Complex Facilities. Large industrial and high-hazard complexes or facilities may require inspection/survey services outside the scope of this Agreement. (HydroCorp typically allows a maximum of up to three (3) hours of inspection time per facility.) An independent cross-connection control survey (at the business owner's expense) may be required at these larger/complex facilities, and the results submitted to the Utility to help verify program compliance.

2.11 INSPECTION TERMS. HydroCorp will perform a minimum of **2,250** inspections over a three-year contract period. The total inspections include all initial inspections, compliance, and re-inspections. *Vacant facilities that have been provided to HydroCorp, scheduled no show, or refusal of inspection will count as an inspection/site visit for purposes of the contract.*

2.12 COMPLIANCE WITH DEPARTMENT OF ENVIRONMENT, GREAT LAKES AND ENERGY (EGLE). HydroCorp will assist in compliance with EGLE and Michigan Plumbing Code cross-connection control program requirements for all commercial, industrial, institutional, residential, multifamily, and public authority facilities.

2.13 POLICY MANUAL. HydroCorp will review and/or develop a comprehensive cross-connection control policy manual/plan and submit to the appropriate regulatory agency for approval on behalf of the Utility.

2.14 INVENTORY. HydroCorp shall inventory all accessible (ground level) backflow prevention assemblies and devices. Documentation will include: location, size, make, model, and serial number if applicable.

2.15 DATA MANAGEMENT. HydroCorp shall provide data management and program notices for all inspection services throughout the contract period.

2.16 ANNUAL YEAR-END REVIEW. HydroCorp will conduct an on-site annual year-end review meeting to discuss the overall program status and specific program recommendations.

2.17 INSURANCE. HydroCorp will provide all required copies of general liability, workers' compensation, and errors and omissions insurance naming the Utility as an additional insured if required.



ARTICLE III. Responsibilities of the Utility

- 3.1 UTILITY REPRESENTATIVE.** On or before the date services are to commence under this Agreement, the Utility shall designate an authorized representative ("Authorized Representative") to administer this Agreement.
- 3.2 COMPLIANCE WITH LAWS.** The Utility, with the technical and professional assistance of HydroCorp, shall comply with all applicable local, state, and federal laws, codes, ordinances, and regulations as they pertain to the water inspection and testing, and shall pay for any capital improvements needed to bring the water treatment and delivery system into compliance with the aforementioned laws.
- 3.3 NOTICE OF LITIGATION.** In the event that the Utility or HydroCorp has or receives notice of or undertakes the prosecution of any actions, claims, suits, administrative proceedings, investigations or other proceedings in connection with this Agreement, the party receiving such notice or undertaking of such prosecution shall give the other party timely notice of such proceedings and will inform the other party in advance of all hearings regarding such proceedings.
- 3.4 FACILITY LISTING.** The Utility must provide HydroCorp a complete list of facilities to be inspected, including facility name, type of service connection, address, contact person, and phone number, (if available). *Electronic file format, such as Microsoft Excel, etc., is required. An additional one-time fee to manually enter the facility listing will be charged at the rate of \$80.00 per hour. Incorrect facility addresses will be returned to the Utility contact, and corrected addresses will be requested.*
- 3.5 LETTERHEAD/LOGO.** The Utility will provide HydroCorp with an electronic file copy of the utility logo or utility letterhead and all envelopes for the mailing of all official program correspondence only. (300 dpi in either .eps, or other high-quality image format for printing.)

ARTICLE IV. Term, Compensation, and Changes in Scope of Services

- 4.1 TERM AND TERMINATION TERM.** Services by HydroCorp under this Agreement shall commence on June 1, 2024, and end three- (3) years from such date unless this Agreement is renewed or terminated as provided herein. The terms of this Agreement shall be valid only upon the execution of this Agreement within ninety (90) days of its receipt. Failure to execute this Agreement within the ninety (90) day period shall deem the proposed terms void.
- 4.2 RENEWAL.** Upon the expiration of this three-year agreement, unless either party provides written notice of termination not less than 60 days prior to the expiration of the initial term (or any such renewal term) this agreement will automatically renew in (1) year term increments. Inflationary adjustments to each renewal term will be equal to the cumulative Consumer Price Index as measured in the Utility's local/regional area at the time of renewal or 4%, whichever is greater.
- 4.3 TERMINATION.** The Utility or HydroCorp may terminate this Agreement at any time and on any date in the initial and renewal terms of this Agreement, with or without any cause, by giving written notice of such intent to terminate to the other party at least thirty (30) days prior to the effective date of termination. Notice of the intent to terminate shall be given in writing by personal service, by an authorized agent, or by certified mail, return receipt requested. The Utility shall pay the balance of any outstanding accounts for work performed by HydroCorp.
- 4.4 BASE COMPENSATION.** The Utility shall pay HydroCorp as compensation ("Base Compensation") for labor, equipment, material, supplies, and utilities provided and the services performed pursuant to this Agreement, **\$6,378.00 per month, \$76,536.00 annually, for a three-year contract total of \$229,608.00.** Completed inspections shall consist of all initial inspections, re-inspections, and compliance inspections as defined in section 2.2.



- 4.5 PAYMENT OF INVOICES.** Upon presentation of invoices by HydroCorp, all payments including base and other compensation shall be due and payable on the first day of each month (due date) after the month for which services have been rendered. All such payments shall be made no later than thirty (30) days after the due date. Failure to pay shall be deemed a default under this Agreement. For any payment to HydroCorp which is not made within thirty (30) calendar days after the due date, HydroCorp, shall receive interest at one and one-half (1½) percent per month on the unpaid balance.
- 4.6 CHANGES IN SCOPE OF SERVICES.** In the event that the Utility requests and HydroCorp consents to perform additional work or services involving the consulting, management, operation, maintenance, and repair of the Utility's water delivery system where such services or work exceeds or changes the Scope of Services contemplated under this Agreement, HydroCorp shall be provided additional compensation. Within thirty (30) calendar days from the date of notice of such additional work or services, the parties shall mutually agree upon an equitable sum for additional compensation. This amount shall be added to the monthly sum effective at the time of change in scope. Changes in the Scope of Service include, but are not limited to, requests for additional service by the Utility or additional costs incurred in meeting new or changed government regulations or reporting requirements.
- 4.7 CLIENT CONFIDENTIALITY.** Disclosure of all communications between HydroCorp and the Utility regarding business practices and other methods and forms of doing business is subject to the provisions of Michigan Freedom of Information Act. HydroCorp agrees to make available for inspection and copying all records in its possession created, produced, collected, or otherwise related to this Agreement to the same extent as if the records were maintained by the Utility. HydroCorp expressly acknowledges and agrees that its obligations concerning Freedom of Information Act and compliance regarding records related to this Agreement should not be limited by copyright, license, privacy and/or confidentiality except as authorized under the Freedom of Information Act.
- 4.8 ACCESSIBILITY.** Backflow prevention device information will be completed in full only when the identifying information (i.e. data plate, brass tag, etc.) is accessible and visible from ground level or from a fixed platform/mezzanine.
- 4.9 CONFINED SPACES.** – HydroCorp personnel will not enter confined spaces.

ARTICLE V. Risk Management and General Provisions

- 5.1 INFORMATION.** Both Parties to this Agreement recognize and acknowledge that the information presented to them is complete to the best of their knowledge, yet due to the inaccessible nature of water piping or lack of access provided by property owner/water user, complete accurate data is not always available. Cross-connection control inspection and results are documented as of a specific date. The property owner and/or water user may make modifications to the potable water system after the inspection date that may impact compliance with the program.
- 5.2 LIMITATION OF LIABILITY.** HydroCorp's liability to the Utility for any loss, damage, claim, or expense of any kind or nature caused directly or indirectly by the performance or non-performance of obligations pursuant to this Agreement shall be limited to general money damages in an amount not to exceed or within the limits of the insurance coverage provided hereunder. HydroCorp shall in no event be liable for indirect or consequential damages, including but not limited to, loss of profits, loss of revenue, or loss of facilities, based upon contract, negligence, or any other cause of action.



5.3 HYDROCORP INSURANCE. HydroCorp currently maintains the following insurance coverage's and limits:

	<u>Occurrence</u>	<u>Aggregate</u>
Comprehensive General Liability	\$1 Million	\$2 Million
Excess Umbrella Liability	\$5 Million	\$5 Million
Automobile Liability (Combined Single Limit)	\$1 Million	
Worker's Compensation/ Employer's Liability	\$1 Million	
Errors and Omissions	\$2 Million	\$2 Million

Within thirty (30) calendar days of the start of the project, HydroCorp shall furnish the Utility with satisfactory proof of such insurance, and each policy will require a 30-day notice of cancellation to be given to the Utility while this Agreement is in effect. The Utility shall be named as an additional insured according to its interest under the general liability policy during the term of this Agreement.

5.4 UTILITY INSURANCE. The Utility will maintain liability insurance on an all-risk basis and including extended coverage for matters set forth in this Agreement.

5.5 RELATIONSHIP. The relationship of HydroCorp to the Utility is that of independent contractor and not one of employment. None of the employees or agents of HydroCorp shall be considered employees of the Utility. For the purposes of all state, local, and federal laws and regulations, the Utility shall exercise primary management, and operational and financial decision-making authority.

5.6 ENTIRE AGREEMENT AMENDMENTS. This Agreement contains the entire Agreement between the Utility and HydroCorp, and supersedes all prior or contemporaneous communications, representations, understandings, or agreements. This Agreement may be modified only by a written amendment signed by both parties.

5.7 HEADINGS, ATTACHMENTS, AND EXHIBITS. The heading contained in this Agreement is for reference only and shall not in any way affect the meaning or interpretation of this Agreement. The Attachments and Exhibits to this Agreement shall be construed as integral parts of this Agreement.

5.8 WAIVER. The failure on the part of either party to enforce its rights as to any provision of this Agreement shall not be construed as a waiver of its rights to enforce such provisions in the future.

5.9 ASSIGNMENT. This Agreement shall not be assigned by either party without the prior written consent of the other unless such assignment shall be to the affiliate or successor of either party.

5.10 FORCE MAJEURE. A party's performance under this Agreement shall be excused if, and to the extent that, the party is unable to perform because of actions due to causes beyond its reasonable control such as, but not limited to, Acts of God, the acts of civil or military authority, loss of potable water sources, water system contamination, floods, quarantine restrictions, riot, strikes, commercial impossibility, fires, explosions, bombing, and all such interruptions of business, casualties, events, or circumstances reasonably beyond the control of the party obligated to perform, whether such other causes are related or unrelated, similar or dissimilar, to any of the foregoing. In the event of any such force majeure, the party unable to perform shall promptly notify the other party of the existence of such force majeure and shall be required to resume performance of its obligations under this Agreement upon the termination of the aforementioned force majeure.

5.11 AUTHORITY TO CONTRACT. Each party warrants and represents that it has authority to enter into this Agreement and to perform the obligations, including any payment obligations, under this Agreement.

5.12 GOVERNING LAW AND VENUE. This Agreement shall be governed by and construed in accordance with the laws of the State of Michigan, regardless of the fact that any of the parties hereto may be or may become a resident of a different state or jurisdiction. Any dispute between the parties, with both parties' consent, may



be settled by arbitration in accordance with the applicable rules of the American Arbitration Association, Any arbitration award or determination shall be final and binding and any court of competent jurisdiction may enter a judgment on such award which shall be enforceable in the same manner as any other judgment of the such court. Any suit or action arising shall be filed in a court of competent jurisdiction within the State of Michigan, venue by the presiding County. The parties hereby consent to the personal jurisdiction of said court within the State of Michigan.

5.13 COUNTERPARTS. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which together shall be deemed to be one and the same instrument.

5.14 NOTICES. All notices, requests, demands, payments and other communications which are required or may be given under this Agreement shall be in writing and shall be deemed to have been duly given if delivered personally or sent by nationally recognized overnight carrier, or mailed by certified mail, postage prepaid, return receipt requested, as follows:

If to HydroCorp:

HydroCorp
c/o Mark Martin
5700 Crooks Road, Ste. 100
Troy, MI 48337
(248) 250-5005

If to Utility:

City of Livonia
c/o Don Rohraff
12973 Farmington Road
Livonia, MI 48150
(734) 466-2607

5.15 SEVERABILITY. Should any part of this Agreement for any reason, be declared invalid or void, such declaration will not affect the remaining portion, which will remain in full force and effect as if the Agreement has been executed with the invalid portion eliminated.

SIGNATURES

IN WITNESS WHEREOF, the parties have duly executed this Agreement effective as of the date first above written.

City of Livonia

By:
Title:

HydroCorp



By: Paul M. Patterson
Its: Senior Vice President



Appendix

Specific Qualifications & Experience

HydroCorp™ is a professional service organization that specializes in Cross Connection Control Programs. Cross Connection Control Program Management & Training is the main core and focus of our business. We are committed to providing water utilities and local communities with a cost-effective and professionally managed cross-connection control program in order to assist in protecting the public water supply.

- HydroCorp conducts over 70,000 Cross Connection Control Inspections **annually**.
- HydroCorp tracks and manages over 135,000+ backflow prevention assemblies for our Municipal client base.
- Our highly trained staff works in an efficient manner in order to achieve maximum productivity and keep program costs affordable. We have a detailed **system** and **process** that each of our field inspectors follow in order to meet productivity and quality assurance goals.
- Our municipal inspection team is committed to providing outstanding customer service to the water users in each of the communities we serve. We teach and train customer service skills in addition to the technical skills since our team members act as representatives of the community that we service.
- Our municipal inspection team has attended training classes and received certification from the following recognized Cross Connection Control Programs: UF TREEO, UW-Madison, and USC – Foundation for Cross Connection Control and Hydraulic Research, American Backflow Prevention Association (ABPA), American Society for Sanitary Engineering (ASSE). HydroCorp recognizes the importance of Professional Development and Learning. We invest heavily in internal and external training with our team members to ensure that each Field Service and Administrative team member has the skills and abilities to meet the needs of our clients.
- We have a trained administrative staff to handle client needs, water user questions and answer telephone calls in a professional, timely, and courteous manner. Our administrative staff can answer most technical calls related to the cross-connection control program and have attended basic cross-connection control training classes.
- HydroCorp currently serves over 370 communities in Michigan, Wisconsin, Maryland, Delaware, Virginia & Florida. We still have our first customer!
- HydroCorp and its' staff are active members in many water industry associations including: National Rural Water Association, State Rural Water Associations, National AWWA, State AWWA Groups, HydroCorp is committed to assisting these organizations by providing training classes, seminars, and assistance in the area of Cross Connection Control.
- Several Fortune 500 companies have relied on HydroCorp to provide Cross Connection Control Surveys, Program Management & Reporting to assist in meeting state/local regulations as well as internal company guidelines.



**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President
Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City
Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

8. REQUEST FOR AUTHORIZATION TO PURCHASE ONE (1) 2024 CASE BACKHOE
MODEL 580SN THROUGH THE SOURCEWELL CONTRACT (FORMERLY NJPA):
Public Works Division, re: to be used by the Roads Department, from budgeted funds.

Don Rohraff, Director of Public Works, presented the request to Council.

Councilmember Jolly offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

8.

DPW
March 21, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Jill Russell, Secretary III,

AGENDA ITEM

REQUEST FOR AUTHORIZATION TO PURCHASE ONE (1) 2024 CASE BACKHOE MODEL 580SN THROUGH THE SOURCEWELL CONTRACT (FORMERLY NJPA): Public Works Division, re: to be used by the Roads Department, from budgeted funds.

BACKGROUND DETAILS

The Roads section of the DPW is seeking to purchase a new Case Backhoe with quick coupler attachments and extended 48-month warranty. We have removed 5 units from service this year as the repair costs exceed the value of the machines. We have been offered a fair price from the vendor on trade in for two of our out-of-service backhoes in the amount of \$15,000.00, bringing the total cost of this new machine to \$125,236.76. This purchase will be made through the Sourcewell contract number 032119-CNH, an extended purchasing program made available to local governments through the Sourcewell Contract (formerly NJPA) which meets our Finance ordinance. The contract this year was awarded to Southeastern Equipment Company, 48545 Grand River Ave., Novi, MI 48734.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

Recommendation to purchase one new Case Backhoe Model 580SN to be used by the Roads Department (ID #401) for a cost of \$125,236.76 from Southeastern Equipment Company, 48545 Grand River Ave., Novi, MI 48734 through the Sourcewell purchasing consortium from fund budgeted in Acct # 226-528-987-000.

SPECIFIC NAME OF PRODUCT AND NUMBER TO BE PURCHASED (if more than one)

Budget funds in the amount of \$125,236.76 are available in account no. 226-528-987-000

CONTRACT: Amount and/or purchase price and length of contract (with dates if applicable)

Price	\$ 173,008.00
Discount	-48,442.24
Coupler	5,200.00
Extended Warranty	5,881.00
Prep & Delivery	4,590.00

Less Trade- - 15,000.00
In
TOTAL \$ 125,236.76

DETAILED WORK BEING PERFORMED

FISCAL CONSIDERATIONS (Amount requested and Account(s) used. If applicable, Grant Funding information)

G/L # 226-528-987-000
\$125,236.76

ACCEPTANCE OF BID (Please detail the following: Why accepted, why not lowest bidder, company name, contact person, full address)

Sourcewell Cooperative purchasing consortium

REASON TO WAIVE BID PROCESS (Emergency, Professional services, No advantage to City and why, Consortium package, etc): Waive the formal bidding process in accordance with Section 3.04.140.E.4 of the Livonia Code of Ordinances, as amended since no advantage to the City would result from competitive bidding.

ATTACHMENTS

1. LTC-2024 Backhoe Loader - #401 - Roads

APPROVED BY



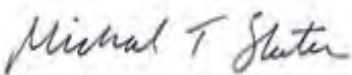
Douglas L. Moore, MSA, Assistant Director of Public Works

Date: March 21, 2024



Don Rohraff, Director of Public Works

Date: March 22, 2024



Michael Slater, Finance Director

Date: March 22, 2024

A handwritten signature in black ink, reading "Maureen Miller Brosnan". The signature is written in a cursive, flowing style.

Date: March 22, 2024

Maureen Miller Brosnan, Mayor

DEPARTMENT OF PUBLIC WORKS
PUBLIC SERVICE DIVISION
FLEET MAINTENANCE

GARY T. GARRISON
FLEET MANAGER



JAMES (BUZZ) KIRBY
FLEET MANAGER

13405 SURREY STREET
LIVONIA, MICHIGAN 48150-1527
(734)-466-2704
FAX: (734)-466-2662

March 18, 2024

Purchase of One New 2024 Case Backhoe Model 580SN to be used by the Roads Section of the DPW. Our assigned city unit number will be #401.

The Roads section of the DPW is seeking to purchase a new Case Backhoe as a replacement for one of the five units that were removed from service this year. The repair cost of those units exceeded the value of the machines.

I am recommending we purchase this Backhoe from Southeastern Equipment Company, 48545 Grand River Ave, Novi, MI 48734. If approved this purchase will be made through Sourcewell, Contract Number 032119-CNH. This meets our financial ordinance for purchasing and provides us with the best possible pricing. The savings discount of 28% is shown in the quote. The after-discount price is \$124,565.76.

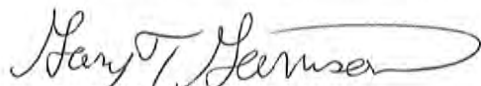
Additional cost for quick coupler attachments \$5,200.00, prep and start up \$3,890.00 also delivery \$700.00.

I am also including in this purchase the extended premier warranty for 48 months or 4000 hrs. This is the extended Case ProCare for \$5,881.00. This covers all maintenance for this period. The total purchase before trade-ins is \$140,236.76.

We have been quoted a trade in price for two of our out of service backhoes in the amount of \$15,000.00 This is a fair price.

The total price for this unit delivered to us will be \$125,236.76. This purchase will be made using approved budgeted funds in account 226-528-987-000.

If you have any questions or require additional information, I can be reached on ext. 2641.


Gary T. Garrison
Fleet Manager

SOURCEWELL SALES ORDER

DATE: MARCH 15, 2024

SALESPERSON: CALEB CHRISTNER /
ACCOUNT #: 758175
COUNTY: WAYNE
Sourcewell Contract #: 032119-CNH

CUSTOMER CONTACT:
PO # (IF APPLICABLE):
SHIP To (IF APPLICABLE):

PURCHASER:

CITY OF LIVONIA
13405 SURREY ST
LIVONIA, MI 48150
P: 734-466-2641

SELLING BRANCH:

48545 Grand River, Novi, MI 48374
Branch: (248) 349-9922

FINANCE INFORMATION:

Financed by:
Rate:
Term:

EQUIPMENT PURCHASED:

Eq #/ Serial #/ Item #	Product Notes	List Price	Discount %	Sourcewell Total Price
	2024 CASE 580SN 4WD 745299 YGR ORDER 423059 4WD Power Shuttle Transmission 8201110 12x16.5, LUG Tread Tires 8401140 19.5LX24, STD Tire 464074 1-WAY OR 2-WAY AUX & EHOE PKG 423047 Heavy Front CWT, Extnhoe 423078 Pilot Controls w/Power Lift 442018 Mechanical Quick Coupler 423069 24" Universal Bucket 442056 Flip Over/Stabilizer Pads Comb 423049 Hydraulic Ldr quick attach 464079 RC, CS, 3SPL, HYD CP 747855 Cab, LH Door w/Heater/AC 745161 Premium Air Susp Heated 423090 Auto Ride Control 464957 Transport Protection 745242 LED Light Package 423093 Cold Start Dual Battery Tool Box Locking Def cover	\$173,008.00	28%	\$124,565.76
	Quick att coupler bucket	\$5,200.00	%	\$5,200.00
	Manufacture freight prep and start up	\$3,890.00	%	\$3,890.00
	Delivery	\$700.00	%	\$700.00
	Extended Warranty 48mo or 4000hr premier	\$5,881.00	%	\$5,881.00

NOTES:

Only able to do this because Gary is such a good guy.

EQUIPMENT WARRANTY AND DELIVERY INFORMATION:

Warranty Type: Sold with standard manufacturer warranty.
Warranty Detail: 1-Year/Unlimited-Hour Full-Coverage Base
Limited Warranty
Or

Delivery Method:
Delivery Date:
Delivery Info:

TRADE-IN EQUIPMENT:

Year	Manufacturer	Model	Serial #	Trade-In Allowance
2008	CASE CE	590SM III	N8C508744	\$10,000.00
2015	CASE CE	580SN	JJGN58SNCFC720927	\$5,000.00

[TOTALS, TERMS AND CONDITIONS, AND SIGNATURES ON FOLLOWING PAGE]

A. Definitions. Seller is Southeastern Equipment Co. Inc.; Purchaser is the entity denoted above in the box titled purchaser; collectively Seller and Purchaser may be referred to as Parties; Equipment is new or used equipment being purchased by Purchaser; Trade-In Equipment is equipment being sold by Purchaser to Seller in exchange for a credit only applied to this sale; and Agreement is this contract for the sale and Trade-In of equipment between the Parties.

B. Price and Payment. The Purchaser and Seller agree that the Total Amount Due will be finally determined by Seller on the date of Delivery of the Equipment based on the manufacturer invoice plus any surcharges from the manufacturer. Seller hereby does sell, convey and transfer title to Purchaser for Equipment upon full payment of the Balance Due, as calculated pursuant to this Agreement. Purchaser shall remit payment to Seller by cash, check, electronic wire, ACH or other reasonable commercially acceptable method of payment within thirty (30) days of Delivery of Equipment if Purchaser has established line of credit with Seller or immediately upon Delivery of Equipment if no line of credit is established. A finance charge of 1.5% per month (or the maximum amount permitted under applicable state law) will be assessed on all past due balances. All additional taxes or fees owed because of the sale are the responsibility of the Purchaser. SELLER RETAINS A SECURITY INTEREST IN THE EQUIPMENT UNTIL THE FULL PURCHASE PRICE IS RECEIVED BY SELLER.

C. Delivery of Equipment. Seller will make Equipment available according to the delivery instructions contained herein. If no instructions are included, the Seller will make Equipment available at the location where the Equipment is located. Purchaser is responsible for all shipping and trucking costs, including loading and unloading, permits and other expenses. Costs may be included in the Total Amount Due if trucking has been predetermined. Any change in delivery location may result in additional charges to be borne by Purchaser. Special order Equipment will be made available once delivery is received by Seller from Equipment supplier. Unless Seller is using Seller's in-house trucking services, Equipment is delivered FOB Seller's location. Seller reserves the right to subcontract or assign Seller's obligation to deliver Equipment. Seller reserves the right to substitute Equipment that is the same year, condition, make, model, within ten (10) hours on the hour meter, and of the same or better configuration without breach of this Agreement or notice.

D. Condition of Equipment. ALL EQUIPMENT IS SOLD AS IS, WHERE IS UNLESS OTHERWISE STATED IN THIS AGREEMENT. SELLER MAKES NO EXPRESS OR IMPLIED REPRESENTATIONS OR WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS, EXCEPT FOR WARRANTY EXPRESSLY MADE ON THIS AGREEMENT. Manufacturer warranty does not in itself create a warranty by Seller. Any reference to hour meters on used equipment is for informational purposes only. Purchaser should inspect any used equipment prior to purchase. Purchaser acknowledges warning and responsibility for inspecting all equipment and ensuring equipment meets any and all applicable safety and operational guidelines and laws for use, including the standards set forth in the Federal Occupational Safety and Health Act of 1970, as amended and restated.

E. Trade-In Equipment. If Trade-In Equipment is included on this Agreement, Purchaser hereby bargains, sells and conveys unto Seller the Trade-In Equipment and represents and warrants that Purchaser has marketable title free and clear of any encumbrances, liens, and security interests except to the extent included in the trade payoff number and fully disclosed to Seller. If Trade-In Equipment is not delivered to the Seller prior to delivery of the Equipment to Purchaser, the Trade-In Equipment may be reappraised at the sole discretion of Seller and such reappraisal value shall determine the allowance made for such Trade-In Equipment. In the event the Trade-In Equipment appraisal value is less than the original allowance for said equipment, the Purchaser may terminate this order, however, termination will only be valid if received prior to delivery of Equipment.

F. Limitation of Liability. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES, OR DAMAGES FOR LOSS OF PROFITS, REVENUE, OR USE INCURRED BY PURCHASER OR ANY THIRD PARTY, WHETHER IN AN ACTION IN CONTRACT, OR TORT, OR OTHERWISE EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SELLER'S LIABILITY FOR DAMAGES ARISING OUT OF

Customer PO:	
SALES ORDER TOTALS	
Total Equipment Price	\$140,236.76
Total Trade-In Allowance	\$15,000.00
Trade-In Difference	\$125,236.76
Applied Rent	
Carrying Charge	
Fuel, DEF & Other	
Freight/Trucking	
Title and License Fees	
Total Trade Payoff	\$0.00
Total Price Before Tax	\$125,236.76
Sales Tax	
FET Tax	
Total Amount Due	\$125,236.76
Down Payment	
Balance Due	\$125,236.76

OR IN CONNECTION WITH THIS AGREEMENT SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE RELEVANT EQUIPMENT. Seller shall not be deemed to be in default of any provision of this Agreement, or for failures in performance, resulting from acts or events beyond Seller's reasonable control ("Force Majeure"). Force Majeure shall include, but are not limited to, acts of God, civil or military authority, civil disturbance, war, strikes, fires, and labor disputes. In the event delivery of Equipment is delayed more than thirty (30) days because of Force Majeure, Purchaser may cancel all or part of its purchase of Equipment.

G. Miscellaneous. Due to price fluctuations in the market, Seller reserves the right to pass on any price increase or surcharge to the Purchaser and Purchaser agrees to pay it pursuant to the terms set forth in paragraph 8. This Agreement constitutes the complete agreement between the Parties with respect to its subject matter and supersedes all prior or contemporaneous agreements, understandings, representations, discussions, proposals, literature, and the like written or oral. This Agreement may not be modified or amended except in a writing signed by an authorized representative of the Seller and Purchaser. Use of headings in this Agreement are for convenience only and are not to be construed in the meaning of the instrument. This Agreement may be executed in counterparts and any scan, copy or facsimile will be deemed valid as an original copy. In the event any provision of this Agreement is determined to be unlawful or against public policy and found invalid or unenforceable, the remaining provisions will remain in full force and effect. The waiver by either party of any default or breach of this Agreement shall not constitute a waiver of any other or subsequent breach. This Agreement, and all matters arising out of or relating to this Agreement, are governed by the laws of the State of Ohio. Any legal action or proceeding relating to this Agreement may only be brought within the jurisdiction of Guernsey County, Ohio.

H. Authority and Understanding. In signing this Sales Order, you represent that you have the authority to sign on behalf of the Purchaser for the purchase of Equipment and disposition of Trade-In Equipment, you have read and fully understand all terms of this Agreement, and you acknowledge receipt of a fully complete and accurate copy of this Agreement and waive notice of the acceptance or rejection of the Purchaser's offer by the Seller.

I. IF CUSTOMER PAYS ANY BALANCE OWED UNDER THIS SALES ORDER USING CREDIT/CHARGE CARD, SOUTHEASTERN RESERVES THE RIGHT TO CHARGE AN ADDITIONAL 3% OF THE TOTAL INVOICE AS A CONVENIENCE FEE WHICH CUSTOMER HEREBY AGREES TO PAY

Accepted for Seller by:

Sign: _____ Date: _____

Print Name: _____

Purchaser (CITY OF LIVONIA):

Sign: _____ Date: _____

Print Name: _____

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

8.

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President
Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City
Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

9. REQUEST FOR AUTHORIZATION TO PURCHASE ONE (1) SELF-CONTAINED
LEAF VACUUM; Public Works Division, re: to be used by the Roads Department, from
budgeted funds.

Don Rohraff, Director of Public Works, presented the request to Council.

Councilmember Morgan offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

9.

DPW
March 21, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Jill Russell, Secretary III,

AGENDA ITEM

REQUEST FOR AUTHORIZATION TO PURCHASE ONE (1) SELF-CONTAINED LEAF VACUUM; Public Works Division, re: to be used by the Roads Department, from budgeted funds.

BACKGROUND DETAILS

The Roads section of the DPW is seeking to purchase one Spartan Pro Self-Contained Leaf Vacuum from Bell Equipment, 78 Northpointe Dr., Lake Orion MI 48359. This purchase will be made through the MI-Deal Contract #071B7700091, an extended purchasing program made available to local governments which meets our Finance ordinance. This purchase will not increase our fleet size, it will replace an older unit whose repair cost and dependability exceeds the value of that unit. With such a small and defined season, we must have reliable equipment to meet the needs of our residents.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

Recommendation to purchase one new Spartan Pro Self-Contained Leaf Machine to be used by the Roads Department (ID #177) for a cost of \$131,990.00 from Bell Equipment, 78 Northpointe Dr., Lake Orion MI 48359 through the MI-Deal Contract #071B7700091 from fund budgeted in Acct # 226-528-987-000.

SPECIFIC NAME OF PRODUCT AND NUMBER TO BE PURCHASED (if more than one)

Budget funds in the amount of \$131,990.00 are available in account no. 226-528-987-000

CONTRACT: Amount and/or purchase price and length of contract (with dates if applicable)

\$131,990.00

DETAILED WORK BEING PERFORMED

FISCAL CONSIDERATIONS (Amount requested and Account(s) used. If applicable, Grant Funding information)

G/L # 226-528-987-000

\$131,990.00

ACCEPTANCE OF BID (Please detail the following: Why accepted, why not lowest bidder, company name, contact person, full address)

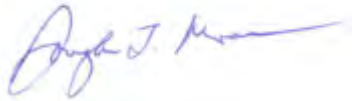
MI-Deal cooperative purchasing consortium

REASON TO WAIVE BID PROCESS (Emergency, Professional services, No advantage to City and why, Consortium package, etc): Waive the formal bidding process in accordance with Section 3.04.140.E.4 of the Livonia Code of Ordinances, as amended since no advantage to the City would result from competitive bidding.

ATTACHMENTS

1. Leaf Vac 2024 - 177 - Roads

APPROVED BY



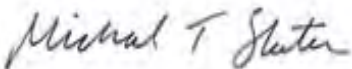
Douglas L. Moore, MSA, Assistant Director of Public Works

Date: March 21, 2024



Don Rohraff, Director of Public Works

Date: March 21, 2024



Michael Slater, Finance Director

Date: March 22, 2024



Maureen Miller Brosnan, Mayor

Date: March 22, 2024

DEPARTMENT OF PUBLIC WORKS
PUBLIC SERVICE DIVISION
FLEET MAINTENANCE

GARY T. GARRISON
FLEET MANAGER



JAMES (BUZZ) KIRBY
FLEET MANAGER

13405 SURREY STREET
LIVONIA, MICHIGAN 48150-1527
(734)-466-2704
FAX: (734)-466-2662

March 18, 2024

**Purchase of One Self-Contained Leaf Vacuum to be used by the Roads Department.
The City Identifications Number will be #177.**

I am recommending the purchase of one Spartan Pro self-contained leaf machine from Bell Equipment, 78 Northpointe Drive, Lake Orion, Michigan 48359. The cost for this unit with the discount applied will be \$131,990.00. This purchase will be made through MI-Deal contract #071B7700091. The use of this contract meets our Finance Department's required bidding process and allows us to get the best buying discounts.

These funds will come from approved budgeted funds in account 226-528-987-000. If this purchase is approved, this unit will be replacing one of our current units whose repair cost and dependability exceeds the value of that unit. With such a small and defined season, we must have reliable equipment to meet the needs of our residents.

If you have any questions, or require additional information, I can be reached on ext. 2641.


Gary T. Garrison
Fleet Manager



Michigan Office:
78 Northpointe Drive
Lake Orion, Michigan 48359
Phone: (248) 370-0000
Fax: (248) 370-0011

Ohio Office:
850 Science Blvd.
Gahanna, OH
Phone 614-655-0022

City of Livonia Bonnell Spartan Leaf Pro

1 – 25 Yard Spartan Pro

\$121,011

Spartan Pro Standard Items
74 HP Diesel Powered Liquid Cooled Engine
Dual Safety Interlock System on Intake Nozzle and Belt Guard
Fire Extinguisher
Wheel Chalks
50 Gallon Round Fuel Tank
Right Side Collection Nozzle
Hydraulic Parking Jack
Heavy Duty Hand Clutch
Elbow Liner
30" Diameter Fan
16" Discharge Nozzle
12 Volt Battery Supported Electrical System
5VX Belt Drive
7 Pin Round Trailer Plug in Lieu of Flat
Tarp Rods

1 – Spare Tire (Unmounted)	\$1,425
1 – Clean-out Door	\$975
1 – Additional Boom Safety Chain	\$350
1 – Tarp	\$425
1 – Containment Hood Installed	\$4,200
1 – Complete Filter Kit	\$524
1 – Inbound Freight	\$2,200
1 – PDI & Delivery	\$880

MiDeal Contract Pricing – Contract # 071B7700091

This pricing realizes a 2% MiDeal Discount of \$2,633

Total - \$131,990

If you would like to proceed with this purchase, please sign and date below and return it to

CBaldas@bellequip.com

Signature:

Date:

Provided on 3-18-24

Street Sweepers • Envirosight Cameras • KEG Nozzles • Setcom Headsets

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough.
Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

10.REQUEST TO AMEND THE CONTRACT WITH OHM ADVISORS FOR THE PRELIMINARY ENGINEERING (PE) DESIGN SERVICES CONTRACT FOR THE NEWBURGH ROAD RECONSTRUCTION FROM ANN ARBOR TRAIL TO PLYMOUTH ROAD AND THE REPLACEMENT OF FIVE TRAFFIC SIGNALS ALONG THE NEWBURGH ROAD CORRIDOR AT CHURCHILL HIGH SCHOOL, ANN ARBOR TRAIL, HINES DRIVE, PLYMOUTH ROAD AND SEVEN MILE ROAD: Engineering Division, re: same. (CR 336-21)

Todd Zilincik, City Engineer, presented the request to Council.

Vice President Ptashnik asked for the timeline.

Mr. Zilincik said MDOT will widen Ann Arbor Road between Newburgh and Plymouth Roads, replace the Hines Road Bridge and do the modernization at the Plymouth, Ann Arbor and Wayne Road intersection. His department would like to use the same contractor as MDOT in the fall of 2025 with completion of the project in 2026.

Vice President Ptashnik offered an approving motion for the Consent agenda.

DIRECTION

APPROVAL

CONSENT



LETTER TO THE LIVONIA CITY COUNCIL

10.

Engineering
March 22, 2024

MEETING DATE

S040124/R041524

PREPARED BY

Karen Worley, Secretary IV,

AGENDA ITEM

REQUEST TO AMEND THE CONTRACT WITH OHM ADVISORS FOR THE PRELIMINARY ENGINEERING (PE) DESIGN SERVICES CONTRACT FOR THE NEWBURGH ROAD RECONSTRUCTION FROM ANN ARBOR TRAIL TO PLYMOUTH ROAD AND THE REPLACEMENT OF FIVE TRAFFIC SIGNALS ALONG THE NEWBURGH ROAD CORRIDOR AT CHURCHILL HIGH SCHOOL, ANN ARBOR TRAIL, HINES DRIVE, PLYMOUTH ROAD AND SEVEN MILE ROAD: Engineering Division, re: same. (CR 336-21)

BACKGROUND DETAILS

The City Council approved Qualification Based Selection (QBS) firms pursuant to Council Resolution No. 336-21, adopted November 22, 2021, to perform all professional engineering services on various federal, state and locally funded projects through fiscal year 2026. Under this procedure, we recommend that OHM Advisors (OHM) serve as our consultant for the Newburgh Road Reconstruction Project from Ann Arbor Trail to Plymouth Road and the replacement of five (5) traffic signals along the Newburgh Road corridor at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road and Seven Mile Road. See attached letter dated March 13, 2024, from OHM Advisors for design engineering services.

The City received approximately \$1.138 million dollars in Federal Funds for the reconstruction of Newburgh Road from Ann Arbor Trail to Plymouth Road in 2025. In addition, we received a Southeast Michigan Council of Governments (SEMCOG) grant to reduce carbon emissions for FY 2025 on the Newburgh Road Corridor from 8 Mile to Ford Road for interconnecting to traffic signals and modernization at five (5) locations for the amount of \$1.25 million.

The OHM Advisors proposed contract amendment in the amount of \$320,000 (portion of approximately \$170,000 for road design of the Newburgh Road from Ann Arbor Trail to Plymouth Road) and the remaining \$150,000 for traffic signal design at approximately \$30,000 for each location. A portion of the \$150,000 will be reimbursed by Wayne County for the design costs related to the traffic signal modernization at Hines Drive, Plymouth Road and Seven Mile Road. Wayne County has previously committed \$50,000 for design, and we are seeking an additional \$40,000 due to the requirements, for a total of approximately \$90,000. The traffic signal improvements under the City jurisdiction will be Ann Arbor Trail at Newburgh Road and Churchill High School at Newburgh Road.

The Michigan Department of Transportation (MDOT) is scheduled to reconstruct the intersection at Ann Arbor Road and Newburgh Road, including the removal and replacement of the Hines Bridge and widening of Ann Arbor Road from Newburgh to Plymouth Road. This MDOT project is to be bid

in October / November 2024. The traffic signals at Ann Arbor Road and Plymouth Road will be modernized. Construction is scheduled for 2025. Newburgh Road from Ann Arbor Trail to Plymouth Road is to bid out in early January 2025 for cost savings as the goal would be to obtain the same contractor that would be working in the area for the MDOT project and start installing traffic signal modernization items in the fall of 2025 and complete the paving portion in the summer of 2026.

In order to proceed with these projects, it is respectfully recommended that the Council take the following actions:

- Authorize the Mayor and the City Clerk to execute an amendment to the Engineering contract with OHM Advisors, 34000 Plymouth Road, Livonia, Michigan 48150, in the not-to-exceed amount of \$320,000 for the design engineering for the Newburgh Road Reconstruction Project from Ann Arbor Trail to Plymouth Road and the replacement of five (5) traffic signals along the Newburgh Road corridor at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road and Seven Mile Road.
- Authorize an additional appropriation and expenditure in the amount of \$320,000 from the unexpended fund balance of the Road, Sidewalk and Tree Fund, (204). A portion of this cost (\$50,000 to \$90,000) will be reimbursed by Wayne County.
- Authorize the City Engineer to approve minor adjustments to the work, as required.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

In order to proceed with these projects, it is respectfully recommended that the Council take the following actions:

- Authorize the Mayor and the City Clerk to execute an amendment to the Engineering contract with OHM Advisors, 34000 Plymouth Road, Livonia, Michigan 48150, in the not-to-exceed amount of \$320,000 for the design engineering for the Newburgh Road Reconstruction Project from Ann Arbor Trail to Plymouth Road and the replacement of five (5) traffic signals along the Newburgh Road corridor at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road and Seven Mile Road.
- Authorize an additional appropriation and expenditure in the amount of \$320,000 from the unexpended fund balance of the Road, Sidewalk and Tree Fund, (204). A portion of this cost (\$50,000 to \$90,000) will be reimbursed by Wayne County.
- Authorize the City Engineer to approve minor adjustments to the work, as required.

SPECIFIC NAME OF PRODUCT AND NUMBER TO BE PURCHASED (if more than one)

n/a

CONTRACT: Amount and/or purchase price and length of contract (with dates if applicable)

\$320,000

DETAILED WORK BEING PERFORMED

Preliminary Engineering for the Newburgh Road Reconstruction from Ann Arbor Trail to Plymouth Road and the replacement of five (5) traffic signals along Newburgh Road Corridor at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road and Seven Mile Road

FISCAL CONSIDERATIONS (Amount requested and Account(s) used. If applicable, Grant Funding information)

\$320,000 from the Unexpended Fund Balance of the Road, Sidewalk and Tree Fund (204). A portion of this cost (\$50,000 to \$90,000 will be reimbursed by Wayne County).

ACCEPTANCE OF BID (Please detail the following: Why accepted, why not lowest bidder, company name, contact person, full address)

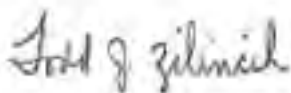
n/a

REASON TO WAIVE BID PROCESS (Emergency, Professional services, No advantage to City and why, Consortium package, etc): Qualification Based Selection (QBS) Firm, CR 336-21

ATTACHMENTS

1. CR 336-21
2. Executed Letter of Support
3. CRP Funding Application for Newburgh Road
4. OHM - Newburgh Proposal 3-13-24 Signed

APPROVED BY



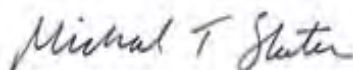
Todd Zilincik, P.E., City Engineer

Date: March 22, 2024



Don Rohraff, Director of Public Works

Date: March 22, 2024



Date: March 22, 2024

Michael Slater, Finance Director

A handwritten signature in blue ink, appearing to read "Michael Slater", written over a light blue circular background.

Date: March 22, 2024

Paul Bernier, City Attorney

A handwritten signature in black ink, appearing to read "Paul Bernier", written over a light blue circular background.

Date: March 22, 2024

Maureen Miller Brosnan, Mayor

Regular Minutes of November 22, 2021

AND BE IT FURTHER RESOLVED THAT the street is an approved public street and is open for public purposes; and FURTHER, that said street is accepted into the City's local street system and is located within a right-of-way under the control of the City of Livonia and that said street was open to the public as of December 31, 2021.

#336-21 RESOLVED, that having considered the report and recommendation of the City Engineer, dated October 26, 2021, submitted pursuant to Council Resolution No. 365-16, which bears the signatures of the Director of Public Works, the Director of Finance and the City Attorney, and is approved for submission by the Mayor, requesting to extend the Qualification-Based Selection (QBS) contracts with OHM Advisors, Hubbell, Roth and Clark, Inc., Spalding Dedecker Associates, Inc. and Anderson, Eckstein and Westrick, Inc., for a period of five (5) years, for future proposals relating to professional engineering consulting services, the Council does hereby accept the proposal to extend the qualification based-selection (qbs) contracts with OHM Advisors, 34000 Plymouth Road, Livonia, MI 48150, Hubbell, Roth and Clark, Inc., 555 Hulet Drive, Bloomfield Hills, MI 48303-0824, Spalding Dedecker Associates, Inc., 905 South Boulevard East, Rochester Hills, MI 48307-5358, and Anderson, Eckstein and Westrick, Inc., 51301 Schoenherr Road, Shelby Township, MI 48315, for a five (5) year period ending November 30, 2026, to perform Professional Engineering Services on various Federal, State and Locally funded roads, bridges, storm sewers, sanitary sewers, water mains, traffic signal modernization and pedestrian signal upgrades and other related projects; FURTHER, the Mayor and City Clerk are hereby authorized to execute contracts for and on behalf of the City of Livonia with the aforesaid companies and to do all other things necessary or incidental to the full performance of this resolution; and all QBS contracts based on scope and contract amount for each future individual project will be brought before the City Council for funding approval.

#337-21 RESOLVED, that having considered the report and recommendation of the City Engineer, dated October 29, 2021, which bears the signatures of the Director of Public Works and the Director of Finance, and is approved for submission by the Mayor, the Council does hereby approve the proposed 2022 Road Repair Program as proposed by the Department of Public Works and as reviewed by the Citizens Advisory Committee on Roads for the tenth year of the ten-year road paving millage approved by Livonia residents, as shown in the attachment to that report.

#338-21 WHEREAS, the Mayor and City Council of the City of Livonia believe quality roads are a vital part of any community; and

WHEREAS, the City of Livonia has a Citizens Advisory Committee on Roads which identifies City streets most in need of repair in order to



Public Services

February 10, 2023

Chris Williams
SEMCOG
1001 Woodward Avenue #1400
Detroit, MI 48226

**Re: Letter of Support for Carbon Reduction Program (CRP) Call for Projects
Newburgh Road Corridor (8 Mile to Ford Road)
City of Livonia & Westland, Michigan, Wayne County**

Dear SEMCOG:

Wayne County Department of Public Services is in support of the City of Livonia's effort to optimize the traffic signals along the Newburgh Road Corridor (8 Mile Road to Joy Road), including the portion in the City of Westland from Joy Road to Ford Road. We support their application for funding of this effort through the Carbon Reduction Program (CRP).

Our understanding is the FY 24 – FY 26 CRP grant has an 80/20 match requirement in which the local Act 51 agency would be responsible for design costs and 20% of construction costs. Thus, we are in support of the Newburgh Road Corridor that will optimize approximately 20 traffic signals and modernization five (5) major traffic signalized intersection at the following locations:

1. Seven Mile Road at Newburgh Road (Wayne County Jurisdiction)
2. Plymouth Road at Newburgh Road (Wayne County Jurisdiction)
3. Hines Road at Newburgh Road (Wayne County Jurisdiction)
4. Ann Arbor Trail at Newburgh Road (City of Livonia Jurisdiction)
5. Churchill High School at Newburgh Road (City of Livonia Jurisdiction)

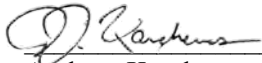
The cost of the traffic signal modernization at \$250,000 each would be \$1,250,000 along with approximately \$5,000 of equipment to allow for communication between the traffic signals equates to a total requested by the City of Livonia in the amount of \$1.35 million.

The City of Livonia has received STP-U Funding FY 2025 for reconstruction of Newburgh Road from Ann Arbor Trail to Plymouth Road in the amount of \$1,138,943. Wayne County would like to modernize the traffic signal at Plymouth Road and at Hines Drive at Newburgh Road in conjunction with this project as the City of Livonia looks to modernize the traffic signals at Ann Arbor Trail.

In addition, we look to modernize the traffic signal at 7 Mile and Newburgh Road which is a main access point onto I-275. The City of Livonia is working closely with the Livonia Public Schools as they expand the Livonia Career Technical Center (LCTC) which will now include robotics at the facility and scheduled to be completed this fall across from Churchill High School.

Wayne County is anticipated the 20% grant funding on the three (3) intersections under our jurisdiction would be approximately \$150,000, plus the anticipated total design costs in the amount of \$45,000 to \$50,000 for a grand total of \$200,000 commitment in FY 2025. This would be in conjunction with the two (2) remaining locations for the City of Livonia and MDOT under their jurisdiction for improvements to the above-mentioned intersections.

Sincerely,



Andrew Kandrevas
Director of Public Services

Agency Name

City of Livonia

Project Primary Contact Name

Todd Zilincik, PE

Applicant Phone and Email

(734) 466-2561

tzilincik@livonia.gov

Project Name

Newburgh Road Signal Optimization and Traffic Signal Modernizations

Project type

Road

For Transit Projects

n/a

Work Description

Newburgh Road Corridor Signal Optimization –The study limits span two communities, the City of Livonia and the City of Westland. Beginning at the south, the optimization would start at Ford Road in Westland and head north to Joy Road at the Westland/Livonia border, then continue through Livonia to the northern limit at 8 Mile Road. In all, there are 20 signals within the optimization limits, 17 signals in Livonia, 1 of which is shares the border with Westland at Joy Road, and 3 additional signals in Westland.

Construction of Five (5) Modernized Traffic Signals – 5 intersections have been chosen to include for signal modernization, to upgrade from existing diagonal span intersections running fixed time operations, to new box span signal intersections with vehicular detection and pedestrian pushbuttons. It is anticipated that the upgrades to the traffic signals will provide significant carbon reduction.

Project Limits

Newburgh Road from Ford Road in Westland at the south end north through Westland and Livonia, ending at the north end at 8 Mile Rd.

Signal Modernization Locations are the intersections of Newburgh with:

- o Churchill High School
- o Ann Arbor Trail
- o Hines Drive
- o Plymouth Road
- o 7 Mile Road

Project Cost

Federal - \$1,080,000

Local - \$270,000

Total - \$1,350,000

Local Match Source

Act 51

Which Fiscal Year

2025

2026

Emissions Calculations (CO2 reduced in kg/day)

Optimization 3445.853

7 Mile 445.838

Plymouth 728.106

Hines 962.601

AA Trail 168.481

Churchill HS 34.797

Grand Total = 5,785.676

In a brief narrative, please highlight any additional information about the proposed project and how it will benefit the community and region.

Signal Optimization - The signal optimization for the Newburgh Corridor, including 20 traffic signals with 16 in Livonia, 3 in Westland and 1 shared location at the intersection of Joy Road. The optimization project will improve the traffic operations along the Newburgh Road corridor through the communities of Livonia and Westland. Portions of this roadway in each community are located in Equity Emphasis Areas: Livonia from Plymouth Road to I-96 and in Westland from Joy Road to Warren Road. In addition to being a heavily traveled corridor for local traffic, this corridor runs parallel to the I-275 and is the first road east of I-275 that covers the entire length from Ford Road (M-153) to 8 Mile Road. Traffic volumes along the corridor range from ADT's of 20,000 to 40,000 vehicles per day. When there are incidents on I-275 or construction, this corridor is even more heavily used than a typical day. The average travel time of 16 minutes from end to end can more than double. A signal optimization of the corridor will help to facilitate carbon reduction. Both communities are on board with the optimization of the corridor. Wayne County has also been contacted for their support.

Signal Modernization - The second part of the project would be to construct modernized traffic signals and intersection improvements for up to 5 intersections along the corridor. Currently of the 20 signals in the corridor, 6 are already upgraded to box span designs. The remaining signals are diagonal spans without detection and utilizing the three-section flashing red ball for left turn movements (where installed). Given the lack of detection for pedestrians and vehicles, it is not possible to obtain significant

reductions in travel delays through optimization. The requested modernizations will allow best possible retiming plans to improve operations in the corridor.

Additional Information – The City of Livonia has funding in place for a concrete inlay for 2025 for the stretch of road from Ann Arbor Trail to Plymouth Road, which is approximately 0.5 miles: FY 2025 STP-U Funding for Newburgh Road (Ann Arbor Trail to Plymouth Road), \$1,138,943, Remove and Replace concrete road, new 21AA aggregate base, and ADA ramps at cross streets.

MDOT has a project that has been in the works for approximately 10 years, which has been stopped and restarted several times. The project is for Old M-14, which is Ann Arbor Road (MDOT JN 110611). The scope of that project includes reconstruction of Ann Arbor Road from Newburgh Road east through the intersection with Plymouth Road. At the intersection of Newburgh Road with Ann Arbor Road, the limits extend north and south along Newburgh Road a few hundred feet in each direction. The planned improvement on Newburgh Road includes added North/South right turn lanes and modernizing the traffic signal. Also included with that project is the replacement of the Hines Drive bridge over Ann Arbor Road, just east of the Newburgh Corridor.

The Livonia and MDOT projects in this area are redoing the roads and the signal at AA Road. This would be a prime time to improve the signals throughout this reconstruction area: Ann Arbor Trail, Hines Drive and Plymouth Road. Each of the intersections needs signal modernization and will benefit from including countdown pedestrian signals, ADA ramp improvements, box span design and pedestrian and bike safe crossing upgrades.

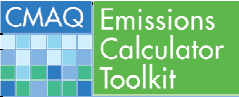
Document Center

Emissions Calc – 6 pager

Signature Page – Signed by Todd

Sponsorship Agreement – n/a

Project Sketch – Location Map



Traffic Signal Synchronization

This calculator will estimate the emission reductions resulting from synchronizing the traffic signals along a previously unsynchronized corridor.

INPUT

Evaluation Year	2025
Area Type	Urban
Corridor Length	8 miles
Number of Signalized Intersections	20
Number of Lanes (one direction)	2
Posted Speed Limit	45 miles per hour (1 - 75 MPH)
Average Cycle Length	90 seconds
Truck Percentage	5%
Annual Average Daily Traffic (AADT) (both directions)	26,586 veh/day
Peak-hour Volume (both directions)	1,595 veh/hr
Existing Corridor Travel Time	16 minutes
Total peak hours per day (AM+PM)	12

OUTPUT

PERFORMANCE

	PEAK-HOUR	OFF-PEAK	
Volume (both directions)	1,595	620.5	veh/hr
Existing Average Speed	30	32	mph
Travel Time Savings	93	81	min
Proposed Average Speed	33	36	mph

EMISSION REDUCTIONS

Pollutant	Peak-hour Kilograms/day	Off-Peak Kilograms/day	Total Kilograms/day
Carbon Monoxide (CO)	27.240	15.927	43.167
Particulate Matter <2.5 µm (PM _{2.5})	0.329	0.220	0.549
Particulate Matter <10 µm (PM ₁₀)	1.472	0.757	2.229
Nitrogen Oxide (NOx)	4.163	2.847	7.010
Volatile Organic Compounds (VOC)	1.221	0.578	1.799
Atmospheric Carbon Dioxide (CO ₂)	2,367.397	1,078.455	3,445.853
Carbon Dioxide Equivalent (CO ₂ e)	2,385.106	1,086.493	3,471.599
Total Energy Consumption (MMBTU)	31.040	14.063	45.102

Intersection Improvements

Navigator

Intersection Improvements

Traffic Signal Synchronization

Roundabouts

Two Way Left Turn Lanes

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2025
Area Type	Urban
Business District	No
Total peak hours per day(AM+PM)	12
Existing Intersection is	Signalized

Use the table below to estimate delay (HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersection
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	31,001	31,623	veh/day
Peak-hour Volume (both directions)	1,943	2,064	veh/hr
Number of Lanes (one direction)	2	2	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	26	30	sec/veh
Existing Left-turn Phase	Yes	Yes	
Existing Right-turn Phase	Yes	Yes	

PROPOSED CONDITIONS

Cycle Length seconds

	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	Yes
Right-turn Phase	Yes	Yes
Ratio of Green Time per Cycle Time	0.5	0.5

OUTPUT

PERFORMANCE

	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	2,767	2,767	2,767	2,767	veh/hr
Proposed Capacity (both directions)	2,767	2,767	2,767	2,767	veh/hr
Volume (both directions)	1,943	2,064	640	571	veh/hr
Delay Reduction per vehicle	8.7	12.1	0.0	0.0	sec/veh

	Roadway 1	Roadway 2	
Roadway Intersection Delay Reduction per day	56.1	83.0	hours
Total Intersection Delay Reduction per day	139.1		hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.771	0.000	0.771
Particulate Matter <2.5 µm (PM _{2.5})	0.017	0.000	0.017
Particulate Matter <10 µm (PM ₁₀)	0.018	0.000	0.018
Nitrogen Oxide (NOx)	0.383	0.000	0.383
Volatile Organic Compounds (VOC)	0.207	0.000	0.207
Atmospheric Carbon Dioxide (CO2)	445.838	0.000	445.838
Carbon Dioxide Equivalent (CO2e)	445.823	0.000	445.823
Total Energy Consumption (MMBTU)	5.866	0.000	5.866

Intersection Improvements

Navigator

Intersection Improvements

Traffic Signal Synchronization

Roundabouts

Two Way Left Turn Lanes

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2025
Area Type	Urban
Business District	No
Total peak hours per day(AM+PM)	12
Existing Intersection is	Signalized

Use the table below to estimate delay (HCM 2010, Exhibit 21-1)

Level of Service Reference Table

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersection
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	28,624	12,366	veh/day
Peak-hour Volume (both directions)	1,717	742	veh/hr
Number of Lanes (one direction)	2	2	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	43	25.6	sec/veh
Existing Left-turn Phase	No	No	
Existing Right-turn Phase	No	No	

PROPOSED CONDITIONS

Cycle Length seconds

	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.7	0.3

OUTPUT

PERFORMANCE

	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	4,800	2,057	4,800	2,057	veh/hr
Proposed Capacity (both directions)	4,571	2,057	4,571	2,057	veh/hr
Volume (both directions)	1,717	742	668	289	veh/hr
Delay Reduction per vehicle	38.1	3.6	17.7	-16.7	sec/veh

	Roadway 1	Roadway 2	
Roadway Intersection Delay Reduction per day	257.6	-7.1	hours
Total Intersection Delay Reduction per day	250.5		hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	1.258	0.000	1.258
Particulate Matter <2.5 µm (PM _{2.5})	0.027	0.000	0.027
Particulate Matter <10 µm (PM ₁₀)	0.030	0.000	0.030
Nitrogen Oxide (NOx)	0.626	0.000	0.626
Volatile Organic Compounds (VOC)	0.338	0.000	0.338
Atmospheric Carbon Dioxide (CO2)	728.031	0.075	728.106
Carbon Dioxide Equivalent (CO2e)	734.538	0.076	734.614
Total Energy Consumption (MMBTU)	9.578	0.001	9.579

Intersection Improvements

Navigator

- [Intersection Improvements](#)
- [Traffic Signal Synchronization](#)
- [Roundabouts](#)
- [Two Way Left Turn Lanes](#)

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2025		
Area Type	Urban		
Business District	No		
Total peak hours per day(AM+PM)	12		
Existing Intersection is	Signalized		
	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	28,624	14,408	veh/day
Peak-hour Volume (both directions)	1,717	864	veh/hr
Number of Lanes (one direction)	2	2	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	48	41	sec/veh
Existing Left-turn Phase	Yes	No	
Existing Right-turn Phase	No	No	

Use the table below to estimate delay (HCM 2010, Exhibit 21-1)

LOS	Delay (s/veh)	
	Unsignalized Intersection	Signalized Intersections
A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

PROPOSED CONDITIONS

Cycle Length	80	seconds
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	Yes	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.7	0.3

OUTPUT

PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	4,571	2,057	4,571	2,057	veh/hr
Proposed Capacity (both directions)	4,571	2,057	4,571	2,057	veh/hr
Volume (both directions)	1,717	864	668	337	veh/hr
Delay Reduction per vehicle	43.1	18.6	17.8	-16.8	sec/veh
Roadway	1	2			
Roadway Intersection Delay Reduction per day	286.5	34.6			hours
Total Intersection Delay Reduction per day	321.1				hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	1.664	0.000	1.664
Particulate Matter <2.5 µm (PM _{2.5})	0.036	0.000	0.036
Particulate Matter <10 µm (PM ₁₀)	0.039	0.000	0.039
Nitrogen Oxide (NOx)	0.828	0.000	0.828
Volatile Organic Compounds (VOC)	0.447	0.000	0.447
Atmospheric Carbon Dioxide (CO ₂)	962.534	0.067	962.601
Carbon Dioxide Equivalent (CO ₂ e)	971.138	0.067	971.205
Total Energy Consumption (MMBTU)	12.664	0.001	12.664

Intersection Improvements

Navigator

Intersection Improvements

Traffic Signal Synchronization

Roundabouts

Two Way Left Turn Lanes

This calculator will estimate the emission reductions resulting from improving traffic signals at a four-way intersection

INPUT

EXISTING CONDITIONS

Evaluation Year	2025
Area Type	Urban
Business District	No
Total peak hours per day(AM+PM)	12
Existing Intersection is	Signalized

Use the table below to estimate delay (HCM 2010, Exhibit 21-1)

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A	0 - 10	0 - 10
B	>10 - 15	>10 - 20
C	>15 - 25	>20 - 35
D	>25 - 35	>35 - 55
E	>35 - 50	>55 - 80
F*	>50	>80

*LOS F typically indicates that traffic demand has exceeded capacity

	Roadway 1	Roadway 2	
Average Annual Daily Traffic volume (AADT) (both directions)	23,502	7,486	veh/day
Peak-hour Volume (both directions)	1,510	499	veh/hr
Number of Lanes (one direction)	2	1	
Truck Percentage	5%	5%	
Existing Delay per Vehicle	19	11	sec/veh
Existing Left-turn Phase	No	No	
Existing Right-turn Phase	No	No	

PROPOSED CONDITIONS

Cycle Length seconds

	Roadway 1	Roadway 2
Number of Left-Turn Lanes to Add (one direction)	0	0
Left-turn Phase	No	No
Right-turn Phase	No	No
Ratio of Green Time per Cycle Time	0.7	0.3

OUTPUT

PERFORMANCE

Roadway	PEAK-HOUR		OFF-PEAK		
	1	2	1	2	
Existing Capacity (both directions)	4,800	1,029	4,800	1,029	veh/hr
Proposed Capacity (both directions)	4,800	1,029	4,800	1,029	veh/hr
Volume (both directions)	1,510	499	449	125	veh/hr
Delay Reduction per vehicle	14.4	-11.9	17.1	-16.6	sec/veh

	Roadway 1	Roadway 2	
Roadway Intersection Delay Reduction per day	98.0	-26.8	hours
Total Intersection Delay Reduction per day	71.2		hours

EMISSION REDUCTIONS

Pollutant	Peak Hours Kilograms/day	Off-Peak Hours Kilograms/day	Daily Total Kilograms/day
Carbon Monoxide (CO)	0.291	0.000	0.291
Particulate Matter <2.5 µm (PM _{2.5})	0.006	0.000	0.006
Particulate Matter <10 µm (PM ₁₀)	0.007	0.000	0.007
Nitrogen Oxide (NOx)	0.145	0.000	0.145
Volatile Organic Compounds (VOC)	0.078	0.000	0.078
Atmospheric Carbon Dioxide (CO2)	168.421	0.060	168.481
Carbon Dioxide Equivalent (CO2e)	169.926	0.060	169.987
Total Energy Consumption (MMBTU)	2.216	0.001	2.217

Fiscal Year (FY) 2024 - 2026 SEMCOG
Carbon Reduction Program (CRP) Call For Projects

Signature Page

Your application will not be considered unless this page is signed and submitted at the time of initial application submission.

The signer acknowledges and agrees to the following:

1. He/she is an authorized representative of the community or agency submitting the application (hereinafter referred to as the “applicant”);
2. The applicant is eligible to apply for and receive CRP funding as defined by Michigan Act 51 of 1951 (i.e., the applicant is an incorporated city, incorporated village, county road commission, or public transit agency within the meaning of the Act);
3. The applicant is responsible for ensuring that all of the application requirements are met, within the schedule as provided by SEMCOG. The applicant further understands that failure to meet these deadlines will result in the rejection of the application;
4. The applicant will provide SEMCOG with any subsequently requested information related to the CRP application;
5. It is the applicant’s responsibility to confirm that the application has been submitted and also to check on the status of the application after it has been submitted;
6. If an application is submitted for funding, it may or may not receive funding, depending upon how it ranks with other applications competing for funding in the same fiscal year, and its eligibility for CRP funding.
7. SEMCOG may, at its discretion, choose to accept applications from Act 51 agencies submitted on behalf of non-Act 51 entities (i.e., for-profit organizations, nonprofit organizations, townships, etc.). However, these projects must be sponsored by the Act-51 eligible agency submitting the application. The sponsorship agreement **must be signed** at the time of initial submission of the CRP application. APPLICATIONS RECEIVED DIRECTLY FROM NON-ACT-51 ENTITIES WILL NOT BE CONSIDERED.
8. If the applicant’s application is approved for funding, SEMCOG may, at its discretion, award less or more federal CRP funding than requested.
9. SEMCOG, at its discretion, may rescind an award if funding is no longer available from the federal government, if the project description as submitted with the application is subsequently changed, or if the applicant is not ready to flex (transit) by May 15th or obligate (highway and other) the funding by June 30 of the fiscal year for which it was awarded. “Flexed” and “Obligated” each carry the same definition as commonly used by the Michigan Department of Transportation (MDOT). It is the APPLICANT’s responsibility to ensure that its awarded application is ready for flexing or obligation, as appropriate.
10. For projects that span multiple years (for example, new transit service over a three-year period), the applicant understands and accepts that SEMCOG only awards funding by specific fiscal year, and that funding for a particular project in one fiscal year DOES NOT GUARANTEE funding for that project in any subsequent fiscal year. All CRP funds awarded for a given fiscal year must either be flexed (transit) or obligated (highway and other) in that fiscal year.

Fiscal Year (FY) 2024 - 2026 SEMCOG
Carbon Reduction Program (CRP) Call For Projects

Signature of Authorized Representative Todd J. Zilincik

Name of Authorized Representative Todd J. Zilincik

(print)
Title of Authorized Representative City Engineer

(print)
Applicant Agency City of Livonia

Date February 10, 2022

Newburgh Road Signal Optimization Cities of Livonia & Westland, Wayne County





March 13, 2024

Mr. Todd Zilincik, PE
City Engineer
City of Livonia
Engineering Department
12973 Farmington Rd.
Livonia, MI 48150

RE: Preliminary Engineering (PE) Design Services -
Newburgh Road Reconstruction, Ann Arbor Trail to Plymouth Road and
Five Traffic Signal Replacements along Newburgh Road

Dear Mr. Zilincik,

Thank you for showing continued confidence in OHM Advisors by requesting us to provide the City of Livonia with an engineering services proposal for the design of Newburgh Road Reconstruction, from Ann Arbor Trail to Plymouth Road, and the replacement of five Traffic Signals along the corridor at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road, and Seven Mile Road. Attached are the necessary exhibits to our Continuing Services Agreement defining our Scope of Services, fee, and schedule to execute the Project Supplement. We understand these projects have received federal funding for construction and will be advertised and bid through the MDOT Local Agency Program as one Contract.

If you have any questions concerning this Proposal, please contact me at (734) 466-4441. We look forward to working with the City of Livonia on this project.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark R. Loch".

Mark R. Loch, PE
Project Manager

Cc: Rhett Gronevelt, PE, OHM
file

Attachment: Exhibit A and Project Supplements A to C

In Witness Whereof, the CITY and CONSULTANT, by and through their duly authorized officers and representatives, have executed this Contract.

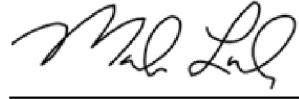
In the Presence of:

CITY OF LIVONIA, a Michigan
Municipal Corporation

By: _____
Maureen Miller Brosnan, Mayor

By: _____
Lori L. Miller, City Clerk

In the Presence of:



OHM Advisors

By: 
Rhett A. Gronevelt, PE

Its: Principal _____

Approved:

Donald R. Rohraff
Director of Public Works

Approved:

Todd J. Zilincik, PE
City Engineer

Approved:

Pursuant to Council Resolution

No.: _____

Michael Slater
Director of Finance

Adopted on: _____

Approved:

Paul A. Bernier
Department of Law

SCOPE OF SERVICES**CITY OF LIVONIA****NEWBURGH ROAD RECONSTRUCTION AND
TRAFFIC SIGNAL REPLACEMENT****PROJECT UNDERSTANDING**

The City received approximately \$1.138M in STPU federal funding through the Wayne County FAC for FY 2025 for the reconstruction of Newburgh Road from Ann Arbor Trail to Plymouth Road. Additionally, OHM assisted the City with the successful application for a Carbon Reduction Program (CRP) grant for a project to optimize the traffic signals on the Newburgh Road Corridor and modernize several of the existing signals. The City was awarded a \$1.25M CRP grant for FY 2025 through SEMCOG. With these two awards, and through our subsequent discussions with the City, we have prepared this proposal to design reconstruction plans along Newburgh Road from the south end of radius of Ann Arbor Trail to the north end of radius of Plymouth Road and includes the Ann Arbor Trail and Hines Drive intersections with Newburgh Road. The project will gap the intersection with Ann Arbor Road up to the north and south limits of the MDOT project. The scope also includes the design of the modernization of Traffic Signals along Newburgh Road at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road and Seven Mile Road.

OHM has included GeoTran Consultants on our team to provide traffic signal foundation borings, pavement cores, soil borings, and pavement section recommendations for the roadway.

SWCA is also on OHM's team to provide State Historic Preservation Office (SHPO) review of the project site, reviewing historic and archeological potential, and completing the required 106 Form. A NEPA environmental analysis will also be required for all areas within the project limits.

ADA sidewalk ramp upgrades are planned to bring City owned noncompliant ramps up to standard at all intersections within the project limits. The project will be advertised, bid, and administered as one contract through the MDOT Local Agency Program (LAP) process and is targeted to be bid in February of 2025.

WORK PLAN**A. Design Parameters****SCOPE OF SERVICES**

The following is the scope of services that OHM will provide for this project.

A. Design Parameters/Considerations

1. Design Speed of 50 mph with a posted speed of 45 mph.

2. General Design Standards: “MDOT 4R Design Standards”, Michigan Manual of Uniform Traffic Control Devices 2023 Standards, and City of Livonia Standards as applicable.
3. Specifications: MDOT: “2020 Standard Specifications for Construction”, including the current “MDOT Standard Plans for Roads and Bridges”, supplemented by locally authored Special Provisions.
4. Project Pavement Repair Scope of Work: The City desires to remove the existing concrete pavement within the project limits, investigate the reuse of the underlying base material, place underdrain if needed and place new concrete pavement back. Depending on the condition and type of the existing aggregate base, new base material may be needed.
5. Project Limits: The road paving limits will extend on Newburgh Road from the south end of radius of Ann Arbor Trail extending north to the north end of radius at Plymouth Road. The project will reconstruct three intersections, Ann Arbor Trail, Hines Drive and Plymouth Road and will gap the pavement over the dam control structure over Newburgh Lake and gap the extended intersection of Ann Arbor Road which will have been previously improved by MDOT. The traffic signal improvements are planned along Newburgh Road at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road and Seven Mile Road.
6. Horizontal Alignment: The horizontal alignment is not expected to change.
7. Horizontal Geometry: The horizontal geometry will remain essentially the same as existing condition. No reduction in lanes is planned.
8. Vertical Alignment: The project will investigate the vertical alignment where the pavement is being removed and replaced. It is anticipated that a similar vertical alignment will be maintained, but OHM will verify minimum slopes are being met.
9. Typical Roadway Cross-Section: The existing pavement is a concrete pavement section anticipated to be at least 9” thick. The proposed pavement section will be 9” - 10” thick with integral curb. The existing aggregate base will be analyzed to see if can be left in place and if underdrain exists, it will be discussed whether it needs to be replaced, or if not in place, added.
10. Driveways: There are residential and commercial driveways within the project limits. Access to these properties will be maintained during construction as long as possible. Possible closures will be investigated if other options are available.
11. Sidewalks will be logged for removal and replacement based on condition, or if impacted by the road construction.
12. Drainage: The condition of the existing underground storm sewer system and existing catch basins is unknown at this time. The City desires to videotape and provide OHM with the results. If possible, it is desired to maintain and utilize the existing mainline storm sewer. The City’s contractor will perform the videotaping work, under a separate contract with the City. This will allow a more definitive decision to be made on salvaging the existing system or providing any repairs that may be necessary. If

the existing condition prevents the videotaping from occurring, the system should be considered for cleaning or replacement/rehabilitation.

13. **Right-of-Way:** The road and sidewalk work on Newburgh Road will most likely be completed within the existing ROW. Traffic signal work can lead to temporary or permanent ROW needs. Since this issue is not known at this time, no effort is included to prepare right-of-way documents, permanent or temporary.
14. **Maintenance of Traffic:** It is anticipated that Newburgh Road will be narrowed to one lane in each direction during construction. Temporary traffic signals will be required to accommodate this lane configuration. Staged intersection plans are anticipated at the Newburgh intersection with Ann Arbor Trail, Ann Arbor Road, Hines Drive, and Plymouth Road. Ann Arbor Road is anticipated to be fully open during all phases of construction. Ann Arbor Trail and Hines Drive are anticipated to have the west and east legs closed during various stages of the project. Plymouth Road, may be constructed in quadrants.
15. **Lane Line Markings:** Full replacement of lane lines will be included and upgraded to meet current standards. The lane markings are planned to be inlaid.
16. **Permanent Signing:** All traffic signs shall be removed and replaced.
17. **Traffic Signals:** There are five traffic signals that will be designed to be removed and replaced as part of the project. All five signals are required to be staged due to maintenance of traffic sequencing.
18. **Utility Conflicts:** Existing utility information will be requested. Utility depth information below the road will be critical due to the excavation to reconstruct the road. Areas of deeper excavation include such areas requiring new storm sewer or traffic signal foundations. Because of this, it is anticipated that the utility conflicts could be possible. Utility conflicts that do arise will be addressed with the affected utility company for resolution. Two utility meetings are planned to give all utility companies a chance to discuss this project.
19. **Guardrail Upgrades:** Upgrades to all guardrail with the road reconstruction limits are planned.
20. **Permits:** An MDOT Encroachment Permit will be required for construction signing on Ann Arbor Road (Old M-14). A Wayne County ROW Permit will be required for construction work and signing within the Hines Drive, Plymouth Road, and Seven Mile Road ROW.
21. **Progress Schedule:** Currently the project is planned for a February, 2025 MDOT Letting. Construction will be ready to commence in late April or early May, 2025, but work may likely be limited until the Fall of 2025 once MDOT's project is complete on Ann Arbor Road.
22. **Intersection street lighting** is present at three of the four signalized intersections (Ann Arbor Road, Hines Drive, and Plymouth Road) within the paving limits and at the Seven Mile intersection. These lights are anticipated to remain and be unaffected by the road construction. No new corridor streetlights are planned for the project.

B. Design Process

The **Design Phase Services** to be provided by OHM shall include the following:

1. Obtain full topographic survey of the corridor between Ann Arbor Trail and Plymouth Road, gapping the MDOT work at Ann Arbor Road, and obtaining structure inventory of depths and condition of all known publicly owned manholes and catch basins within the project area. Additionally, two intersections outside the road paving limits will be surveyed for the design of a new traffic signal. These intersections are Seven Mile Road/Newburgh Road, and the Churchill High School Driveway/Newburgh Road
2. Conduct field review of existing features in the area that may be affected by construction.
3. Check the existing known utilities for interference, public and private, within the project limits and coordinate relocation if identified as being in conflict with the proposed work. Show these utilities on the construction plans including any as-built depth information on the profile sheets. It is known there is a water main within the road ROW. Any adjustments to City owned facilities will be coordinated and new casting will be added to the project if the existing casting is not the current casting desired by the City.
4. Investigate the potential for historical and archaeological impacts through the SHPO process. The process will start soon after authorization and it is the aim to submit the application before the GI meeting. MDOT will review the submitted materials and send back their decision on impacts.
5. Investigate the potential of wetland and endangered species impacts through the NEPA process. OHM will prepare the require forms and submit to MDOT for their concurrence on OHM's findings.
6. It is anticipated to utilize the existing storm sewer as much as possible but possibly adding additional catch basins if existing catch basin spacing is too long or low point drainage needs to be supplemented.
7. Coordinate the soil borings & pavement cores with GeoTran, to confirm pavement thickness and subgrade materials for the road work and foundation borings for the traffic signals. Geotechnical Engineering scope is to include:
 - a. Obtain six (6) pavement cores and 10' deep soil borings strategically spaced and alternated on each side of the centerline along Newburgh Road. These borings will verify pavement depth and underlying aggregate base/subgrade depth. A description of the pavement condition and thickness will be provided.
 - b. Provide twenty (20) 25' deep soil borings at each of the four quadrants of the five intersections receiving new traffic signals. Note that there are stipulations included in the GeoTran proposal requiring additional compensation if problems occur in the field.
 - c. A written report of the findings will be provided.
8. The plan set for this project will contain full removal and construction plans within the project limits and follow MDOT LAP plan presentation. The following sheets are anticipated:

- a. Title Sheet (1)
- b. Legend Sheet (1)
- c. Note Sheet (1)
- d. Typical Sections (4)
- e. Alignment Sheet (1)
- f. Misc. Detail Sheets (2)
- g. Removal Plans (4)
- h. Construction Plans (4)
- i. Triple Profiles (4)
- j. Detailed Grading Plan (2)
- k. Stage Construction Plans (20)
- l. Signing and Striping Plans (2)
- m. Detour Plan (2)
- n. Traffic Signal Plans (15)
- o. Traffic Signal Detail Sheets (TBD)

Total anticipated Sheets – 63+

- 9. All City owned sidewalk ramps within the project limits will be reviewed and, if required, upgraded to conform to ADA requirements.
- 10. Prepare special provisions outlining project pay items in 2020 MDOT format with Wayne County and City modifications.
- 11. Assist the City with the setup of the project through JobNet.
- 12. Prepare a Programming application for each job number to be sent to MDOT. Updating the project cost sheet is also anticipated as the project progresses to final plans.
- 13. Prepare project crash analysis. This analysis will look for crash trends where mitigation additions can be recommended.
- 14. Prepare Maintenance of Traffic Plans. Maintenance of traffic will be coordinated with MDOT's reconstruction project of Plymouth Road/Ann Arbor Road. The concept is to follow the MDOT project construction in 2025 with construction starting late 2025 and finishing in 2026. OHM will evaluate the OHM MOT concept for the MDOT project to see how much work can proceed in 2025 without disrupting the MDOT MOT concept already planned. There will be significant design work required to stage the three planned intersections at Ann Arbor Trail, Hines Drive and Plymouth Road. It is

anticipated that each intersection must be either be kept open, or a short detour set up to maintain two-way traffic during all phases of construction. Partial intersection closures will be investigated. Possible staging sequencing at each intersection would include:

- a. The intersection of Newburgh Road with Churchill High School, and Seven Mile Road will general remain fully open during the construction of the traffic signals, with the exceptions of daytime outside lane closures when constructing the sidewalk ramps at the road edge.
 - b. It is anticipated the project will require the closing the west half of the Hines/Newburgh intersection and utilize NB Newburgh to WB Plymouth to SB Jughandle Road as the WB detour route, and NB Jughandle to EB Plymouth to SB Newburgh for the EB detour. The east half of the intersection would be detoured to NB Newburgh to EB Plymouth to SB Stark to Hines Drive.
 - c. The Ann Arbor Road intersection would be kept fully open during construction having been constructed in the previous MDOT project.
 - d. Closing the west half of the Ann Arbor Trail intersection and utilizing EB Ann Arbor Road to SB Newburgh as the EB detour route and NB Newburgh Road to WB Ann Arbor Road for the WB detour. The east half of the intersection would be detoured at Wayne Road sending traffic SB on Wayne to WB Joy to NB Newburgh to Ann Arbor Trail.
 - e. Special emphasis will be on maintaining optimum access to Livonia Churchill High School once school starts in the Fall. This may include limiting work on Newburgh Road until school is out in June, 2026.
15. Prepare traffic signal design plans for the intersections of Newburgh Road at Churchill High School, Ann Arbor Trail, Hines Drive, Plymouth Road and 7 Mile Road. This process includes:
- a. OHM will utilize this survey data to create Base Plans. Base Plan design will include a conceptual signal layout and will depict existing ROW and utility information. The signal plans will be created in AutoCAD format and will be designed using MDOT and WCDPS standards and specifications, per WCDPS requirements.
 - b. Initial Signal Design Field Meeting: Will be coordinated by OHM to meet on site with the City of Livonia, WCDPS, DTE and other pertinent Utility representatives. Conceptual Base Plans will be provided to all persons invited to the field meeting. Prior to the meeting, OHM will stake out proposed pole and signal equipment locations and will coordinate a Miss Dig ticket so utility markings will be available to review potential utility conflicts with the proposed signal equipment. Potential conflicts will be mitigated to the extent possible at the meeting by relocation of proposed signal equipment. OHM will assist if and where additional mitigation is required. Signal layout and operational requirements will be verified with WCDPS during this meeting and electrical service and clearances to proposed signal equipment will be coordinated with DTE.

- c. Utility Coordination: Where possible, OHM will design all proposed signal equipment to avoid overhead, and underground utilities based on the utility information acquired by record information and Miss Dig markings. Where potential utility conflicts are anticipated, OHM will invite the utility representative to the initial field meeting to discuss resolutions and will assist with further coordination, as necessary.
 - d. Preliminary Plan preparation: OHM will incorporate the information gained at the initial field meeting into the Base Plans. The Preliminary Plan features will include plan views, wiring diagrams, material lists, appropriate note blocks, signal legends, and proposed sidewalk layouts. Anticipated designs will include box span design utilizing a six-anchor base, 6 bolt steel strain poles, digital type traffic signal controller, span wires with tether spans, LED signals w/ backplates, 4-section flashing yellow arrow signal heads for left-turn phasing, countdown type pedestrian signals, pushbutton activated pedestrian crossings, and vehicle detection for left-turn lanes and side streets. Plans will be submitted for review to WCDPS and Livonia prior to a MDOT Local Agency Programs Grade inspection submittal. OHM will utilize the 2020 MDOT Specifications and current MDOT LRFD pole and foundation guidelines for this project.
 - e. Final Plan preparation: Upon receipt of review comments, the comments will be addressed, and revisions made. Signal plans, special provisions and cost estimates will then be substantially completed. OHM will submit final plans, specifications, and quantities to MDOT for advertisement and bidding through Local Agency Programs. Supporting documents will be supplied upon request.
 - f. ADA Ramp Design: OHM will prepare plans for intersection sidewalk modifications necessary to comply with current ADA (PROWAG) requirements. Where this is not possible, we will provide documentation why conformance was not met. Sidewalk plans will be coordinated with the signal design.
 - g. Permitting: OHM anticipates a WCDPS permit will be required for work within WCDPS ROW at the Hines Drive, Plymouth Road, and Seven Mile and will submit a permit application.
 - h. Meetings: Coordination meetings are included with WCDPS (2) and MDOT (1), as the project necessitates.
16. Prepare preliminary engineer's opinion of probable construction cost, breaking out the participating federal aid items for each job number separately and from any locally funded work.
17. A Progress Meeting will be held with the City at about the 30% completion point to review issues. Another submittal will occur at the GI milestone, 80% complete.
18. Coordinate and attend the GI Plan review meeting with MDOT and the City.
19. Following the GI, make requested changes to the project documents and then submit for a final review to the City. Make agreed upon modifications, finalize details and submit plans and construction cost estimates to MDOT LAP as required to complete the bid preparation process.
20. Final submittal to MDOT will include one copy of the following:

- a. Project construction plans and specifications
- b. Engineer's Opinion of Probable Construction Cost in .xml format
- c. Copies of quantity calculations, if required.
- d. Final permit approvals
- e. Final ROW documentation, if required

21. Answer questions during the bidding process as requested by MDOT.

SERVICES NOT INCLUDED

1. Traffic Signal Timing Permits (completed under separate contract for CRP signal optimization): To program the traffic signal controllers, the selected consultant for CRP signal optimization will prepare updated signal timing permits. This work includes updating phasing for the addition of left turns, adjusting splits and offsets, and updating pedestrian and vehicle clearance intervals, including walk, flashing don't walk, yellow and all red times. Clearance interval spreadsheets will be prepared along with Synchro models of each intersection for AM, PM and Off-Peak periods. Traffic count data will be collected as part of the CRP signal optimization.
2. Videotaping of the existing storm sewer system.
3. Locating private utilities other than requesting as-built information from private utility owners.
4. Permit fees and any fees associated with permit applications, reviews, bonding or inspections.
5. Environmental Assessment, drainage studies and drainage improvements or wetland delineation, survey, mitigations, and/or permitting related to County drain crossings.
6. Preparation or acquisition of temporary grading permits, permanent rights-of-way or other easements.
7. Tree tagging/identification or tree preservation plan.
8. Remediation plan or removal and replacement of contaminated soils.

D. City's Responsibilities

1. Provide existing water, storm and sanitary sewer information, as available by February 16, 2024.
2. Provide known problems within the project limits from DPW and Engineering Department

records by February 16, 2024.

3. Coordination with the police and fire departments, and Livonia Public Schools.
4. Lead coordination with MDOT's project.
5. Pay any required permit review fees or reimburse the CONSULTANT for permit fees paid to expedite review and approval.
6. Submit permit application information to WCDPS for work on County roads.
7. Host a public information meeting with residents, businesses and institutions, as needed.

SUPPLEMENT B - PROJECT SCHEDULE

CITY OF LIVONIA

NEWBURGH ROAD RECONSTRUCTION AND TRAFFIC SIGNAL REPLACEMENT

ID	Task Name	Start	Finish	Duration	Jan 2024	May 2024	Sep	Jan 2025	May 2025
1	Notice to Proceed	Tue 2/13/24	Tue 2/13/24	0 days	◆ Tue 2/13/24				
2	Preliminary Design Phase	Thu 2/15/24	Thu 7/25/24	113 days					
3	Internal Predesign Meeting	Thu 2/15/24	Thu 2/15/24	1 day	▶				
4	Commence NEPA Investigation	Fri 2/16/24	Fri 2/16/24	1 day	▶				
5	Commence SHPO Investigation	Fri 2/16/24	Fri 2/16/24	1 day	▶				
6	Topographic Survey	Fri 2/23/24	Thu 3/21/24	20 days	▶				
7	Geotechnical Investigation	Fri 4/5/24	Mon 4/22/24	12 days	▶				
8	Field Log of Repairs	Tue 4/23/24	Wed 5/1/24	7 days	▶				
9	Develop 30% Plans	Fri 4/12/24	Thu 5/9/24	20 days	▶				
10	Meet with City	Fri 5/17/24	Fri 5/17/24	1 day	▶				
11	Develop 80% Plans	Mon 5/20/24	Wed 7/10/24	35 days	▶				
12	QA/QC and Revisions of Preliminary Documents	Thu 7/11/24	Wed 7/24/24	10 days	▶				
13	Submit GI plans	Thu 7/25/24	Thu 7/25/24	1 day	▶				
14	Final Design Phase	Fri 8/30/24	Fri 2/7/25	104 days					
15	GI Meeting	Fri 8/30/24	Fri 8/30/24	1 day	▶				
16	Final Design Plans	Tue 9/3/24	Tue 10/1/24	21 days	▶				
17	Permit Submittal (Wayne Co Plymouth Road)	Wed 9/25/24	Wed 9/25/24	1 day	▶				
18	Permit Submittal (MDOT - Ann Arbor Road)	Wed 9/25/24	Wed 9/25/24	1 day	▶				
19	QA/QC and Revisions of Final Documents	Wed 10/2/24	Wed 10/2/24	1 day	▶				
20	Submit Final Plans to City	Thu 10/3/24	Thu 10/3/24	1 day	▶				
21	Final Revisions	Fri 10/4/24	Tue 10/8/24	3 days	▶				
22	Final Submittal to MDOT LAP	Wed 10/9/24	Wed 10/9/24	1 day	▶				
23	MDOT Advertisement Period	Fri 1/3/25	Thu 2/6/25	25 days	▶				
24	MDOT Bid Letting	Fri 2/7/25	Fri 2/7/25	1 day	▶				
25	Construction Phase	Thu 4/17/25	Fri 10/16/26	392 days					
26	Preconstruction Meeting	Thu 4/17/25	Thu 4/17/25	1 day	▶				
27	Road Construction	Mon 7/7/25	Fri 10/16/26	335 days	▶				



Supplement C – Payments to the Consultant

PAYMENTS TO CONSULTANT

CITY OF LIVONIA

NEWBURGH ROAD RECONSTRUCTION AND TRAFFIC SIGNAL REPLACEMENT

The following fees are based on the projected construction budgeted cost of \$3,300,000 and the pavement treatment noted in Supplement A.

Design Phase

The CITY agrees to pay the CONSULTANT on an hourly basis, billed monthly, per the 2024 OHM Rate Schedules at the not-to-exceed amount of Three Hundred Twenty Thousand Dollars and Zero Cents (\$320,000.00).

Construction Phase

Construction Engineering services are not included at this time.

Additional Services

Additional services, if approved by City Council, shall be paid at the current hourly rate schedule or at an agreed upon price between the CITY and CONSULTANT.

PAYMENTS TO THE CONSULTANT
CITY OF LIVONIA
NEWBURGH ROAD RECONSTRUCTION AND
TRAFFIC SIGNAL REPLACEMENT PROJECT
2024 RATE SCHEDULE

Professional Engineer IV / Architect IV / Senior Interior Designer IV	\$200.00
Professional Engineer III / Architect III / Senior Interior Designer III	\$182.00
Professional Engineer II / Architect II / Senior Interior Designer II	\$168.00
Professional Engineer I / Architect I / Senior Interior Designer I	\$156.00
Project Specialist III	\$185.00
Project Specialist II	\$165.00
Project Specialist I	\$135.00
Graduate Engineer IV	\$158.00
Graduate Engineer III	\$150.00
Graduate Engineer II	\$145.00
Graduate Engineer I	\$135.00
Graduate Architect III / Landscape Architect III / Interior Designer III	\$145.00
Graduate Architect II / Landscape Architect II / Interior Designer II	\$128.00
Graduate Architect I / Landscape Architect I / Interior Designer I	\$118.00
Technician IV	\$153.00
Technician III	\$135.00
Technician II	\$120.00
Technician I	\$102.00
Engineering / Architectural / Interior Design Aide	\$80.00
Professional Surveyor III	\$175.00
Professional Surveyor II	\$162.00
Professional Surveyor I	\$146.00
Graduate Surveyor	\$132.00
Surveyor III	\$135.00
Surveyor II	\$120.00
Surveyor I	\$105.00
Surveyor Aide	\$80.00
Planner IV	\$170.00
Planner III	\$153.00
Planner II	\$129.00
Planner I	\$110.00
Planner Aide	\$75.00
Graphic Designer	\$125.00
Administrative Support	\$95.00
Clerical Aide	\$80.00
Principal	\$235.00
Sr. Associate	\$215.00
Associate	\$205.00

Rates as reflected subject to review and adjustment on an annual basis.
2024 Public Rates 23-1227 (MI OH Public)

CAPITAL OUTLAY AND INFRASTRUCTURE COMMITTEE MEETING
WEDNESDAY, APRIL 10, 2024
7:00PM

10.

A Capital Outlay and Infrastructure Committee meeting was held on Wednesday, April 10, 2024, at Livonia City Hall in the City Council Chambers on the 2nd floor.

Committee Members Present: Rob Donovic, Chair
Jim Jolly, Vice Chair
Carrie Budzinski, Member

Committee Members Absent: None

City Council Members Present: Brandon McCullough, Council President
Martha Ptashnik, Council Vice President
Scott Morgan, Councilmember

**City Officials
and Others Present:** Maureen Miller Brosnan, Mayor
Bob Jennison, Fire Chief
Paul Bernier, City Attorney
Mike Slater, Finance Director
Debra Lichtenberg, Finance Director
Mark Taormina, Planning and Economic Dev. Director
Don Rohraff, Director, DPW
Ted Davis, Superintendent of Parks and Recreation
Robb Drzewicki, Governmental Affairs Director

Doug Smith, Plante Moran Real Point
Paul Theriault, Plante Moran Real Point
Rick Erickson, Plane Moran Real Point

Additional Attendees: See attached list

1. CR 02-23 Subject matter of the 2022 Facility Condition Assessment and Space Needs Assessment.

The meeting convened at 7:00pm, led by Committee Chair, Rob Donovic.

This meeting was the first of at least three scheduled committee meetings to discuss this subject matter.

The topic of discussion for the first meeting was the Facility Condition Assessment and Site / Space Program Findings and Recommendations, primarily focusing on the Police Department, City Hall, and Fire Station 1.

Phase 1 was completed in March of 2023, which covered 9 buildings, which were selected due to their potential impact on Livonia Vision 21.

Mayor Brosnan explained the summary from PMRP (Plante Moran Real Point) is in phase 2 of the Facility Condition Assessment and Space Needs, expected to be completed in April 2024.

This summary is a Path Forward to Realizing City Center Development Principles.

Phase 2 covers Assessment and Site / Space Program Findings and Recommendations, conceptual budgets, highest and best uses, and preliminary development strategies.

PMRP recommends building a new Police Station, City Hall, and renovating Fire Station 1.

The budget impact to maintain and update these 9 critical buildings has increased from 96 million to 107 million dollars over the next 10 years.

Noble Library was discussed. This analysis does not recommend further investment in the building, only accounting for \$363,365 for demolition.

The current City Hall building has many issues, PMRP estimates over the next 10 years, operating and maintenance costs will be roughly 8 million dollars and capital improvements roughly 24 million, totaling 32 million dollars, while building a new City Hall is estimated to be 36 million dollars.

The City Hall building was mentioned as being a place for the residents, not just a standard office building with a conference room. A potential new City Hall would have a Council Chambers with a traditional Dias and meeting space to accommodate 200-300 people.

That the Council Chambers be a focal point and place for the residents, the community, and business owners to attend Council meetings and voice their opinions.

City administration has discussed in the past with Livonia Public Schools about a type of joint administration buildings to share and split costs, sharing a common building for administrative staff. LPS did not express interest in doing this, so this isn't an option.

The estimated costs in the packet are future projected prices in 2026, not today.

The cost to maintain the police department over the next 10 years is roughly 6 million with 12 million in capital improvement costs, totaling 18 million. A new police department would cost roughly 42 million dollars as it's an advanced building.

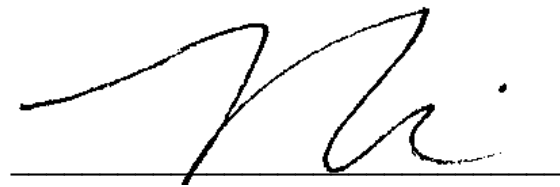
These costs only reflect 10 years into the future, the costs increase the next 10, 20, etc. years.

The next 2 or 3 meetings will be going more in depth into the report and financing structure and the public is welcome to attend.

PMRP provided a comprehensive report that I am asking the administration to enter into the meetings and be made available for the public to see in City Council committee agenda and or minutes.

The meeting concluded at 8:15pm

This meeting will be reported at the Regular Meeting of April 15, 2024.

A handwritten signature in black ink, appearing to read 'Rob', is written over a horizontal line.

Rob Gjonaj Donovic, Chair

CAPTIAL OUTLAY AND INFRASTRUCTURE COMMITTEE MEETING
WEDNESDAY, APRIL 10, 2024, 7:00PM

NAME

DEPT OR CONTACT INFO FOR NOTIFICATIONS*
*PERTAINING TO THE SUBJECT MATTER OF THIS MEETING

Pick Erickson	PMP	248.227.4691
Steve Alexander		2981-9 6587
Mike Slater	Finance	
Debbie Lichtberg	Finance	
Robert Jernison	Fire Chief	
Ted Davis	P+D	



LETTER TO THE LIVONIA CITY COUNCIL

1.

Council Office
February 27, 2024

MEETING DATE

COI040324/COI041024/COI041724/R050624

PREPARED BY

Sara Kasprowicz, Council Office Manager,

AGENDA ITEM

The subject matter of the 2022 Facility Condition Assessment and Space Needs Assessment. (CR 02-23)

BACKGROUND DETAILS

At the Regular Meeting of July 24, 2023, Councilmember McCullough gave a report of the Capital Outlay and Infrastructure Committee Meeting held on July 17, 2023.

At the Regular Meeting of March 13, 2023, Councilmember McCullough gave a report of the Capital Outlay and Infrastructure Committee Meeting held on March 1, 2023.

At the Regular Meeting of January 18, 2023:

On a motion by Councilmember McCullough, supported by Councilmember Donovic and unanimously adopted, it was:

#002-23 RESOLVED, that upon the motion by Councilmember Brandon McCullough, seconded by Councilmember Rob Donovic, at the Regular Meeting held January 18, 2023, the Council does hereby refer the "2022 Facility Condition Assessment and Space Needs Assessment" to the Capital Outlay and Infrastructure Committee for further discussion.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

To discuss updated information as presented.

ATTACHMENTS

1. COI071723 Revised New Data recd 7-17-23
2. COI071723 New Data - Space Needs
3. COI071723 LTC Space Needs and Cap Plan Svcs Report
4. City of Livonia PMC - First Amendment FINAL
5. COI030123 Space Needs Assessment Documents Item 1- New Data
6. COI030123 LTC Space Needs and Cap Plan Svcs Report
7. R011823 Subject matter of Space Needs Assessment to COI CR 02-23
8. S013122 Space Needs Assessment Documents
9. R021622 Approval of engineering svcs for Space Needs Assess and Cap Planning CR 51-22
10. 20221119_COL_FCA and SNA_Preliminary Findings-FINAL
11. 20221119_COL_Facility Condition Assessment-FINAL
12. 20221119_COL_Space Needs Assessment-FINAL

APPROVED BY

DRAFT

February 17, 2024

**Space/Site Program,
Opinion of Probable Cost,
and Milestone Schedule for
City Hall, Police Station, and Fire Station No. 1**

City of Livonia



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Floor Plans, Space and Site Program, Opinion of Probable Cost, and Milestone Schedule:	
▪ City Hall	7
▪ Police Station	33
▪ Fire Station No. 1	47

Assumptions and Clarifications

- Existing square footage was calculated from owner furnished drawings (PDF) and are approximate. PMR did not verify dimensions in field.

DRAFT

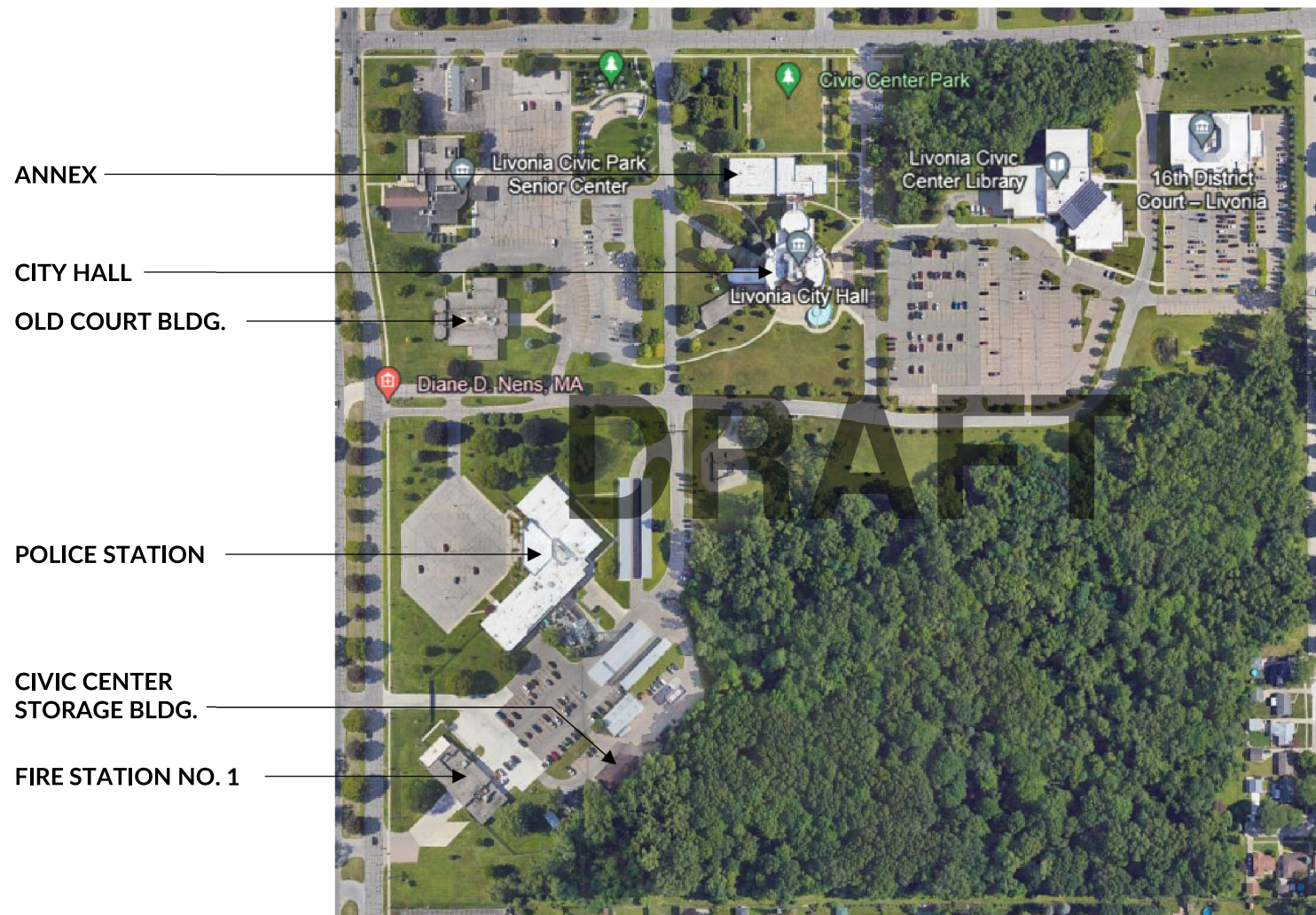
Process

- PMR reviewed owner furnished floor plans to define and document department boundaries
- PMR distributed a space programming survey to key stakeholders to gather information about current staffing/space and projected staffing/space.
- PMR conducted follow up interviews with stakeholders to review and validate survey responses
- PMR toured existing facilities to observe current space types, sizes, adjacencies, and utilization.
- PMR documented existing space deficiencies
- PMR assisted the COL with developing workplace standards, consolidation of centralized operations, and general workplace strategies.
- PMR developed, and reviewed with the owner, a draft Space/Site programs, Opinion of Probable Costs, and Milestone Schedules.
- PMR refined the draft report per owner comments.

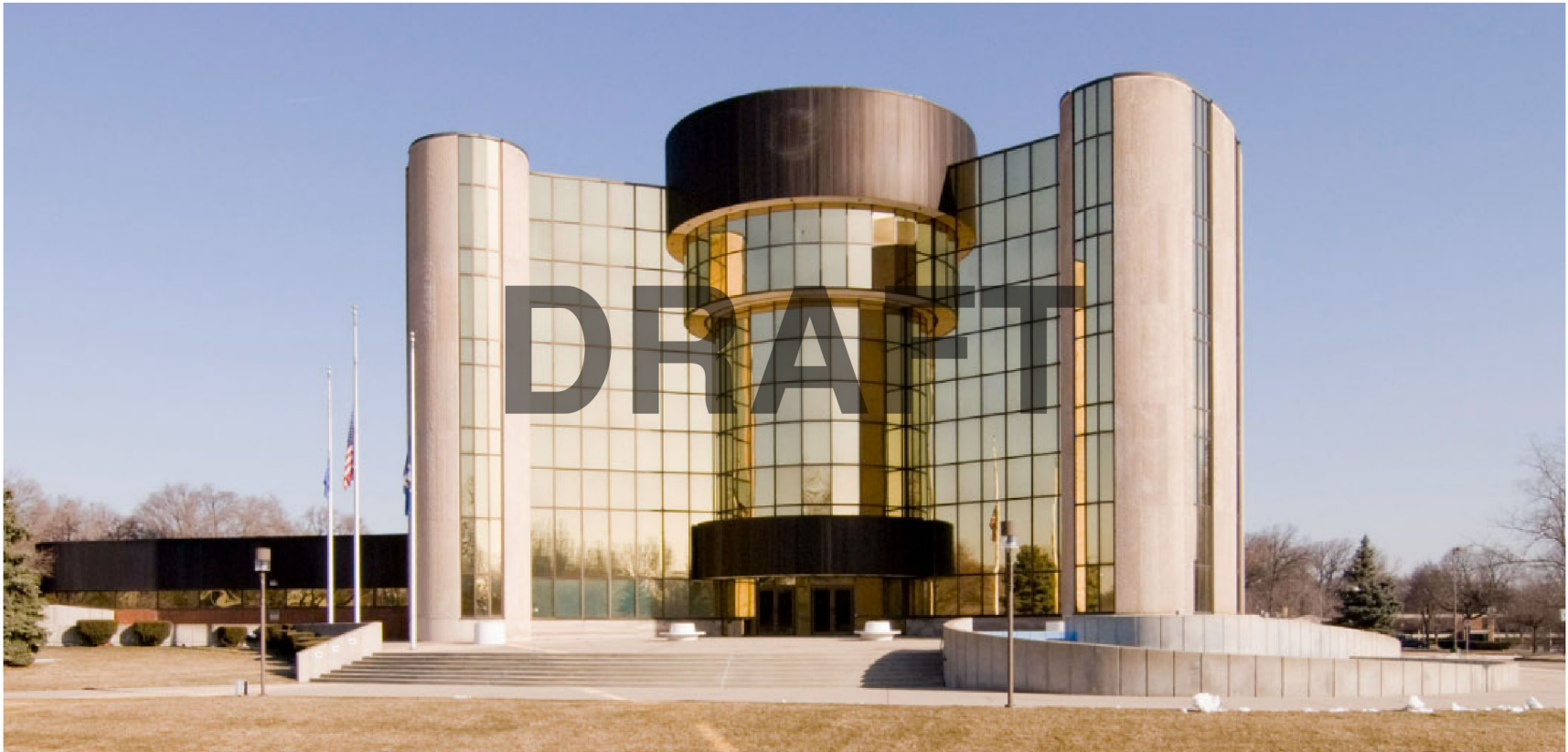
Executive Summary

Building	Gross Square Footage (Existing)	Gross Square Footage (Projected Full Program)	Gross Square Footage (Projected Reduced Program)	Capital Improvement Costs per 2022 Facility Condition Assessment	New Construction Costs (Full Program)	New Construction Costs (Reduced Program)
City Hall + Annex	90,605					
Old Court House (Storage)	1,900 +/-					
Civic Center Storage Facility	1,500 +/-					
Total	94,005	66,200	49,500	\$28.3 M	\$42 M	\$32 M
Police Department	62,410	76,800	63,800	\$13.7 M	\$53M	\$44 M
Fire Station No. 1	14,150	24,900	16,900	\$3.0 M	\$20 M	\$14 M
Total	170,565	167,900	130,200	\$45 M	\$115 M	\$90 M

Campus Map



City Hall

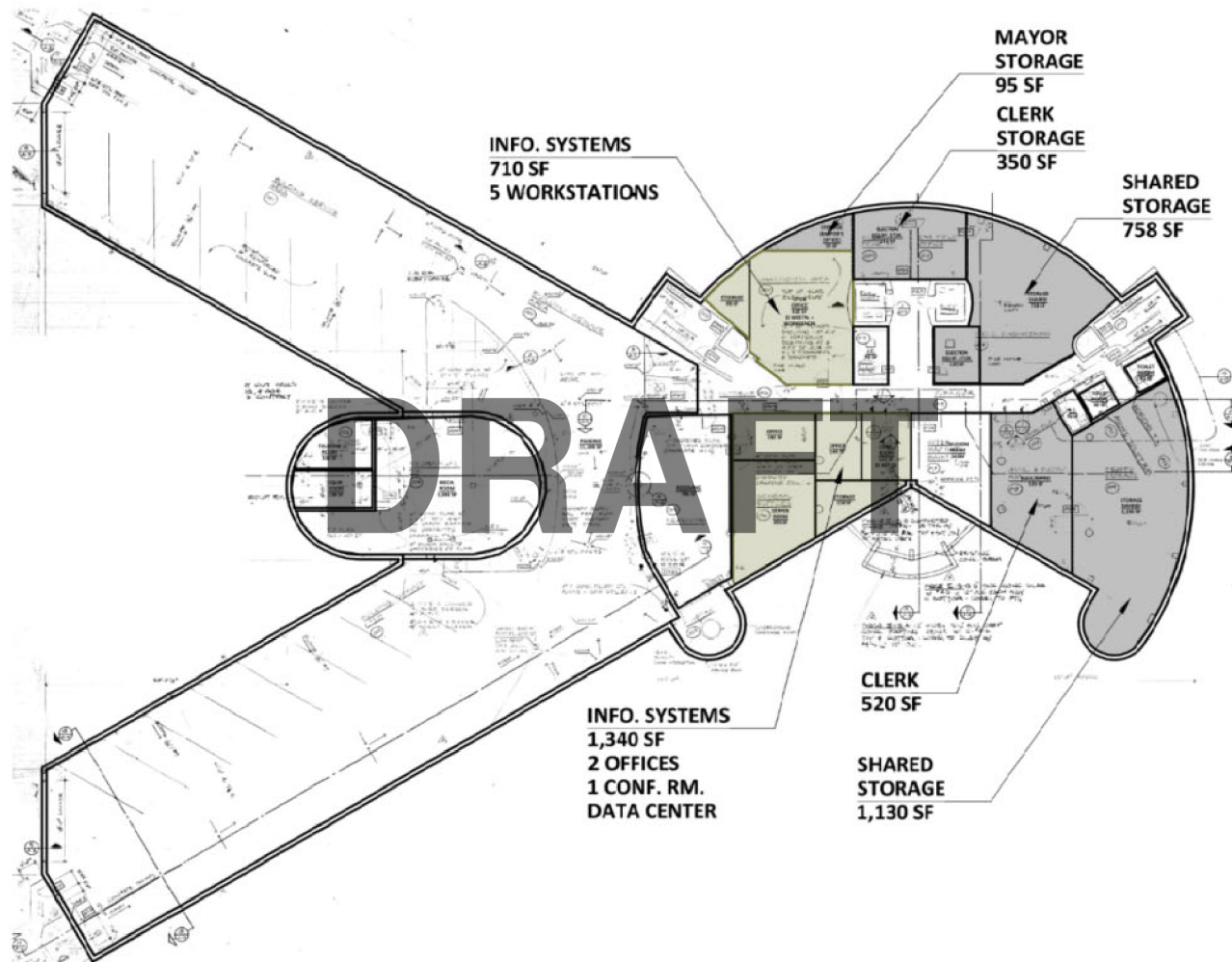


Year Built: 1977 (47 Years Old)

City Hall - Site



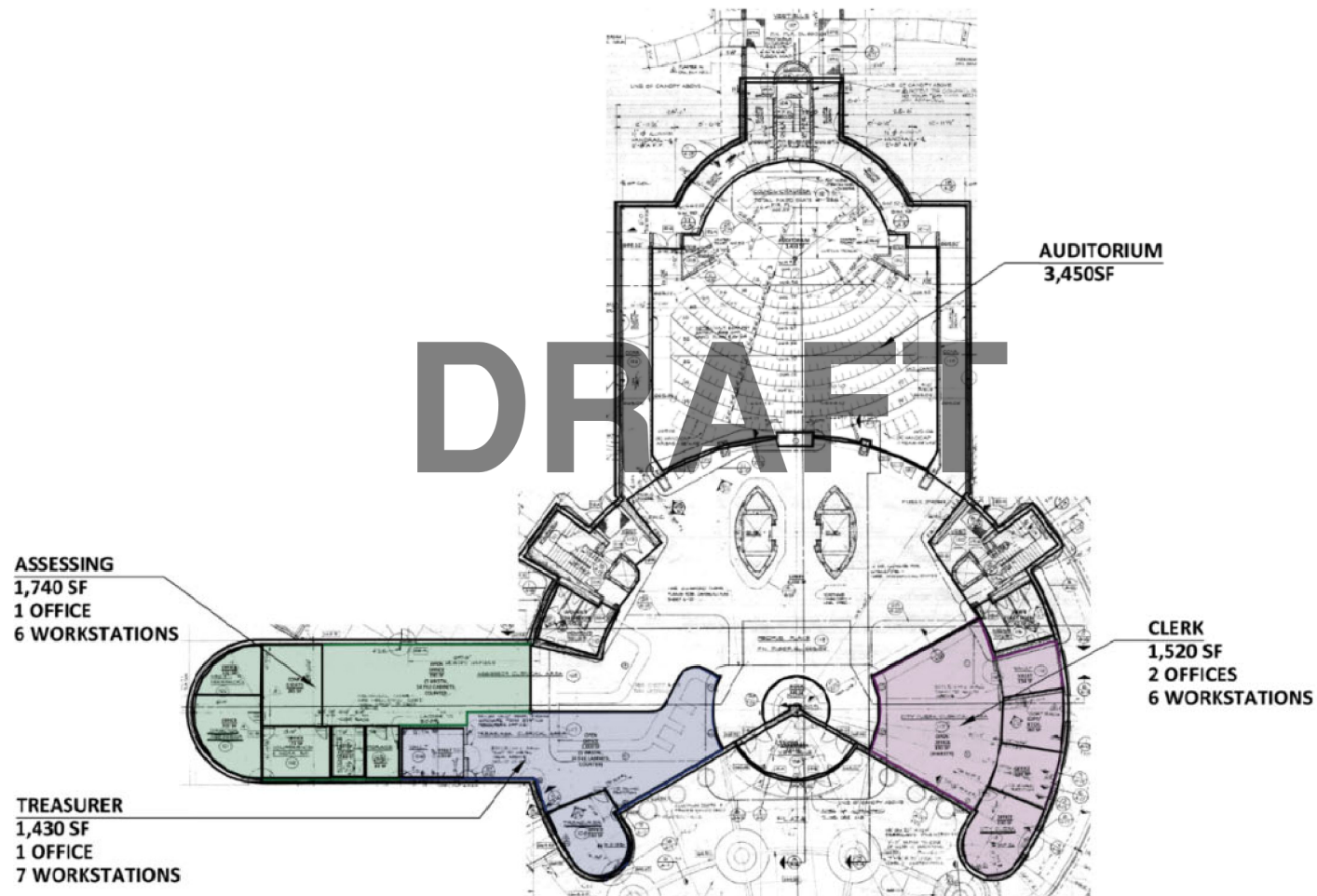
City Hall – Lower Level Floor Plan



CITY OF LIVONIA - CITY HALL - LOWER LEVEL FLOOR PLAN
NOT TO SCALE

21,353 GSF +/-

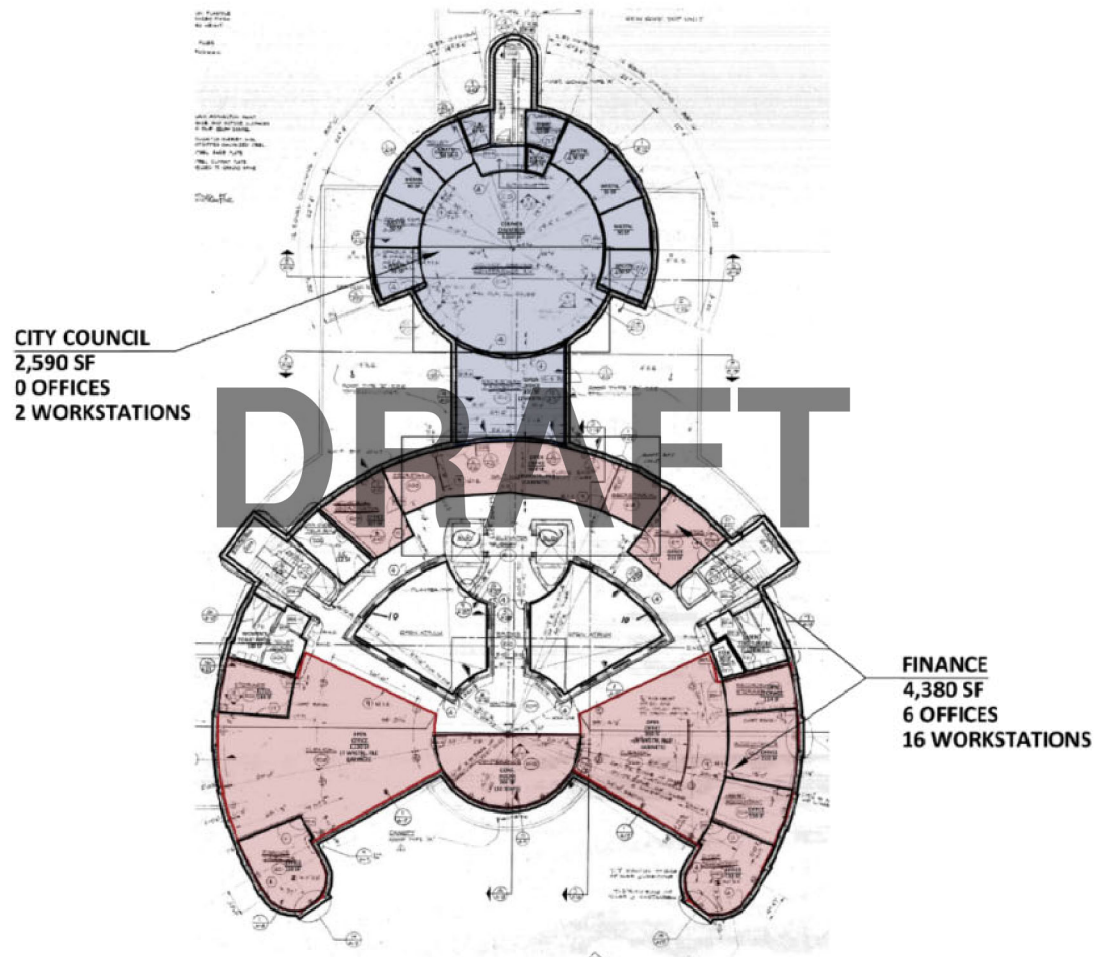
City Hall – Main Level Floor Plan



CITY OF LIVONIA - CITY HALL - MAIN LEVEL FLOOR PLAN
NOT TO SCALE

16,220 GSF +/-

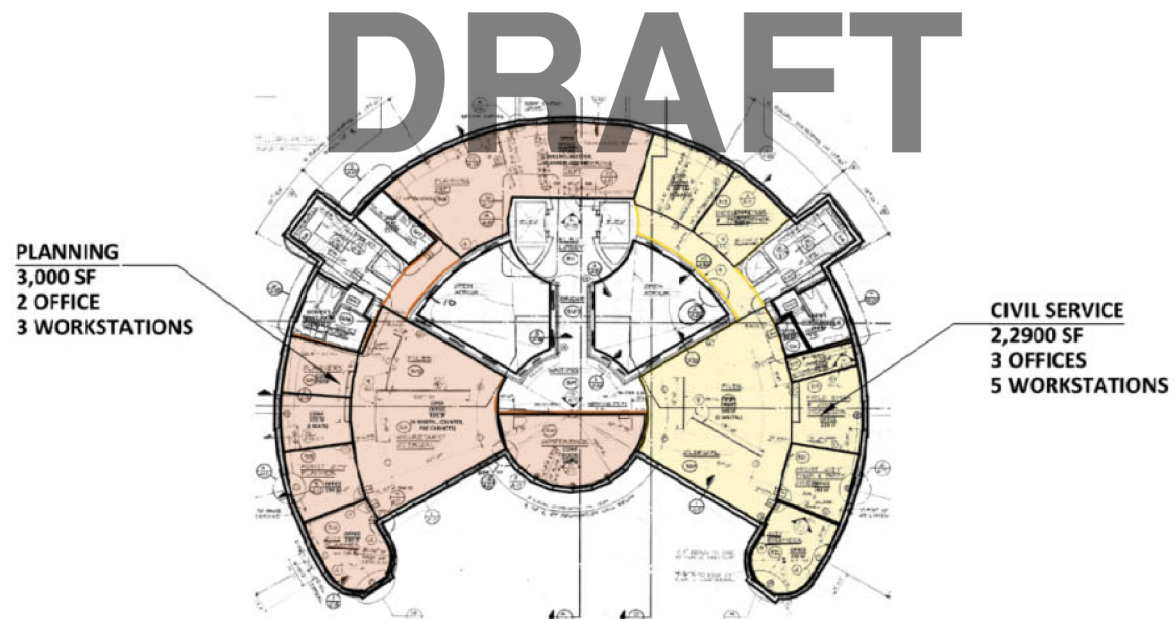
City Hall – Second Level Floor Plan



CITY OF LIVONIA - CITY HALL - SECOND LEVEL FLOOR PLAN
NOT TO SCALE

11,617 GSF +/-

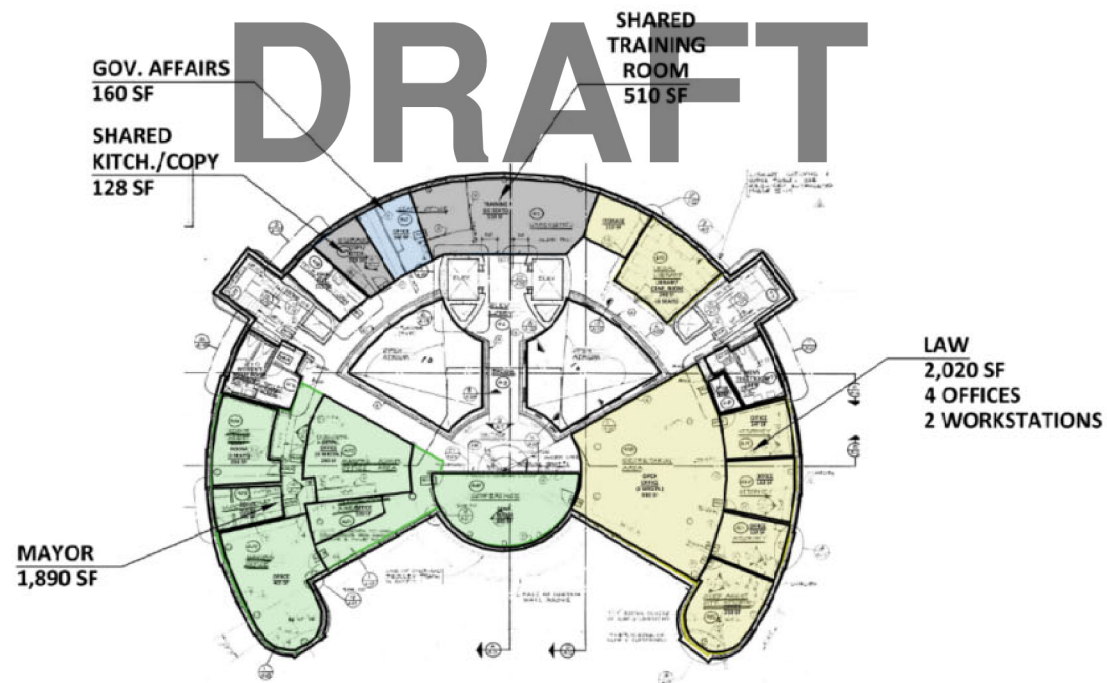
City Hall – Third Level Floor Plan



CITY OF LIVONIA - CITY HALL - THIRD LEVEL FLOOR PLAN
NOT TO SCALE

8,665 GSF +/-

City Hall – Forth Level Floor Plan

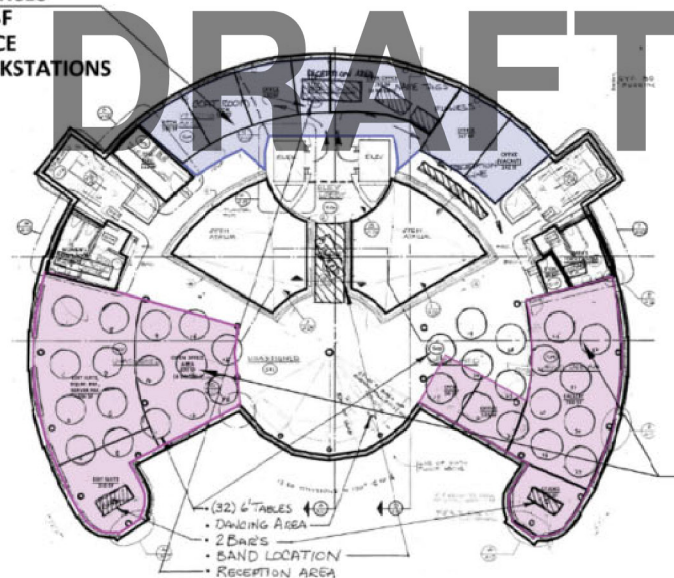


CITY OF LIVONIA - CITY HALL - FORTH LEVEL FLOOR PLAN
NOT TO SCALE

8,665 GSF +/-

City Hall – Fifth Level Floor Plan

**COMMUNITY
RESOURCES**
1,230 SF
3 OFFICE
3 WORKSTATIONS



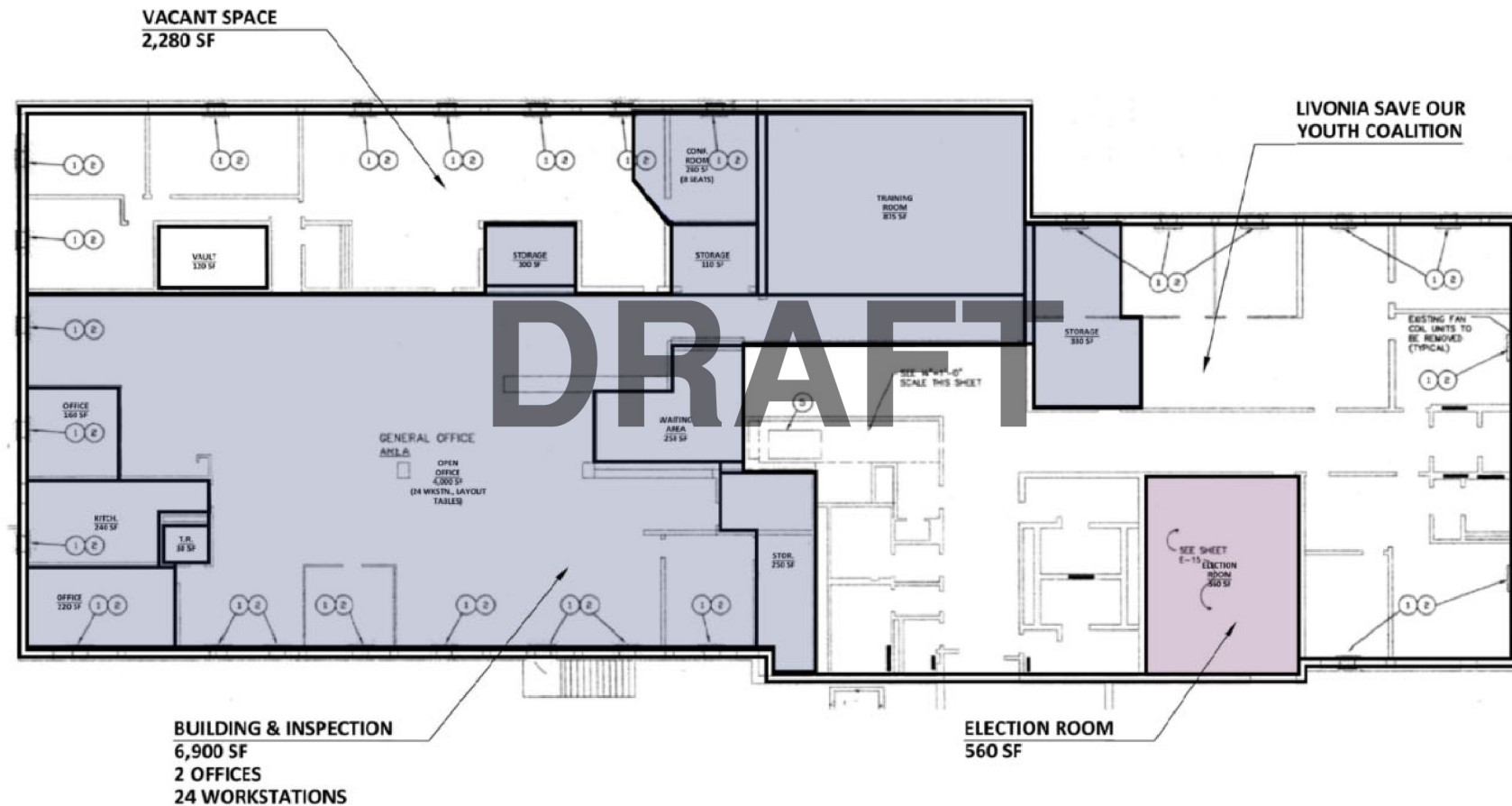
CABLE-LIVONIA TV
2,500 SF
1 OFFICES
5 WORKSTATIONS



CITY OF LIVONIA - CITY HALL - FIFTH LEVEL FLOOR PLAN
NOT TO SCALE

8,865 GSF +/-

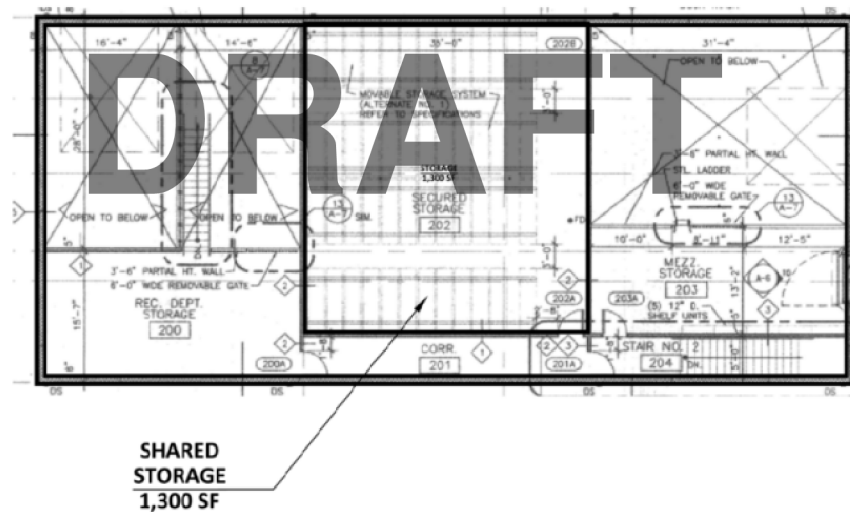
Annex – Main Level Floor Plan



CITY OF LIVONIA - ANNEX - MAIN LEVEL FLOOR PLAN
NOT TO SCALE

14,660 GSF +/-

Civic Center Storage Building – Upper Level Floor Plan



CITY OF LIVONIA - CIVIC CENTER STORAGE BUILDING - SECOND LEVEL FLOOR PLAN
NOT TO SCALE

4,570 GSF +/-

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Assessment Department (Jacob Liberati)											
Office 1	1	1		1	0	230	168	230	168		
Office 2	1	1		1	0	173	168	173	168		
Office 3	1	1		1	0	116	168	116	168		
Workstations	5	6		0	6	64	64	320	384		
Open Office Storage			1			100	100	100	100		
Conference Room (6 seats)			1			245	-	245	-		
Conference Room (12 seats)			1			-	264	-	264		
Copy Room			1			40	-	40	-	included in Support/Common space	
Storage Room			1			82	-	82	-		
Storage Room			1			100	200	100	200	long term storage, needs to remain on-site	
Kitchenette			1			40		40	-	Pantry/Café will be added as Support/Common area	
Subtotal								1,446	1,452		
Secondary Circulation								294	610		
Total	8	9		3	6			1,740	2,062	current space is 1,740 SF	
Cable-Livonia TV (Mike DiFazio)											
Office/Edit Suite 1	1	1		1		124	220	124	220	current Office	
Office/Edit Suite 2	1	1		1		250	220	250	220	current Edit Suite	
Office/Edit Suite 3	0	1		1			220	-	220		
Office/Edit Suite 4	0	1		1			220	-	220		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	0				64	64	64	-		
Workstation 3	1	0				64	64	64	-		
Open Office Storage/Work Space			1			100	100	100	100		
Edit Suite/Equipment Room/Server Room			1			690	-	690	-		
Equipment Room			1			-	200	-	200		
Equipment Storage			-			-		-	-	approx. 600 sf currently in civic center storage building, exact SF to be confirmed. Can remain off site.	
Server Room			1			-	-	-	-	included in Support/Common space	
Sound Booth			1			24	100	24	100	currently in Auditorium	
Studio			1			150	300	150	300	currently part of Gallery	300
Gallery			1			700	-	700	-	to be included as Support/Common space	
Storage Room			1			94	120	94	120		
Subtotal								2,324	1,764		
Secondary Circulation								176	529		
Total	5	5		4	1			2,500	2,293	current space is 2,500 SF (5th floor only)	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
City Clerk (Lori Miller, Doris DeMarco)											
Office 1	1	1		1		230	230	230	230		62
Office 2	1	1		1		156	168	156	168		
Office 3		1		1			120	-	120		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3	1	1			1	64	64	64	64		
Workstation 4	1	1			1	64	64	64	64		
Workstation 5	1	1			1	64	64	64	64		
Workstation 6	1	1			1	64	64	64	64		
Workstation 7		1			1		64	-	64		
Open Office Storage			1			100	225	100	225		
Kitchenette/Copy			1			160		160	-	Pantry/Café will be added as Support/Common area	
Mail/Reprographics Room			1			520	520	520	520	currently in basement	
Vault			1			134	134	134	134		
Counter Space			1			64	64	64	64	Three windows, one is used by Water Dept.	
Conference Room (12 seats)			1				264	-	264		264
Election Equip. Storage			1			470	3,500	470	3,500	currently in basement	1,500
Storage			1			200	200	200	200	currently in basement	200
Storage			1			100	100	100	100	100 SF +/- currently at Greenmead	100
Storage			1			560	1,200	560	1,200	currently in Annex	1,200
Storage			1			1,500	3,000	1,500	3,000	1,500 SF +/- currently in old Courthouse	3,000
Storage			1			200	200	200	200	200 SF +/- currently in civic center storage building	200
Subtotal								4,778	10,373		
Secondary Circulation								292	652		
										current space on first floor = 1,520 SF; storage space in basement, annex, old courthouse, and civic center storage building = approximately 3,550 SF.	
Total	8	10		3	7			5,070	11,025		

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Civil Service/Human Resources (Elizabeth Hallack, Jeannine Laible)											
Office 1	1	1		1		230	168	230	168		
Office 2	1	1		1		220	168	220	168		
Office 3	1	1		1		190	120	190	120		
Office 4 (currently vacant)		1		1		200	120	200	120		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3	1	1			1	64	64	64	64		
Workstation 4	1	1			1	64	64	64	64		
Workstation 5	1	1			1	64	64	64	64		
Workstation 6		1			1	64	64	-	64		
Open Office Storage			1			200	200	200	200		
Conference Room (4 seats)			1			247	170	247	170		
Copy/Work Room			1					-	-	included in Support/Common space	
Storage Room			1			200	200	200	200	currently in basement	
Storage Room			1			-		-	-	approximately 200 SF currently in civic center storage building, can remain off-site	
Kitchenette/Copy			1			70		70	-	Pantry/Café will be added as Support/Common area	
Subtotal								1,877	1,530		
Secondary Circulation								613	643		
Total	8	10		4	6			2,490	2,173	current space on first floor = 2,290 SF; storage space in basement = approximately 200 SF.	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Community Resources and Communications (Kristin Houchins, Chris Jackett)											
Office 1	1	1		1		120	120	120	120		
Office 2	1	1		1		167	120	167	120		
Office 3	0	0		0		142	-	142	-	vacant	
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3						64		64	-	vacant	
Workstation 4						64		64	-	vacant	
Open Office Storage			1			100	100	100	100		
Kitchenette/Storage			1			100		100	-	Pantry/Café will be added as Support/Common area	
Storage			1			120	100	120	100		
Copy/Storage			1			80		80	-	included in Support/Common space	
Subtotal								1,085	568		
Secondary Circulation								145	239		
Total	4	4		2	2			1,230	807	current space is 1,230 SF	
City Council (Sara Kasprovicz, Brandon McCullough)											
Workstation 1	1	1			1	90	49	90	49	in area separate from Council Chambers	
Workstation 2	1	1			1	90	49	90	49	in area separate from Council Chambers	
Workstation 3	1	1			1	90	49	90	49	in area separate from Council Chambers	
Workstation 4	1	1			1	90	49	90	49	in area separate from Council Chambers	
Workstation 5	1	1			1	90	49	90	49	in area separate from Council Chambers	
Workstation 6	1	1			1	90	49	90	49	in area separate from Council Chambers	
Workstation 7	1	1			1	90	49	90	49	in area separate from Council Chambers	
Workstation 8	1	1			1	64	64	64	64	Secretary	
Workstation 9	1	1			1	64	64	64	64	Reception	
Conference Room (20 seats)			1				420	-	420		420
Council Chambers			1			1,250	2,500	1,250	2,500	primary function is to accommodate council and other commission meetings; and replace the meeting function of the existing auditorium	
Pre-function Space/Lobby			1			-	625	-	625		
Toilet Room			1			36	100	36	100		
Storage			1			52	-	52	-		
Coffee/Work Area			1			20	100	20	100		
Subtotal								2,116	4,216		
Secondary Circulation								474	1,771		
Total	9	9		0	9			2,590	5,987	existing space is 2,590 SF	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Economic Development (Mark Taormina)											
Office 1	1	1		1		230	168	230	168		
Office 2	1	1		1		194	120	194	120		
Office 3		1		1			120	-	120		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3	1					64	64	64	-		
Workstation 4						178	64	-	-		
Open Office Storage			1			400	200	500	200		
Storage			1			-		-	-	approximately 100 SF currently in civic center storage building, can remain off-site	
Conference Room (6 seats)			1			155	155	155	155		155
Conference Room (12 seats)			1			360		360	-	included in Support/Common space	
Copy Room			1			150		150	-	included in Support/Common space	
Plotter/Scanner/Copier Area			1			240	240	240	240		
Subtotal								2,021	1,131		
Secondary Circulation								979	475		
Total	5	5		3	2			3,000	1,606	current space is 3,000 SF	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Finance (Connie Kumpula)											
Office 1	1	1		1		230	168	230	168		
Office 2	1	1		1		150	120	150	120		
Office 3	1	1		1		210	120	210	120		
Office 4	1	1		1		210	120	210	120		
Office 5	1	1		1		187	120	187	120		
Office 6	1	1		1		230	168	230	168		
Office 7		1		1		120	120	-	120		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3	1	1			1	64	64	64	64		
Workstation 4	1	1			1	64	64	64	64		
Workstation 5	1	1			1	64	64	64	64		
Workstation 6	1	1			1	64	64	64	64		
Workstation 7	1	1			1	64	64	64	64		
Workstation 8	1	1			1	64	64	64	64		
Workstation 9	1	1			1	64	64	64	64		
Workstation 10	1	1			1	64	64	64	64		
Workstation 11	1	1			1	64	64	64	64		
Workstation 12	1	1			1	64	64	64	64		
Workstation 13	1					64	64	64	-		
Open Office Storage			1			300	300	300	300		100
Copy/Storage			1			114		114	-	included in Support/Common space	
Storage			1			200	200	200	200	currently in basement, exact SF to be confirmed	
Storage			-			-	-	-	-	approximately 200 SF of storage at civic center storage building, can remain off-site	
Kitchenette			1			144		144	-	Pantry/Café will be added as Support/Common area	
Conference Room (10 seats)			1			360		360	-	included in Support/Common space	
Subtotal								3,167	2,204		
Secondary Circulation								1,213	926		
Total	19	19		7	12			4,380	3,130	current space is 4,380 SF (2nd floor only)	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Housing (Jim Inglis)											
Office 1 (Director)	1	1		1		120	120	120	120	currently located at McNamara Tower	
Office 2 (Deputy Director)	1	1		1		120	120	120	120	currently located at McNamara Tower	
Office 3 (Finance Director)	1	1		1		120	120	120	120	currently located at McNamara Tower	
Subtotal								360	360		
Secondary Circulation								162	151		
Total	3	3		3	0			522	511		
Information Systems											
Office 1	1	1		1		144	120	144	120		
Office 2	1	1		1		180	120	180	120		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3	1	1			1	64	64	64	64		
Workstation 4	1	1			1	64	64	64	64		
Workstation 5					1	64	64	-	64	for vendor's	64
Workstation 6		1			1	64	64	-	64	future staff	
Open Office Storage/Lab Area				1		100	100	100	100		
Conference Room (6 seats)				1		152		152	-	included in Support/Common space	
Storage				1		150	150	150	150		
Storage				1		86	86	86	86		
Server Room				1		395		395	-	included in Support/Common space	
Subtotal								1,463	960		
Secondary Circulation								237	403		
Total	6	7		2	6			1,700	1,363	current space is 1,700 sf	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Inspections (Jerome Hanna)											
Office 1	1	1		1		220	168	220	168		
Office 2	1	1		1		160	168	160	168		
Office 3		1		1			120	-	120		
Office 4		1		1			120	-	120		
Workstation 1	1	1			1	100	100	100	100	plan review	
Workstation 2	1	1			1	100	100	100	100	plan review	
Workstation 3	1	1			1	64	64	64	64		
Workstation 4	1	1			1	64	64	64	64		
Workstation 5	1	1			1	64	64	64	64		
Workstation 6	1	1			1	64	64	64	64		
Workstation 7	1	1			1	64	64	64	64		
Workstation 8	1	1			1	64	64	64	64		
Workstation 9 -26	18	18			18	20	20	360	360	benching	
Open Office Storage			1			400	400	400	400		100
Waiting Room/Lobby			1			250	250	250	250		
Storage (drawing)			1			330	330	330	330	drawing storage	330
Vault (office supplies)			1			120	120	120	120	does not need to be secured storage	
Kitchenette			1			240		240	-	Pantry/Café will be added as Support/Common area	
Storage			1			110	110	110	110		
Storage			1			100	-	100	-		
Storage			1			250	250	250	250		
Conference Room (8 seats)			1			240		240	-		
Training Room (30 seats)			1			875	-	875	-	included in Support/Common space	
Subtotal								4,239	2,980		
Secondary Circulation								2,661	1,252		
Total	28	30		4	26			6,900	4,232	current space is 6,900 SF	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Law (Mike Fisher)											
Office 1	1	1		1		230	168	230	168		
Office 2	1	1		1		150	168	150	168		
Office 3	1	1		1		163	168	163	168		
Office 4	1	1		1		147	168	147	168		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3						64		-	-		
Open Office Storage				1		200	200	200	200		
Library/Conference Room (6 seats)				1		240	240	240	240		
Storage				1		110	110	110	110		
Subtotal								1,368	1,350		
Secondary Circulation								632	567		
Total	6	6		4	2			2,000	1,917	current space is 2,000 SF	
Mayor's Office (Dave Varga)											
Office 1	1	1		1	0	405	400	405	400	room for desk and casual seating area	
Office 2	1	1		1	0	100	120	100	120	room for desk and (2) guest chairs	
Workstation 1	1	1		0	1	64	64	64	64		
Workstation 2	1	1		0	1	64	64	64	64		
Workstation 3/Office	1	1		1	0	160	120	160	120	Government Affairs	
Conference Room (6 seats)				1		206	206	206	206		
Conference Room (12 seats)				1		360		360	-	included in common/shared space	
Toilet Room (Mayor's)				1		106	100	106	100		
Copy Room				1		100	100	100	100		
Storage Room				1		100	-	100	-	currently located in basement	
Kitchenette				1		50	50	50	50		
Reception/Waiting Area				1		-	200	-	200		
Subtotal								1,715	1,424		
Secondary Circulation								175	598		
Total	5	5		3	2			1,890	2,022	current space is 1,890 SF (4th floor only)	

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Treasurer's Office (Susan Nash)											
Office 1	1	1		1		230	168	230	168		
Office 2		1		1		64	120	-	120		
Workstation 1	1	1			1	64	64	64	64		
Workstation 2	1	1			1	64	64	64	64		
Workstation 3	1	1			1	64	64	64	64		
Workstation 4	1	1			1	64	64	64	64		
Workstation 5	1	1			1	64	64	64	64		
Workstation 6	1	1			1	64	64	64	64		
Workstation 7	1					64	-	64	-		
Open Office Storage			1			200	200	200	200	consider adding a drive-thru window	200
Vault			1			150	150	150	150		
Storage			1			-	-	-	-	approximately 200 SF in civic center storage building, can remain off-site	
Storage			1			200	200	200	200	currently in city hall basement	
Walk-up payment area			1			100	150	100	150		
Subtotal								1,328	1,372		
Secondary Circulation								102	576		
Total	8	8		2	6			1,430	1,948	current space is 1,430 SF (1st floor only)	
Total - Office Area	122	130		44	87			35,442	41,075		

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support/Common Area											
Phone Room			4				64	-	256		256
Huddle Room			4				120	-	480		480
Open Collaboration Area			6				100	-	600		600
Wellness Room			2				120	-	240		
Pantry			2				200	-	400		400
Café			1				500	-	500	centrally located	
Gallery/Training (50 seats)			1				1,400	-	1,400	requested by City Clerk, can be divided into (2) 700 SF Conference Rooms (accommodates current Gallery function)	
Conference Room (16 seats)			1				364	-	364		
Conference Room (12 seats)			2				264	-	528		264
Copy/Work Room			4				200	-	800		
Server Room			1				200	-	200		
Telecom Room			1				340	-	340	currently on lower level, combine w/ Server Room	
Telecom Room			1				140	-	140	currently on lower level	
Equipment Room			1				138	-	138	currently on lower level	
Mechanical Room			1				1,086	-	1,086	currently on lower level	
Receiving			1				706	-	706	currently on lower level	
Parking			1				11,100	-	11,100	currently on lower level	
J.C.			1				90	-	90	currently on lower level	
J.C.			1				45	-	45	currently on lower level	
Toilet Room			1				40	-	40	currently on lower level	
Toilet Room			1				42	-	42	currently on lower level	
Auditorium and Control Room			1				3,450	-	3,450	currently on first floor, not included in future program	
Control Room			1				450	-	450	currently on first floor	
Kiosk			1				105	-	105	currently on first floor	
Lobby/Counter Space			1				4,000	-	4,000	currently on first floor	
Men's Toilet Room			1				162	-	162	currently on first floor	
Women's Toilet Room			1				162	-	162	currently on first floor	
Vacant Space			1				2,280	-	2,280	currently in Annex	
Livonia Save our Youth			1				4,360	-	4,360	currently in Annex, confirm if this space is required	
Coalition/Common/Support Space											

City Hall – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support/Common Area											
Men's Toilet Room			1			134	134	134	134	currently on second floor	
Women's Toilet Room			1			180	180	180	180	currently on second floor	
Storage			1			30	-	30	-	currently on second floor	
J.C.			1			112	100	112	100	currently on second floor	
Men's Toilet Room			1			134	134	134	134	currently on third floor	
Women's Toilet Room			1			180	180	180	180	currently on third floor	
Storage			1			30	-	30	-	currently on third floor	
Tele./Elec.			1			112	112	112	112	currently on third floor	
Men's Toilet Room			1			134	134	134	134	currently on fourth floor	
Women's Toilet Room			1			180	180	180	180	currently on fourth floor	
Training Room			1			510	-	510	-	currently on fourth floor	
Copy/Kitchenette			1			128	-	128	-	currently on fourth floor	
Storage			1			30	-	30	-	currently on fourth floor	
Tele./Elec.			1			112	112	112	112	currently on fourth floor	
Men's Toilet Room			1			134	134	134	134	currently on fifth floor	
Women's Toilet Room			1			180	180	180	180	currently on fifth floor	
Storage			1			30	-	30	-	currently on fifth floor	
Tele./Elec.			1			112	-	112	-	currently on fifth floor	
Subtotal								31,158	11,605		10,195
Secondary Circulation								12,190	4,874		4,282
Total - Support/Common Area								43,348	16,479		14,477
Grand Total	122	130		44	87			80,790	57,554		

Gross-Up Factor 15%

12,119 8,633

2,172

Grand Total - All Areas

92,909 66,187

16,648

City Hall – Space Program

Current GSF

Existing Square Footage (City Hall)		NSF	GSF
Lower Level		20,370	21,353
First Floor		15,480	16,220
Second Floor		10,075	11,617
Third Floor		7,328	8,665
Forth Floor		7,328	8,665
Fifth Floor		7,525	8,865
Total		68,106	75,385
Existing Square Footage (Annex)		NSF	GSF
Annex		14,100	15,220
Total		14,100	15,220
Existing Square Footage (City Hall + Annex)		82,206	90,605
Projected Reduced Program GSF for New City Hall			49,539

includes 560 SF of basement

City Hall – Site Program

Site Areas		Square Feet	
Building Footprint			
	City Hall		66,187
			-
	Total		66,187
Building Support Areas			
Parking		Qty.	Area
	Staff	130	350
	Visitor	50	350
	Subtotal	180	700
	Current	181	approximately
Docks		-	-
Fenced Outdoor Storage		-	-
Generator		1	200
	Subtotal		200
	Total		129,387
Retention Area			<u>20,000</u>
			149,387
Circulation, Setbacks, Greenbelts, etc.			<u>59,755</u>
	Total		209,142
		rounded	5.0 Acres

City Hall – Opinion of Probable Cost

Professional Services			\$	3,829,707
Regulatory		0.03%	\$	7,283
Construction			\$	29,130,862
Furniture + Fixtures	\$	55.00	\$	1,820,143
Owner Equipment		allowance	\$	15,000
Technology	\$	30.00	\$	1,985,611
Subtotal			\$	36,788,606
Contingency		10%	\$	2,913,086
Escalation		8%	\$	2,330,469

Total Project Cost			\$	42,032,161
	Hard Costs	69.31%	\$	29,130,862
	Soft Costs	30.69%	\$	12,901,299
Total Project Cost (Potential Reductions)			\$	31,459,551

Assumptions/Clarifications:

1. Excludes computers, monitors, keyboards, printers, etc.
2. Assumes abatement is not required
3. Excludes kitchen equipment
4. Excludes exercise equipment
5. Assumes site utilities are in place and have adequate capacity
6. Assumes building will be constructed of durable and readily available materials, as used in construction of similar facilities.
7. Furniture budget includes offices, workstations, café, open collaboration, and conference rooms.
8. Assumes EGLE permitting, wetland boundary survey, and traffic study are not required.
9. Construction budget includes site work; demo of existing city hall building; and construction of new city hall building.

City Hall – Milestone Schedule

Professional Services Procurement =	4	Months
Design Phase =	9	Months
Construction Phase =	18	Months
Close Out =	3	Months
Schedule Contingency =	2	Months
Total Project Duration =	36	Months

Assumptions:

1. The City of Livonia will make timely decisions and provide timely approvals in order to maintain the project schedule.

Police Department



Year Built: Original building = 1961 (62 Years Old), Addition = 1986 (37 Years Old)

Police Department – Site

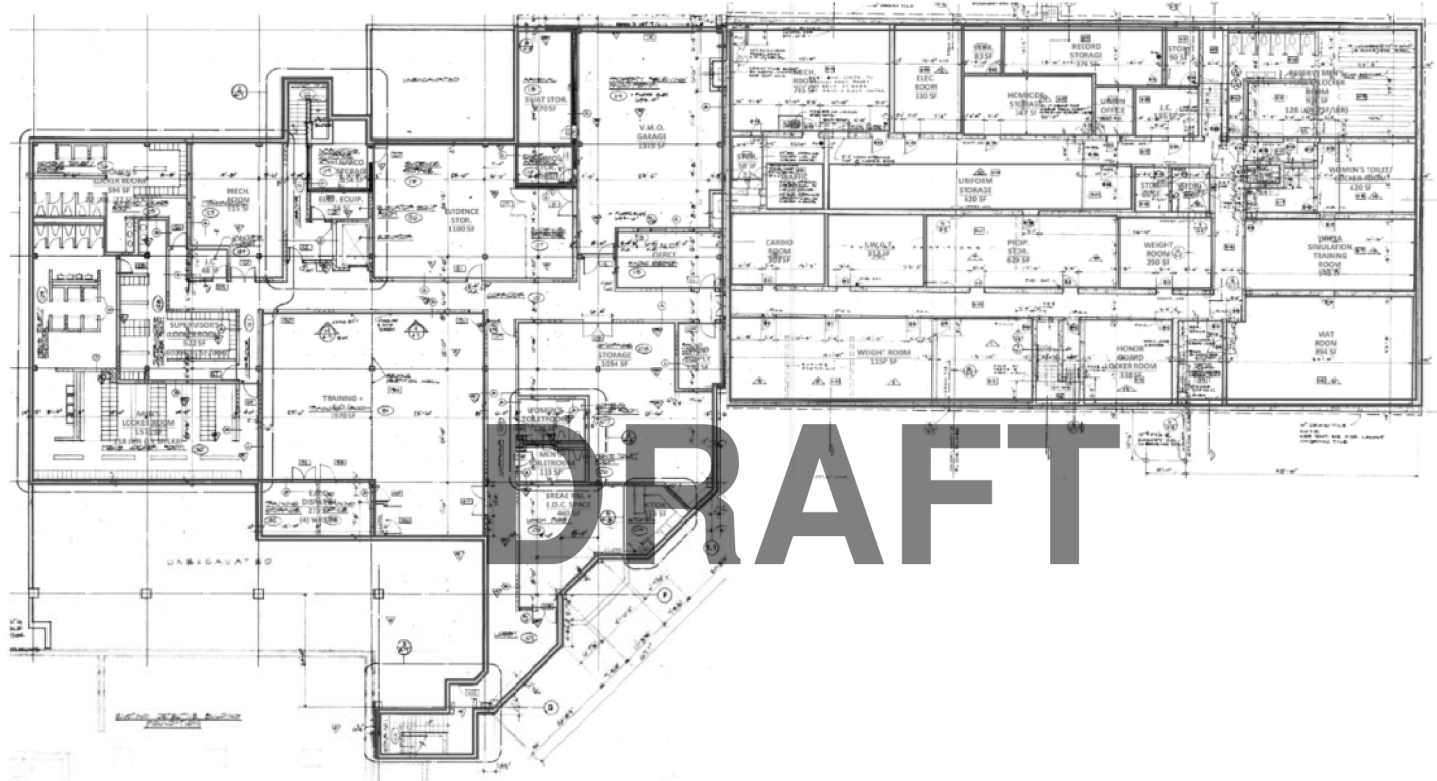


CITY OF LIVONIA - POLICE STATION - SITE

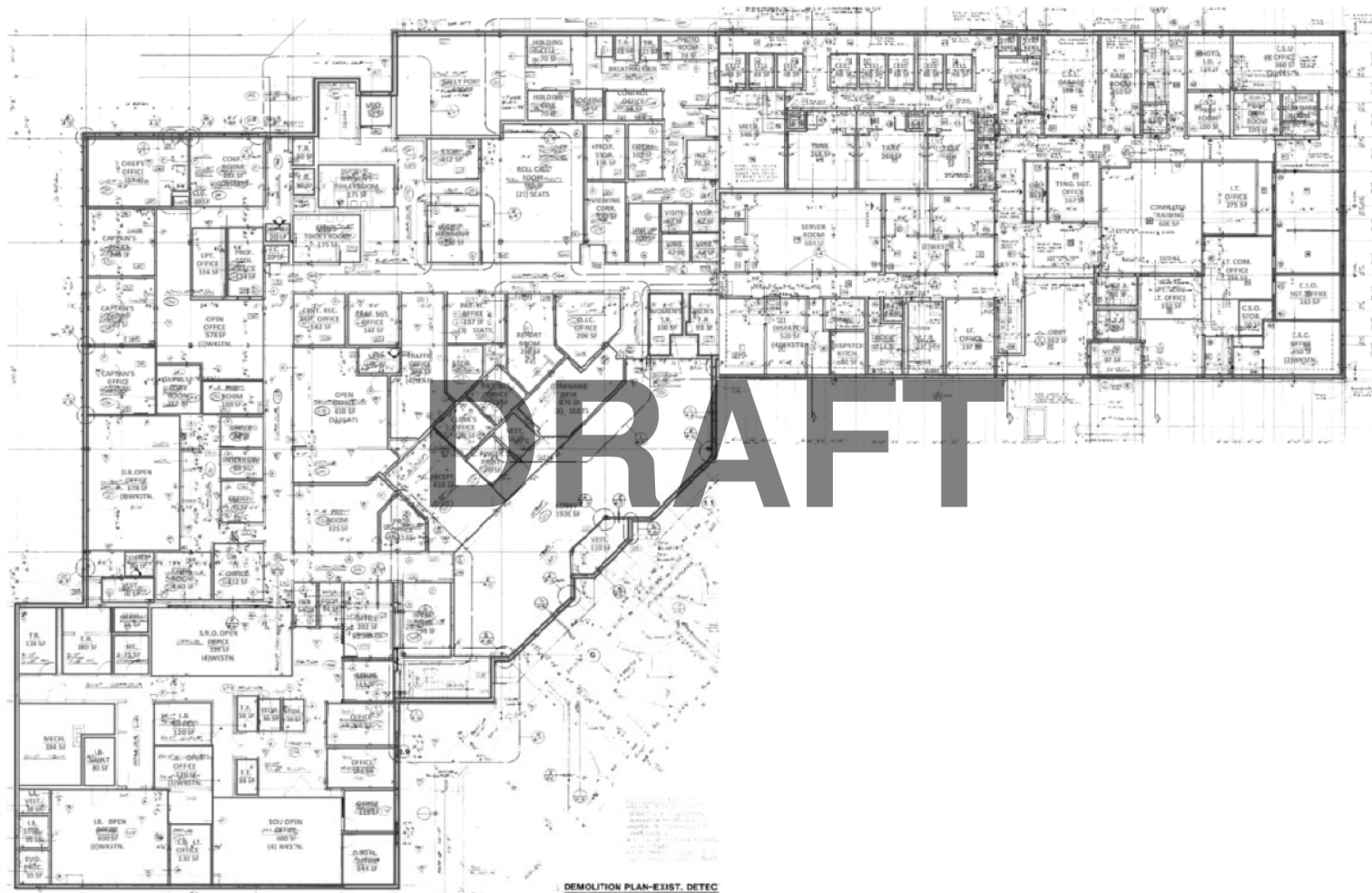
NOT TO SCALE

1/4/24

Police Department – Lower Level Floor Plan



Police Department – Mail Level Floor Plan



CITY OF LIVONIA - POLICE STATION - FIRST FLOOR PLAN

NOT TO SCALE

36,034 GSF +/-

Police Department – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Lower Level											
E.O.C. Dispatch (shared office)	4	4			4	275	330	275	330	includes open office storage and circulation	
Union Office	1	1		1		82	100	82	100		
V.M.O. Office	1	1			1	268	268	268	268		
Upper Level (West Side)											
Captain's Office	1	1		1		246	250	246	250		
Captain's Office	1	1		1		124	250	124	250		
Captain's Office	1	1		1		243	250	243	250		
Captain's Office	1	1		1		250	250	250	250		
Central Records Supervisor's Office	1	1		1		142	120	142	120		
Chief's Office	1	1		1		357	430	357	430	includes private toilet room and closet	
Clerk's Office	1	1		1		100	100	100	100		
Command Desk	3	3			3	276	276	276	276	includes open office storage and circulation	
Control Office	4	4			4	90	130	90	130	includes circulation	
Detective Bureau Open Office	8	10			10	678	900	678	900	includes open office storage and circulation	
Intelligence Bureau Office	1	1		1		120	168	120	168		
Intelligence Bureau LT. Office	1	1		1		132	168	132	168		
Intelligence Bureau Open Office	3	3			3	220	250	220	250	includes open office storage and circulation	
Intelligence Bureau Open Office	8	6			6	600	400	600	400	includes open office storage and circulation	
Investigative Desk	2	2			2	196	196	196	196		
Lieutenant Office	1	1		1		152	168	152	168		
O.I.C. Office	1	1		1		200	168	200	168		
Office	1	1				68		68	-		
Office	1	1		1		95	120	95	120		
Office	2	2			2	202	250	202	250	includes open office storage and circulation	
Office	1	1		1		111	120	111	120		
Office	1	1		1		156	120	156	120		
Office	1	1		1		146	120	146	120		
Office	1	1		1		113	120	113	120		
Office	1	1		1		144	120	144	120		
Open Office	5	5			5	650	600	650	600	includes open office storage and circulation	
Prof. Stds. Lieutenant Office	1	1		1		124	120	124	120		
Patrol Lieutenant Office	3	3		1		157	-	157	-		
Patrol Lieutenant Office		1		1			100	-	100		
Patrol Lieutenant Office		1		1			100	-	100		

Police Department – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Patrol Lieutenant Office		1		1			100	-	100		
Patrol Sergeant Office	1	1		1		102	168	102	168		
Prop. Office	2	2		2		112	120	112	120		
Reception	2	2			2	410	410	410	410	includes file and copy area	
S.R.O. Office	4	4			4	520	450	520	450	includes open office storage and circulation	
SOU Open Office	4	6			6	600	400	600	400	includes open office storage and circulation	
Traffic Office	4	4			4	364	364	364	364	includes open office storage and circulation	
Traffic Sergeant Office	1	1		1		142	120	142	120		
Upper Level (East Side)											
C.S.O. Office	2	2			2	350	400	350	400	includes open office storage and circulation	
C.S.O. Sergeant Office	1	1		1		160	120	160	120		
C.S.U. Office	3	3			3	860	860	860	860	includes open office storage and circulation	
Dispatch	4	4			4	520	520	520	520	includes open office storage and circulation	
Information Technology	2	2			2	465	450	465	450	includes open office storage and circulation	
IT Training Office	2	2			2	275	275	275	275	includes open office storage and circulation	
E.P.D. Office	1	1		1		234	168	234	168		
Lieutenant Office	1	1		1		197	120	197	120		
Support Serv. LT. Office	1	1		1		150	168	150	168		
Training Sergeant Office	1	1		1		167	120	167	120		
Subtotal								12,345	12,395		
Secondary Circulation								972	1,662		
Total	99	104		32	69			13,317	14,057		
Total - Office Area											740

Police Department – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support/Common Area											
Lower Level (West Side)											
Break Room and E.O.C. Space			1			460		460	-	Café/Pantry will be added	
E.O.C.			1			-	1,000	-	1,000	30 seats, round table layout, equip. stor.	1,000
Elevator Equipment Room			1			74	74	74	74		
Evidence Storage			1			1,100	1,100	1,100	1,100		
Janitor's Closet			1			48	48	48	48		
Kitchen			1			153	-	153	-	Café/Pantry will be added	
Mechanical Room			1			515	515	515	515		
Men's Toilet Room			1			113	113	113	113		
Men's Toilet/Locker Room			1			1,573	2,600	1,573	2,600		
Narcotics Storage			1			154	-	154	-	Included in Evidence Storage	
Radio Supply			1			130	130	130	130		
S.W.O.T. Storage			1			270	270	270	270		
Storage (Ammo)			1			100	100	100	100		
Storage (Supplies)			1			1,054	1,054	1,054	1,054		
Supervisor's Locker Room (Male)			1			522	800	522	800		
Supervisor's Locker Room (Female)			1			-	200	-	200		
Training			1			-	2,500	-	2,500	100 seats, classroom layout; adjacent to EOC w/ operable partition	1,000
Training and E.O.C.			1			1,970	-	1,970	-		
V.M.O. Garage			1			1,335	1,600	1,335	1,600		265
Women's Toilet Room			1			126	126	126	126		
Women's Toilet/Locker Room			1			594	500	594	500		
Lower Level (East Side)											
Cardio Room			1			303	-	303	-	combine with Weight Room	
Electrical Room			1			330	330	330	330		
Homicide Storage			1			347	347	347	347		
Honor Guard Locker Room			1			338	338	338	338		
Janitor's Closet			1			135	100	135	100		
Janitor's Closet			1			26		26	-		
Mat Room			1			894	894	894	894		
Storage			1			172	250	172	250		
Mechanical Room			1			765	765	765	765		

Police Department – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support/Common Area											
Property Storage			1			620	740	620	740		
Record Storage			1			374	-	374	-		
Reserve Men's Toilet/Locker Room			1			920	640	920	640		
S.W.O.T. Locker Room			1			312	500	312	500		
Storage (Traffic)			1			118	118	118	118		
Storage			1			83	-	83	-		
Storage			1			58	-	58	-		
Storage			1			66	-	66	-		
Storage			1			77	150	77	150		
Storage			1			90	-	90	-		
Reserve Women's Toilet/Locker Room			1			420	260	420	260		
Uniform Storage			1			620	620	620	620		
Virtra Simulation Training Room			1			546	1,500	546	1,500	can this be combined with other Training/EOC?	500
Weight Room			1			290	-	290	-		
Weight Room			1			1,157	2,500	1,157	2,500		500
Upper Level (West Side)											
Booking			1			50	50	50	50		
Breathalyzer			1			20	20	20	20		
Closet			1			10	10	10	10		
Coffee			1			20		20	-	Café/Pantry will be added	
Coffee			1			30		30	-	Café/Pantry will be added	
Conference Room (O.I.C.)			1			-	170	-	170	8 seats required	
Conference Room			1			140	170	140	170	8 seats required	
Conference Room			1			288	288	288	288	12 seats required	
Equipment Handout			1			160	400	160	400		
Evidence Processing			1			55	55	55	55		
File Room			1			108	110	108	110		
File Room			1			325	250	325	250		
Fingerprinting			1			70	70	70	70		
Holding Cell			2			70	70	140	140		
Intelligence Bureau Storage			1			52	52	52	52		
Intelligence Bureau Vault			1			80	80	80	80		
Intelligence Bureau Vestibule			1			38	38	38	38	excluded from circulation factor	

Police Department – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support/Common Area											
Interview Room			1			68	80	68	80		
Interview Room			1			73	80	73	80		
Interview Room			1			54	80	54	80		
Interview Room			1			70	-	70	-		
Janitor's Closet			1			20	20	20	20		
Kitchenette			1			102	120	102	120		
Line Up			1			100	100	100	100		
Lobby			1			1,920	500	1,920	500	excluded from circulation factor	
Mechanical			1			334	334	334	334		
Photo Room			1			78	78	78	78		
Report Writing Room			1			230	330	230	330		
Roll Call Room (21 seats)			1			750	950	750	950	36 seats required	
Sally Port			1			680	780	680	780	needs to be 26' deep min.	
Storage			1			46	46	46	46		
Storage			1			54	54	54	54		
Storage			2			36	36	72	72		
Storage			1			112	-	112	-		
Storage (Property)			1			118	118	118	118		
Storage (Traffic)			1			90	150	90	150		
Supply Room			1			112	120	112	120		
Toilet Room			1			30	30	30	30		
Toilet Room			1			30	30	30	30		
Toilet Room			1			134	134	134	134		
Toilet Room			1			180	180	180	180		
Toilet Room			2			38	38	76	76		
Toilet Room			2			25	25	50	50		
Toilet Room (Men's)			1			175	175	175	175		
Toilet Room (Men's)			1			93	93	93	93		
Toilet Room (Women's)			1			175	175	175	175		
Toilet Room (Women's)			1			100	100	100	100		
Vestibule			1			50	50	50	50	excluded from circulation factor	
Vestibule			1			70	70	70	70	excluded from circulation factor	
Vestibule			1			58	58	58	58	excluded from circulation factor	
Vestibule			1			56	56	56	56	excluded from circulation factor	
Vestibule			1			110	110	110	110	excluded from circulation factor	

Police Department – Space Program

FUNCTION	FTE 2023	FTE 2028	LPS	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support/Common Area											
Viewing Corridor			1			150	150	150	150	excluded from circulation factor	
Visit			4			42	42	168	168		
Upper Level (East Side)											
ARS			1			24	24	24	24		
C.S.O. Storage			1			50	50	50	50		
C.S.U. Garage			1			300	600	300	600	additional bay requested	300
C.S.U. Prop Room			1			100	100	100	100		
Cell			10			384	480	384	480	(7) male, (3) female	
Computer Training			1			600	600	600	600	20 seats required (classroom layout)	
Dispatch Kitchenette			1			80	100	80	100		
Film Dark Room			1			80	-	80	-		
Interview			1			17	-	17	-		
Janitor's Closet			1			23	-	23	-		
Janitor's Closet			1			37	-	37	-		
Lobby			1			382	-	382	-		
Mechanical			1			346	346	346	346		
Photo I.D.			1			128	128	128	128		
Print Dark Room			1			105	-	105	-		
Radio Room			1			210	210	210	210		
Server Room			1			684	300	684	300		
Shower			2			16	16	32	32		
Storage			2			24	-	48	-		
Storage			1			150	-	150	-		
Storage			1			70	-	70	-		
Tank			1			268	268	268	268		
Tank			1			268	268	268	268		
Tank			1			200	-	200	-		
Toilet Room (Men's)			1			137	137	137	137		
Toilet Room (Men's)			1			62	62	62	62		
Toilet Room (Women's)			1			113	113	113	113		
Toilet Room (Women's)			1			62	62	62	62		
Vestibule			1			97	-	97	-		
Visit			1			20	20	20	20		
Digital Evidence Lab			1				450	-	450		450

Police Department – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support/Common Area											
Conference Room (6 seats)			1				170	-	170		
Community Room			1				1,000	-	1,000	for press conf., meetings, etc.; off main lobby; 30 seats	1,000
Café/Pantry			1				1,500	-	1,500		500
Gun Range			1				3,150	-	3,150		3,150
Wellness Room			2				120	-	240		
Subtotal								32,803	40,812		8,665
Secondary Circulation								8,125	11,934		2,600
Total - Support/Common Area								40,928	52,746		11,265
Grand Total	99	104		32	69			54,245	66,803		

Gross-Up Factor	15%		8,137	10,020		1,690
Grand Total - All Areas			62,382	76,823	14,442	12,954
Current GSF			62,410			
Reduce GSF				63,869		

DRAFT

Police Department – Space Program

Site Areas		Square Feet		
Building Footprint				
	Police Station			76,823
				-
	Total			76,823
Building Support Areas				
Parking		Qty.	Area	
	Staff Parking	154	350	53,900
	Visitor Parking	88	350	30,800
	Parking Expansion	-	-	-
	Total	242	700	84,700
Communications Tower		1	5,500	
Fuel Station		1	1,500	
Generator		1	200	
Storage/Maintenance Building (existing)		1	3,600	
	Subtotal			10,800
	Total			172,323
Retention Area				<u>20,000</u>
				192,323
Circulation, Setbacks, Greenbelts, etc.				<u>76,929</u>
	Total			269,253
		rounded		7.0 Acres

Note: A secured, climate controlled structure was requested for 140 patrol and special response vehicles, which is not reflected in the space program or conceptual budget.

Police Department – Opinion of Probable Cost

Professional Services			\$	4,873,399
Regulatory		0.03%	\$	9,514
Construction			\$	38,057,153
Furniture + Fixtures	\$	55.00	\$	1,056,322
Owner Equipment		allowance	\$	25,000
Technology	\$	30.00	\$	2,304,704
Subtotal			\$	46,326,091
Contingency		10%	\$	3,805,715
Escalation		8%	\$	3,044,572

Total Project Cost			\$	53,176,379
	Hard Costs	71.57%	\$	38,057,153
	Soft Costs	28.43%	\$	15,119,226
Total Project Cost (Potential Reductions)			\$	44,209,636

Assumptions/Clarifications:

1. Excludes computers, monitors, keyboards, printers, etc.
2. Assumes abatement is not required
3. Excludes kitchen equipment
4. Excludes exercise equipment
5. Assumes site utilities are in place and have adequate capacity
6. Assumes building will be constructed of durable and readily available materials, as used in construction of similar facilities.
7. Furniture budget includes offices, workstations, café, open collaboration, and conference rooms.
8. Assumes EGLE permitting, wetland boundary survey, and traffic study are not required.
9. Construction budget includes site work; demo of existing police station, fuel station and maintenance/storage building; new police station, fuel station, and maintenance/storage building.

Police Department – Milestone Schedule

Professional Services Procurement =	4	Months
Design Phase =	9	Months
Construction Phase =	18	Months
Close Out =	3	Months
Schedule Contingency =	2	Months
Total Project Duration =	36	Months

Assumptions:

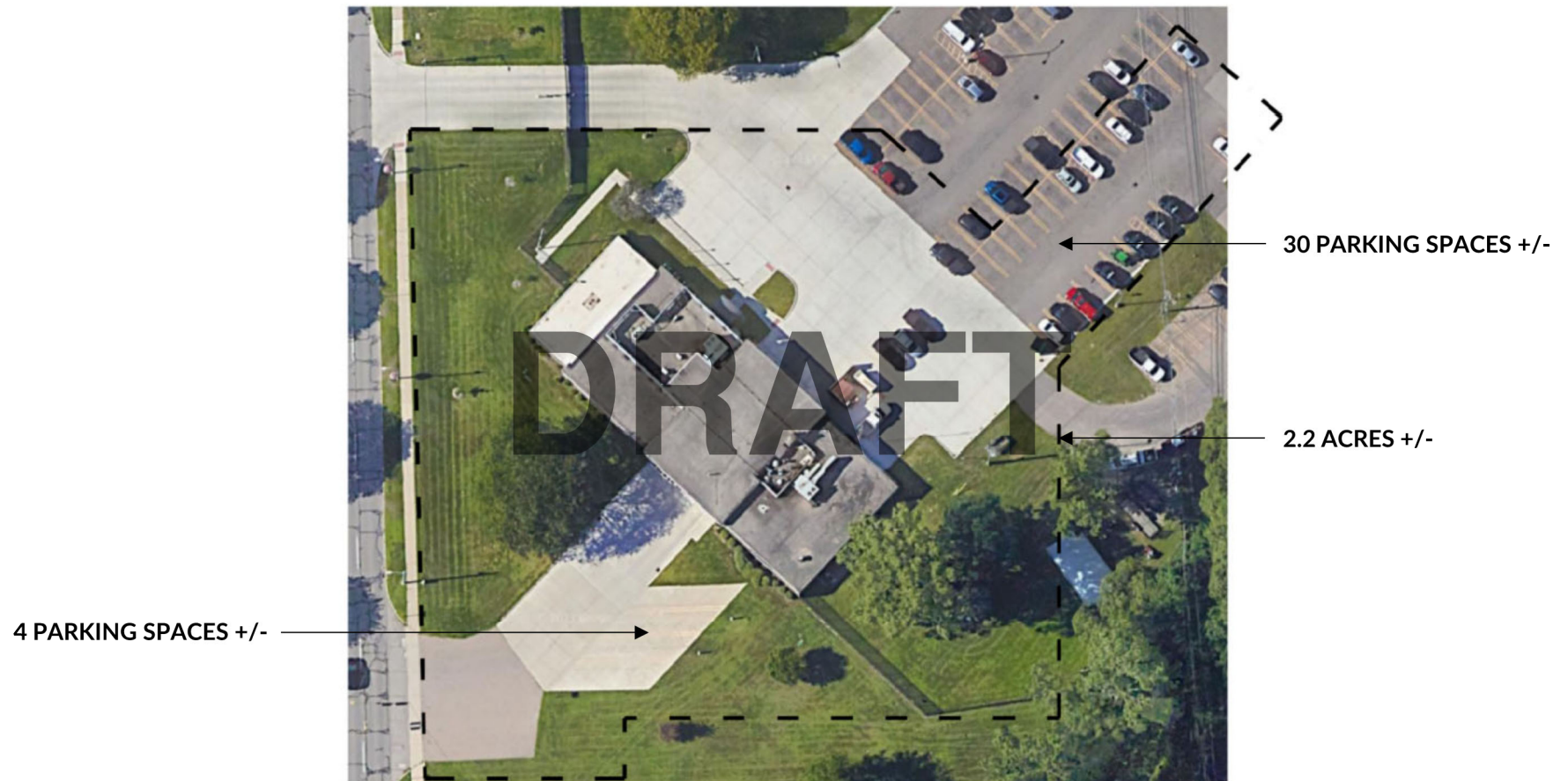
1. The City of Livonia will make timely decisions and provide timely approvals in order to maintain the project schedule.

Fire Station No. 1



Year Built: Original = 1967 (55 Years Old), Addition = 2018 (4 Years Old)

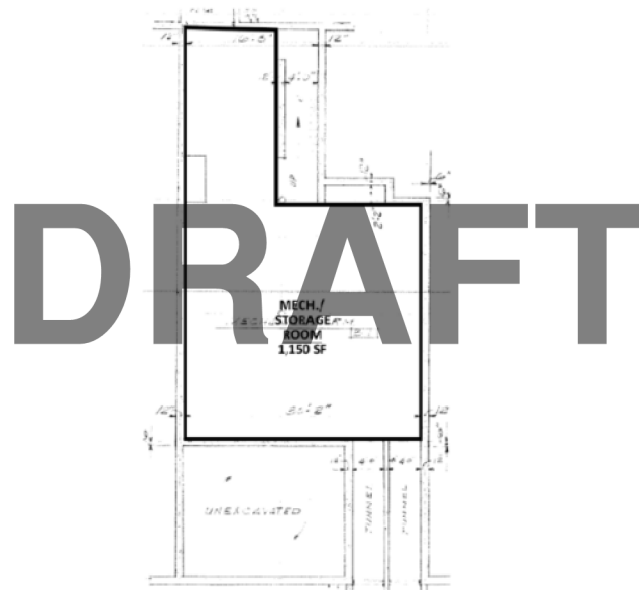
Fire Station No. 1 - Site



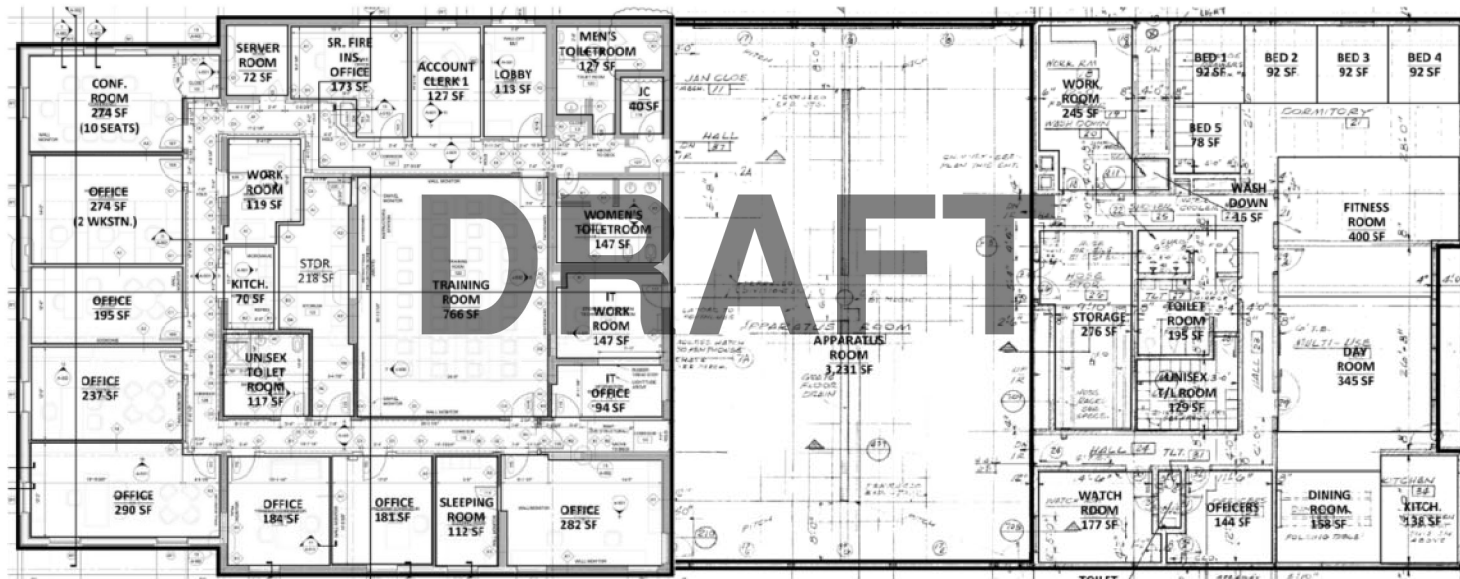
CITY OF LIVONIA - FIRE STATION NO. 1 - SITE PLAN
NOT TO SCALE

12/27/2023

Fire Station No. 1 – Lower Level Floor Plan



Fire Station No. 1 – Main Level Floor Plan



Fire Station No. 1 – Space Program

FUNCTION	FTE 2023	FTE 2028	SPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Office Area											
Fire Investigators Office	2	2		0	2	274	274	274	274		
Fire Marshal Office	1	1		1	0	195	195	195	195		
Deputy Chief Office	1	1		1	0	237	237	237	237		
Fire Chief Office	1	1		1	0	290	290	290	290		
Training Coordinator Office	1	1		1	0	184	180	184	180		
Program Supervisor	1	1		1	0	181	180	181	180		
Battalion Chief Office	1	1		1	0	282	282	282	282	two seats	
IT Office	1	1		1	0	94	100	94	100		
Account Clerk 1 Office	1	1		1	0	127	127	127	127		
Senior Fire Inspector	1	1		1	0	173	180	173	180		
Fire Investigators Office (future)	0	1		1	0	-	180	-	180		
EMS Coordinator Office (future)	0	1		1	0	-	180	-	180		
Admin Chief	0	1		1	0	-	180	-	180		180
Subtotal								2,037	2,585		
Secondary Circulation								367	465		
Total	11	14		12	2			2,404	3,050		
Total - Office Area	11	14		12	2			2,404	3,050		

Fire Station No. 1 – Space Program

FUNCTION	FTE 2023	FTE 2028	Sr	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support /Common Area											
Conference Room (10 seats) + Closet			1			274	392	274	392	need seating for 20	
Lobby			1			113	200	113	200		
Work Room			1			119	200	119	200		
Storage			1			218	400	218	400		
Training Room			1			766	1,200	766	1,200	need seating for 50+ seats	734
Training Room Storage			1			-	200	-	200		200
IT Office/Work Room			1			147	300	147	300		
Apparatus Room (three bays currently)			1			3,231	6,500	3,231	6,500	five total bays requested	3,269
Work Room			1			245	300	245	300	need separate space for refilling system and a dirty room, space for ice machine	
Wash Down			1			16	16	16	16		
Bed 1			1			92	100	92	100		
Bed 2			1			92	100	92	100		
Bed 3			1			92	100	92	100		
Bed 4			1			92	100	92	100		
Bed 5			1			78	100	78	100		
Bed 6			1			-	100	-	100		
Bed 7			1			-	100	-	100		
Storage			1			276	-	276	-		
EMS Storage			1			-	140	-	140		
Station Supplies Storage			1			-	100	-	100		
Day Room			1			400	400	400	400		
Watch Room			1			177	177	177	177		
Officers Room			1			144	144	144	144	includes bed	
Dining Room			1			158	185	158	185		
Sleeping Room			1			112	120	112	120		
Mechanical/Storage			1			1,150	-	1,150	-	currently in basement/mechanical only	
Mechanical			1			-	500	-	500		
Storage			1			-	500	-	500		250
Server Room			1			72	100	72	100		
Men's Toilet Room			1			127	127	127	127		
Women's Toilet Room			1			147	147	147	147		
Janitor's Closet			1			40	40	40	40		
Unisex Toilet Room w/ shower			1			117	-	117	-		
Kitchenette/Breakroom			1			70	200	70	200		

Fire Station No. 1 – Space Program

FUNCTION	FTE 2023	FTE 2028	LPT	PO	WS	UNIT SF 2023	UNIT SF 2028	SF 2023	SF 2028	NOTES	POTENTIAL REDUCTIONS
Support /Common Area											
Kitchen			1			138	280	138	280		
Toilet Room			1			195	195	195	195		
Unisex Toilet/Locker Room			1			129		129	-		
Toilet Room			1			20	-	20	-		
Fitness Room			1			345	600	345	600		
Turnout Gear/Work Room			1				200	-	200		
Clean Gear Storage			1				100	-	100		
Mezzanine Storage			1				1,400	-	1,400	will this accommodate the items in the old courthouse?	1,400
Training Tower			1				-	-	-		
Unisex Shower/Toilet Room (Admin)			1				100	-	100	one shower	100
Locker Room (Admin)			1				125	-	125	locker area for M + W (12 full height)	125
Unisex Shower/Toilet Room (Fire)			1				400	-	400	four showers	
Locker Room (Fire)			1				300	-	300	locker area for M + W (30 full height)	
Subtotal								9,392	16,988		6,258
Secondary Circulation								1,225	3,058		1,126
Total - Support/Common Area								10,617	20,046		7,384
Grand Total	11	14		12	2			13,021	23,096		
Gross-Up Factor	8%							1,042	1,848		591
	15%										
Grand Total - All Areas								14,062	24,944		7,975
Current GSF								14,150			
Reduced GSF									16,969		

Fire Station No. 1 – Site Program

Site Areas		Square Feet	
Building Footprint			
	Fire Station No. 1		24,944
			-
	Total		24,944
Building Support Areas			
Parking		Qty.	Area
	Staff	8	350
	Visitor	26	350
	Parking Expansion	-	-
	Total	34	700
			11,900
	Current	34	approximately
Docks		-	-
Fenced Outdoor Storage		-	-
Generator		1	200
	Subtotal		200
	Total		37,044
Retention Area			<u>10,000</u>
			47,044
Circulation, Setbacks, Greenbelts, etc.			<u>18,818</u>
	Total		65,861
		rounded	2.0 Acres

Fire Station No. 1 – Opinion of Probable Cost

Professional Services			\$	1,982,648
Regulatory		0.03%	\$	3,640
Construction			\$	14,560,607
Furniture + Fixtures	\$	55.00	\$	342,978
Owner Equipment		allowance	\$	25,000
Technology	\$	30.00	\$	748,315
Subtotal			\$	17,663,187
Contingency		10%	\$	1,456,061
Escalation		8%	\$	1,164,849

Total Project Cost			\$	20,284,097
Hard Costs	71.78%		\$	14,560,607
Soft Costs	28.22%		\$	5,723,490
Total Project Cost (Potential Reductions)			\$	13,798,741

Assumptions/Clarifications:

1. Excludes computers, monitors, keyboards, printers, etc.
2. Assumes abatement is not required
3. Excludes kitchen equipment
4. Excludes exercise equipment
5. Assumes site utilities are in place and have adequate capacity
6. Assumes building will be constructed of durable and readily available materials, as used in construction of similar facilities.
7. Furniture budget includes offices, workstations, café, open collaboration, and conference rooms.
8. Assumes EGLE permitting, wetland boundary survey, and traffic study are not required.
9. Construction budget includes site work, demo of existing fire station and construction of new fire station.

Fire Station No. 1 – Milestone Schedule

Professional Services Procurement =	4	Months
Design Phase =	8	Months
Construction Phase =	16	Months
Close Out =	3	Months
Schedule Contingency =	2	Months
Total Project Duration =	33	Months

Assumptions:

1. The City of Livonia will make timely decisions and provide timely approvals in order to maintain the project schedule.



plante moran | cresa

2022 Facility Condition Assessment (Amended)

City of Livonia
March 5, 2024



City of Livonia
33000 Civic Center Drive
Livonia, Michigan 48154

March 5, 2024

Dear City of Livonia Leadership:

Plante Moran Cresa (PMC) was engaged by The City of Livonia (COL) to conduct a facility condition assessment for thirteen (13) facilities that are currently in use. The goal of this assessment was to provide the COL with a capital planning template to determine the cost of maintaining the COL's facilities over a ten-year period with three major components: critical need, deferrable maintenance, and future need.

The facility condition assessments were intended to be high-level; they were not exhaustive, nor did they include any diagnostic or destructive investigation. We conducted our assessment through on-site visits at each building and grounds, interviews with staff, and review of owner furnished documentation. We wish to acknowledge the COL staff for their time, assistance, and cooperation in providing information for the preparation of this assessment.

We understand the COL's intent is to use the combination of these assessments as a guiding road map in determining the most practical and efficient way to maintain these buildings. It is our sincerest hope that this information will confidently supply you with objective facts in your quest for alignment and enable the COL to make informed decisions beneficial to the future of their buildings.

We would be happy to answer any questions that may arise as well as provide clarifications to any items found herein. Please feel free to contact me with any questions or concerns regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read "Rick Erickson", with a long horizontal line extending to the right.

Rick Erickson,
Vice President



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Facility Assessment

City of Livonia

33000 Civic Center Drive

Livonia, Michigan 48154

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Plante Moran Cresa

3000 Towne Center, Suite 100

Southfield, MI 48075



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Facility Assessment

City of Livonia
33000 Civic Center Drive
Livonia, Michigan 48154

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3000 Towne Center, Suite 100
Southfield, MI 48075



Section A

Executive Summary



Executive Summary

Overview

Plante Moran Cresa (PMC) performed this property assessment at the request of **City of Livonia (COL)** for the city's, support services, transportation, and administrative buildings.

Date(s) of Assessment:	3/29/22 - 4/11/22 (Fire Station No. 3, 4, 5, and 6 were assessed on October 25 th , 2023)
City Staff Present:	Sammy Lovin (Building Maintenance); Ted Davis (Senior Center/ Rec. Center); Jacob Rushlow (DPW), Wade Clay, Robert Jennison
PMC Staff Present:	David Goldman (Rick Erickson was present for Fire Station No. 3, 4, 5, and 6)
Architect/Engineer Staff Present:	N/A
Number of Buildings:	13
Average Building Age:	Approximately 50 Years

Acknowledgements

For their assistance and cooperation, we wish to acknowledge all city staff, and all additional user groups who provided information for the preparation of this assessment report and during PMC's visit to each individual property.

Purpose

The purpose of this assessment is as follows:

- Observe and document readily visible building site conditions (roadways, walkways, surface parking, lighting, and equipment), building envelope conditions (roof systems, walls, windows and entry/exit doors) interior building conditions (walls, floors, ceilings, millwork/casework, restrooms, gymnasiums, lockers, pools, food service areas and equipment, etc.) as well as building system (heating, ventilating, air conditioning, plumbing, electrical) deficiencies that impact the function and value of the buildings and properties
- Quantify and communicate the condition of each building and site component and assign a repair / replacement value within a future ten-year period. Within this ten-year timeframe, building and site needs are identified as: Critical Needs (1 – 3 years), Deferrable Maintenance (4 – 6 years) and Future Needs (7 – 10 years). Projected replacement costs include an annual escalation factor. **PMC recommends costs be revisited, at a minimum, once a year to adjust for inflation/escalation.**

Scope

This assessment report is based on city provided information and site visit(s) during which PMC performed a visual, nonintrusive, and nondestructive evaluation of various external and internal building components. This assessment is not a building code, safety, regulatory, or environmental compliance inspection. No diagnostic testing or invasive inspections took place. PMC took photographs to record the buildings' general conditions and to illustrate the specific observed deficiencies.

PMC observed representative samples of the major building components and the physical conditions of the following:

- Site conditions
- Building structure
- Architectural (interior finishes)
- Mechanical and electrical systems
- Plumbing system – Observations did not include collection or testing of water samples

The city provided PMC with the following documentation to aid in the creation of this report:

- Property site plans
- Floor plans

PMC took photographs to record the buildings' general conditions and to illustrate the specific observed deficiencies.

Building List:

1. City Hall
2. Police Station
3. Fire Station No. 1
4. Civic Center Library
5. Senior Center
6. Jack E. Kirksey Recreation Center
7. Housing Commission
8. Carl Sandburg Library
9. Alfred Noble Building
10. City Wide Technology
11. Fire Station No. 3
12. Fire Station No. 4
13. Fire Station No. 5
14. Fire Station No. 6

Assumptions & Clarifications

CITY OF LIVONIA ASSUMPTIONS / CLARIFICATIONS
This Facility Assessment Report is based on site visits during which PMC performed a visual, non-intrusive, and non-destructive evaluation of various external and internal building components. This assessment is not a building code, safety, regulatory, or environmental compliance inspection. PMC does not include the identification or resolution of any life safety issues or the non-compliance with any building code or other legal requirements
Placeholder allowances for landscaping have been designated for each facility and should be evaluated for funding amount as well as placement within the 10-yr timeframe.
Building and Site Acres estimated using DraftLogic online program if the information was not provided by the City.
Square footage used for the ceilings at city hall are based on the reflected ceiling plans from 1977.
Door count for city hall based on the plans from 1977
Roof Replacement at city hall is area above parking deck entrance and exit
While we made an effort to locate and identify all mechanical equipment; there may be some pieces that were not observed/assessed.
Assume 2,500 lb elevator for city hall
Assume that the Alfred Noble Building is beyond repair and needs to be demolished
Door count for civic Center Library based on the plans from 1986
It is assumed that any building aged 1980 or newer is non-asbestos containing. Prior to beginning any work it is recommended that City of Livonia hire an environmental consultant to confirm this assumption and review the abatement scope at each facility. The funding allowances found within this 10-yr capital are assumptions based upon limited information
It is assumed that that fire proofing / caulking at all multi story City of Livonia facilities is code compliant. If this is not correct, there may be substantial costs to upgrade
Abatement allowance added for each building for unknown/unforeseen conditions. I licensed abatement contractor should be hired for all abatement work
Assume that new monument signs will be allowed by the city
Rework of concrete entrance at City Hall includes ramps and railings
Redesign entry fountain at City Hall includes new plumbing
Assume all utility feeds to each building are sufficient for the current use
Wood Paneling in City Hall Auditorium is Not Included in the costs
Curtain wall replacement costs at City Hall is an allowance only. Actual sizes will need to be obtained in order to provide a better estimate.
Number of VAVs in city hall is just an estimate. PMC did not look above any ceilings for these during our walkthrough
Technology costs are shown for the senior center at the request of City of Livonia staff. PMC to meet with city technology director to discuss pricing needed for Technology across all city buildings
There is a Roof Top HVAC unit on told on the recently renovated space in the fire station. This unit is oversized for the space and is causing a lot of humidity issues. This unit should be replaced with a correct sized unit.
Plante Moran meet with Casey O'Neil- City of Livonia- Information Systems Director and Steven Arslanian- LPD- Computer Services on 9/27/22 to discuss the technology needs for the city. The discussion included the following (high level):
Controls needed for all HVAC equipment (all locations)
The data center is located in the City Hall Basement. This should be relocated above ground
PD device re-fresh plan: laptops and desktops on a 5 year replacement plan; All larger equipment is on a 7-8 year replacement plan.
Each department buys their own technology
New Phone System needed at City Hall
Re-cabling of Rec. Center needed
Wireless network upgrades needed
Electronic time keeping system needs to be upgraded
It is suggested that Plante Moran do a more in depth review and discussion of all technology needs with the city. An amendment to the contract is being drafted up as of 10/3/22. All costs provided are just allowances at this time

Condition Definitions

The following terms are used throughout the report and are defined as follows:

Excellent (E)

Observed to be new or like new.

Good (G)

Observed to be of average to above-average condition for the building system or material assessed, with consideration of its age, design, and geographical location. Generally, other than normal maintenance, no work is recommended or required.

Fair (F)

Observed to be of average condition for the building system evaluated. Satisfactory; however, some short-term and/or immediate attention is required or recommended (primarily due to normal aging and wear of the building system) to return the system to a good condition.

Poor (P)

Observed to be of below average condition for the building system evaluated. Requires immediate repair, significant work, or replacement is anticipated to return the building system or material to an acceptable condition.

Critical Need (CN)

Items that through our observations or discussions with COL may require capital expenditure **within the next 1 to 3 years** by virtue of current condition, remaining useful life, or COL's priorities.

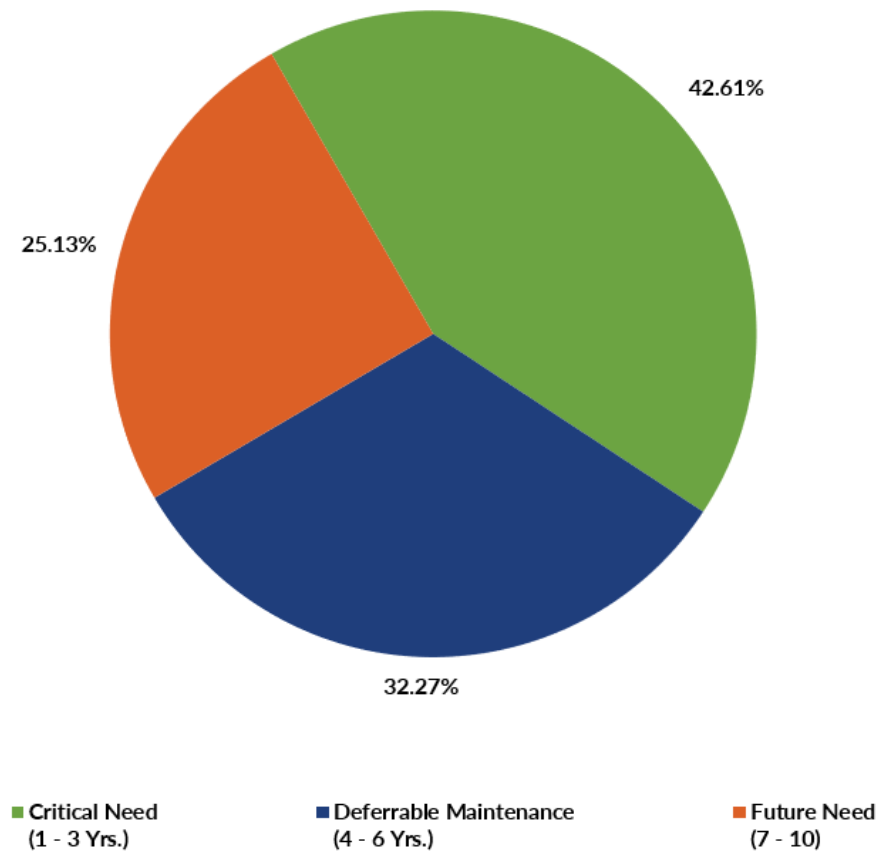
Deferred Maintenance (DM)

These are items that through our observations or discussions with COL **may require capital expenditure within the next 4 to 6 years** by virtue of current condition, remaining useful life, or COL's priorities.

Future Need (FN)

These are items that through our observations or discussions with COL **may require capital expenditure within the next 7 to 10 years** by virtue of current condition, remaining useful life, or COL's priorities.

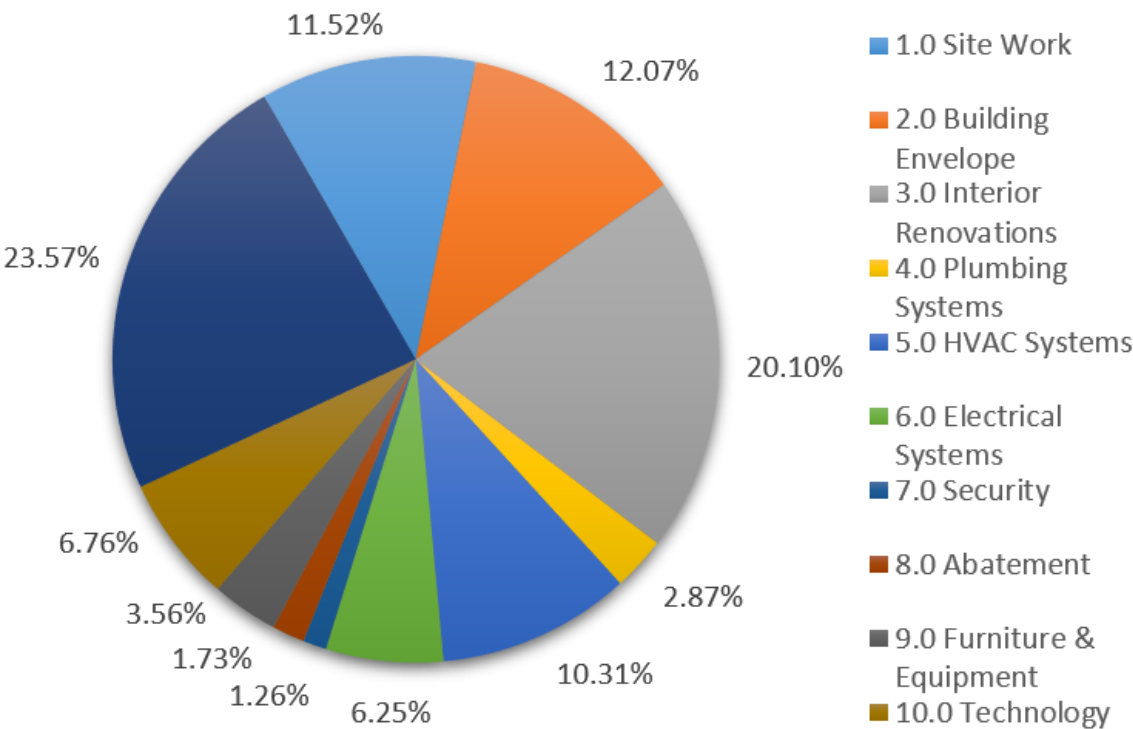
Summary of Costs by Priority



Bldg #	Name of Facility	Critical Need (1 - 3 Yrs.)	Deferrable Maintenance (4 - 6 Yrs.)	Future Need (7 - 10)	Complete Cost with Escalation
1	City Hall	\$12,397,784	\$7,595,335	\$8,392,853	\$28,385,972
2	Police Department	\$8,467,808	\$3,381,330	\$1,875,608	\$13,724,746
3	Fire Department No. 1	\$1,335,601	\$897,792	\$766,557	\$2,999,950
4	Civic Center Library	\$6,348,772	\$4,936,406	\$1,240,231	\$12,525,410
5	Senior Center/Community Transit	\$5,811,271	\$659,776	\$1,029,377	\$7,500,424
6	Livonia Community Recreation Center	\$2,699,860	\$10,977,139	\$10,236,580	\$23,913,579
7	Housing Commission	\$856,369	\$169,270	\$310,537	\$1,336,176
8	Carl Sandburg Library	\$1,737,877	\$821,019	\$410,894	\$2,969,791
9	Alfred Noble Building*	\$346,062	\$0	\$0	\$346,062
10	City Wide - Technology	\$2,073,674	\$815,002	\$927,849	\$3,816,525
11	Fire Department No. 3	\$78,111	\$950,011	\$94,839	\$1,122,961
12	Fire Department No. 4	\$551,822	\$540,889	\$125,817	\$1,218,528
13	Fire Department No. 5	\$577,150	\$311,900	\$135,675	\$1,024,725
14	Fire Department No. 6	\$267,055	\$925,259	\$135,675	\$1,327,989
TOTAL BUILDINGS BUDGET		\$43,549,218	\$32,981,128	\$25,682,491	\$102,212,837

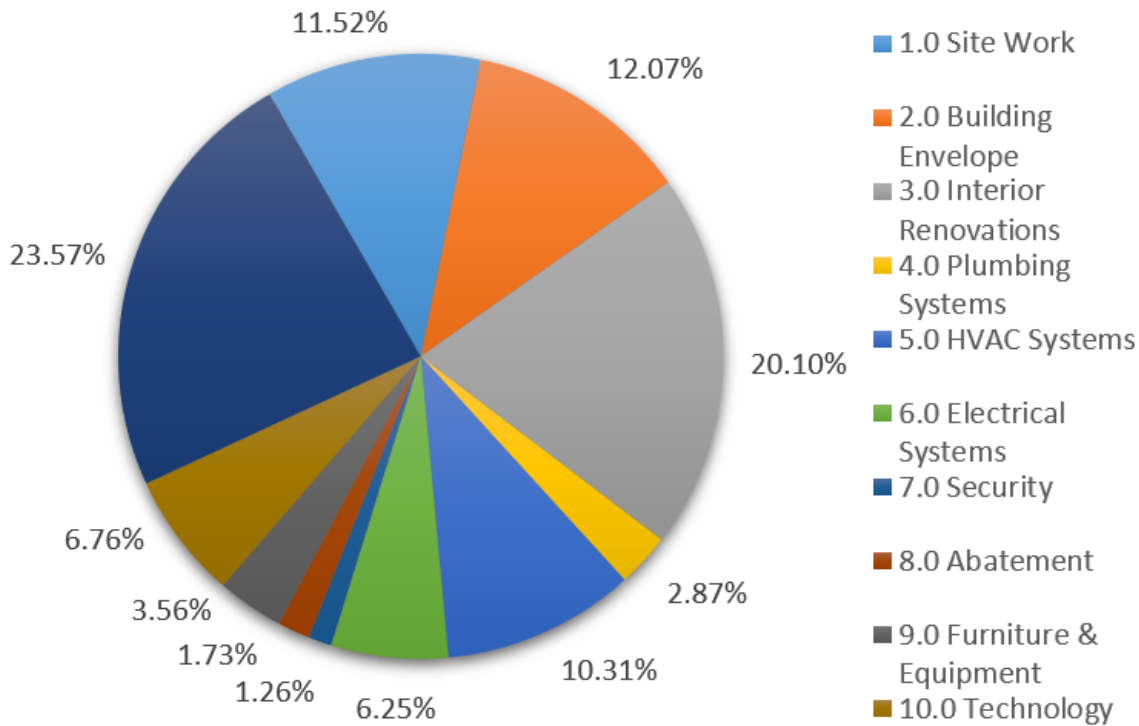
* This is for demolition costs only

Summary of Costs by Category



Bldg #	Name of Facility	Net Present Value	1.0 Site Work	2.0 Building Envelope	3.0 Interior Renovations	4.0 Plumbing Systems	5.0 HVAC Systems
1	City Hall	\$24,609,976	\$3,880,047	\$2,737,260	\$6,330,544	\$473,710	\$2,310,841
2	Police Department	\$12,278,278	\$2,152,812	\$542,592	\$4,353,063	\$319,378	\$719,890
3	Fire Department No. 1	\$2,544,154	\$104,976	\$521,640	\$596,333	\$124,050	\$386,508
4	Civic Center Library	\$10,984,002	\$1,139,865	\$1,647,000	\$3,139,322	\$52,618	\$1,609,425
5	Senior Center/Community Transit	\$7,014,316	\$899,640	\$1,284,854	\$1,491,075	\$226,454	\$403,380
6	Livonia Community Recreation Center	\$18,060,421	\$2,547,711	\$4,084,560	\$2,595,170	\$1,227,830	\$5,050,504
7	Housing Commission	\$1,196,399	\$312,284	\$74,520	\$165,264	\$55,188	\$77,807
8	Carl Sandburg Library	\$2,647,062	\$613,950	\$326,399	\$355,996	\$114,972	\$221,076
9	Alfred Noble Building*	\$346,062	\$258,336	\$0	\$0	\$0	\$0
10	City Wide - Technology	\$3,327,524	\$0	\$0	\$0	\$0	\$0
11	Fire Department No. 3	\$872,969	\$44,064	\$116,375	\$322,701	\$54,467	\$54,756
12	Fire Department No. 4	\$1,052,902	\$138,428	\$283,951	\$223,452	\$32,003	\$27,022
13	Fire Department No. 5	\$908,745	\$142,020	\$71,226	\$220,889	\$43,235	\$11,178
14	Fire Department No. 6	\$1,070,466	\$404,190	\$71,226	\$220,889	\$43,235	\$16,578
TOTAL		\$86,913,276	\$12,638,322	\$11,761,604	\$20,014,698	\$2,767,140	\$10,888,965

Summary of Costs by Category (Continued)



Bldg #	Name of Facility	6.0 Electrical Systems	7.0 Security	8.0 Abatement	9.0 Furniture & Equipment	10.0 Technology	Soft Costs (AE/CM/Contingency)	Total Cost (Escalated)
1	City Hall	\$1,329,946	\$386,100	\$799,200	\$1,020,600	\$2,921,138	\$6,196,586	\$28,385,972
2	Police Department	\$901,578	\$375,840	\$540,000	\$455,976	\$0	\$3,363,619	\$13,724,746
3	Fire Department No. 1	\$289,109	\$95,904	\$60,480	\$81,000	\$0	\$739,951	\$2,999,950
4	Civic Center Library	\$767,275	\$111,888	\$120,960	\$1,020,600	\$0	\$2,916,457	\$12,525,410
5	Senior Center/Community Transit	\$588,617	\$69,768	\$54,000	\$454,680	\$324,000	\$1,703,955	\$7,500,424
6	Livonia Community Recreation Center	\$1,660,241	\$159,840	\$0	\$272,160	\$432,000	\$5,883,562	\$23,913,579
7	Housing Commission	\$185,469	\$32,400	\$42,120	\$70,200	\$0	\$320,923	\$1,336,176
8	Carl Sandburg Library	\$364,176	\$47,952	\$64,800	\$144,180	\$0	\$716,289	\$2,969,791
9	Alfred Noble Building*	\$0	\$0	\$0	\$0	\$0	\$87,726	\$346,062
10	City Wide - Technology	\$0	\$0	\$0	\$0	\$2,849,040	\$967,485	\$3,816,525
11	Fire Department No. 3	\$91,822	\$70,200	\$0	\$75,060	\$0	\$293,516	\$1,122,961
12	Fire Department No. 4	\$88,128	\$35,100	\$24,840	\$33,750	\$0	\$331,855	\$1,218,529
13	Fire Department No. 5	\$162,432	\$36,504	\$25,920	\$33,750	\$0	\$277,571	\$1,024,725
14	Fire Department No. 6	\$76,140	\$51,948	\$37,800	\$47,250	\$0	\$358,734	\$1,327,990
TOTAL		\$6,504,933	\$1,473,444	\$1,770,120	\$3,709,206	\$6,526,178	\$24,158,229	\$102,212,839

Opinion of Probable Cost

Based upon observations during our site visit and information received from our interviews with building users, which for the purpose of this report was deemed reliable, PMC prepared general scope opinions of probable cost based on appropriate remedies for the deficiencies noted. Such remedies and their associated cost were considered commensurate with subject's position in the market and prudent expenditures. These opinions are for components of systems exhibiting significant deferred maintenance and existing deficiencies requiring major repairs or replacement. Repairs or improvements that could be classified as cosmetic, a decorative part or parcel of a building renovation program, routine, or normal preventative maintenance were included as future needs. Costs provided are based on mid-level commercial pricing.

Our intent in this report is to outline material physical deficiencies and the corresponding opinion of probable costs that are commensurate with the complexity and age of the buildings. Opinions of probable costs that are a threshold amount of approximately \$1,000 or less are omitted from our review.

Replacement and repair preliminary budgets are based on approximate quantities. Specific building square footages are estimates based on the information provided by the city. A detailed inventory of quantities for cost estimating is not a part of the scope of this report. Budgets were derived using Metro Detroit area material and labor costs. As this report projects costs over the next 10 years, PMC utilized a reasonable cost escalation factor for these costs based on the anticipated time of improvement implementation.

Please note that the budget values in this report are conceptual values only, and do not represent hard bid market pricing our opinions of probable costs will likely vary from actual market conditions. These conceptual budget values are intended for a high-level planning approach by the city in consideration for future renovations of the aforementioned buildings. We highly recommend that, if any of the recommendations are to move forward accordingly, the city (a) have a formal design completed by a registered architectural or engineering firm and (b) in conjunction with its registered architectural or engineering firm and construction professional develop a refined preliminary budgets and (c) undergo the formal competitive bid process per the requirements set forth.

Statement of Limitations

This assessment report represents a statement of the physical condition of the buildings and properties based upon visual site observation. It applies only to those portions of the property, items, and equipment that PMC staff were able to visually observe. Walls and ceilings were not opened to observe covered, hidden, or concealed conditions. PMC's assessment of plumbing systems did not include the collection or testing of water samples to determine water quality. The assessment of mechanical systems and equipment based on general observations of condition and/or age and not a full diagnostic or inspection by a certified maintainer.

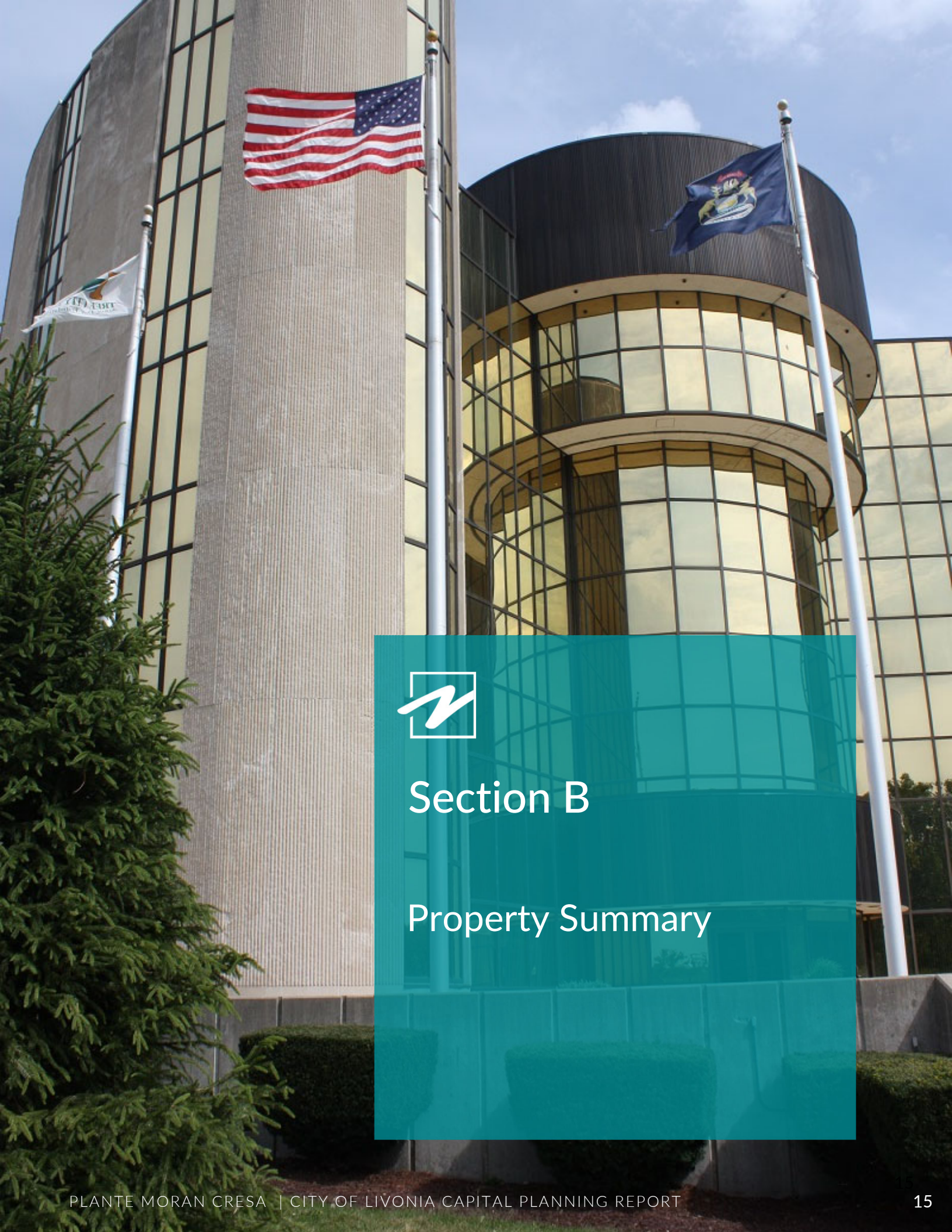
In addition, PMC did not sample any property components or test nonfunctioning equipment at the time the assessment was conducted. Minimal as-built or record drawings and specifications were available only to the extent described in this report. PMC's assessment, analysis, and recommendations are, in whole or in part, dependent on the information provided by The City of Livonia and other third parties. PMC cannot provide an opinion on the reliability of such information, and inaccuracies in such information may impact our assessment, analysis, and recommendations.

This assessment does not include any services (including the collection or testing of samples) related to known or unknown Constituents of Concern. Constituents of Concern shall include: (i) asbestos, (ii) petroleum, (iii) radioactive material, (iv) polychlorinated biphenyls (PCBs), (v) hazardous waste, (vi) lead, or (vii) any substance, product, waste, or other material listed under any other federal, state, or local (meaning any applicable jurisdiction) statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material. The parties further acknowledge that PMC is not and shall not be required to be an "owner," "arranger," "operator," "generator," or "transporter" of any Constituents of Concern.

This report was prepared for and intended solely for the information use of The City of Livonia and may not be used or relied upon by another party without the express written authorization of PMC.

The contents of the report are based on the relevant information available, and the condition observed at the time of issuance. Information and conditions are subject to change, and PMC assumes, no responsibility to update this report in the event of such change.

This assessment report should be read in its entirety. Information provided in the various sections is complementary and, in some instances, provides additional explanation of information concerning the assessment. Therefore, interpretations and conclusions drawn by reviewing only specific sections are the sole responsibility of the user.



Section B

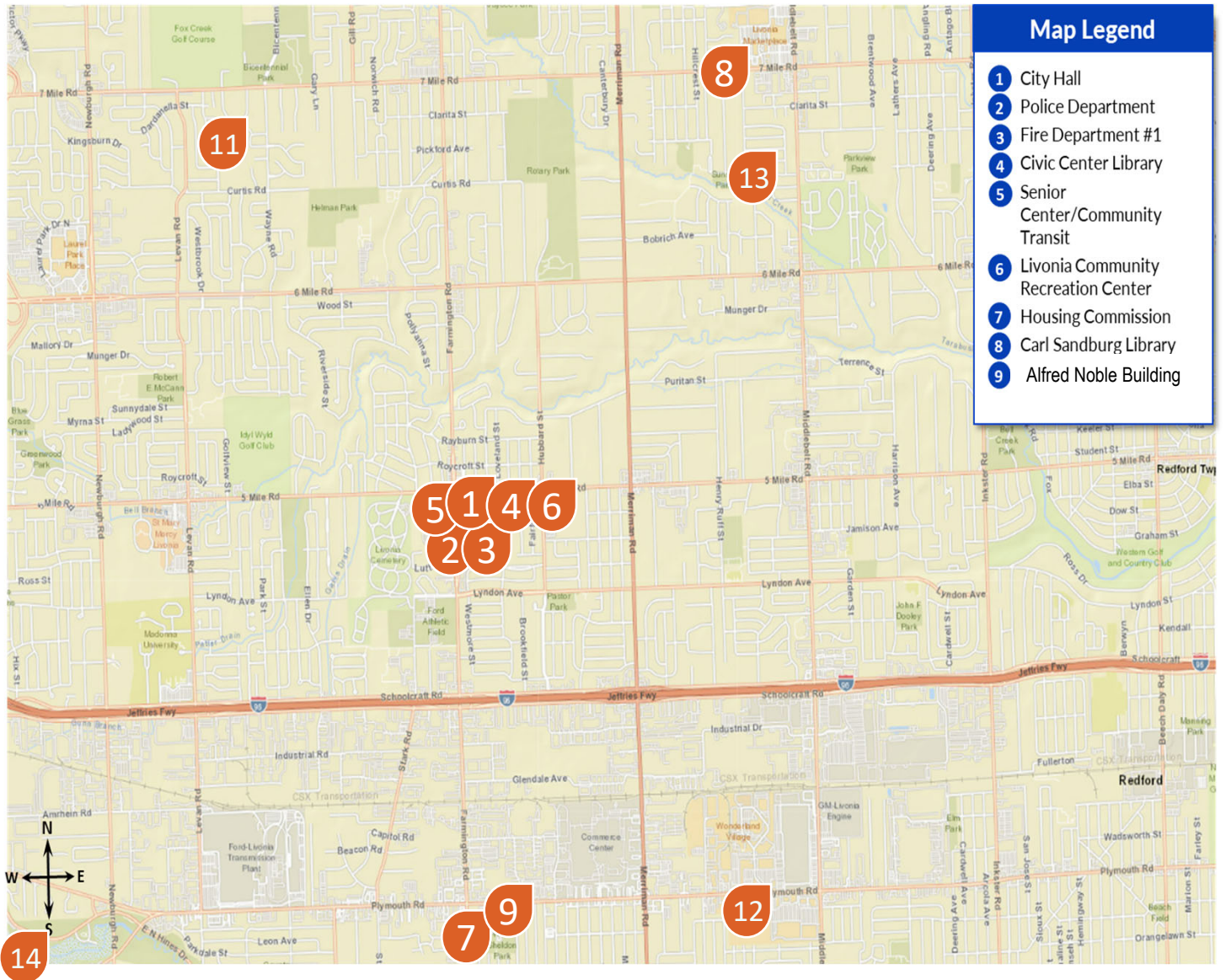
Property Summary



SECTION B

Property Summary

Building Locations Map | City, State



Map Legend (continued from above):

- 11 Fire Department No. 3
- 12 Fire Department No. 4
- 13 Fire Department No. 5
- 14 Fire Department No. 6

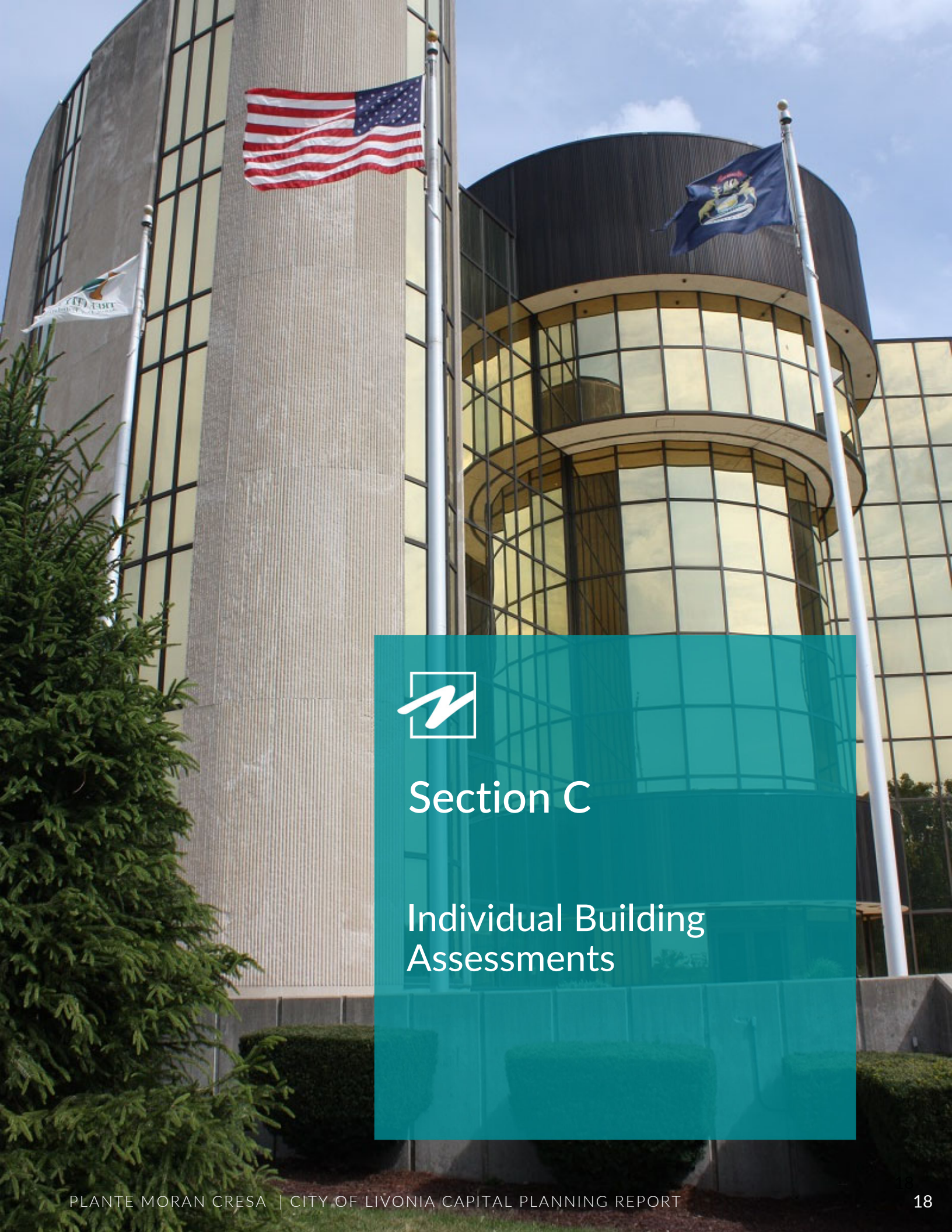


SECTION B

Property Summary

Building Locations Map | City, State

Bldg #	Facility	Address	City	State	Zip
BUILDINGS					
1	City Hall	33000 Civic Center Drive	Livonia	Michigan	48154
2	Police Department	15052 Farmington Road	Livonia	Michigan	48154
3	Fire Department No. 1	14910 Farmington Road	Livonia	Michigan	48154
4	Civic Center Library	32777 Five Mile Road	Livonia	Michigan	48154
5	Civic Center Park Senior Center & Transit Office	15218 Farmington Road	Livonia	Michigan	48154
6	Jack E. Kirksey Livonia Community Recreation Center	15100 Hubbard Street	Livonia	Michigan	48154
7	Housing Commission	10800 Farmington Road	Livonia	Michigan	48150
8	Carl Sandburg Library	30100 West Seven Mile Road	Livonia	Michigan	48152
9	Alfred Noble Building	32901 Plymouth Road	Livonia	Michigan	48150
10					
11	Fire Department No. 3	35000 SevenMile Road	Livonia	Michigan	48152
12	Fire Department No. 4	12300 Middlebelt Road	Livonia	Michigan	48150
13	Fire Department No. 5	18910 Middlebelt Road	Livonia	Michigan	48152
14	Fire Department No. 6	37876 Plymouth Road	Livonia	Michigan	48150



Section C

Individual Building Assessments

Building 01 – Livonia City Hall



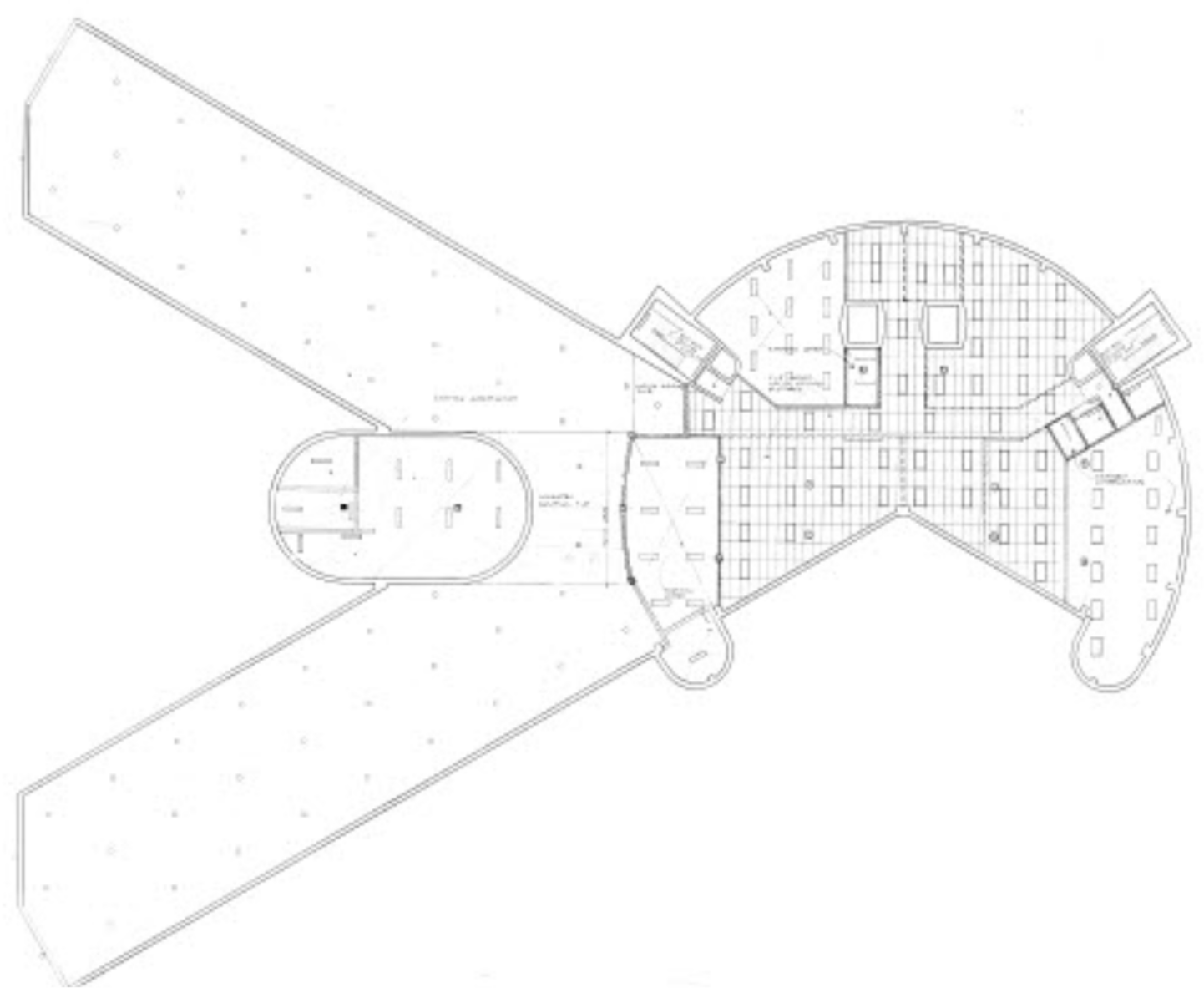
Address:	33000 Civic Center Dr. Livonia MI 48154
Year Built:	1977
Square Footage:	67,736
Site Area:	4.99 acres
Parking Spaces:	115
Stories:	5
Basement:	Yes
Elevator(s):	2
Exterior Façade:	Glass Curtain Wall/Brick/Concrete
Roof:	TPO
Fire Protection:	Fully Sprinkled

Site Plan:



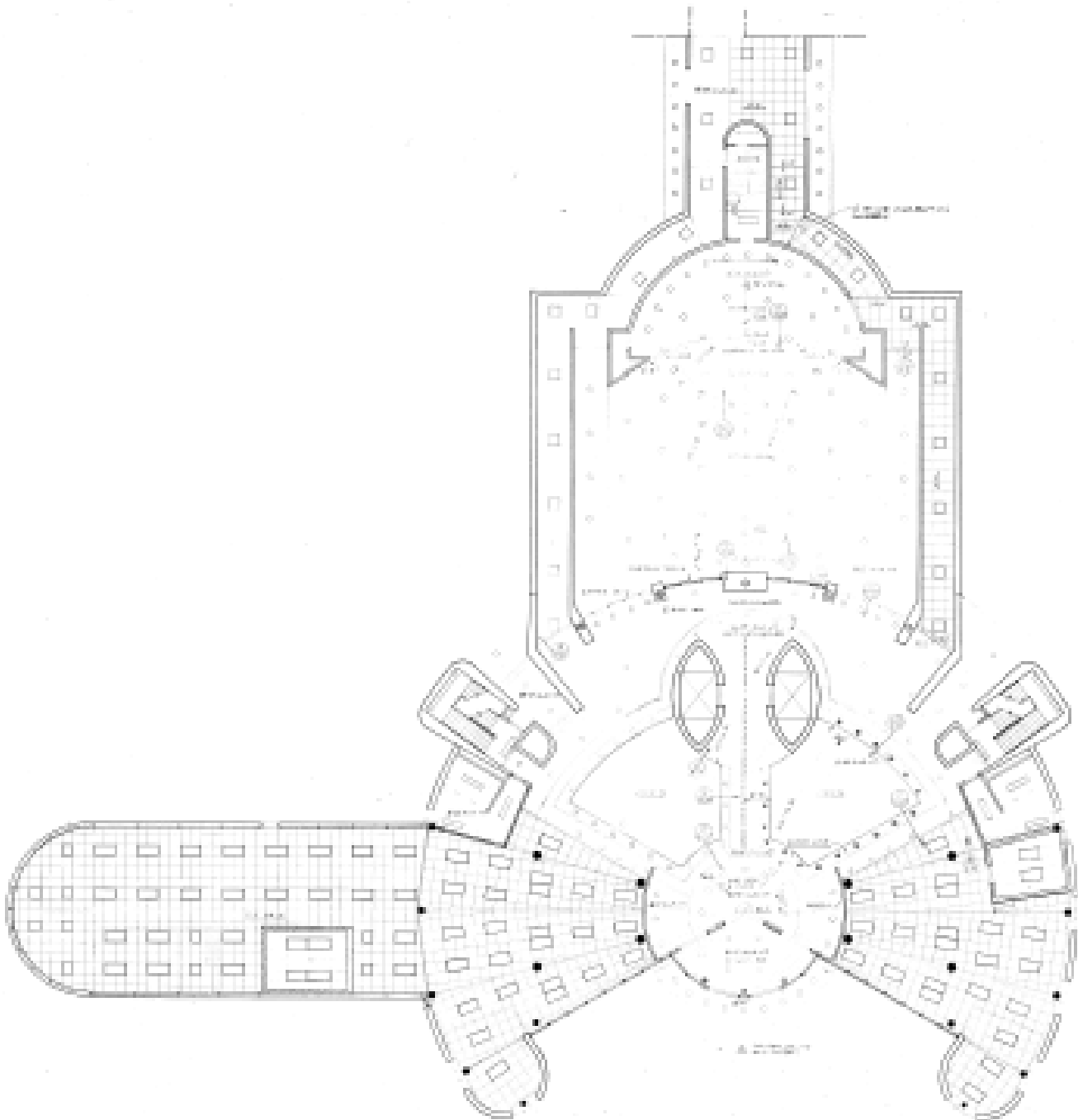
Building 01 - Livonia City Hall

Ground Floor Plan:



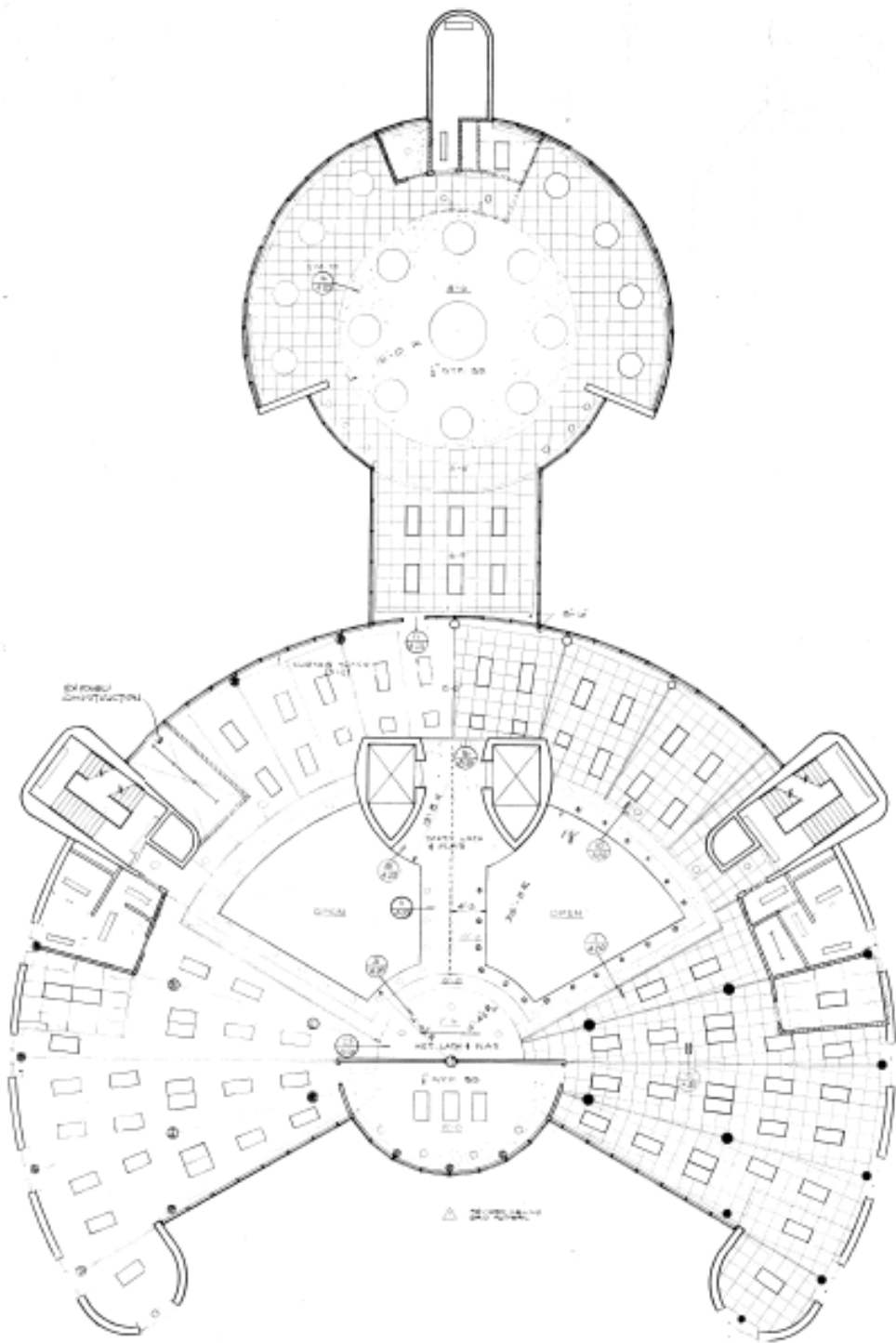
Building 01 - Livonia City Hall

1st Floor Plan:



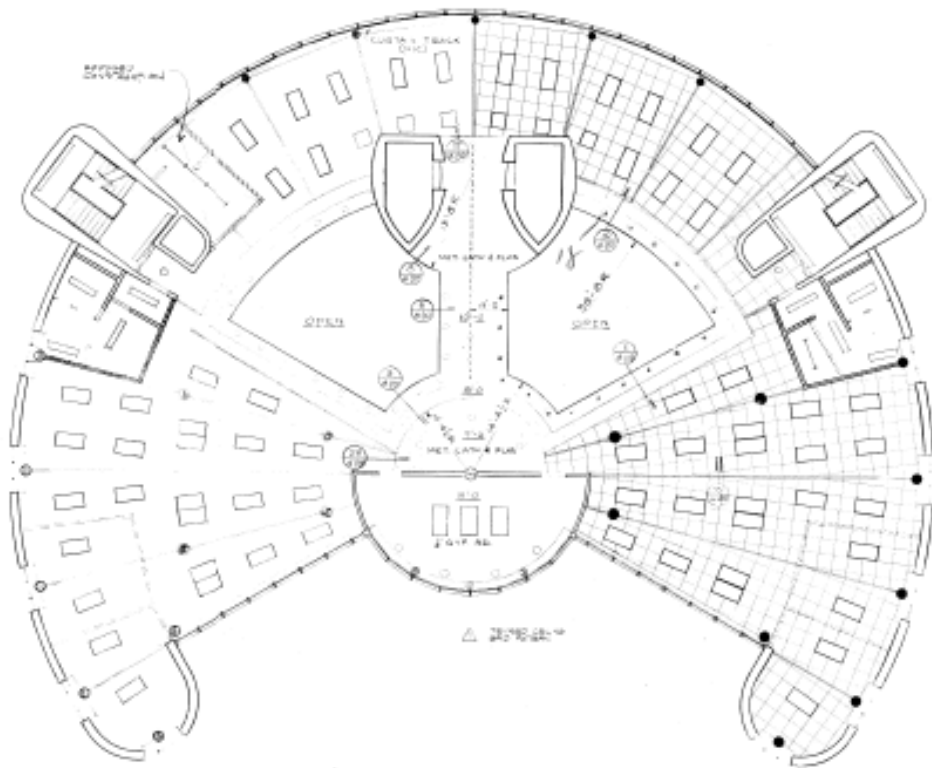
Building 01 - Livonia City Hall

2nd Floor Plan

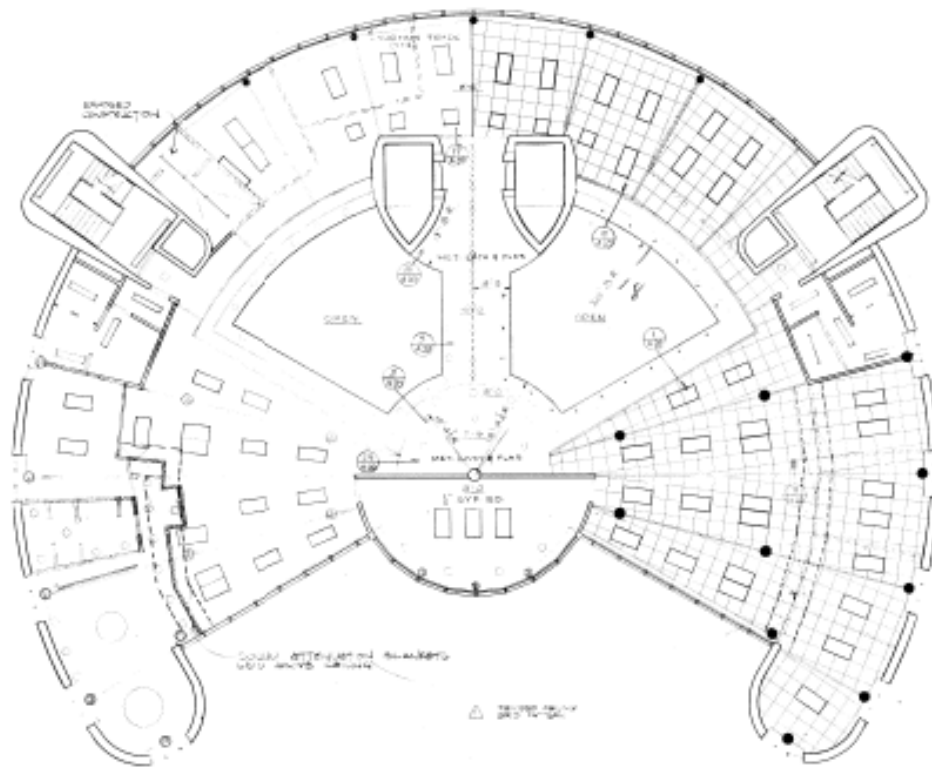


Building 01 - Livonia City Hall

3rd Floor Plan:

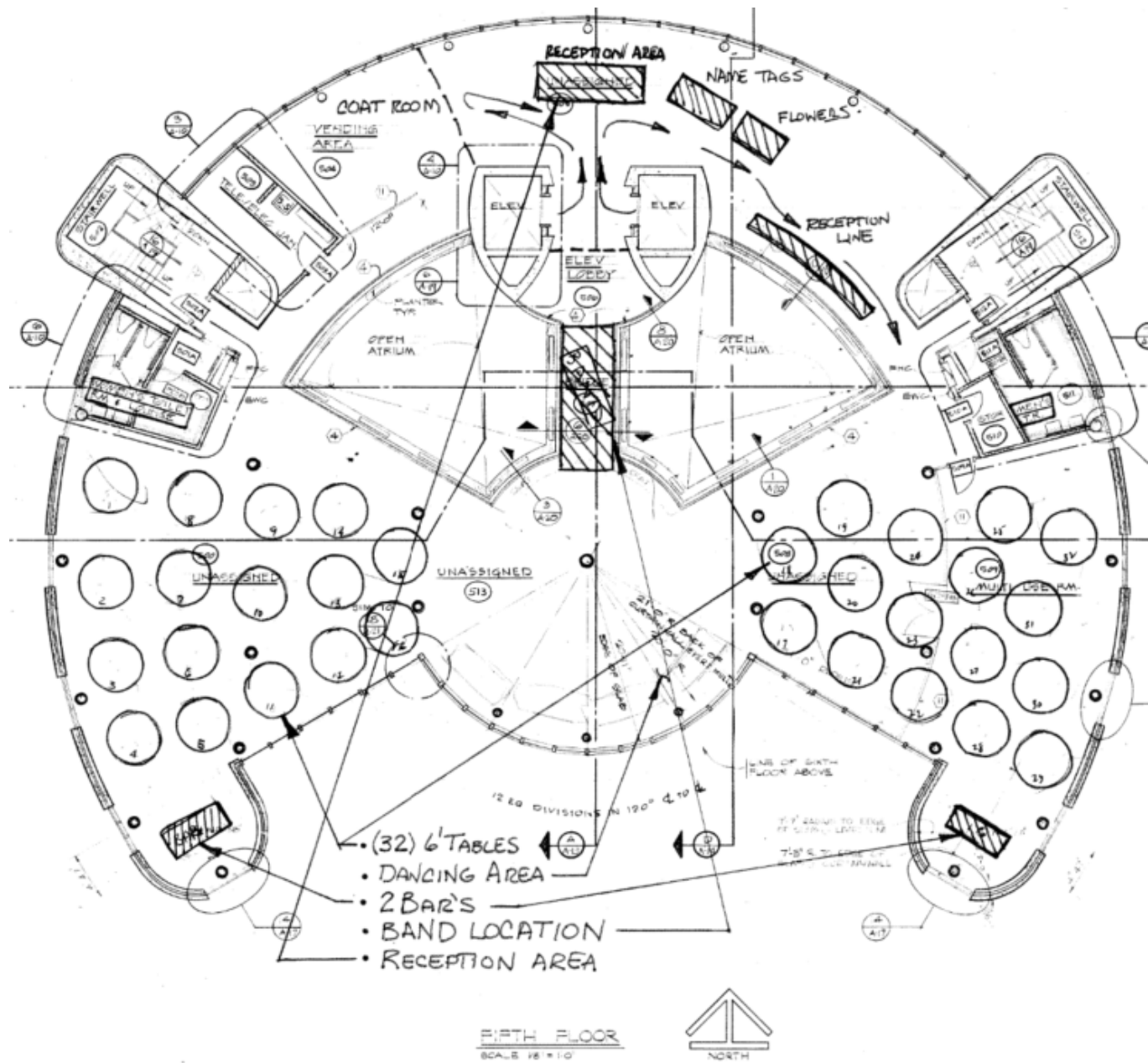


4th Floor Plan:



Building 01 - Livonia City Hall

5th Floor Plan:



SECTION C | Individual Building Assessments

Building 01 – Livonia City Hall

Summary of Budgets:

City Hall		Cost Data							
Building SF		67,736		Specification Factor =		Geographic Factor =		Cost Escalation Factors	
				Cost Escalation Factor =		1.08		1.30	
								1.48	
Program Area		Quantity	Unit	# of	As % of	Critical Needs	Deferrable	Future Need	
		Per Unit		Units	Total Units	Cost	(1 - 3 years)	(4 - 6 years)	(7 - 10 years)
1.0 SITE									
Paving									
Pavement and Base Reconstruction		110,200	SF	1	110,200	2.90%	\$0	\$0	\$1,056,862
Selective Sidewalk & Curb Replacement		1	Allowance	1	1	0.66%	\$54,000	\$70,200	\$79,920
Sealcoating/Re-stripping		110,200	SF	1	110,200	0.15%	\$35,705	\$0	\$0
Site Amenities - Bike Racks / Benches / Picnic Tables / Trash Receptacles / Etc.		1	Allowance	1	1	1.32%	\$0	\$421,200	\$0
Landscaping									
Improve Landscaping		1	Allowance	1	1	1.32%	\$0	\$0	\$479,520
Utilities									
Misc. Utility Repairs		1	Allowance	1	1	1.32%	\$108,000	\$140,400	\$159,840
Misc.									
Monument Sign - Powered & Electronic Display		1	Allowance	1	1	0.44%	\$0	\$140,400	\$0
Rework Concrete Entrance (Ramps and Railings)		1	Allowance	1	1	1.76%	\$432,000	\$0	\$0
Refurbish Entry Fountain (Includes New Plumbing)		1	Allowance	1	1	2.19%	\$0	\$702,000	\$0
SITE SUBTOTAL						12.04%	\$629,705	\$1,474,200	\$1,776,142
2.0 BUILDING ENVELOPE									
Roofing Work									
Replace Roof (EPDM)- .60 Mil/Reinforced/ Fully-Adhered (Parking Garage)		10,000	SF	1	10,000	1.54%	\$378,000	\$0	\$0
Replace Roof (EPDM)- .60 Mil/Reinforced/ Fully-Adhered (Main Tower) ~2015/ 30 yr. Warranty		13,800	SF	1	13,800	2.12%	\$0	\$0	\$0
Replace Roof (EPDM)- .60 Mil/Reinforced/ Fully-Adhered (Annex)		14,000	SF	1	14,000	2.15%	\$0	\$0	\$783,216
Misc. Drainage Repair		1	Allowance	1	1	0.07%	\$18,144	\$0	\$0
Paint Structural Steel for Equipment Screens		1	Allowance	1	1	0.09%	\$0	\$28,080	\$0
Replace Exterior Curtainwall System		1	Allowance	1	1	3.07%	\$0	\$0	\$1,118,880
Exterior Walls									
Re-Caulk Expansion Joints		1	Allowance	1	1	0.11%	\$0	\$0	\$39,960
Tuckpointing		1	Allowance	1	1	0.33%	\$0	\$105,300	\$0
Exterior Envelope Repairs/Upgrades (Curtain Wall/ Precast/ Soffits/ Painting)		1	Allowance	1	1	0.44%	\$36,000	\$46,800	\$53,280
Replace Exterior Doors		24	EA	1	24	0.53%	\$129,600	\$0	\$0
BUILDING ENVELOPE SUBTOTAL						10.44%	\$561,744	\$180,180	\$1,995,336
3.0 INTERIOR/FINISHES									
Interior Doors & Hardware									
Replace Door Hardware		200	EA	1	200	2.63%	\$648,000	\$0	\$0
Walls & Partitions									
Misc. Plaster/ Drywall Repairs		1	Allowance	1	1	0.88%	\$0	\$280,800	\$0
Ceilings									
Remove Existing & Install New Acoustic Tile Ceiling		30,700	SF	1	30,700	1.15%	\$281,826	\$0	\$0
Flooring									
Remove & Replace Flooring - Carpet		34,000	SF	1	34,000	1.00%	\$246,024	\$0	\$0
Remove and Replace VCT Tile		17,000	SF	1	17,000	0.67%	\$165,240	\$0	\$0
Remove and Replace Hard Tile Flooring		17,000	SF	1	17,000	2.24%	\$550,800	\$0	\$0
Interior Storefront Repairs/Replacement		1	Allowance	1	1	2.19%	\$270,000	\$351,000	\$0
Paint									
Painting Allowance		67,736	SF	1	67,736	0.74%	\$0	\$237,753	\$0
Signage									
Replace Interior Signage		67,736	SF	1	67,736	0.12%	\$0	\$38,041	\$0
Way-finding and Branding		1	Allowance	1	1	0.66%	\$0	\$0	\$239,760
Restrooms									
Renovate Floor Restrooms (2/floor)		12	EA	1	12	3.95%	\$486,000	\$631,800	\$0
Auditorium / Little Theater									
Replace Fabric and Make Repairs to Chairs		330	EA	1	330	0.22%	\$53,460	\$0	\$0
Rework Seating Configuration to Improve Accessibility		1	Allowance	1	1	1.10%	\$270,000	\$0	\$0
Casework & Countertops									
Replace Misc. Casework/Millwork		1	Allowance	1	1	2.19%	\$270,000	\$351,000	\$0
Other									
Replace Elevator		2	Allowance	1	2	2.63%	\$0	\$0	\$959,040
INTERIOR/FINISHES SUBTOTAL						22.37%	\$3,241,350	\$1,890,394	\$1,198,800
4.0 PLUMBING SYSTEMS									
Fire Protection									
Add / Modify Fire Suppression System for Improvements		1	Allowance	1	1	0.39%	\$97,200	\$0	\$0
Equipment & Fixtures									
Existing Lochinvar Water Heater, Serial # 1227M000978, 2012		1	EA	1	1	0.04%	\$0	\$11,232	\$0
Existing Lochinvar Water Heater, Serial # HG15292920, 2011		1	EA	1	1	0.04%	\$0	\$11,232	\$0
Provide Bottle Filler Drinking Fountains		6	EA	1	6	0.18%	\$43,546	\$0	\$0
Piping									
Replace Portions- Domestic Water/Sanitary Piping and Valves		1	Allowance	1	1	1.10%	\$135,000	\$175,500	\$0
PLUMBING SYSTEMS SUBTOTAL						1.74%	\$275,746	\$197,964	\$0

SECTION C | Individual Building Assessments

Building 01 – Livonia City Hall

Summary of Budgets:

City Hall		Cost Data						
Building SF		Specification Factor =		Geographic Factor =		Cost Escalation Factors		
67,736						1.08	1.30	1.48
						Cost Escalation Factor =		
Program Area		Quantity	# of	As % of	Critical Needs	Deferrable	Future Need	
		Per Unit	Units	Total Units	Cost	Cost	Cost	
		Unit				(1 - 3 years)	(4 - 6 years)	(7 - 10 years)
5.0 HVAC SYSTEMS								
Equipment								
Existing Lochinvar Boiler, Serial # I11H10196040, 2011		1	EA	-	0.00%	\$0	\$0	\$0
Existing Lochinvar Boiler, Serial # I11H10196045, 2011		1	EA	-	0.00%	\$0	\$0	\$0
Existing Lochinvar Boiler, Serial # I11H10202692, 2011		1	EA	-	0.00%	\$0	\$0	\$0
Existing Lochinvar Boiler, 2011		1	EA	-	0.00%	\$0	\$0	\$0
Existing Lochinvar Boiler, Serial # H985854, 1998		1	EA	1	0.71%	\$175,392	\$0	\$0
Existing Lochinvar Boiler, Serial # H985853, 1998		1	EA	1	0.71%	\$175,392	\$0	\$0
Existing Lochinvar Boiler, Serial # H985852, 1998		1	EA	1	0.71%	\$175,392	\$0	\$0
Replace Boiler Pumps		3	EA	3	0.11%	\$27,216	\$0	\$0
Existing Trane Air Handler Unit, Serial # C18H06307, 2018		1	EA	-	0.00%	\$0	\$0	\$0
Existing Trane Air Handler Unit, Serial # C18H06309, 2018		1	EA	-	0.00%	\$0	\$0	\$0
Existing Alton Air Handling Unit (Not Able to Read Tag)		1	EA	1	1.10%	\$270,000	\$0	\$0
Replace Existing Variable Air Volume (VAV) Units		30	EA	30	0.79%	\$0	\$252,720	\$0
Existing McQuay Chiller, Serial #58K8504302, 1998		1	EA	1	0.88%	\$216,000	\$0	\$0
Existing Fujitsu Split System, Serial # KSA031893		1	EA	1	0.03%	\$0	\$0	\$11,189
Existing Fujitsu Split System, Serial # KSA022850		1	EA	1	0.03%	\$0	\$0	\$11,189
Piping								
Replace Portions- Hydronic Piping and Valves		1	Allowance	1	1.10%	\$270,000	\$0	\$0
Other HVAC								
Air and Water Balance		67,736	SF	67,736	0.09%	\$21,946	\$0	\$0
Commissioning		67,736	SF	67,736	0.06%	\$14,631	\$0	\$0
Temperature Controls		67,736	SF	67,736	1.49%	\$365,774	\$0	\$0
Clean/Sanitize All Ductwork and Grilles		1	Allowance	1	1.32%	\$324,000	\$0	\$0
HVAC SYSTEMS SUBTOTAL					9.12%	\$2,035,744	\$252,720	\$22,378
6.0 ELECTRICAL SYSTEMS								
Power								
Power for IT Equipment & Upgrades		1	Allowance	1	0.44%	\$108,000	\$0	\$0
Power for new HVAC		1	Allowance	1	0.25%	\$60,480	\$0	\$0
Upgrade Panels and Add New Circuits Throughout Building		67,736	SF	67,736	0.89%	\$0	\$285,304	\$0
Panel Capacity Investigations and Re-tagging		1	Allowance	1	0.20%	\$48,600	\$0	\$0
Lighting								
Replace Lighting with LEDs (New OS, Switching, and Controls)		67,736	SF	67,736	2.97%	\$731,549	\$0	\$0
Replace Exterior Wall Packs		12	EA	12	0.04%	\$10,886	\$0	\$0
Replace Emergency & Exit Lights		67,736	SF	67,736	0.09%	\$21,946	\$0	\$0
Fire Alarm System								
Adjustments to Fire Alarm System		1	Allowance	1	0.20%	\$0	\$63,180	\$0
ELECTRICAL SYSTEMS SUBTOTAL					5.08%	\$981,462	\$348,484	\$0
7.0 SECURITY								
Security								
Security Allowance - Cameras / Surveillance		1	Allowance	1	0.00%	\$0	\$280,800	\$0
Security Allowance - Access Controls		1	Allowance	1	0.00%	\$0	\$105,300	\$0
SECURITY SYSTEMS SUBTOTAL					1.21%	\$0	\$386,100	\$0
8.0 ABATEMENT								
Abatement								
Abatement Allowance		1	Allowance	1	2.19%	\$0	\$0	\$799,200
ABATEMENT SUBTOTAL					2.19%	\$0	\$0	\$799,200
9.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance		1	Allowance	1	3.29%	\$270,000	\$351,000	\$399,600
FURNITURE & EQUIPMENT SUBTOTAL					3.29%	\$270,000	\$351,000	\$399,600
10.0 TECHNOLOGY								
Technology								
Relocate Data Center from Basement to Above Ground		1	Allowance	1	6.58%	\$1,620,000	\$0	\$0
Re-rack Servers SAN (2020)			EA	-	0.00%	\$0	\$0	\$0
Re-rack Servers Host (2021)			EA	-	0.00%	\$0	\$0	\$0
New Phone System		1	Allowance	1	2.19%	\$0	\$702,000	\$0
TECHNOLOGY SUBTOTAL					10.71%	\$1,778,502	\$908,053	\$234,583
SOFT COSTS								
Building Infrastructure Improvement Total:					78.20%	\$9,774,252	\$5,989,095	\$6,426,039
Project Contingency:		10.00%			6.42%	\$772,575	\$473,004	\$579,186
Permits, Testing & Printing:		2.50%			1.77%	\$212,458	\$130,076	\$159,276
Professional Fees & Costs:		9.00%			7.10%	\$854,528	\$523,179	\$640,624
Construction Manager Fee & Costs:		9.00%			6.51%	\$783,970	\$479,981	\$587,729
PROJECT TOTAL					100.00%	\$12,397,784	\$7,595,335	\$8,392,853

Building 01 – Livonia City Hall

Photos: Provided by City of Livonia



Phone Room Leak Aftermath



Fifth Floor 2013



Fifth Floor Ventilation Grates 2013



First Floor Leak



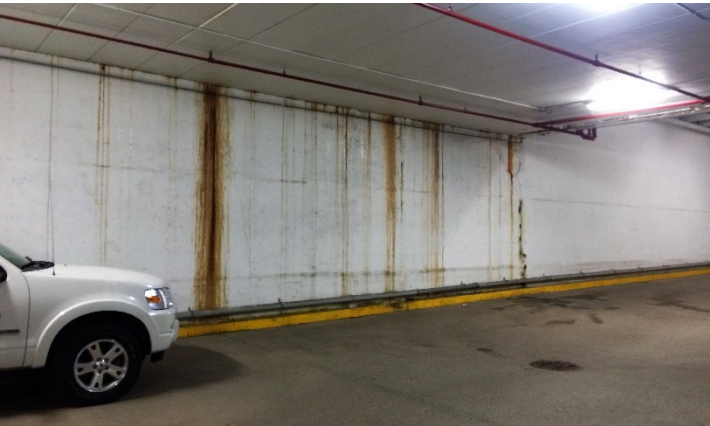
Annex Lobby 2017



Basement Leak Near Elevator 2016

Building 01 – Livonia City Hall

Photos: Provided by City of Livonia



Garage 20107



Garage 2017



Garage 2017



Ruptured Pipe in Annex 2022



Annex Hall Damage 2022

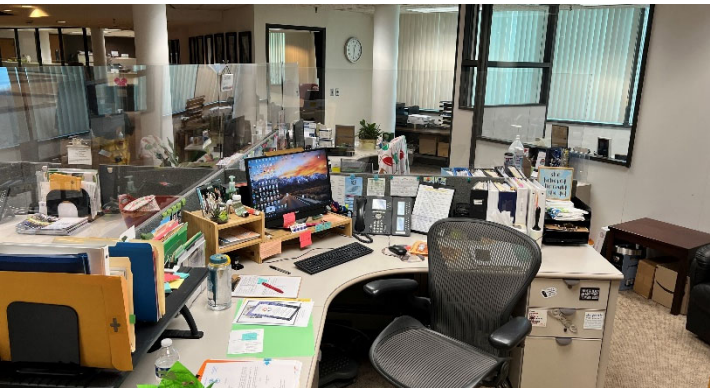
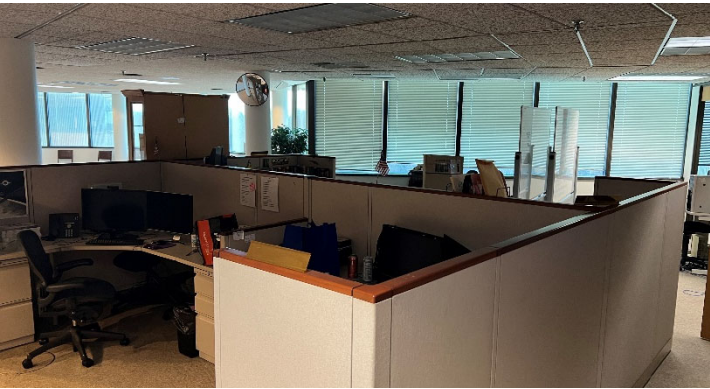
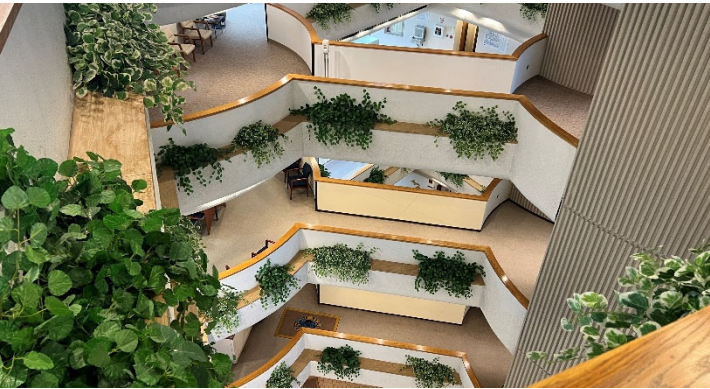


Basement Storage & Sump 2016

SECTION C | Individual Building Assessments

Building 01 – Livonia City Hall

Photos:



Building 01 - Livonia City Hall

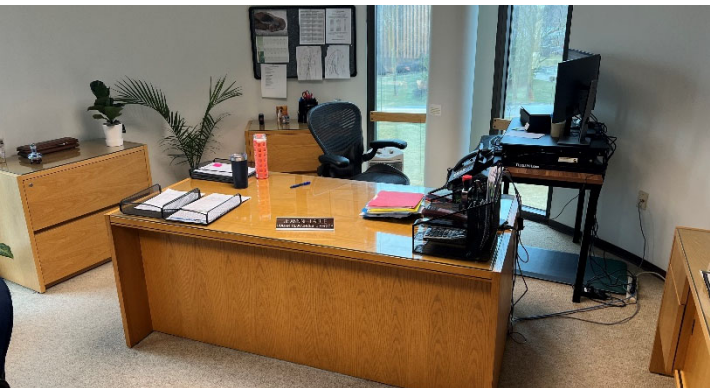
Photos:



SECTION C | Individual Building Assessments

Building 01 – Livonia City Hall

Photos:



SECTION C | Individual Building Assessments

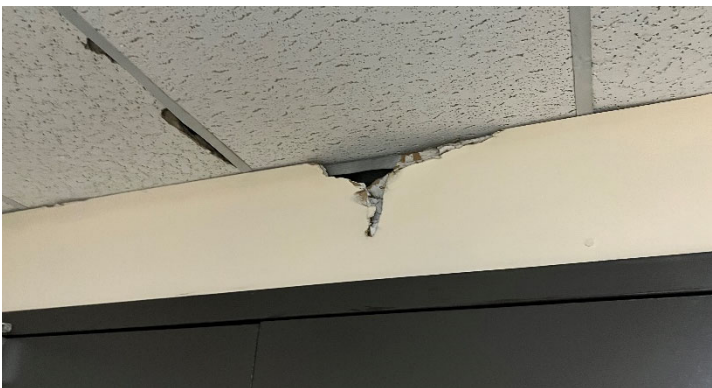
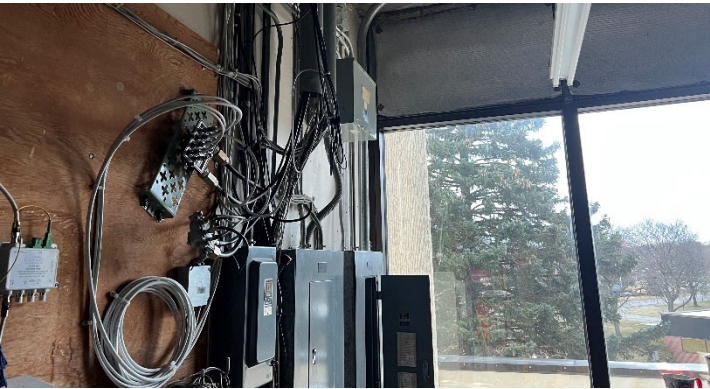
Building 01 – Livonia City Hall

Photos:



Building 01 - Livonia City Hall

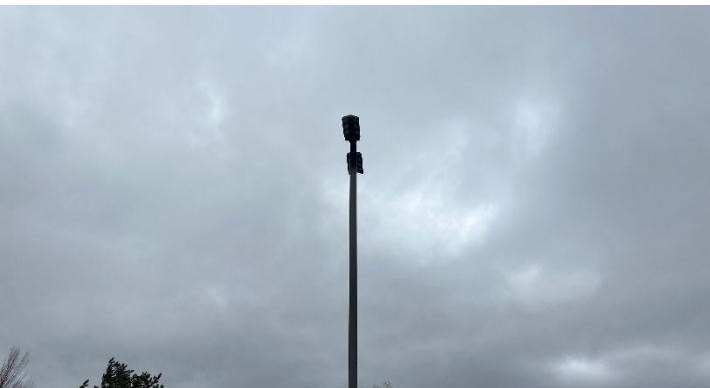
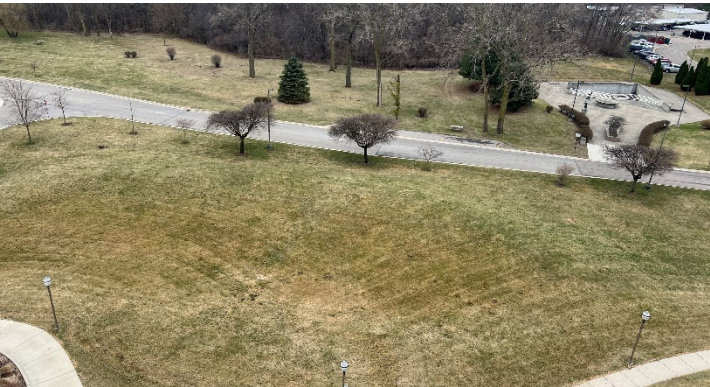
Photos:



SECTION C | Individual Building Assessments

Building 01 – Livonia City Hall

Photos:



Building 01 – Livonia City Hall

Photos:



Building 02 – Livonia Police Department



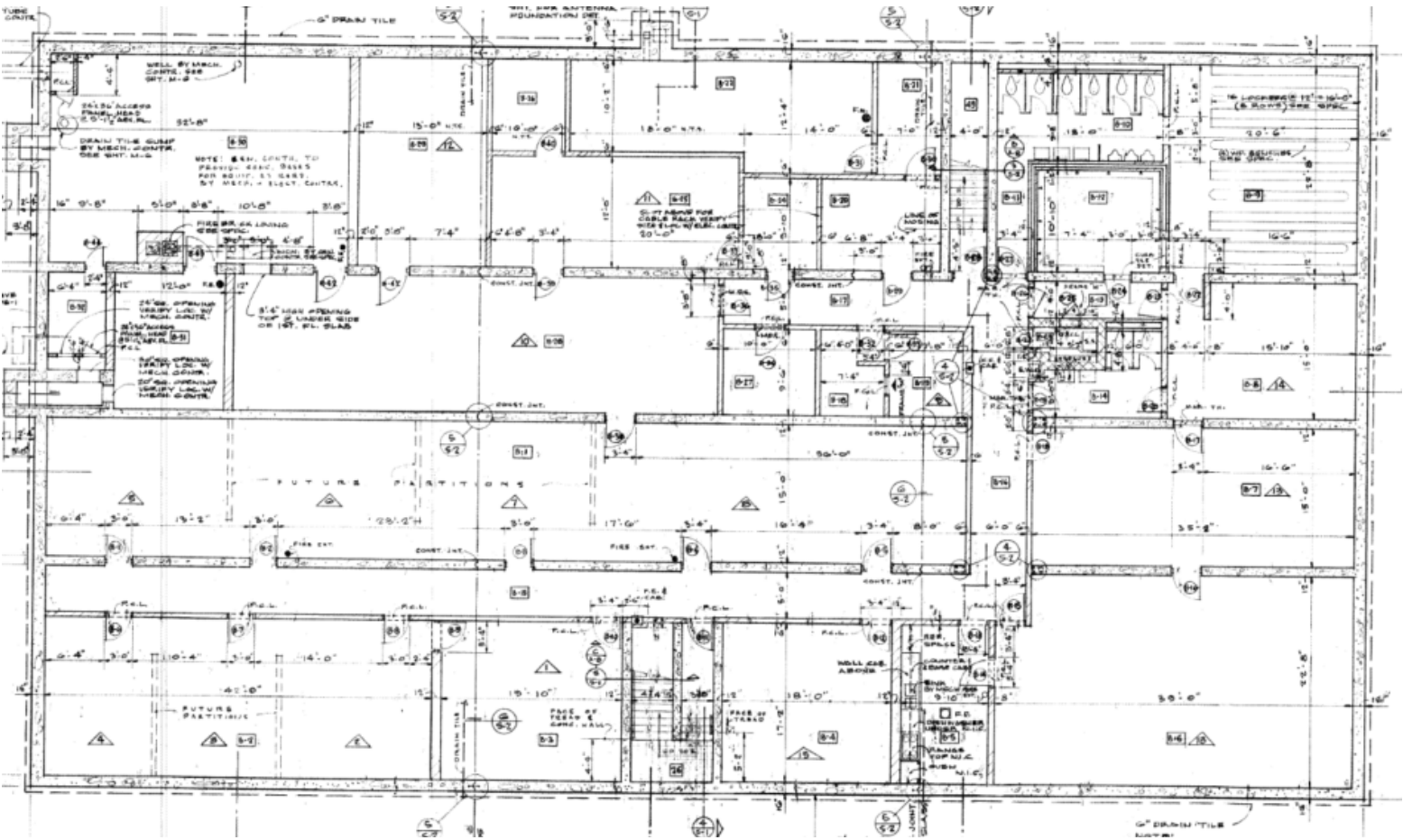
Address:	15050 Farmington Rd. Livonia MI 48154
Year Built:	1961/1987
Square Footage:	59,540
Site Area:	46.48 Acres
Parking Spaces:	76
Stories:	1
Basement:	Yes
Elevator(s):	Yes
Exterior Façade:	Brick
Roof:	PVC
Fire Protection:	No

Site Plan:



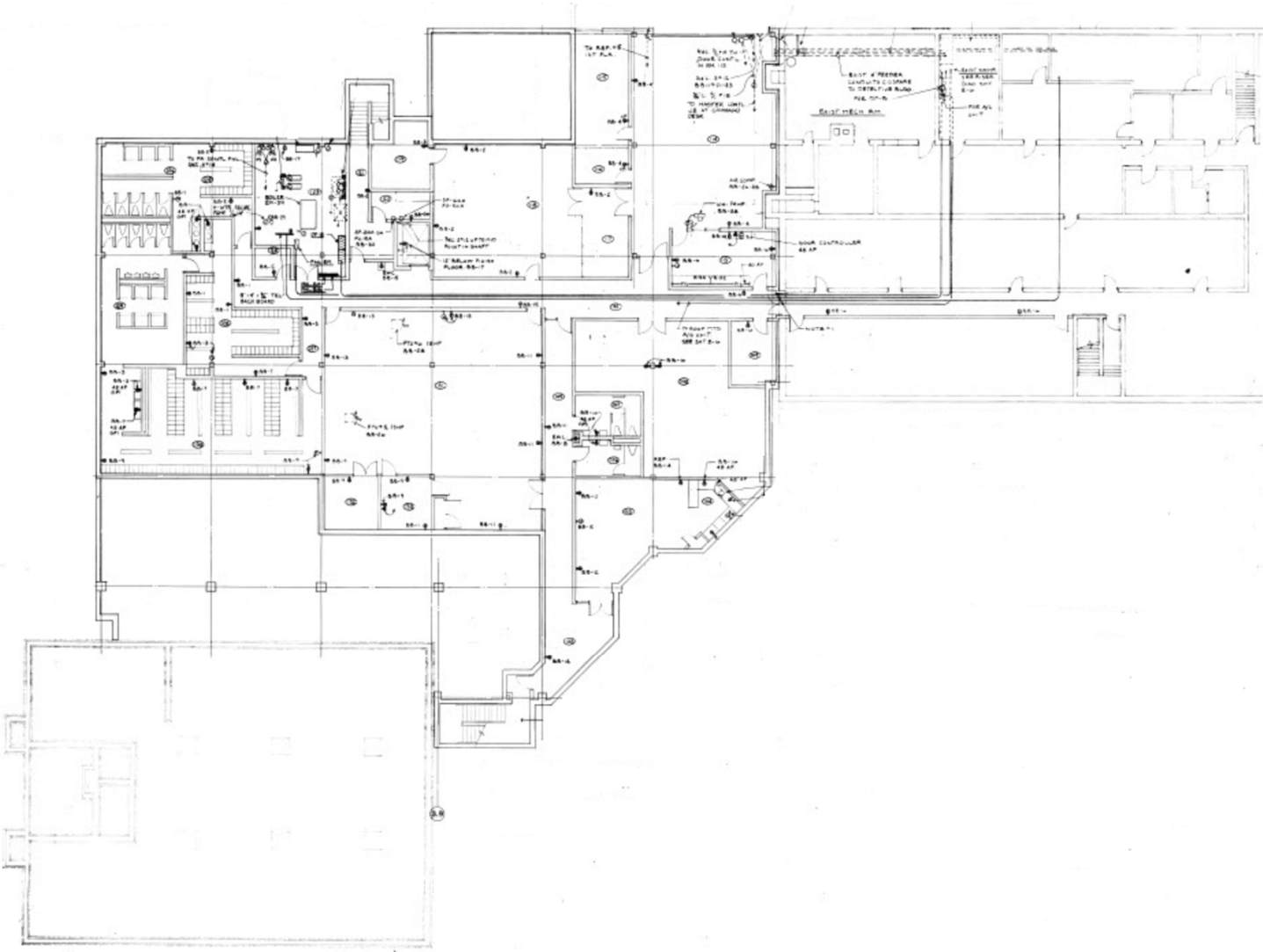
Building 02 - Livonia Police Department

Basement Floor Plan (1961):



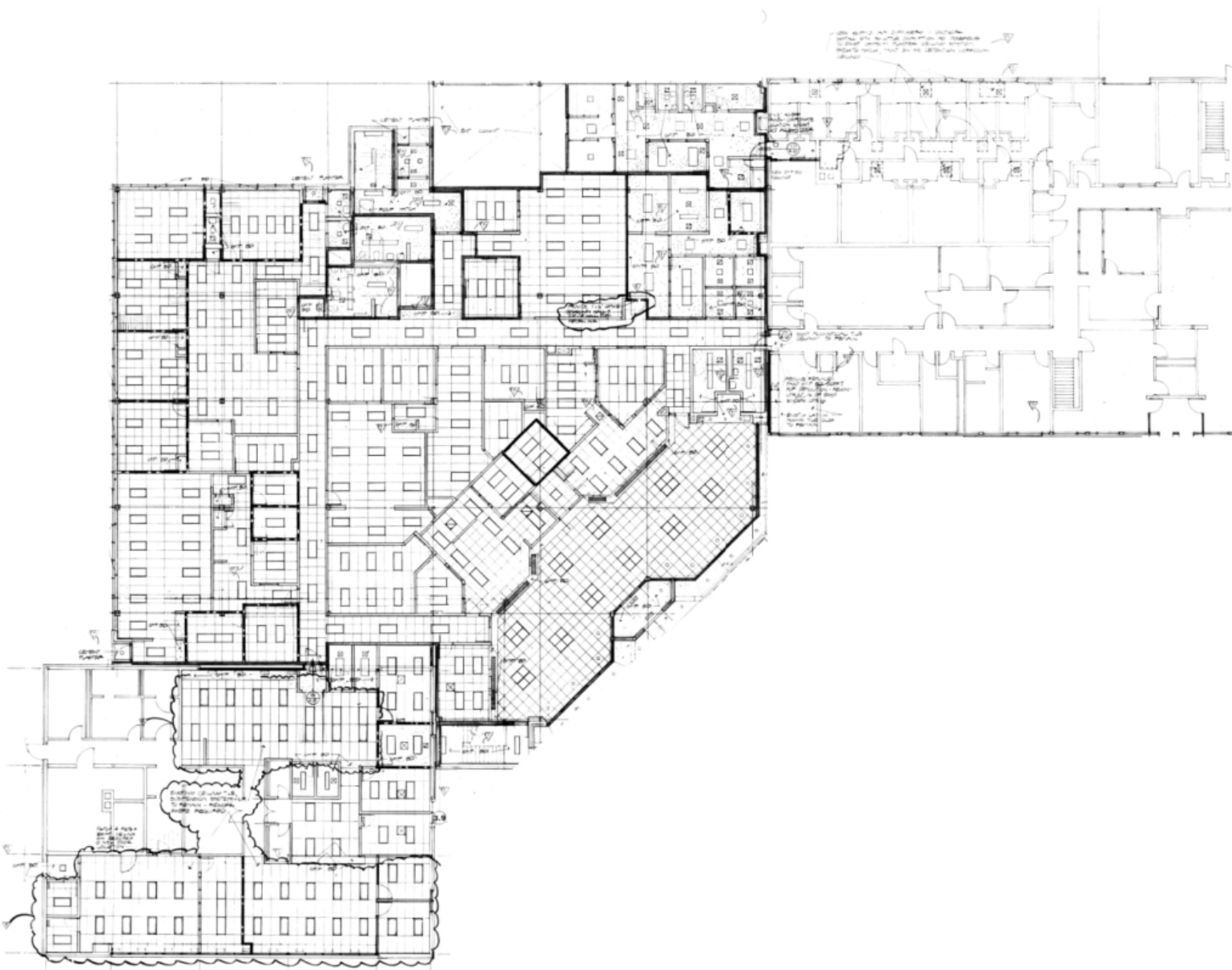
Building 02 – Livonia Police Department

Basement Floor Plan (1986):



Building 02 - Livonia Police Department

1st Floor Plan (1986):



SECTION C | Individual Building Assessments

Building 02 – Livonia Police Department

Summary of Budgets:

Police Department				Cost Data					
Building SF		59,540		Specification Factor =		Geographic Factor =		Cost Escalation Factors	
				Cost Escalation Factor =		1.08		1.30	
						1.48			
						Critical Needs Cost	Deferrable Maintenance Cost	Future Need Cost	
Program Area						(1 - 3 years)	(4 - 6 years)	(7 - 10 years)	
Quantity	# of	As % of							
Per Unit	Units	Total Units	Cost						
1.0 SITE									
Paving									
Pavement and Base Reconstruction	156,000	SF	1	156,000	8.23%	\$0	\$1,314,144	\$0	
Replace Concrete Stairs and Railings	1	Allowance	1	1	0.22%	\$27,000	\$0	\$0	
Selective Sidewalk & Curb Replacement	1	Allowance	1	1	0.39%	\$48,384	\$0	\$0	
Sealcoating/Re-striping	156,000	SF	1	156,000	0.41%	\$50,544	\$0	\$0	
Utilities									
Catch Basin / Manholes	6	EA	1	6	0.24%	\$0	\$37,740	\$0	
Misc. Utility Repairs	1	Allowance	1	1	0.44%	\$0	\$70,200	\$0	
Fire Suppression Utilities	1	Allowance	1	1	0.44%	\$54,000	\$0	\$0	
Misc.									
Monument Sign - Powered & Electronic Display	1	EA	1	1	0.44%	\$54,000	\$0	\$0	
Repairs Needed for Carports	1	Allowance	1	1	1.76%	\$0	\$280,800	\$0	
Rework Concrete Entrance (Ramps and Railings)	1	Allowance	1	1	1.76%	\$216,000	\$0	\$0	
SITE SUBTOTAL						14.33%	\$449,928	\$1,702,884	\$0
2.0 BUILDING ENVELOPE									
Roofing Work									
Existing PVC Roof (Under Warranty- Install Year Unknown)	37000		1	37,000	0.00%	\$0	\$0	\$0	
Install Guard Rails Around Roof Hatch	1	Allowance	1	1	0.04%	\$5,400	\$0	\$0	
Windows									
Replace Exterior Window Systems	1	Allowance	1	1	2.64%	\$324,000	\$0	\$0	
Re-caulk Windows	1	Allowance	1	1	0.75%	\$91,800	\$0	\$0	
Exterior Walls									
Re-Caulk Expansion Joints	1	Allowance	1	1	0.13%	\$16,200	\$0	\$0	
Tuckpointing	1	Allowance	1	1	0.66%	\$81,000	\$0	\$0	
Exterior Doors									
Overhead Door Replacement	2	EA	1	2	0.20%	\$24,192	\$0	\$0	
BUILDING ENVELOPE SUBTOTAL						4.42%	\$542,592	\$0	\$0
3.0 INTERIOR/FINISHES									
Interior Doors & Hardware									
Replace Interior Doors & Hardware	240	EA	1	240	8.44%	\$1,036,800	\$0	\$0	
Walls & Partitions									
Replace Fabric Wall Panels in Line Up Room	1	Allowance	1	1	0.13%	\$16,200	\$0	\$0	
Ceilings									
Remove Existing & Install New Acoustic Tile Ceiling	60,000	SF	1	60,000	4.49%	\$550,800	\$0	\$0	
Flooring									
Remove & Replace Flooring - Carpet	30,000	SF	1	30,000	1.77%	\$108,540	\$141,102	\$0	
Remove & Replace VCT Flooring with LVT	30,000	SF	1	30,000	2.37%	\$0	\$379,080	\$0	
Remove & Replace Carpet- Training Room	1	Allowance	1	1	0.44%	\$54,000	\$0	\$0	
New Tile At Old Lobby Entrance	1	Allowance	1	1	0.04%	\$5,400	\$0	\$0	
Windows									
Remove & Replace Window Treatments	1	Allowance	1	1	0.53%	\$0	\$0	\$95,904	
Paint									
Paint - Basement	1	Allowance	1	1	0.66%	\$81,000	\$0	\$0	
Paint - Interior	59,540	SF	1	59,540	0.79%	\$0	\$125,391	\$0	
Paint Structural Steel in Carports	1	Allowance	1	1	0.53%	\$64,800	\$0	\$0	
Paint Basement	1	Allowance	1	1	0.00%	\$0	\$0	\$0	
Signage									
Replace Interior Signage	59,540	SF	1	59,540	0.21%	\$0	\$33,438	\$0	
Restrooms									
Renovate Toilet Rooms	8	EA	1	8	3.52%	\$432,000	\$0	\$0	
Casework & Countertops									
Replace Misc. Casework/Millwork	1	Allowance	1	1	0.35%	\$21,600	\$0	\$31,968	
Other									
Elevator Cab Upgrade	1	Allowance	1	1	0.53%	\$0	\$84,240	\$0	
Renovate Various Locker Rooms	1	Allowance	1	1	8.80%	\$1,080,000	\$0	\$0	
Renovate Cafeteria / Lounge (In Process)	1	Allowance	1	1	0.09%	\$10,800	\$0	\$0	
INTERIOR/FINISHES SUBTOTAL						33.68%	\$3,461,940	\$763,251	\$127,872
4.0 PLUMBING SYSTEMS									
Fire Protection									
New Fire Suppression System	40,000	SF	1	40,000	1.76%	\$216,000	\$0	\$0	
Equipment & Fixtures									
Existing Lochinvar Hot Water Heater, Serial # 102522081, 2015	1	EA	1	1	0.07%	\$0	\$11,232	\$0	
Existing Lochinvar Hot Water Heater, Serial # AB4230360, 2004- Replaced 2022	1	EA	1	1	0.07%	\$0	\$0	\$0	
Existing Lochinvar Hot Water Heater, Serial # AB4258516, 2004- Replaced 2022	1	EA	1	1	0.07%	\$0	\$0	\$0	
Existing Lochinvar Hot Water Heater, Serial # 1243A006858, 2012	1	EA	1	1	0.07%	\$8,640	\$0	\$0	
Provide Bottle Filler Drinking Fountains	6	EA	1	6	0.35%	\$43,546	\$0	\$0	
Piping									
Replace Piping, Valves & Unions	1	O			0.00%	\$0	\$0	\$0	
	1	Allowance	1	1	0.22%	\$0	\$0	\$39,960	
PLUMBING SYSTEMS SUBTOTAL						2.62%	\$268,186	\$11,232	\$39,960

SECTION C | Individual Building Assessments

Building 02 – Livonia Police Department

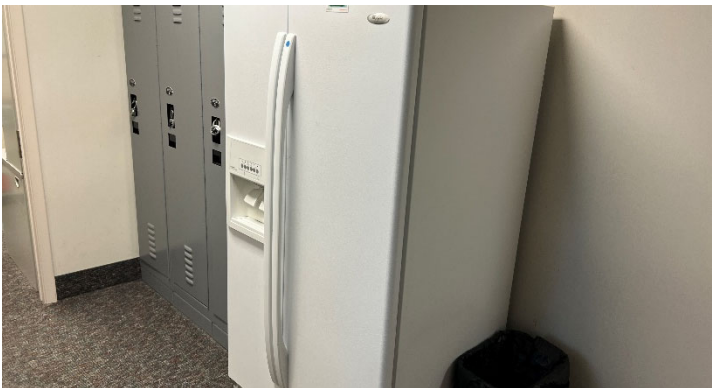
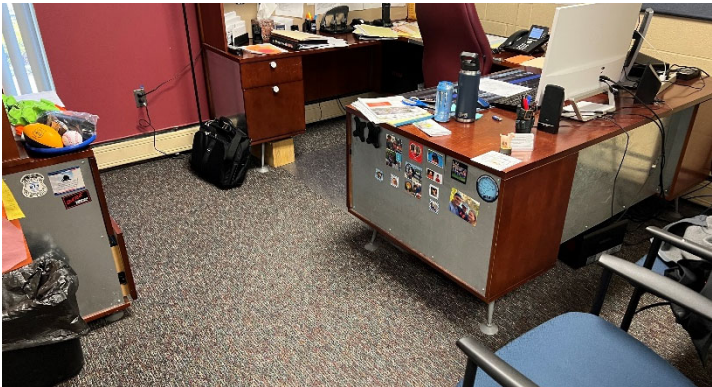
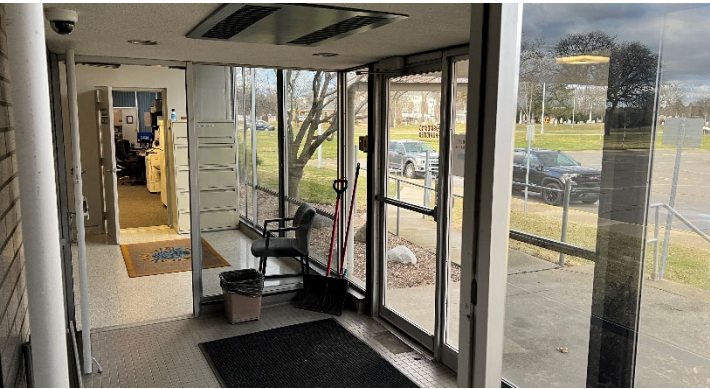
Summary of Budgets:

Police Department						Cost Data		
Building SF						Specification Factor =	Geographic Factor =	Cost Escalation Factor =
59,540						1.08	1.30	1.48
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
5.0 HVAC SYSTEMS								
Equipment								
Existing Lochinvar Boiler, 2009	1	EA	1	1	0.00%	\$0	\$0	\$0
Existing Lochinvar Boiler, Serial # I09H00221808, 2009	1	EA	1	1	0.00%	\$0	\$0	\$0
Existing Carrier Roof Top Unit, Serial # 2496G21157, 1996 (In Process)	1	EA	1	1	0.22%	\$27,000	\$0	\$0
Existing Trane Roof Top Unit, Serial # C13H04967, 2013	1	EA	1	1	0.22%	\$0	\$0	\$39,960
Existing Liebert Condensing Unit, Serial # 0739C03857, 2007	1	EA	1	1	0.22%	\$0	\$0	\$39,960
Existing Liebert Condensing Unit, Serial # 0112C46261, 2001	1	EA	1	1	0.22%	\$0	\$0	\$39,960
Existing Carrier Air Handling Unit, Serial # 2213U21703, 2021		EA	-	-	0.00%	\$0	\$0	\$0
Existing Trane Chiller, Serial # J98H82634, 1998	1	EA	1	1	0.88%	\$108,000	\$0	\$0
Existing Fujitsu Split System, Serial # BWB 000063, 2017	1	EA	1	1	0.12%	\$0	\$0	\$22,378
Existing Fujitsu Split System, Serial # BWP 000546, 2016	1	EA	1	1	0.12%	\$0	\$0	\$22,378
Existing Fujitsu Split System, Serial # QVA 017109, 2019	1	EA	1	1	0.12%	\$0	\$0	\$22,378
Existing Fujitsu Split System, Serial # QVN 012696, 2019	1	EA	1	1	0.12%	\$0	\$0	\$22,378
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.22%	\$0	\$0	\$39,960
Other HVAC								
Air and Water Balance	59,540	SF	1	59,540	0.16%	\$0	\$0	\$28,551
Commissioning	59,540	SF	1	59,540	0.10%	\$0	\$0	\$19,034
Temperature Controls	59,540	SF	1	59,540	1.47%	\$0	\$0	\$266,472
HVAC SYSTEMS SUBTOTAL					4.32%	\$135,000	\$0	\$584,890
6.0 ELECTRICAL SYSTEMS								
Power								
Power for IT Equipment & Upgrades	1	Allowance	1	1	0.18%	\$21,600	\$0	\$0
Replace Existing Electrical Panels	1	Allowance	1	1	0.44%	\$0	\$0	\$79,920
Power for new HVAC	1	Allowance	1	1	0.49%	\$60,480	\$0	\$89,510
Miscellaneous Power Allowance	59,540	SF	1	59,540	0.21%	\$25,721	\$0	\$0
Panel Capacity Investigations and Re-tagging	1	Allowance	1	1	0.15%	\$18,144	\$0	\$0
Lighting								
Replace Lighting with LED's (New OS, Switching, etc.)	59,540	SF	1	59,540	3.82%	\$469,413	\$0	\$0
Replace Exterior Wall Packs	12	EA	1	12	0.09%	\$10,886	\$0	\$0
Fire Alarm System								
Adjustments to Fire Alarm System	1	Allowance	1	1	0.10%	\$0	\$0	\$17,902
Other								
Replace PA System	1	Allowance	1	1	0.88%	\$108,000	\$0	\$0
ELECTRICAL SYSTEMS SUBTOTAL					6.36%	\$714,245	\$0	\$187,332
7.0 SECURITY								
Security								
Security Allowance - Cameras / Surveillance	1	Allowance	1	1	0.00%	\$0	\$0	\$119,880
Security Allowance - Access Controls	1	Allowance	1	1	0.00%	\$0	\$0	\$119,880
Security Allowance	1	Allowance	1	1	0.88%	\$36,000	\$46,800	\$53,280
SECURITY SYSTEMS SUBTOTAL					2.20%	\$36,000	\$46,800	\$293,040
8.0 ABATEMENT								
Abatement								
Abatement Allowance	1	Allowance	1	1	4.40%	\$540,000	\$0	\$0
ABATEMENT SUBTOTAL					4.40%	\$540,000	\$0	\$0
9.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance	1	Allowance	1	1	2.46%	\$151,200	\$0	\$223,776
Other								
Replace Jail Metal Benches/Cots	1	Allowance	1	1	0.66%	\$81,000	\$0	\$0
FURNITURE & EQUIPMENT SUBTOTAL					3.12%	\$232,200	\$0	\$223,776
10.0 TECHNOLOGY								
Technology								
Primary Dispatch Center - 2020		EA	-	-	0.00%	\$0	\$0	\$0
Primary Dispatch Center Equipment - 2021		EA	-	-	0.00%	\$0	\$0	\$0
Laptop/Desktop Replacement (Every 5 Years) \$2,400/Each		EA	-	-	0.00%	\$0	\$0	\$0
TECHNOLOGY SUBTOTAL					0.00%	\$0	\$0	\$0
SOFT COSTS								
Building Infrastructure Improvement Total:					75.44%	\$6,380,091	\$2,524,166	\$1,456,870
Project Contingency:	10.00%				7.23%	\$614,789	\$252,417	\$123,309
Permits, Testing & Printing:	2.50%				1.99%	\$169,067	\$69,415	\$33,910
Professional Fees & Costs:	9.00%				8.00%	\$680,004	\$279,192	\$136,390
Construction Manager Fee & Costs:	9.00%				7.34%	\$623,857	\$256,140	\$125,128
PROJECT TOTAL					100.00%	\$8,467,808	\$3,381,330	\$1,875,608

SECTION C | Individual Building Assessments

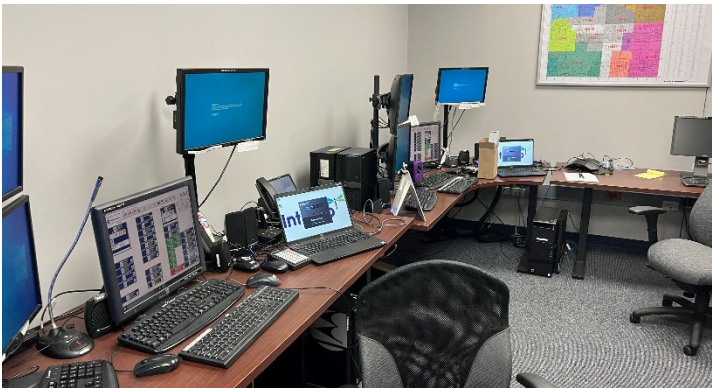
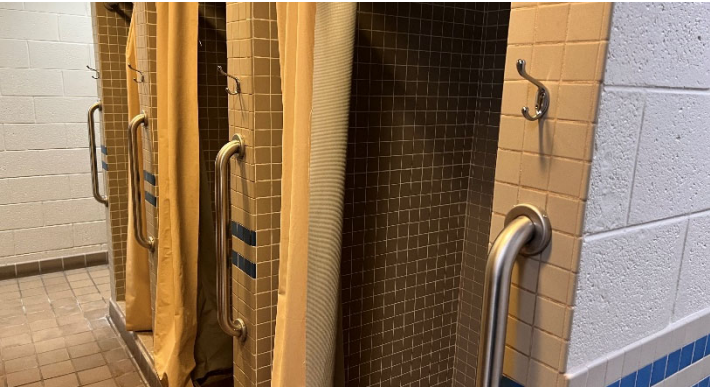
Building 02 – Livonia Police Department

Photos:



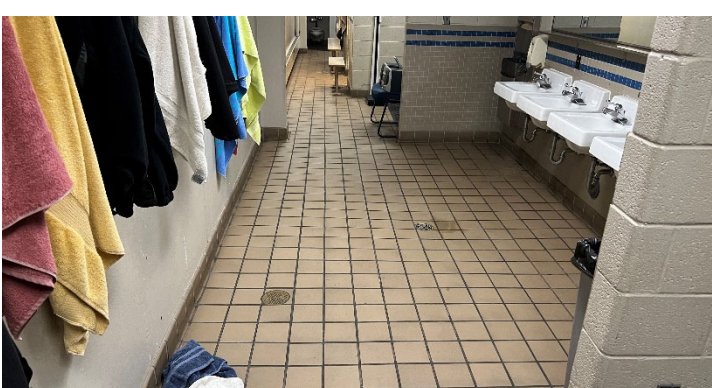
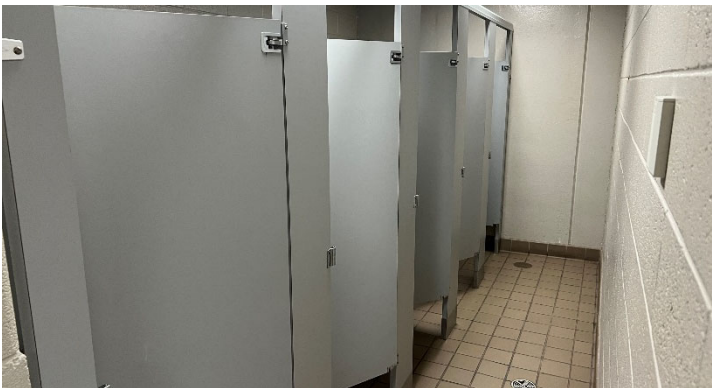
Building 02 – Livonia Police Department

Photos:



Building 02 – Livonia Police Department

Photos:



Building 02 – Livonia Police Department

Photos:



SECTION C | Individual Building Assessments

Building 02 – Livonia Police Department

Photos:



Building 03 – Station No. 1



Address:	14910 Farmington Rd. Livonia MI 48154
Year Built:	1967 – 2018 (Addition)
Square Footage:	13,137
Site Area:	46.48 Acres
Parking Spaces:	26
Stories:	1
Basement:	Yes
Elevator(s):	No
Exterior Façade:	Brick
Roof:	PVC (Addition) & Tar
Fire Protection:	No

Space Needs Summary:

1. Four additional beds are required
2. Additional storage is required
3. Site circulation could be improved
4. The public entrance is difficult to locate
5. The entrance lobby is too small
6. Two additional apparatus bays are required
7. Additional offices for future Fire Investigator, EMS Coordinator, and Admin Chief are required
8. Current Training Room is too small
9. Separate Locker Rooms with showers are required for admin staff and fire staff
10. A Turnout Gear/Work Room is required
11. Current Kitchen is too small

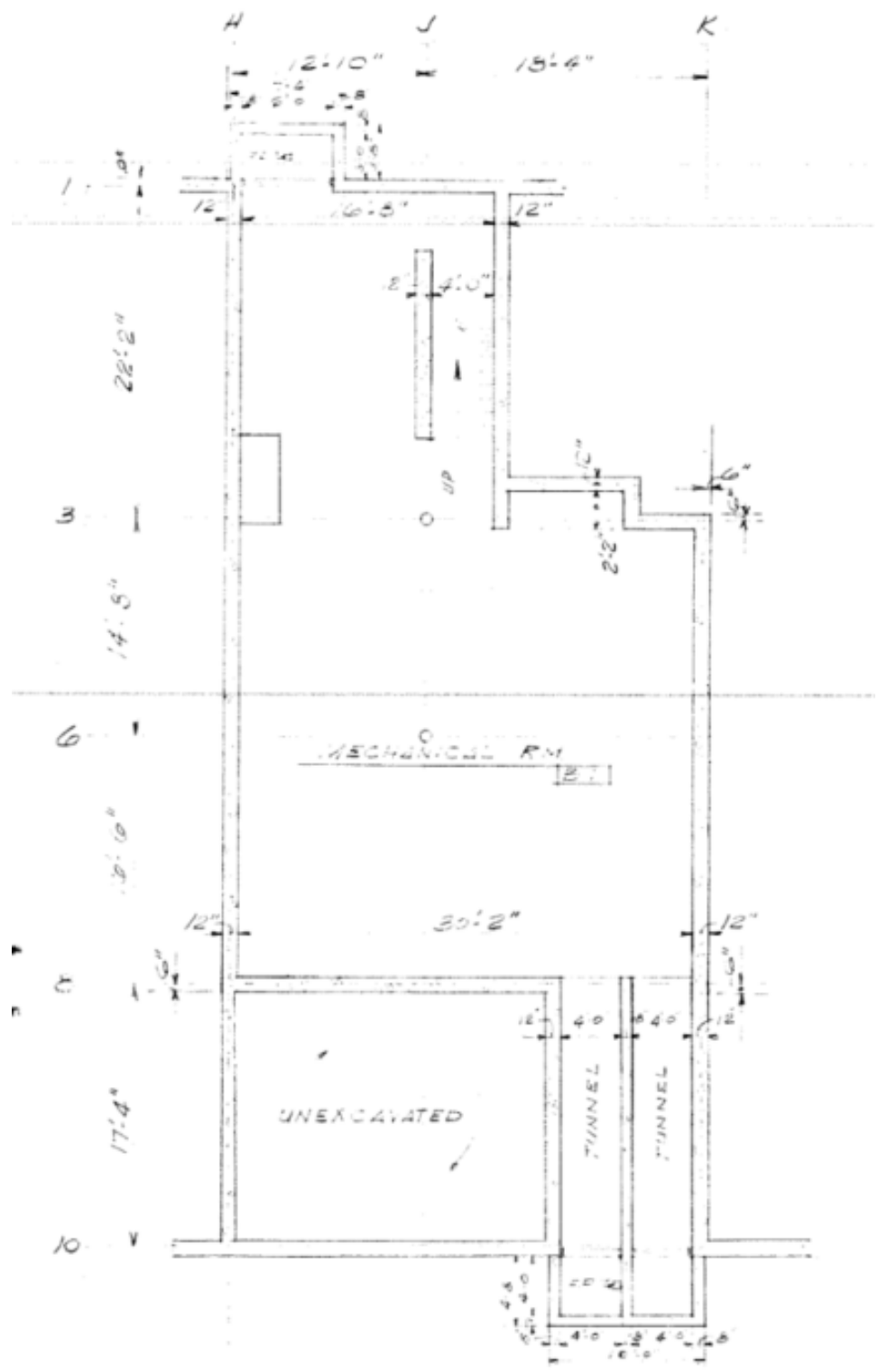
Building 03 – Station No. 1

Site Plan:



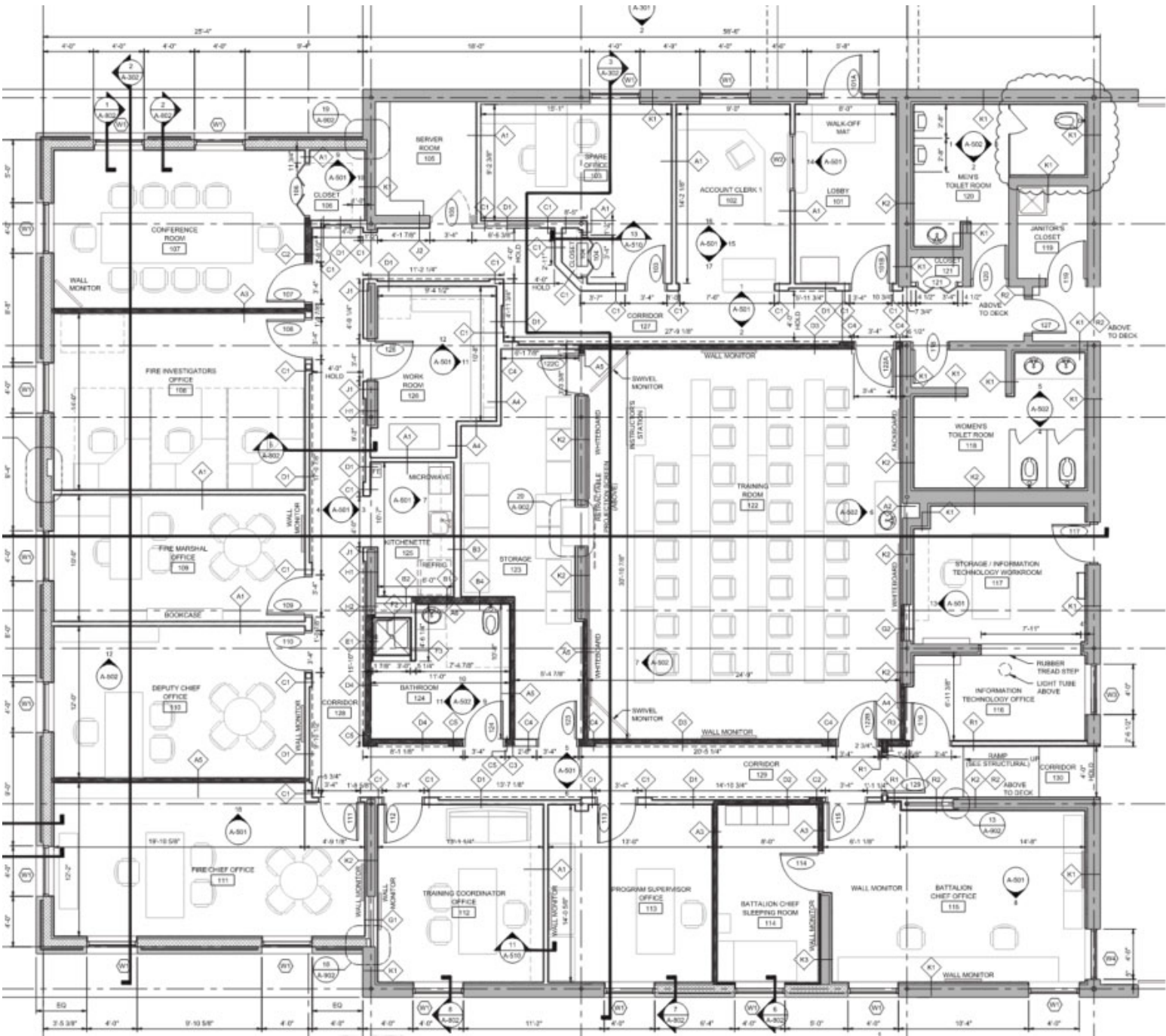
Building 03 - Station No. 1

Basement Floor Plan:



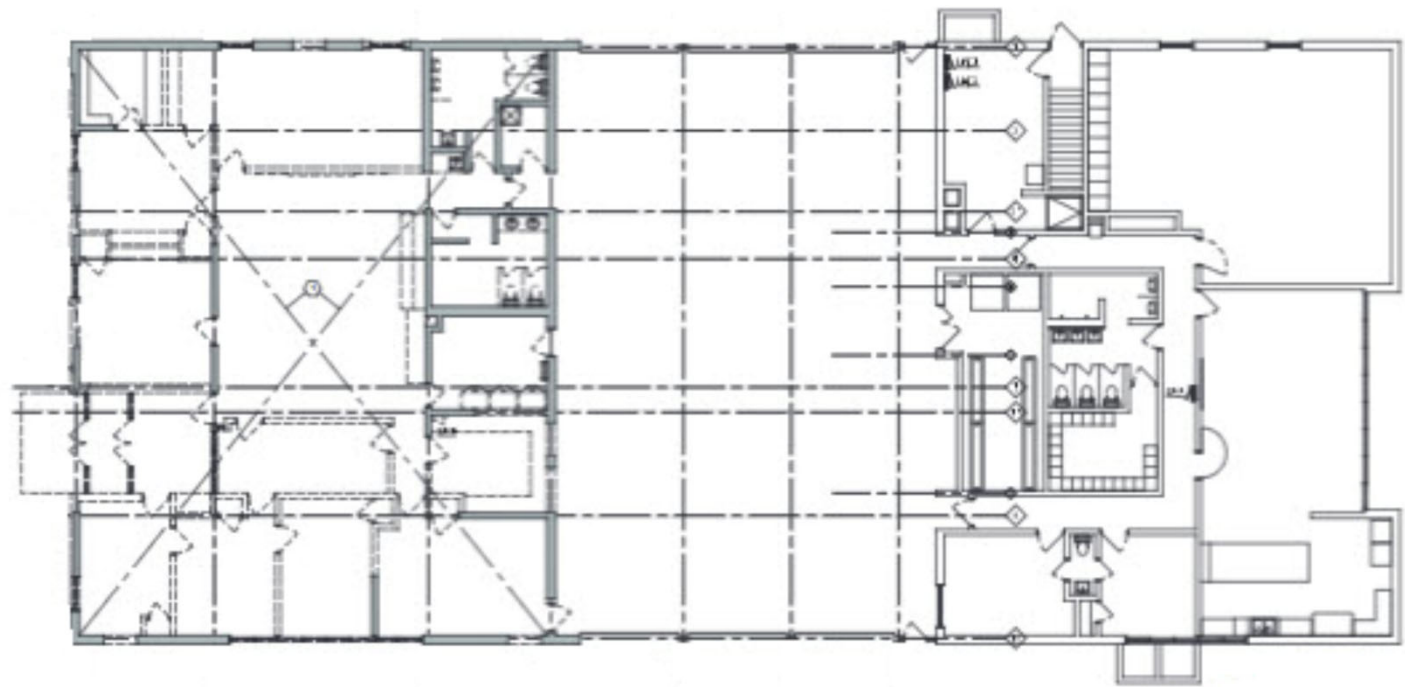
Building 03 – Station No. 1

1st Floor Plan (W/ Addition- 2017):

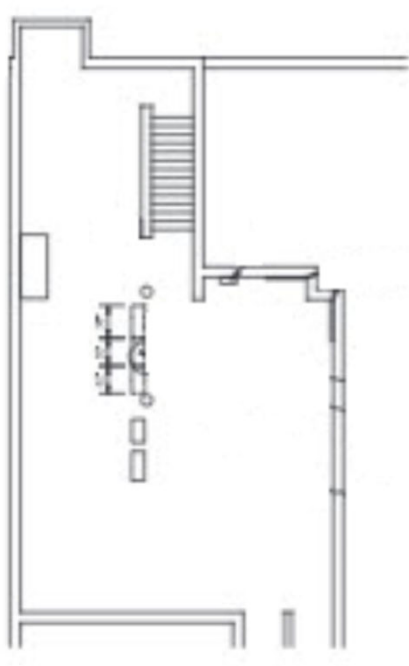


Building 03 – Station No. 1

1st Floor Plan:



Basement Floor Plan:



Penthouse Floor Plan:



SECTION C | Individual Building Assessments

Building 03 – Station No. 1

Summary of Budgets:

Program Area	Quantity per Unit	Unit	No. of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
1.0 SITE								
Paving								
Selective Sidewalk & Curb Replacement	1	Allowance	1	1	0.42%	\$10,800	\$0	\$0
Landscaping								
Improve Landscaping	1	Allowance	1	1	0.21%	\$0	\$0	\$7,992
Utilities								
Misc. Utility Repairs	1	Allowance	1	1	0.42%	\$0	\$0	\$15,984
Misc.								
Monument Sign - Powered & Electronic Display	1	EA	1	1	2.12%	\$0	\$70,200	\$0
SITE SUBTOTAL					3.18%	\$10,800	\$70,200	\$23,976
2.0 BUILDING ENVELOPE								
Roofing Work								
Replace Roof (EPDM) - .60 Mil/Reinforced/Fully-Adhered (Old Portion of Bldg.)- In Process	12,000	SF	1	12,000	17.83%	\$453,600	\$0	\$0
Windows								
Re-caulk Windows	1	Allowance	1	1	0.64%	\$16,200	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints	1	Allowance	1	1	0.64%	\$16,200	\$0	\$0
Tuckpointing	1	Allowance	1	1	1.27%	\$32,400	\$0	\$0
Exterior Doors								
Exterior Hollow Metal Doors/Frames/Hardware- Single Door	1	EA	1	1	0.13%	\$3,240	\$0	\$0
BUILDING ENVELOPE SUBTOTAL					20.50%	\$521,640	\$0	\$0
3.0 INTERIOR/FINISHES								
Interior Doors & Hardware								
Replace Interior Doors & Hardware	35	EA	1	35	5.94%	\$151,200	\$0	\$0
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling	12,000	SF	1	12,000	0.00%	\$0	\$143,208	\$0
Flooring								
Remove & Replace Flooring - Carpet	6,000	SF	1	6,000	1.71%	\$0	\$0	\$64,256
Remove & Replace Corridor Flooring - LVT	2,500	SF	1	2,500	0.96%	\$0	\$0	\$35,964
Paint								
Paint - Interior	13,137	SF	1	13,137	0.84%	\$0	\$0	\$31,497
Restrooms								
Renovate Toilet/Locker Rooms	2	EA	1	2	1.43%	\$36,288	\$0	\$0
Lockers								
Replace Lockers by Dormitory	1	Allowance	1	1	2.12%	\$54,000	\$0	\$0
Casework & Countertops								
Replace Misc. Casework/Millwork	1	Allowance	1	1	2.12%	\$0	\$0	\$79,920
INTERIOR/FINISHES SUBTOTAL					19.44%	\$241,488	\$143,208	\$211,637
4.0 PLUMBING SYSTEMS								
Fire Protection								
New Fire Suppression System	13,137	SF	1	13,137	2.79%	\$70,940	\$0	\$0
Equipment & Fixtures								
Existing Lochinvar Hot Water Heater, Serial # 1326A008396, 2013	1	EA	1	1	0.34%	\$0	\$11,232	\$0
Replace Flush Valves & Faucets	1	Allowance	1	1	0.48%	\$0	\$0	\$17,902
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.64%	\$0	\$0	\$23,976
PLUMBING SYSTEMS SUBTOTAL					4.24%	\$70,940	\$11,232	\$41,878
5.0 HVAC SYSTEMS								
Equipment								
Existing Lochinvar Boiler, Serial # G985529, 1998	1	EA	1	1	3.18%	\$0	\$105,300	\$0
Existing Lochinvar Boiler, Serial # G985530, 1998	1	EA	1	1	3.18%	\$0	\$105,300	\$0
Replace Boiler Pumps	2	EA	1	2	0.71%	\$0	\$23,587	\$0
Existing Trane Split System Heat Pump, Serial # 180251043X, 2018	1	EA	1	1	0.00%	\$0	\$0	\$0
Existing Trane Split System Heat Pump, Serial #, 180452187X, 2018	1	EA	1	1	0.00%	\$0	\$0	\$0
Existing Trane Roof Top Unit, Serial # 181312500L, 2018	1	EA	1	1	0.00%	\$0	\$0	\$0
Existing Trane Roof Top Unit Serial # 181410054D, 2018	1	EA	1	1	0.00%	\$0	\$0	\$0
Existing Trane Roof Top Unit Serial # N26101795D, 1998	1	EA	1	1	1.06%	\$0	\$0	\$39,960
Replace Exhaust Fans	5	EA	1	5	0.83%	\$0	\$27,518	\$0
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.64%	\$0	\$0	\$23,976
Other HVAC								
Air and Water Balance	13,137	SF	1	13,137	0.17%	\$0	\$5,533	\$0
Commissioning	13,137	SF	1	13,137	0.11%	\$0	\$3,689	\$0
Temperature Controls	13,137	SF	1	13,137	1.56%	\$0	\$51,644	\$0
HVAC SYSTEMS SUBTOTAL					11.45%	\$0	\$322,572	\$63,936

SECTION C | Individual Building Assessments

Building 03 – Station No. 1

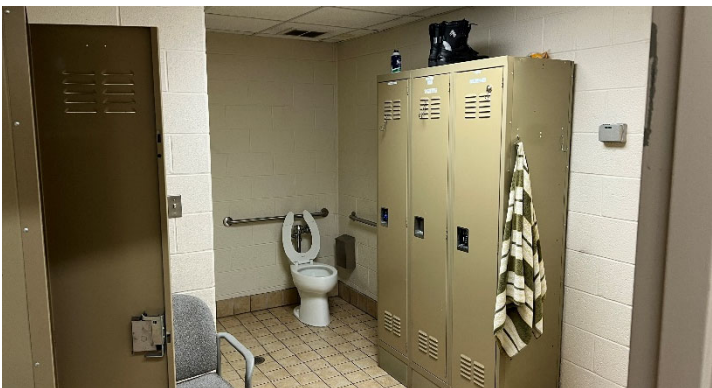
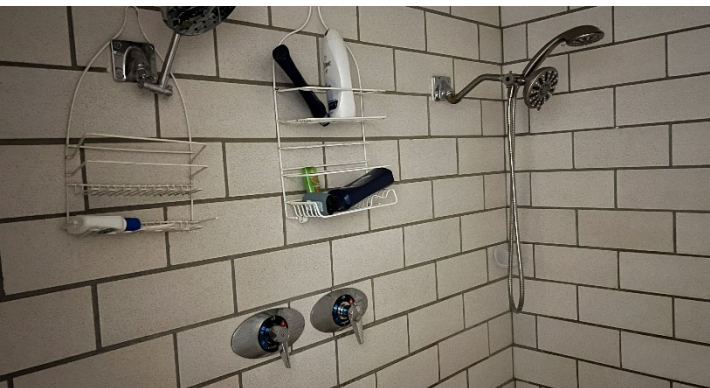
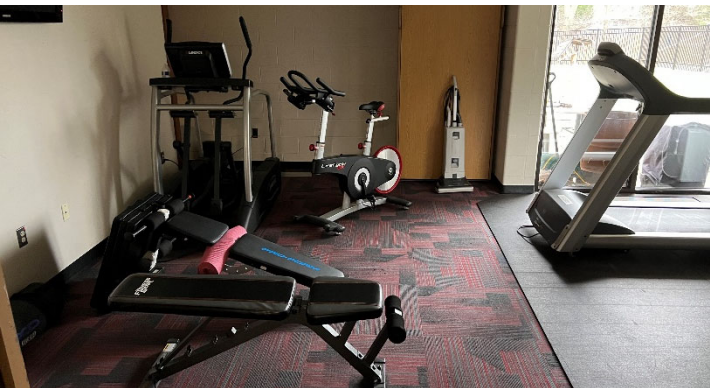
Summary of Budgets:

Program Area	Quantity per Unit	Unit	No. of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
6.0 ELECTRICAL SYSTEMS								
Power								
Power for IT Equipment & Upgrades	1	Allowance	1	1	0.85%	\$0	\$0	\$31,968
Power for new HVAC	1	Allowance	1	1	2.38%	\$0	\$0	\$89,510
Lighting								
Replace Lighting with LED's (New OS, Switching, etc.)	12,000	SF	1	12,000	3.72%	\$0	\$122,990	\$0
Replace Exterior Wall Packs	10	EA	1	10	0.36%	\$0	\$0	\$13,427
Fire Alarm System								
Replace Fire Alarm System	13,137	SF	1	13,137	1.23%	\$31,214	\$0	\$0
Other								
Existing Kohler Generator	1	EA	1		0.00%	\$0	\$0	\$0
ELECTRICAL SYSTEMS SUBTOTAL					8.53%	\$31,214	\$122,990	\$134,905
7.0 SECURITY								
Security								
Security Allowance - Cameras / Surveillance	1	Allowance	1	1	0.00%	\$0	\$0	\$47,952
Security Allowance - Access Controls	1	Allowance	1	1	0.00%	\$0	\$0	\$47,952
SECURITY SYSTEMS SUBTOTAL					2.55%	\$0	\$0	\$95,904
8.0 ABATEMENT								
Abatement								
Abatement Allowance	1	Allowance	1	1	2.38%	\$60,480	\$0	\$0
ABATEMENT SUBTOTAL					2.38%	\$60,480	\$0	\$0
9.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance	1	Allowance	1	1	3.18%	\$81,000	\$0	\$0
FURNITURE & EQUIPMENT SUBTOTAL					3.18%	\$81,000	\$0	\$0
SOFT COSTS								
Building Infrastructure Improvement Total:					75.46%	\$1,017,561	\$670,202	\$572,236
Project Contingency:	10.00%				7.23%	\$93,656	\$67,020	\$57,224
Permits, Testing & Printing:	2.50%				1.99%	\$25,755	\$18,431	\$15,736
Professional Fees & Costs:	9.00%				7.99%	\$103,591	\$74,130	\$63,294
Construction Manager Fee & Costs:	9.00%				7.33%	\$95,038	\$68,009	\$58,068
PROJECT TOTAL					100.00%	\$1,335,601	\$897,792	\$766,557

SECTION C | Individual Building Assessments

Building 03 – Station No. 1

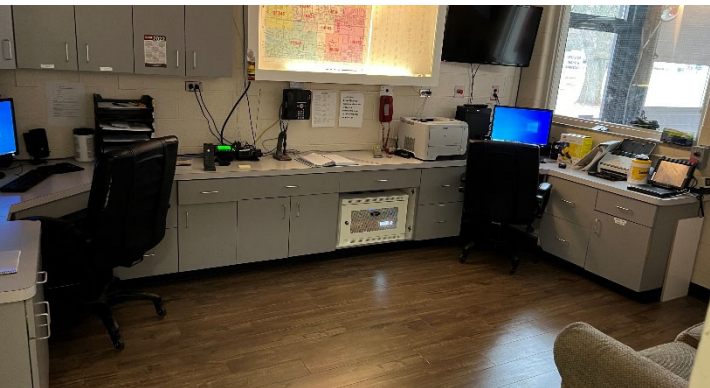
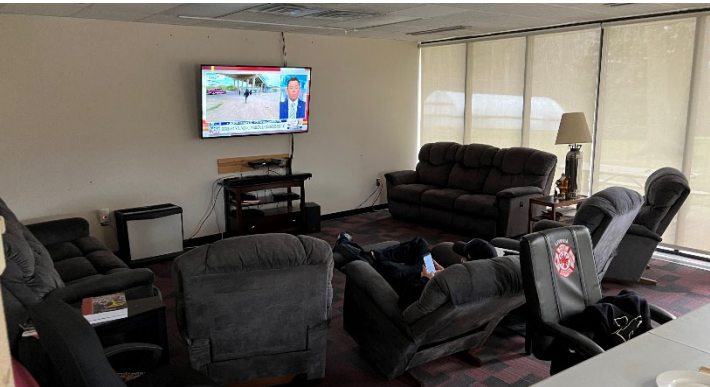
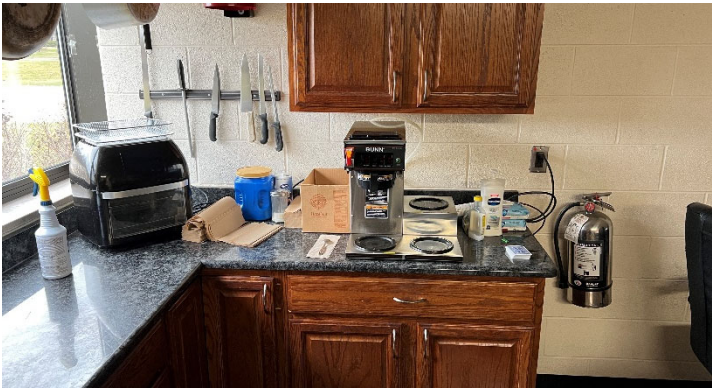
Photos:



SECTION C | Individual Building Assessments

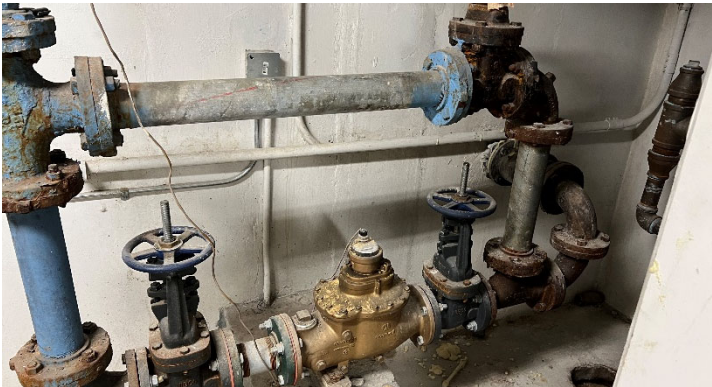
Building 03 – Station No. 1

Photos:



Building 03 – Station No. 1

Photos:



Building 04 – Livonia Civic Center Library



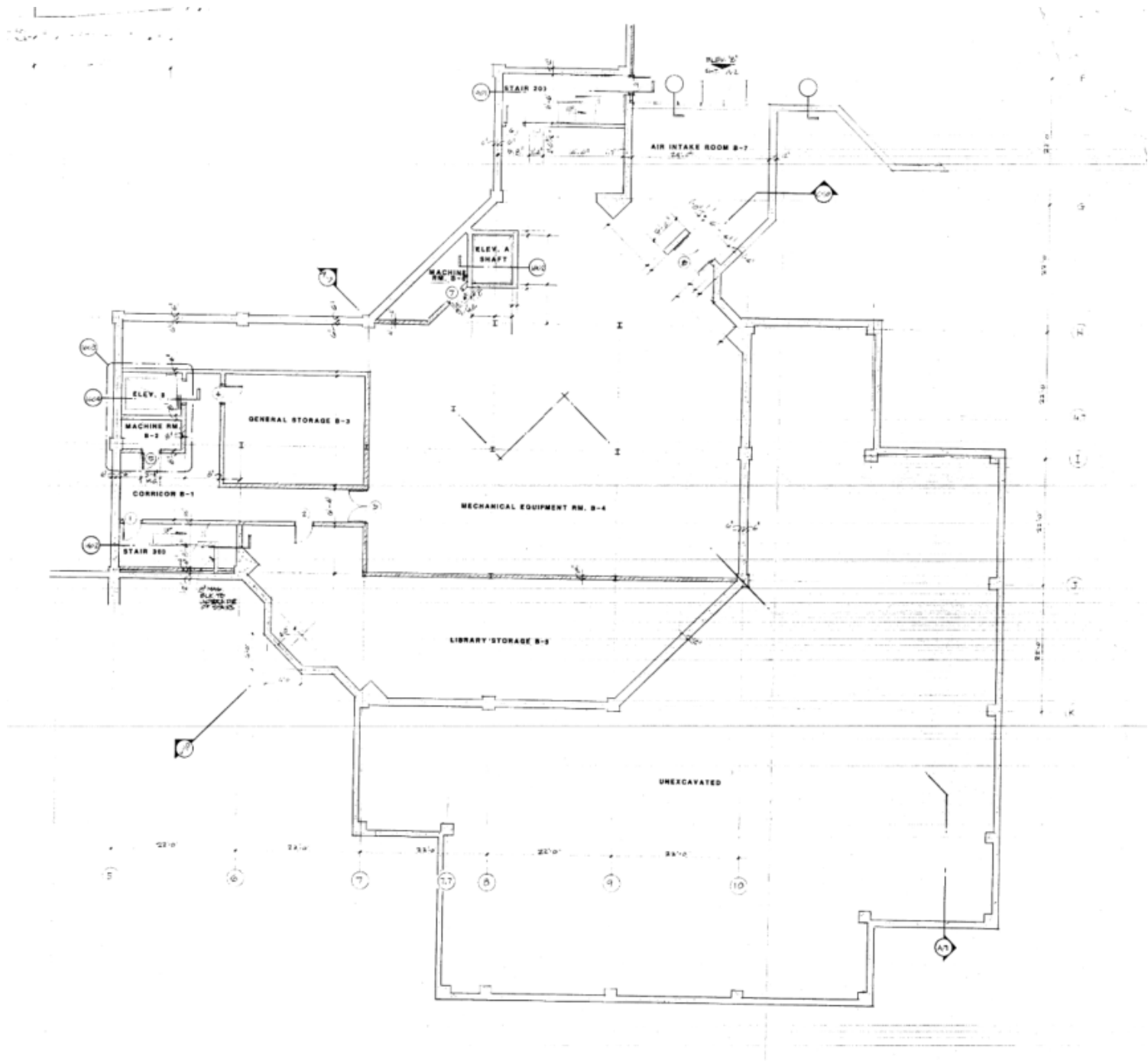
Address:	32777 Five Mile Rd. Livonia MI 48154
Year Built:	1987
Square Footage:	64,000
Site Area:	3.85
Parking Spaces:	197
Stories:	3
Basement:	Yes
Elevator(s):	No
Exterior Façade:	Brick & Limestone
Roof:	TPO
Fire Protection:	Yes

Site Plan:



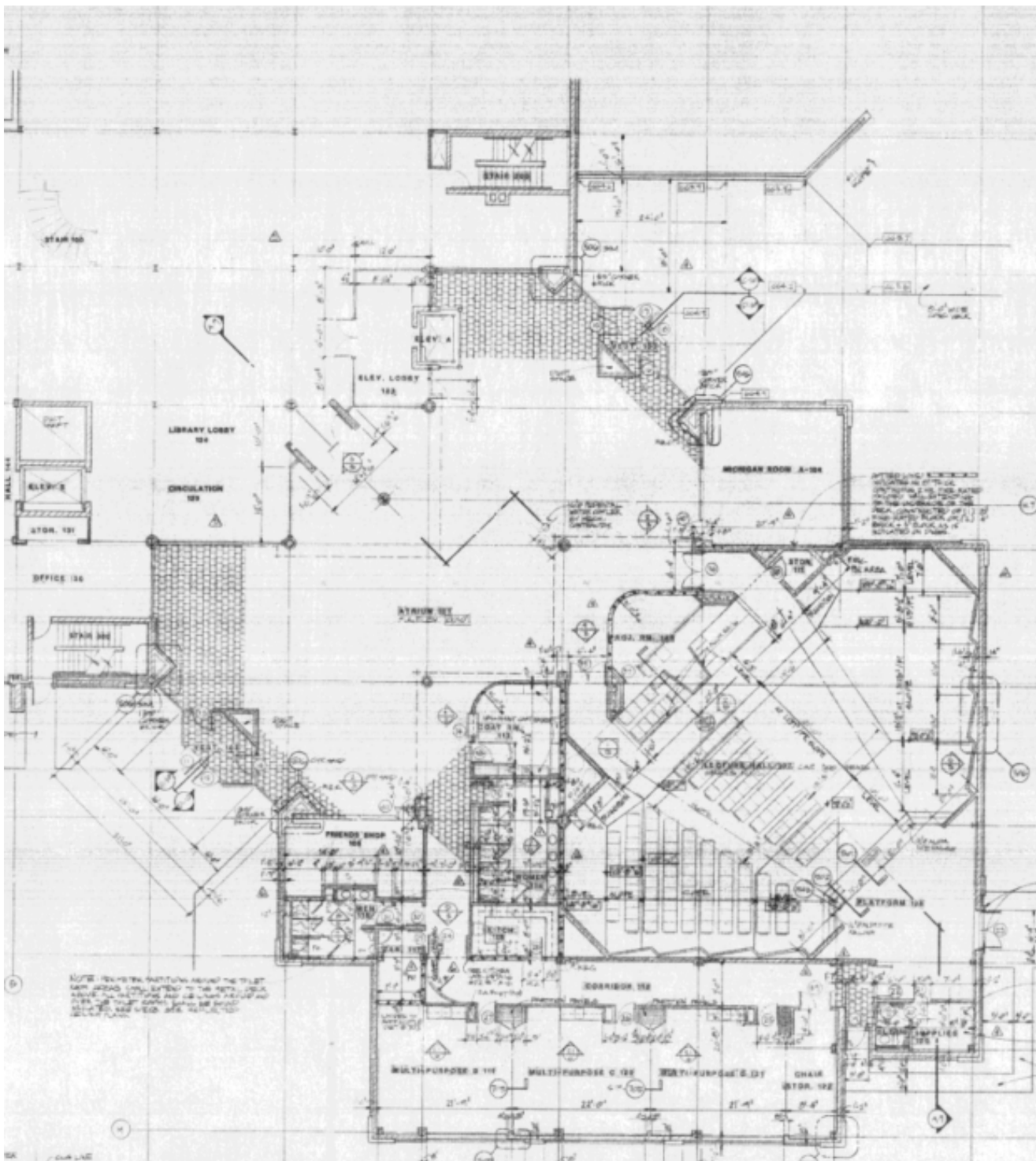
Building 04 – Livonia Civic Center Library

Basement Floor Plan:



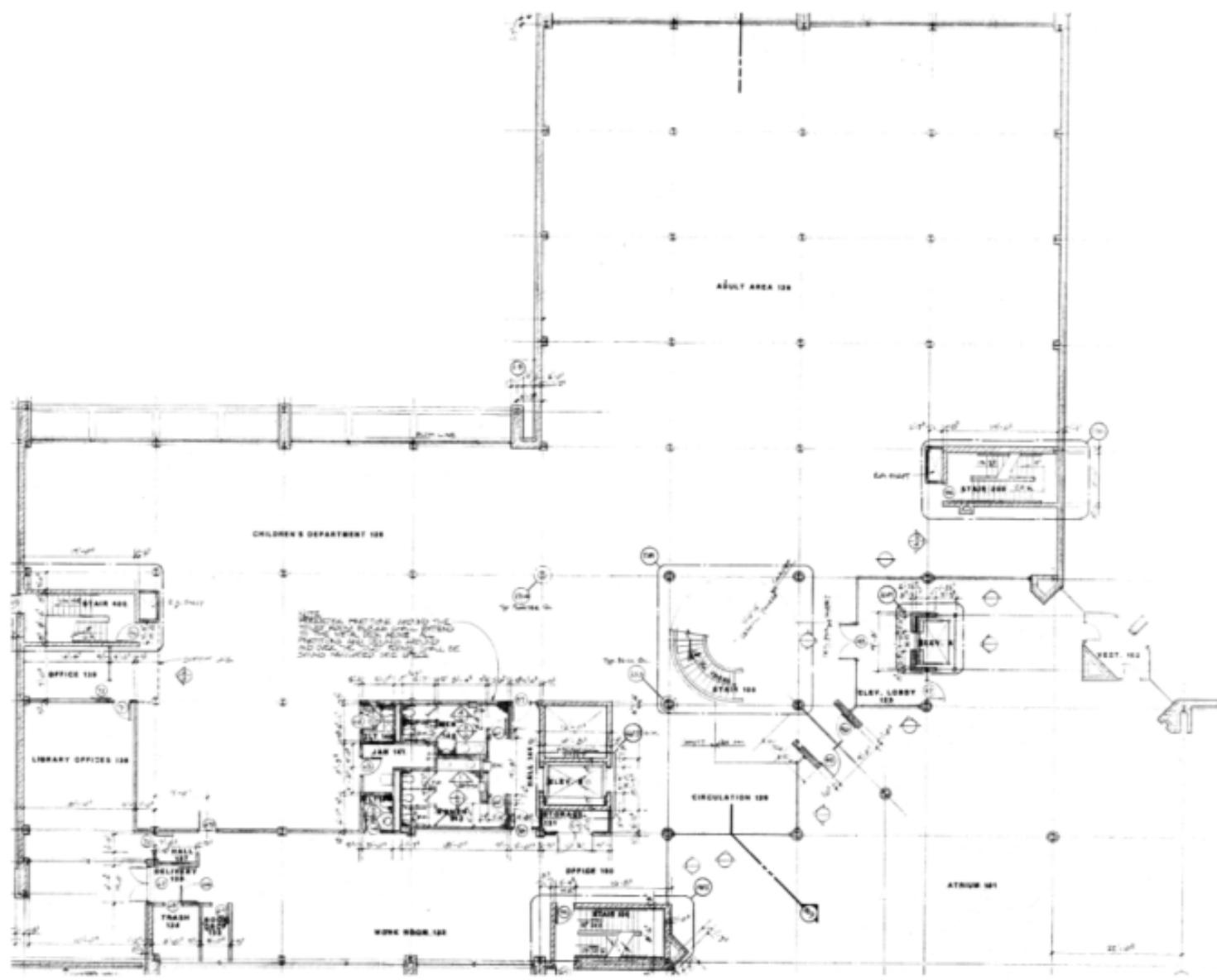
Building 04 – Livonia Civic Center Library

1st Floor Plan (Lecture Hall):



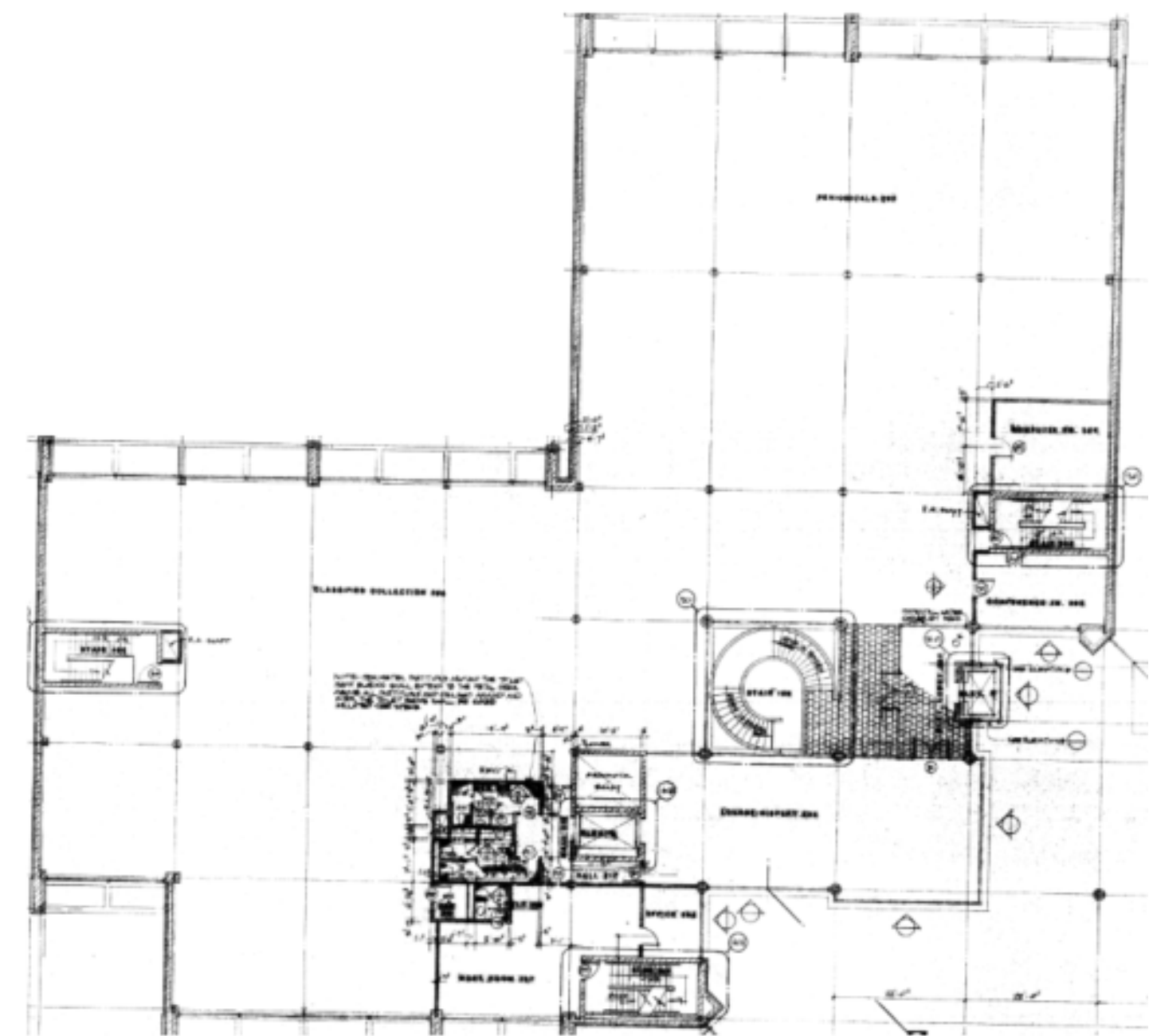
Building 04 – Livonia Civic Center Library

1st Floor Plan:



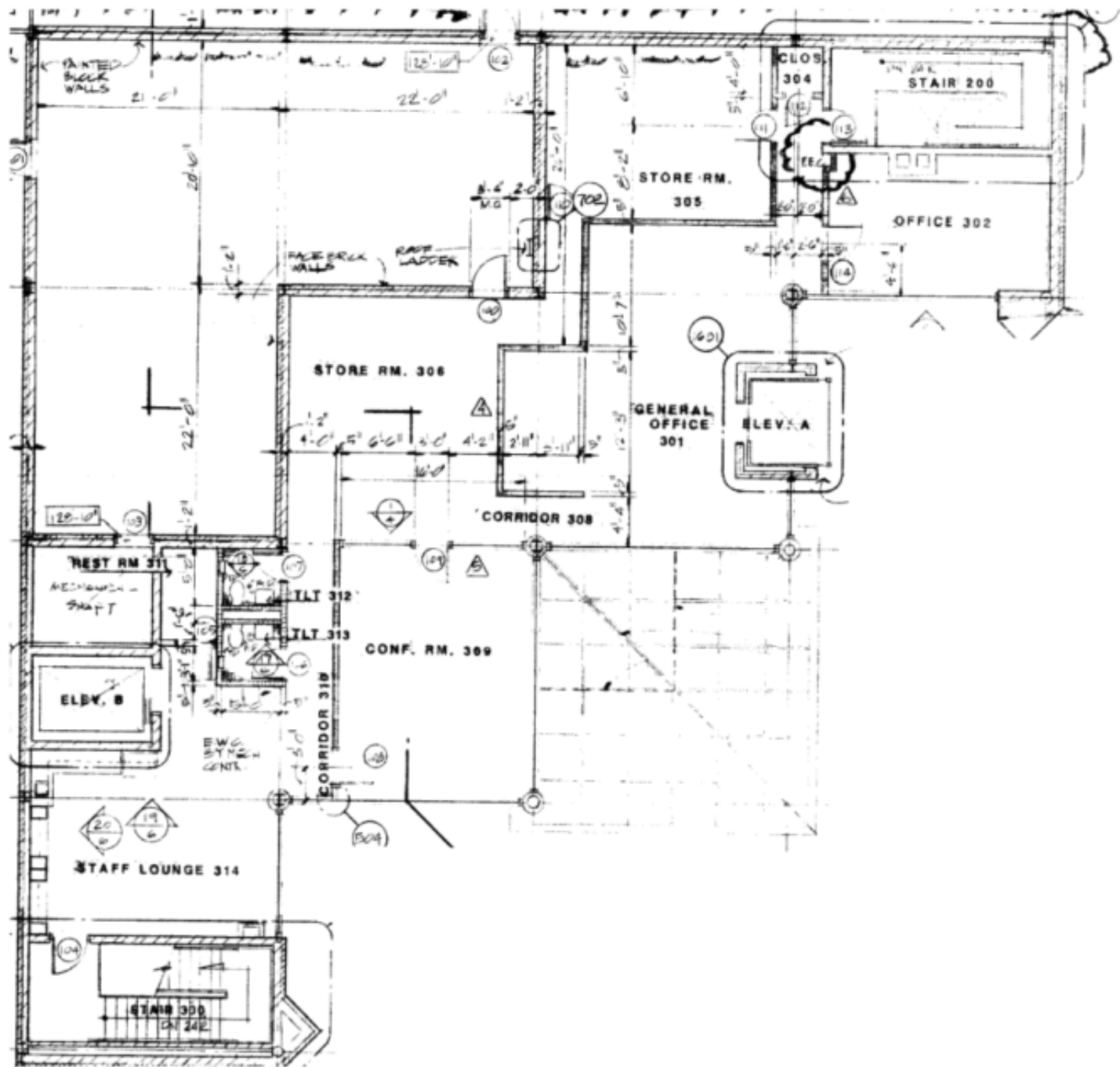
Building 04 - Livonia Civic Center Library

2nd Floor Plan:



Building 04 – Livonia Civic Center Library

3rd Floor Plan:



SECTION C | Individual Building Assessments

Building 04 – Livonia Civic Center Library

Summary of Budgets:

Civic Center Library						Cost Data		
Building SF		64,000				Specification Factor =	Geographic Factor =	Cost Escalation Factor =
						Cost Escalation Factors		
						1.08	1.30	1.48
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
1.0 SITE								
Paving								
Pavement and Base Reconstruction	82,387	SF	1	82,387	4.86%	\$0	\$694,028	\$0
Selective Sidewalk & Curb Replacement	1	Allowance	1	1	0.44%	\$48,384	\$0	\$0
Sealcoating/Re-stripping	82,387	SF	1	82,387	0.24%	\$26,693	\$0	\$0
Landscaping								
Improve Landscaping	1	Allowance	1	1	0.74%	\$81,000	\$0	\$0
Utilities								
Catch Basin / Manholes	4	EA	1	4	0.18%	\$0	\$25,160	\$0
Misc. Utility Repairs	1	Allowance	1	1	1.47%	\$0	\$210,600	\$0
Misc.								
Monument Sign - Powered & Electronic Display	1	EA	1	1	0.49%	\$54,000	\$0	\$0
SITE SUBTOTAL					8.42%	\$210,077	\$929,788	\$0
2.0 BUILDING ENVELOPE								
Windows								
Replace Exterior Window Systems	1	Allowance	1	1	2.46%	\$0	\$0	\$399,600
Re-caulk Windows	1	Allowance	1	1	0.98%	\$108,000	\$0	\$0
Atrium Window Leak Repair- (In Process)	1	Allowance	1	1	6.88%	\$756,000	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints- (In Process)	1	Allowance	1	1	0.39%	\$43,200	\$0	\$0
Tuckpointing- (In Process)	1	Allowance	1	1	0.98%	\$108,000	\$0	\$0
Clean Limestone, Masonry and Retaining Wall- (In Process)	1	Allowance	1	1	1.23%	\$135,000	\$0	\$0
Paint Exposed Steel Where Paint is Peeling	1	Allowance	1	1	0.74%	\$81,000	\$0	\$0
Exterior Doors								
Exterior Hollow Metal Doors/Frames/Hardware- Single Door	3	EA	1	3	0.09%	\$9,720	\$0	\$0
Exterior Hollow Metal Doors/Frames/Hardware- Double Door	1	EA	1	1	0.06%	\$6,480	\$0	\$0
BUILDING ENVELOPE SUBTOTAL					13.81%	\$1,247,400	\$0	\$399,600
3.0 INTERIOR/FINISHES								
Interior Doors & Hardware								
Replace Interior Doors & Hardware	114	EA	1	114	4.48%	\$492,480	\$0	\$0
Walls & Partitions								
Misc. Drywall Repairs	1	Allowance	1	1	0.39%	\$21,600	\$0	\$31,968
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling	64,000	SF	1	64,000	5.35%	\$0	\$763,776	\$0
Flooring								
Remove & Replace Flooring - Carpet	50,000	SF	1	50,000	4.92%	\$540,000	\$0	\$0
Remove & Replace Flooring in Attrium- Hard Tile	1	Allowance	1	1	0.74%	\$81,000	\$0	\$0
Windows								
Remove & Replace Window Treatments	1	Allowance	1	1	0.44%	\$0	\$63,180	\$0
Paint								
Paint - Interior	64,000	SF	1	64,000	1.57%	\$0	\$224,640	\$0
Signage								
Replace Interior Signage	64,000	SF	1	64,000	0.25%	\$0	\$35,942	\$0
Restrooms								
Renovate - Toilet Room (Single / Staff)	5	EA	1	5	0.83%	\$0	\$117,936	\$0
Renovate - Toilet Room (Group)	6	EA	1	6	4.42%	\$0	\$631,800	\$0
Casework & Countertops								
Replace Misc. Casework/Millwork	1	Allowance	1	1	1.23%	\$135,000	\$0	\$0
INTERIOR/FINISHES SUBTOTAL					24.63%	\$1,270,080	\$1,837,274	\$31,968
4.0 PLUMBING SYSTEMS								
Fire Protection								
Add / Modify Fire Suppression System for Improvements	1	Allowance	1	1	0.10%	\$10,800	\$0	\$0
Equipment & Fixtures								
Existing Lochinvar Water Heater; Serial # 1915114512800, 2012	1	EA	1	1	0.08%	\$0	\$0	\$12,787
Provide Bottle Filler Drinking Fountains	4	EA	1	4	0.26%	\$29,030	\$0	\$0
PLUMBING SYSTEMS SUBTOTAL					0.44%	\$39,830	\$0	\$12,787
5.0 HVAC SYSTEMS								
Equipment								
Existing Apex Boiler, Serial # 65750249, 2020 (Sidewalk Radiant Heating)	1	EA	1		0.00%	\$0	\$0	\$0
Existing Raypak Boiler, Serial #	1	EA	1	1	1.60%	\$175,392	\$0	\$0
Existing Raypak Boiler, Serial #	1	EA	1	1	1.60%	\$175,392	\$0	\$0
Replace Boiler Pumps	3	EA	1	3	0.25%	\$27,216	\$0	\$0
Existing Trane Airfoil Fan, Serial # K87C09323, 1987	1	EA	1	1	1.47%	\$162,000	\$0	\$0
Existing BAC Chiller, Serial # 0151933401-01-01 (In Progress)	1	EA	1	1	7.37%	\$810,000	\$0	\$0
Replace Exhaust Fans	5	EA	1	5	0.19%	\$0	\$0	\$31,329
Other HVAC								
Air and Water Balance	64,000	SF	1	64,000	0.19%	\$20,736	\$0	\$0
Commissioning	64,000	SF	1	64,000	0.13%	\$13,824	\$0	\$0
Temperature Controls	64,000	SF	1	64,000	1.76%	\$193,536	\$0	\$0
HVAC SYSTEMS SUBTOTAL					14.56%	\$1,578,096	\$0	\$31,329

SECTION C | Individual Building Assessments

Building 04 – Livonia Civic Center Library

Summary of Budgets:

Civic Center Library						Cost Data		
Building SF		64,000				Specification Factor =		
						Geographic Factor =		
						Cost Escalation Factor =		
						Cost Escalation Factors		
						1.08	1.30	1.48

Building 04 – Livonia Civic Center Library

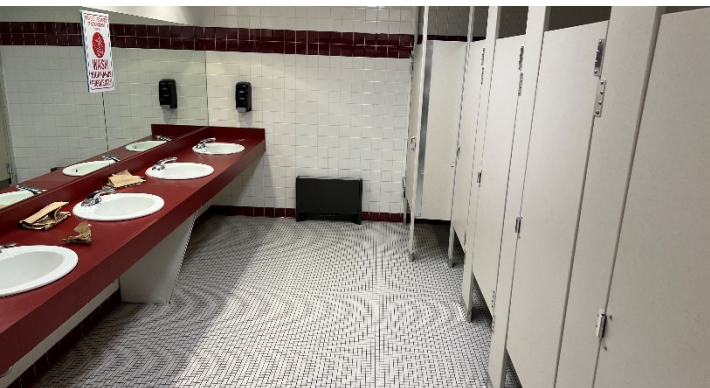
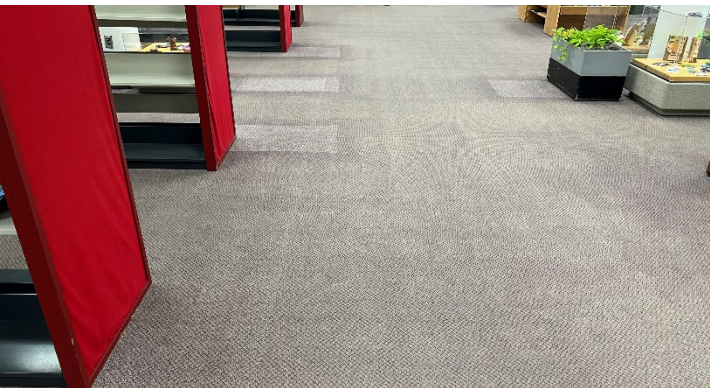
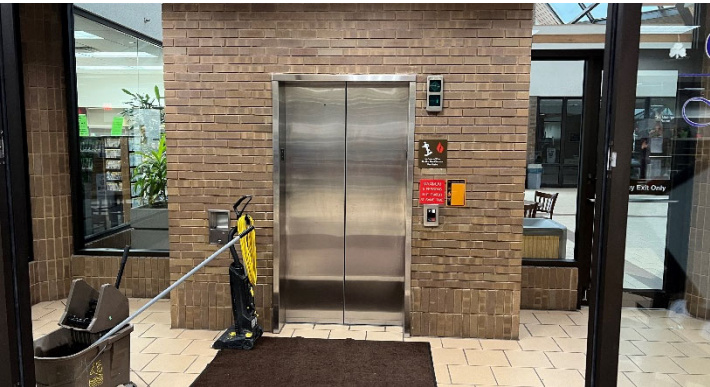
Photos:



SECTION C | Individual Building Assessments

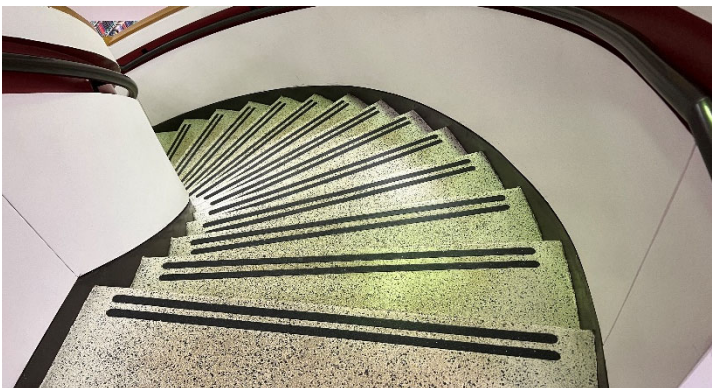
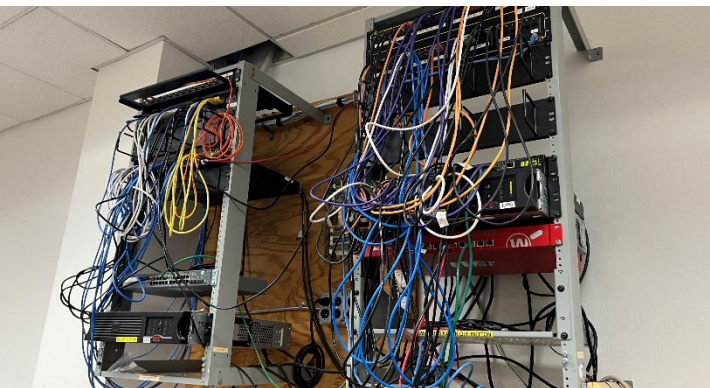
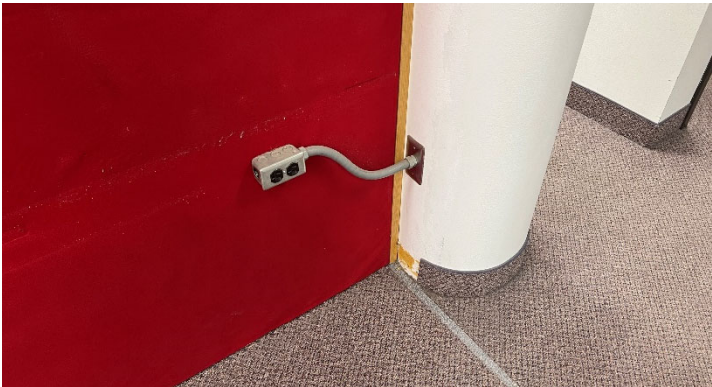
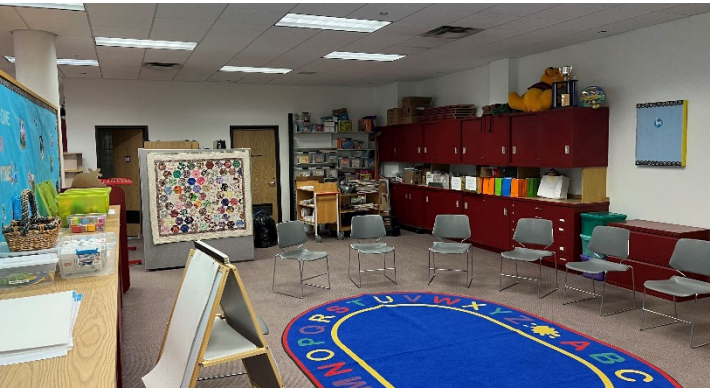
Building 04 – Livonia Civic Center Library

Photos:



Building 04 – Livonia Civic Center Library

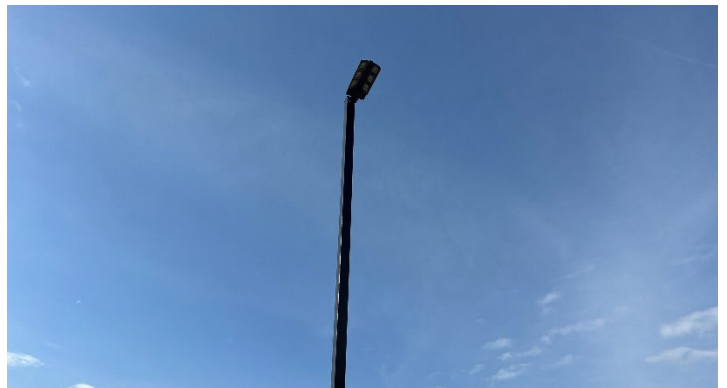
Photos:



Building 04 – Livonia Civic Center Library

Photos:





Building 05 – Livonia Civic Center Park Senior Center & Transit Office



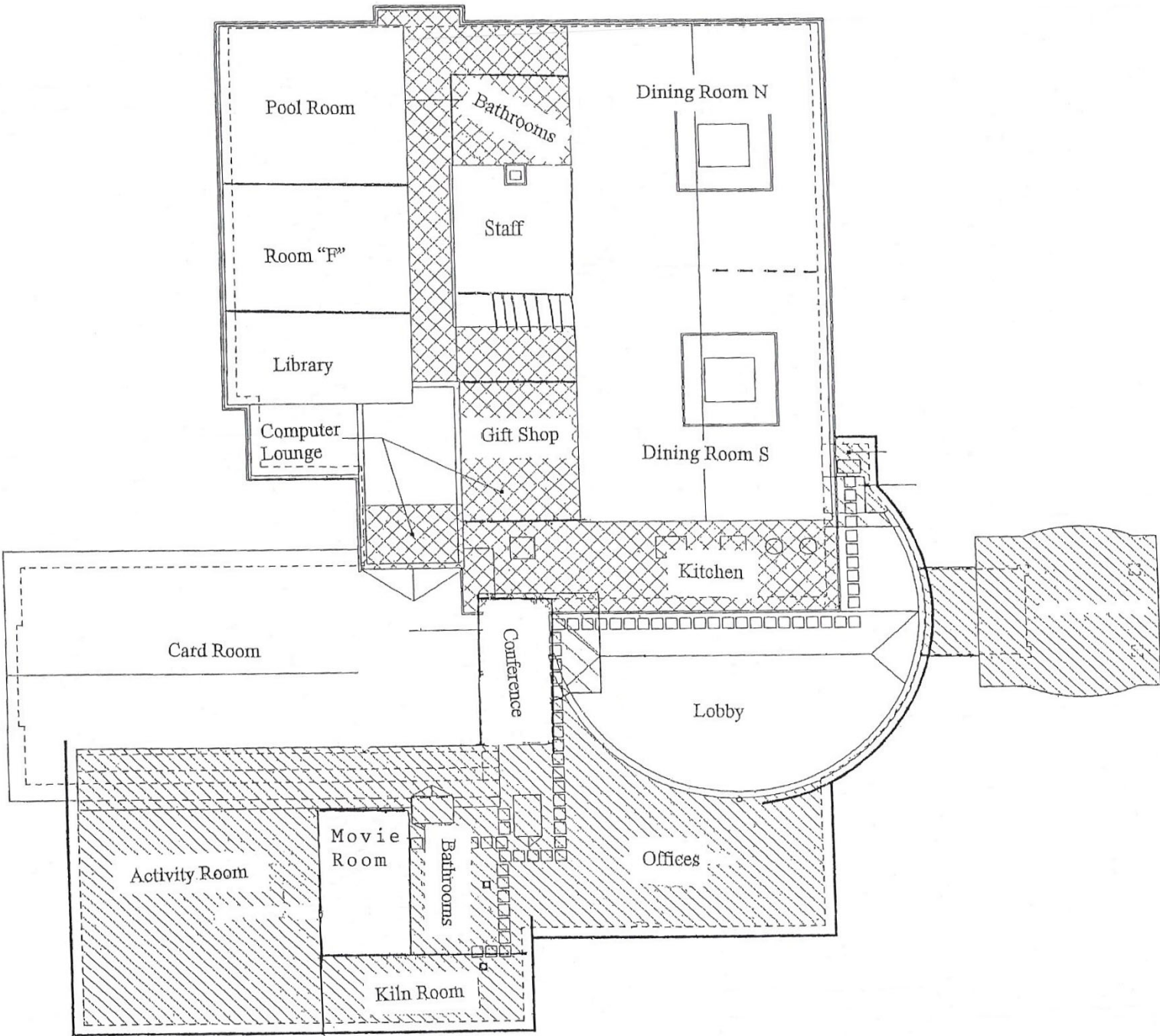
Address:	15218 Farmington Rd. Livonia MI 48154
Year Built:	1964 Additions: 1984 Lobby, 2001 Offices
Square Footage:	25,000
Site Area:	1.99 acres
Parking Spaces:	135
Stories:	1
Basement:	Yes
Elevator(s):	No
Exterior Façade:	Brick
Roof:	Shingled and EPDM
Fire Protection:	None

Site Plan:



Building 05 – Livonia Civic Center Park Senior Center & Transit Office

1st Floor Plan:



SECTION C | Individual Building Assessments

Building 05 – Livonia Civic Center Park Senior Center & Transit Office

Summary of Budgets:

Senior Center/Community Transit						Cost Data		
Building SF						Specification Factor =		
25,000						Geographic Factor =		
						Cost Escalation Factor =		
						Cost Escalation Factors		
						1.08	1.30	1.48
						Critical Needs Cost	Deferrable Maintenance Cost	Future Need Cost
						(1 - 3 years)	(4 - 6 years)	(7 - 10 years)
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost			
1.0 SITE								
Paving								
Pavement and Base Reconstruction	83,000	SF	1	83,000	7.67%	\$537,840	\$0	\$0
Replace Concrete Approach	1,000	SF	1	1,000	0.22%	\$15,768	\$0	\$0
Selective Sidewalk & Curb Replacement	1	Allowance	1	1	0.77%	\$54,000	\$0	\$0
Site Amenities								
Site Amenities - Bike Racks / Benches / Picnic Tables / Trash Receptacles / Etc.	1	Allowance	1	1	0.38%	\$0	\$0	\$39,960
Landscaping								
Improve Landscaping	1	Allowance	1	1	0.46%	\$0	\$0	\$47,952
Utilities								
Catch Basin / Manholes	3	EA	1	3	0.23%	\$16,200	\$0	\$0
Misc. Utility Repairs	1	Allowance	1	1	1.54%	\$108,000	\$0	\$0
Misc.								
Internally Lit Monument Sign w/ Brick Base	1	EA	1	1	0.77%	\$0	\$0	\$79,920
SITE SUBTOTAL					12.05%	\$731,808	\$0	\$167,832
2.0 BUILDING ENVELOPE								
Roofing Work								
Replace Roof (Asphalt Shingle)	3,800	SF	1	3,800	0.47%	\$32,832	\$0	\$0
Replace Roof (EPDM) - .60 Mil/Reinforced/Fully-Adhered	21,000	SF	1	21,000	6.47%	\$453,600	\$0	\$0
Replace Gutters & Downspouts	850	LF	1	850	0.16%	\$11,016	\$0	\$0
Misc. Drainage Repair	1	Allowance	1	1	0.18%	\$12,960	\$0	\$0
Paint Structural Steel for Equipment Screens	1	Allowance	1	1	0.38%	\$27,000	\$0	\$0
Windows								
Replace Exterior Window Systems	1	Allowance	1	1	5.39%	\$378,000	\$0	\$0
Recaulk Windows	1	Allowance	1	1	0.38%	\$27,000	\$0	\$0
Reseal Windows	1	Allowance	1	1	0.15%	\$10,800	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints	1	Allowance	1	1	0.23%	\$16,200	\$0	\$0
Tuckpointing	1	Allowance	1	1	0.62%	\$43,200	\$0	\$0
Replace Soffits	1	Allowance	1	1	1.54%	\$108,000	\$0	\$0
Replace Fascia	1	Allowance	1	1	1.54%	\$108,000	\$0	\$0
Exterior Doors								
Exterior FRP Doors/Frames/Hardware - Single Door	5	EA	1	5	0.39%	\$27,216	\$0	\$0
Exterior FRP Doors/Frames/Hardware - Double Door	3	EA	1	3	0.41%	\$29,030	\$0	\$0
BUILDING ENVELOPE SUBTOTAL					18.32%	\$1,284,854	\$0	\$0
3.0 INTERIOR/FINISHES								
Interior Doors & Hardware								
Replace Interior Doors & Hardware	45	EA	1	45	2.77%	\$194,400	\$0	\$0
Misc. Drywall Repairs	1	Allowance	1	1	0.15%	\$10,800	\$0	\$0
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling	25,000	SF	1	25,000	3.27%	\$229,500	\$0	\$0
Flooring								
Remove & Replace Flooring - Carpet	12,500	SF	1	12,500	1.29%	\$0	\$117,585	\$0
Remove & Replace VCT Flooring with LVT	12,500	SF	1	12,500	1.73%	\$0	\$157,950	\$0
Remove & Replace Window Treatments		Allowance		50,000	6.93%	\$486,000	\$0	\$0
Paint								
Paint - Interior	25,000	SF	1	25,000	0.77%	\$0	\$70,200	\$0
Signage								
Replace Interior Signage	25,000	SF	1	25,000	0.15%	\$0	\$14,040	\$0
Restrooms								
Renovate - Toilet Room (Group)	4	Allowance	1	4	1.85%	\$129,600	\$0	\$0
Casework & Countertops								
Replace Misc. Casework/Millwork	1	Allowance	1	1	1.15%	\$81,000	\$0	\$0
INTERIOR/FINISHES SUBTOTAL					20.07%	\$1,131,300	\$359,775	\$0
4.0 PLUMBING SYSTEMS								
Fire Protection								
New Fire Suppression System	25,000	SF	1	25,000	1.92%	\$135,000	\$0	\$0
Equipment & Fixtures								
Existing Hot Water Heater: Lochinvar, Serial # 1147A013612, November 2011	1	EA	1	1	0.12%	\$0	\$11,232	\$0
Existing Hot Water Heater: Lochinvar, Serial # EC10347074, March 2008	1	EA	1	1	0.12%	\$0	\$11,232	\$0
Replace Additional Bottle Filling Stations at Existing Drinking Fountains	2	EA	2	4	0.41%	\$29,030	\$0	\$0
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.38%	\$0	\$0	\$39,960
PLUMBING SYSTEMS SUBTOTAL					2.97%	\$164,030	\$22,464	\$39,960

SECTION C | Individual Building Assessments

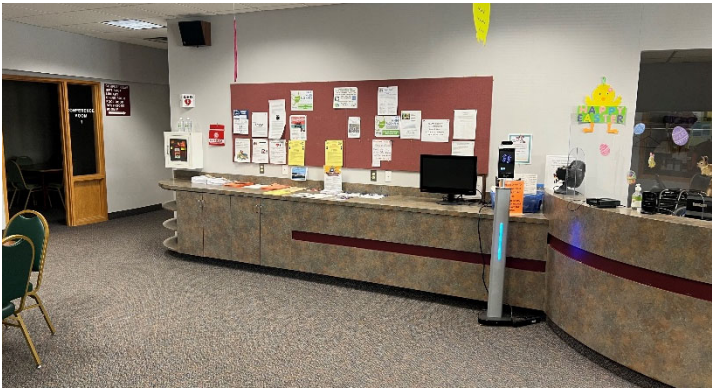
Building 05 – Livonia Civic Center Park Senior Center & Transit Office

Summary of Budgets:

Senior Center/Community Transit					Cost Data			
Building SF					Specification Factor =		Geographic Factor =	
25,000					Cost Escalation Factor =		Cost Escalation Factors	
					1.08		1.30	
							1.48	
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
5.0 HVAC SYSTEMS								
Equipment								
Existing Rooftop Unit: Trane, Serial # 823101169L	1	EA	1	1	0.54%	\$37,800	\$0	\$0
Existing Rooftop Unit: Trane Serial # 8222G4W9H, May 2008	1	EA	1	1	0.54%	\$0	\$49,140	\$0
Existing Rooftop Unit: HyperCore Serial # T09C06177	1	EA	1	1	0.54%	\$37,800	\$0	\$0
Existing Rooftop Unit: Trane Serial # 222100111L, May 2002	1	EA	1	1	0.54%	\$37,800	\$0	\$0
Existing Rooftop Unit: Trane Serial # 162810069L, July 2016		EA	-	-	0.00%	\$0	\$0	\$0
Existing Rooftop Unit: Trane Serial # 210810277L, Feb 2021	1	EA	-	-	0.00%	\$0	\$0	\$0
Existing Rooftop Unit: Trane Serial # 113910340L, March 2011	1	EA	1	1	0.54%	\$0	\$0	\$55,944
Existing Rooftop Unit: Trane Serial # 113910354L, 2011	1	EA	1	1	0.54%	\$0	\$0	\$55,944
Add Exhaust Fans (Kilns)	1	EA	1	1	0.08%	\$5,400	\$0	\$0
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.38%	\$0	\$0	\$39,960
Air and Water Balance	25,000	SF	-	-	0.00%	\$0	\$0	\$0
Commissioning	25,000	SF	1	25,000	0.08%	\$0	\$0	\$7,992
Temperature Controls	25,000	SF	1	25,000	1.08%	\$75,600	\$0	\$0
HVAC SYSTEMS SUBTOTAL						4.85%	\$194,400	\$49,140
6.0 ELECTRICAL SYSTEMS								
Power								
Power for IT Equipment & Upgrades	1	Allowance	1	1	0.31%	\$0	\$0	\$31,968
Replace Existing Electrical Panels	1	Allowance	1	1	0.77%	\$0	\$0	\$79,920
Power for new HVAC	1	Allowance	1	1	0.86%	\$0	\$0	\$89,510
Electrical Wiring Upgrades	1	Allowance	1	1	0.86%	\$20,160	\$26,208	\$29,837
Lighting								
Replace Lighting with LED's (New OS, Switching, etc.)	25,000	SF	1	25,000	2.81%	\$197,100	\$0	\$0
Replace Emergency & Exit Lights	25,000	SF	1	25,000	0.12%	\$8,100	\$0	\$0
Fire Alarm System								
Replace Fire Alarm System	25,000	SF	1	25,000	0.85%	\$0	\$0	\$87,912
Adjustments to Fire Alarm System	1	Allowance	1	1	0.17%	\$0	\$0	\$17,902
ELECTRICAL SYSTEMS SUBTOTAL						6.75%	\$225,360	\$26,208
7.0 SECURITY								
Security								
Access Control System (Prox Card Readers)	8	EA	1	8	0.34%	\$24,192	\$0	\$0
Security Allowance - Cameras / Surveillance	1	Allowance	1	1	0.00%	\$0	\$0	\$23,976
Security Allowance	1	Allowance	1	1	0.31%	\$21,600	\$0	\$0
SECURITY SYSTEMS SUBTOTAL						0.88%	\$45,792	\$23,976
8.0 ABATEMENT								
Abatement Allowance	1	Allowance	1	1	0.77%	\$54,000	\$0	\$0
ABATEMENT SUBTOTAL						0.77%	\$54,000	\$0
9.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance	1	Allowance	1	1	1.54%	\$36,000	\$46,800	\$53,280
Other FF&E								
Renovate Kitchen and Replace Appliances	1	Allowance	1	1	3.46%	\$243,000	\$0	\$0
Existing Walk-in Fridge: Vollrath	1	Allowance	1	1	0.54%	\$37,800	\$0	\$0
Existing Walk-in Freezer: Vollrath	1	Allowance	1	1	0.54%	\$37,800	\$0	\$0
FURNITURE & EQUIPMENT SUBTOTAL						6.08%	\$354,600	\$46,800
10.0 TECHNOLOGY								
Technology								
Misc. Technology Upgrades	25,000	SQFt	1	25,000	4.62%	\$324,000	\$0	\$0
TECHNOLOGY SUBTOTAL						4.62%	\$324,000	\$0
SOFT COSTS								
Building Infrastructure Improvement Total:					77.36%	\$4,510,145	\$504,387	\$781,937
Project Contingency:	10.00%				6.67%	\$383,154	\$45,759	\$72,866
Permits, Testing & Printing:	2.50%				1.83%	\$105,367	\$12,584	\$20,038
Professional Fees & Costs:	9.00%				7.37%	\$423,799	\$50,613	\$80,595
Construction Manager Fee & Costs:	9.00%				6.76%	\$388,806	\$46,434	\$73,940
PROJECT TOTAL						100.00%	\$5,811,271	\$659,776
								\$1,029,377

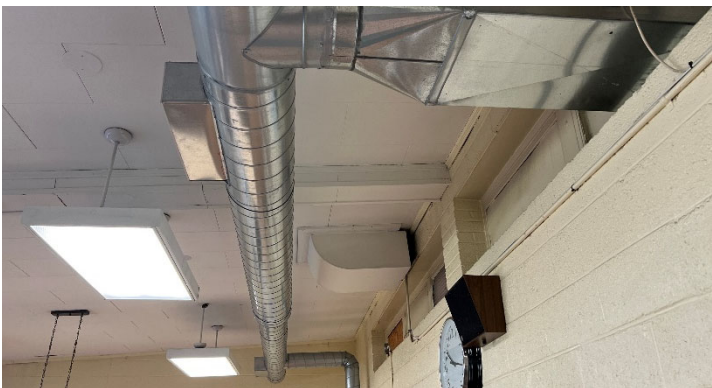
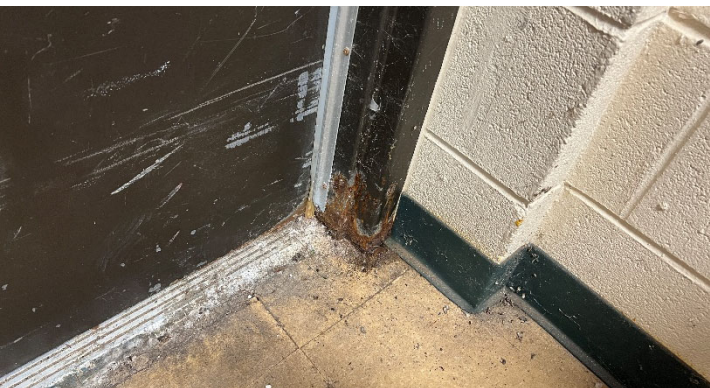
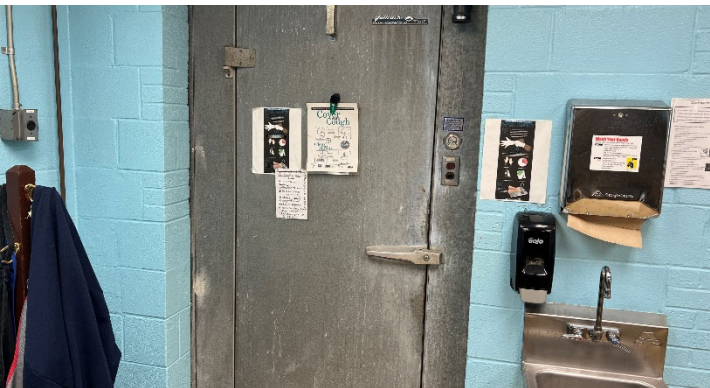
Building 05 – Livonia Civic Center Park Senior Center & Transit Office

Photos:



Building 05 – Livonia Civic Center Park Senior Center & Transit Office

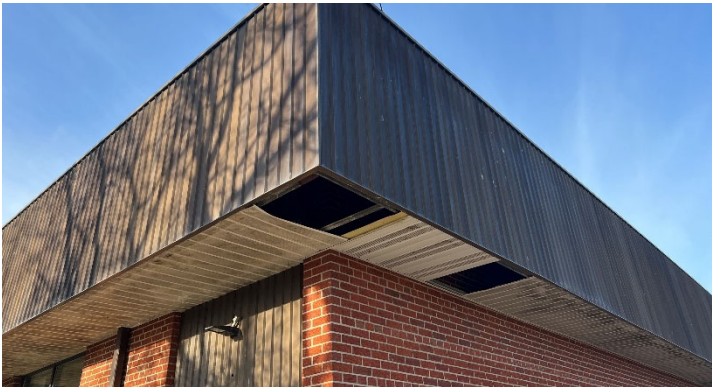
Photos:



SECTION C | Individual Building Assessments

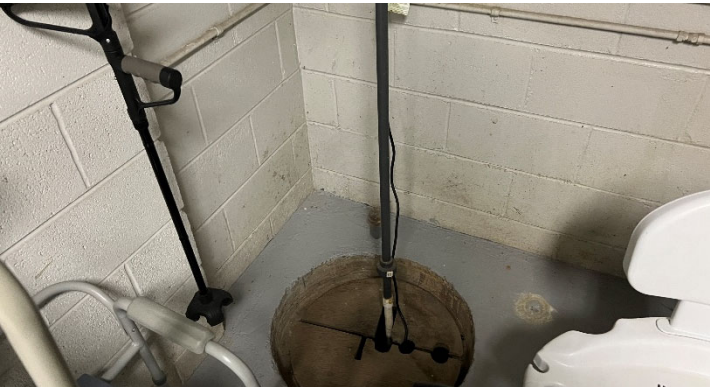
Building 05 – Livonia Civic Center Park Senior Center & Transit Office

Photos:

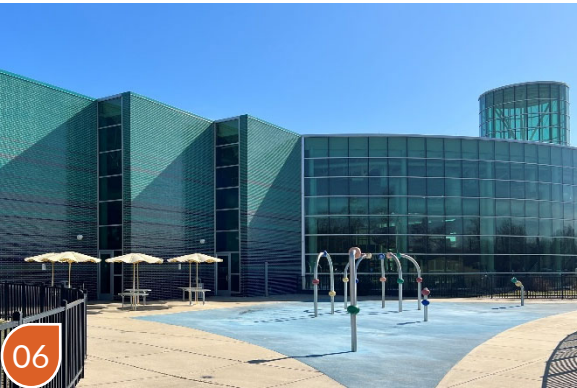


Building 05 – Livonia Civic Center Park Senior Center & Transit Office

Photos:

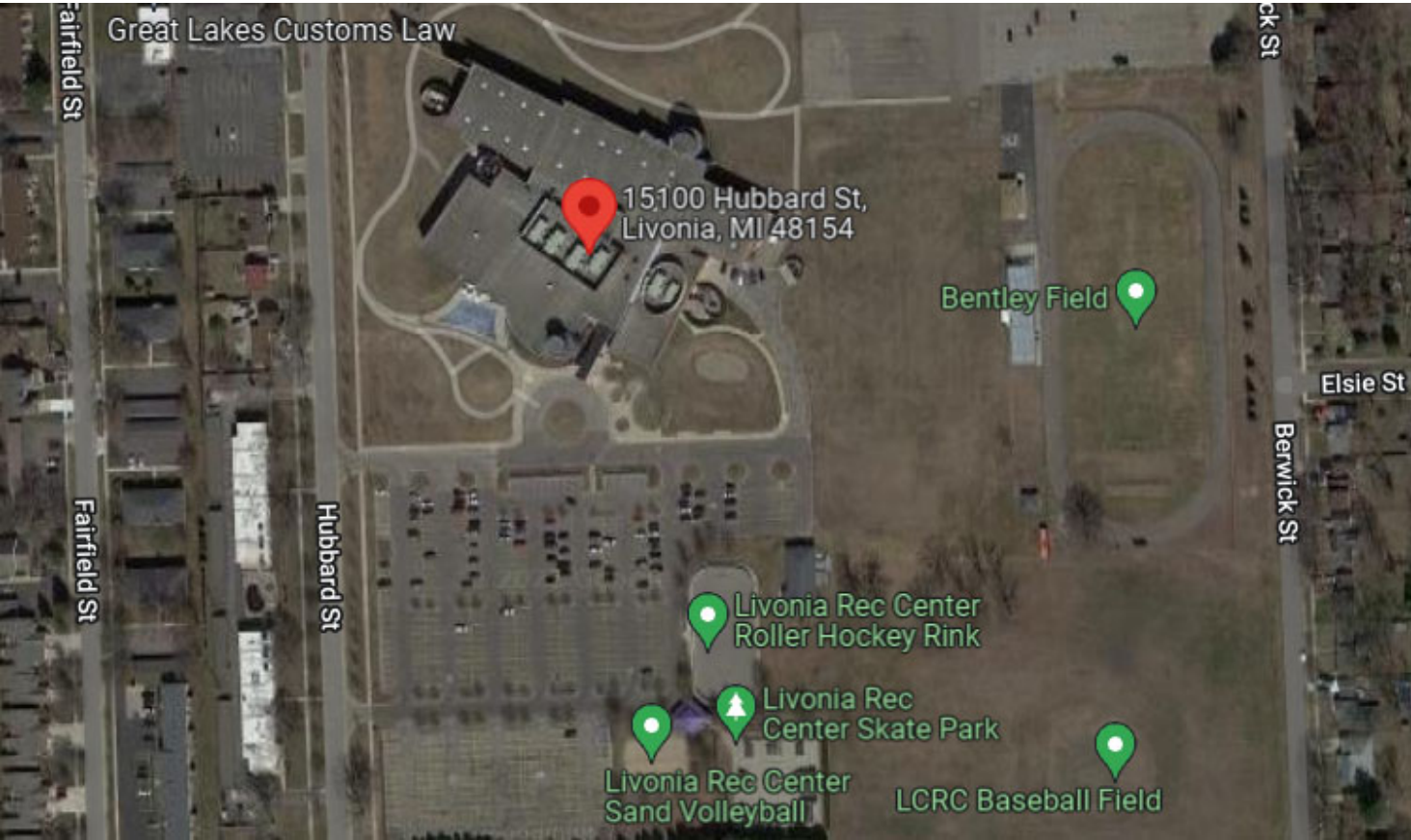


Building 06 – Jack E. Kirksey Livonia Community Recreation Center



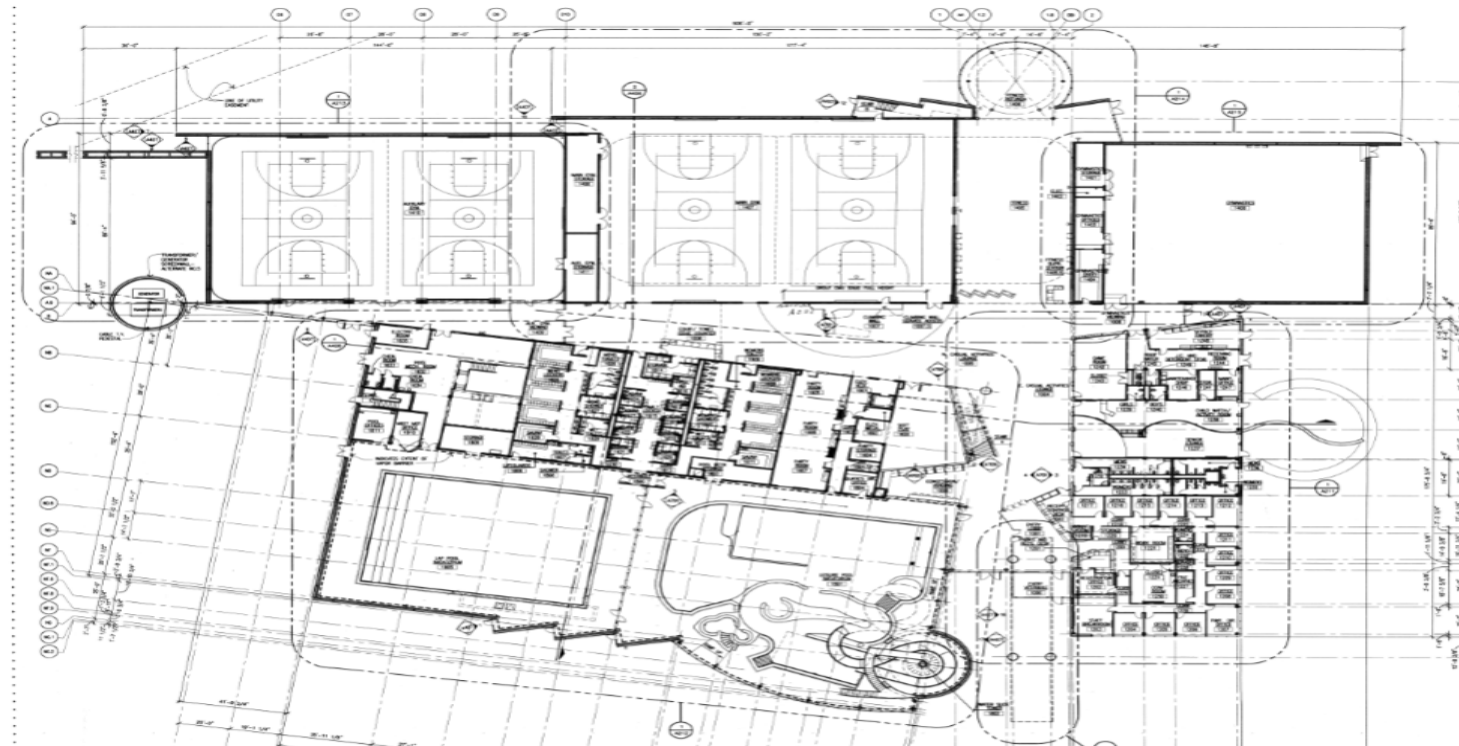
Address:	15100 Hubbard St. Livonia MI 48154
Year Built:	2003
Square Footage:	130,000
Site Area:	Approximately 17 Acres
Parking Spaces:	381
Stories:	2
Basement:	No
Elevator(s):	1
Exterior Façade:	Brick
Roof:	EPDM
Fire Protection:	Fully Sprinkled

Site Plan:

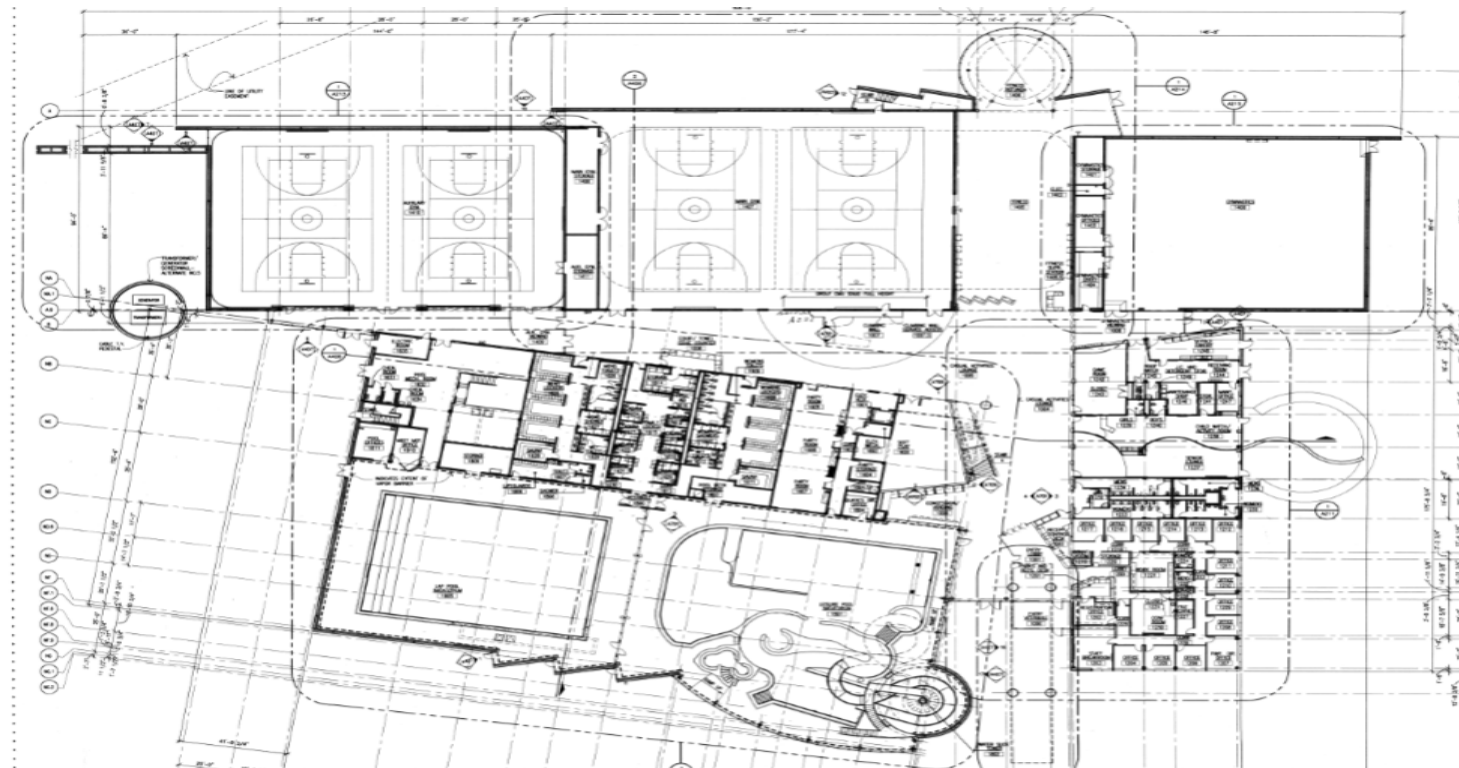


Building 06 – Jack E. Kirksey Livonia Community Recreation Center

1st Floor Plan:



2nd Floor Plan:



SECTION C | Individual Building Assessments

Building 06 – Jack E. Kirksey Livonia Community Recreation Center

Summary of Budgets:

Jack E. Kirksey Recreation Center						Cost Data		
Building SF 130,000						Specification Factor =	Geographic Factor =	Cost Escalation Factor =
						Cost Escalation Factors		
						1.08	1.30	1.48
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
1.0 SITE								
Paving								
Pavement and Base Reconstruction	222352	SF	1	222,352	7.98%	\$0	\$0	\$2,132,445
Selective Sidewalk & Curb Replacement	1	Allowance	1	1	0.09%	\$16,200	\$0	\$0
Sealcoating/Re-stripping	222352	SF	1	222,352	0.40%	\$72,042	\$0	\$0
Playground / Play pad								
Provide Synthetic Safety Surfacing on Playground (Kid Quarters)	1	Allowance	1	1	0.18%	\$32,400	\$0	\$0
Landscaping								
Improve Landscaping	1	Allowance	1	1	0.30%	\$0	\$70,200	\$0
Redesign and Replace Illuminated Bollards	1	Allowance	1	1	0.60%	\$0	\$140,400	\$0
Utilities								
Misc. Utility Repairs	1	Allowance	1	1	0.15%	\$0	\$0	\$39,960
Misc.								
Add Power to Outdoor Pavilion	1	Allowance	1	1	0.06%	\$0	\$0	\$15,984
Update Site Signage	1	Allowance	1	1	0.12%	\$0	\$28,080	\$0
SITE SUBTOTAL					9.87%	\$120,642	\$238,680	\$2,188,389
2.0 BUILDING ENVELOPE								
Roofing Work								
Replace Roof (EPDM) - .60 Mil/Reinforced/Fully-Adhered	110000	SF	1	80,000	16.74%	\$0	\$3,931,200	\$0
Windows								
Recaulk Windows	1	Allowance	1	1	0.15%	\$0	\$0	\$39,960
Exterior Walls								
Re-Caulk Expansion Joints	1	Allowance	1	1	0.04%	\$8,100	\$0	\$0
Tuckpointing	1	Allowance	1	1	0.45%	\$0	\$105,300	\$0
BUILDING ENVELOPE SUBTOTAL					17.39%	\$8,100	\$4,036,500	\$39,960
3.0 INTERIOR/FINISHES								
Walls & Partitions								
Misc. Drywall Repairs	1	Allowance	1	1	0.06%	\$10,800	\$0	\$0
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling	14,000	SF	1	14,000	0.71%	\$0	\$167,076	\$0
Flooring								
Remove & Replace Flooring - Carpet (Offices + Kid Quarters)	5,500	SF	1	5,500	0.22%	\$39,798	\$0	\$0
Remove & Replace Flooring - Carpet (Gymnastics) Done in 2020	9,800	SF	1	9,800	0.39%	\$0	\$0	\$104,951
Remove & Replace Flooring - Carpet (1st and 2nd Floor Cardio) Done in 2019	8,800	SF	1	8,800	0.35%	\$0	\$0	\$94,242
Windows								
Remove & Replace Window Treatments	1	Allowance	1	1	0.39%	\$0	\$0	\$103,896
Paint								
Paint - Interior	130,000	SF	1	130,000	1.55%	\$93,600	\$121,680	\$138,528
Restrooms								
Renovate - Toilet Room (Single / Staff)	2	EA	1	2	0.20%	\$0	\$0	\$53,706
Renovate - Toilet Room (Group)	6	EA	1	6	3.01%	\$0	\$0	\$805,594
Gym / Pool Equipment								
Replace ADA Lift	1	Allowance	1	1	0.09%	\$0	\$21,060	\$0
Casework & Countertops								
Replace Misc. Casework/Millwork	1	Allowance	1	1	1.20%	\$0	\$140,400	\$159,840
Other								
Renovate Tree Fort	1	Allowance	1	1	2.99%	\$540,000	\$0	\$0
INTERIOR/FINISHES SUBTOTAL					11.17%	\$684,198	\$450,216	\$1,460,756
4.0 PLUMBING SYSTEMS								
Fire Protection								
New Fire Suppression System	130,000	SF	1	130,000	3.89%	\$702,000	\$0	\$0
Equipment & Fixtures								
Existing Lochinvar Hot Water Heater, Serial # 1934116042349,	1	EA	1	1	0.05%	\$0	\$0	\$12,787
Existing Lochinvar Hot Water Heater, Serial #	1	EA	1	1	0.05%	\$0	\$0	\$12,787
Replace Flush Valves & Faucets	1	Allowance	1	1	0.07%	\$4,032	\$5,242	\$5,967
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.15%	\$0	\$0	\$39,960
Pool								
Pool - Preventative Maintenance (grout, acid wash, etc.)	1	Allowance	1	1	0.36%	\$0	\$0	\$95,904
Misc. Pool Equipment Replacement (\$25K/Year)	10	Allowance	1	10	1.49%	\$90,000	\$117,000	\$133,200
PLUMBING SYSTEMS SUBTOTAL					6.09%	\$796,032	\$122,242	\$309,557

SECTION C | Individual Building Assessments

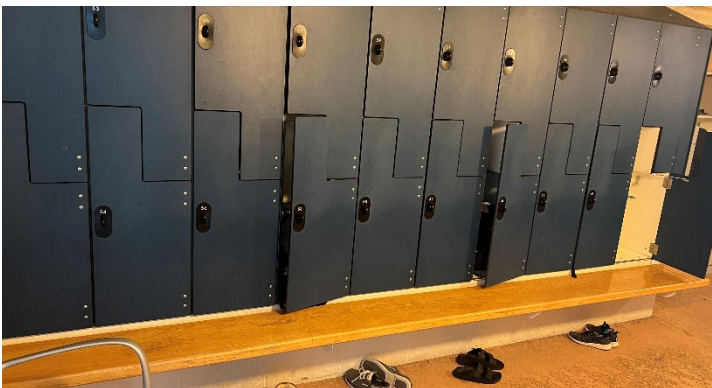
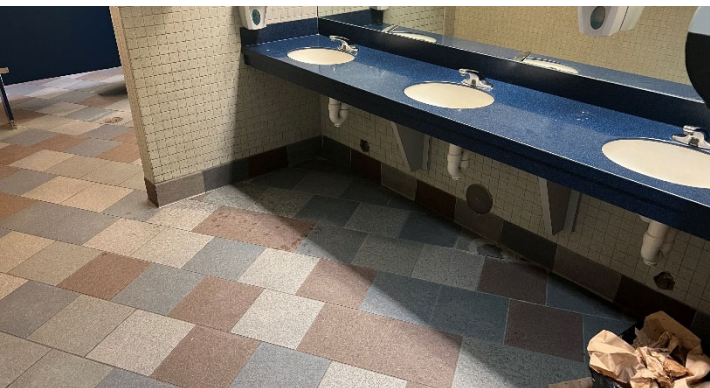
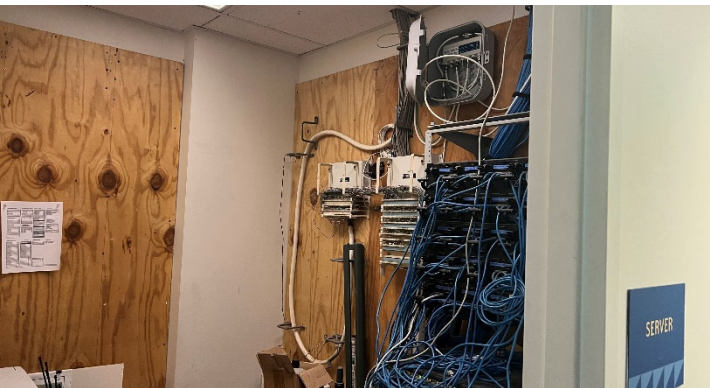
Building 06 – Jack E. Kirksey Livonia Community Recreation Center

Summary of Budgets:

Jack E. Kirksey Recreation Center						Cost Data		
Building SF 130,000						Specification Factor =	Geographic Factor =	Cost Escalation Factor =
						Cost Escalation Factors		
						1.08	1.30	1.48
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
5.0 HVAC SYSTEMS								
Equipment								
Existing Cleaver Brooks Boiler Serial # OL101674, 2002 (10,000,000 BTU)	1	EA	1	1	3.59%	\$0	\$0	\$959,040
Existing Cleaver Brooks Boiler Serial # OL101673, 2002 (10,000,000 BTU)	1	EA	1	1	3.59%	\$0	\$0	\$959,040
Existing Trane Air Handling Unit- 2002	1	EA	1	1	0.90%	\$0	\$210,600	\$0
Existing Trane Air Handling Unit- 2002	1	EA	1	1	0.90%	\$0	\$210,600	\$0
Existing Trane Air Handling Unit- 2002	1	EA	1	1	0.90%	\$0	\$210,600	\$0
Existing Trane Air Handling Unit- 2002	1	EA	1	1	0.90%	\$0	\$210,600	\$0
Existing Trane Air Handling Unit- 2002	1	EA	1	1	0.90%	\$0	\$210,600	\$0
Existing Trane Air Handling Unit- 2002	1	EA	1	1	0.90%	\$0	\$210,600	\$0
Existing Evapco Chiller, Serial # T020199, 2002	1	EA	1	1	2.39%	\$0	\$0	\$639,360
Replace Exhaust Fans	8	EA	1	8	0.19%	\$0	\$0	\$50,126
Replace Misc. HVAC Equipment	1	Allowance	1	1	2.01%	\$0	\$0	\$537,062
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.15%	\$0	\$0	\$39,960
Air and Water Balance	130,000	SF	1	130,000	0.23%	\$0	\$54,756	\$0
Commissioning	130,000	SF	1	130,000	0.16%	\$0	\$36,504	\$0
Temperature Controls	130,000	SF	1	130,000	2.18%	\$0	\$511,056	\$0
HVAC SYSTEMS SUBTOTAL						19.86%	\$0	\$1,865,916
6.0 ELECTRICAL SYSTEMS								
Power								
Power for IT Equipment & Upgrades	1	Allowance	1	1	0.21%	\$0	\$0	\$55,944
Replace Existing Electrical Panels	1	Allowance	1	1	0.30%	\$0	\$0	\$79,920
Power for new HVAC	1	Allowance	1	1	0.33%	\$0	\$78,624	\$0
Miscellaneous Power Allowance	130,000	SF	1	130,000	0.31%	\$0	\$0	\$83,117
Lighting								
Replace Lighting with LED's (New OS, Switching, etc.)	130,000	SF	1	130,000	5.67%	\$0	\$1,332,396	\$0
Replace Exterior Wall Packs	20	EA	1	20	0.10%	\$18,144	\$0	\$0
Fire Alarm System								
Adjustments to Fire Alarm System	1	Allowance	1	1	0.07%	\$12,096	\$0	\$0
ELECTRICAL SYSTEMS SUBTOTAL						7.00%	\$30,240	\$1,411,020
7.0 SECURITY								
Security								
Security Allowance - Cameras / Surveillance	1	Allowance	1	1	0.00%	\$0	\$0	\$79,920
Security Allowance - Access Controls	1	Allowance	1	1	0.00%	\$0	\$0	\$79,920
SECURITY SYSTEMS SUBTOTAL						0.60%	\$0	\$159,840
9.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance	1	Allowance	1	1	1.20%	\$72,000	\$93,600	\$106,560
FURNITURE & EQUIPMENT SUBTOTAL						1.20%	\$72,000	\$106,560
10.0 TECHNOLOGY								
Technology								
Recable all IT Wiring	1	Allowance	1	1	2.39%	\$432,000	\$0	\$0
TECHNOLOGY SUBTOTAL						2.39%	\$432,000	\$0
SOFT COSTS								
Building Infrastructure Improvement Total:					75.56%	\$2,143,212	\$8,218,174	\$7,668,631
Project Contingency:	10.00%				7.20%	\$163,921	\$812,457	\$756,207
Permits, Testing & Printing:	2.50%				1.98%	\$45,078	\$223,426	\$207,957
Professional Fees & Costs:	9.00%				7.96%	\$181,310	\$898,641	\$836,424
Construction Manager Fee & Costs:	9.00%				7.30%	\$166,339	\$824,441	\$767,361
PROJECT TOTAL						100.00%	\$2,699,860	\$10,977,139
								\$10,236,580

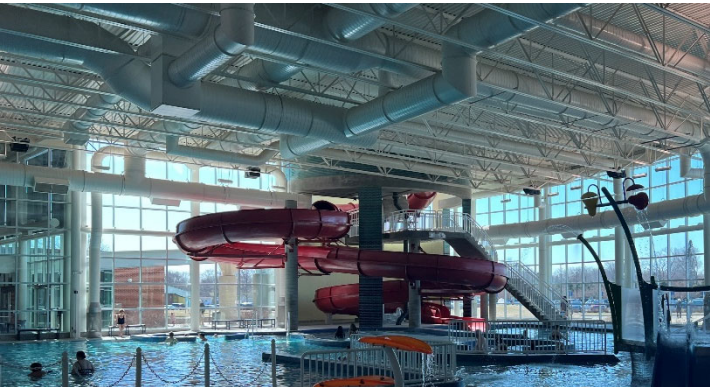
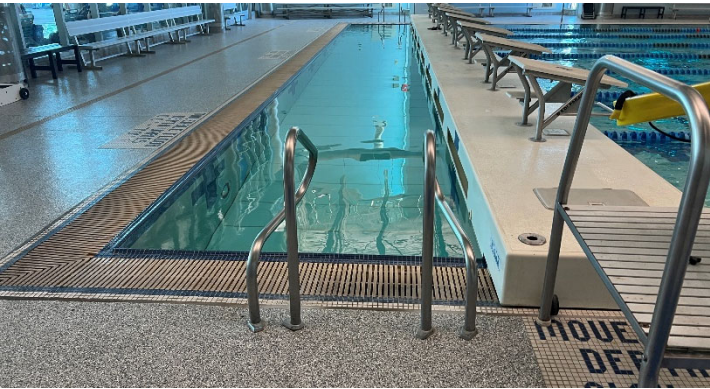
Building 06 – Jack E. Kirksey Livonia Community Recreation Center

Photos:



Building 06 – Jack E. Kirksey Livonia Community Recreation Center

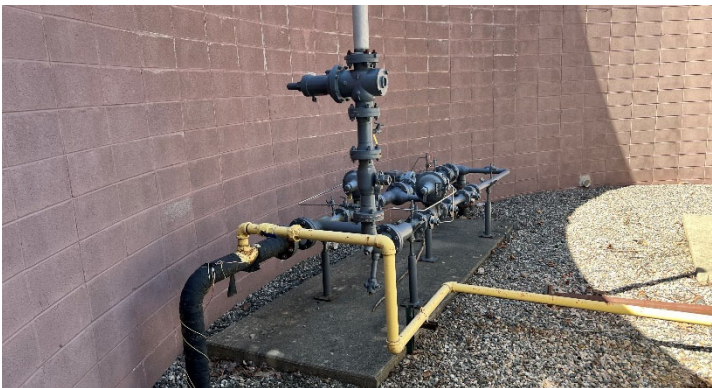
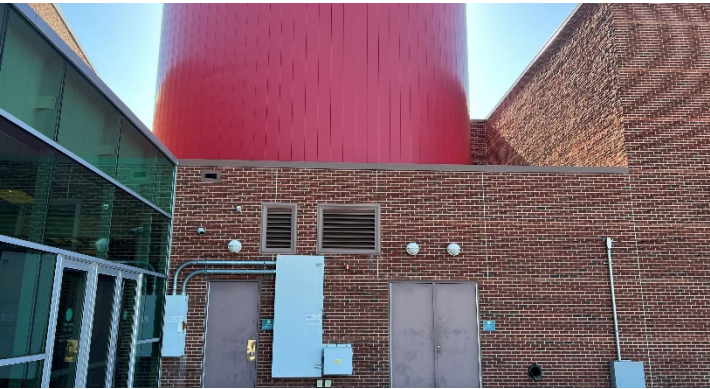
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SECTION C | Individual Building Assessments

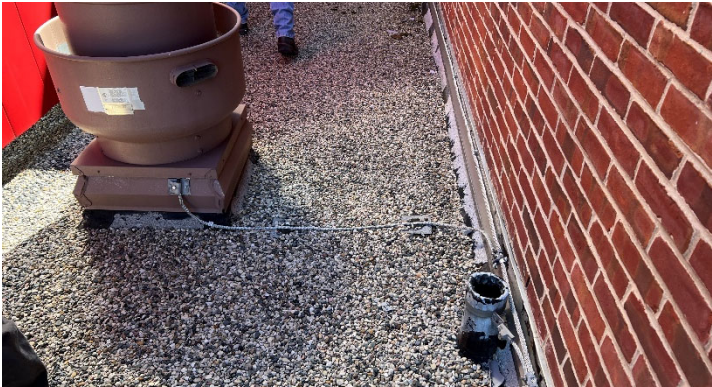
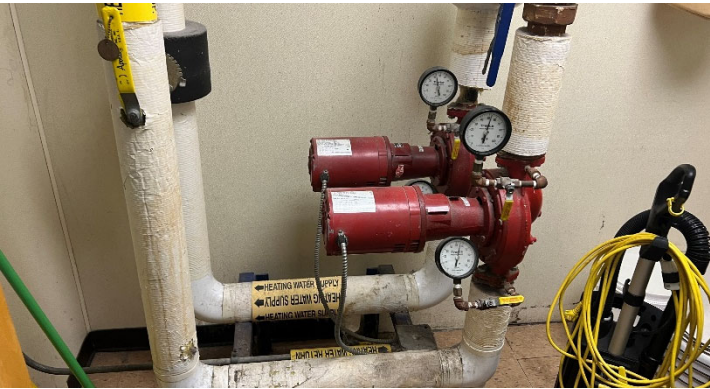
Building 06 – Jack E. Kirksey Livonia Community Recreation Center

Photos:



Building 06 – Jack E. Kirksey Livonia Community Recreation Center

Photos:



Building 07 – Livonia Housing Commission



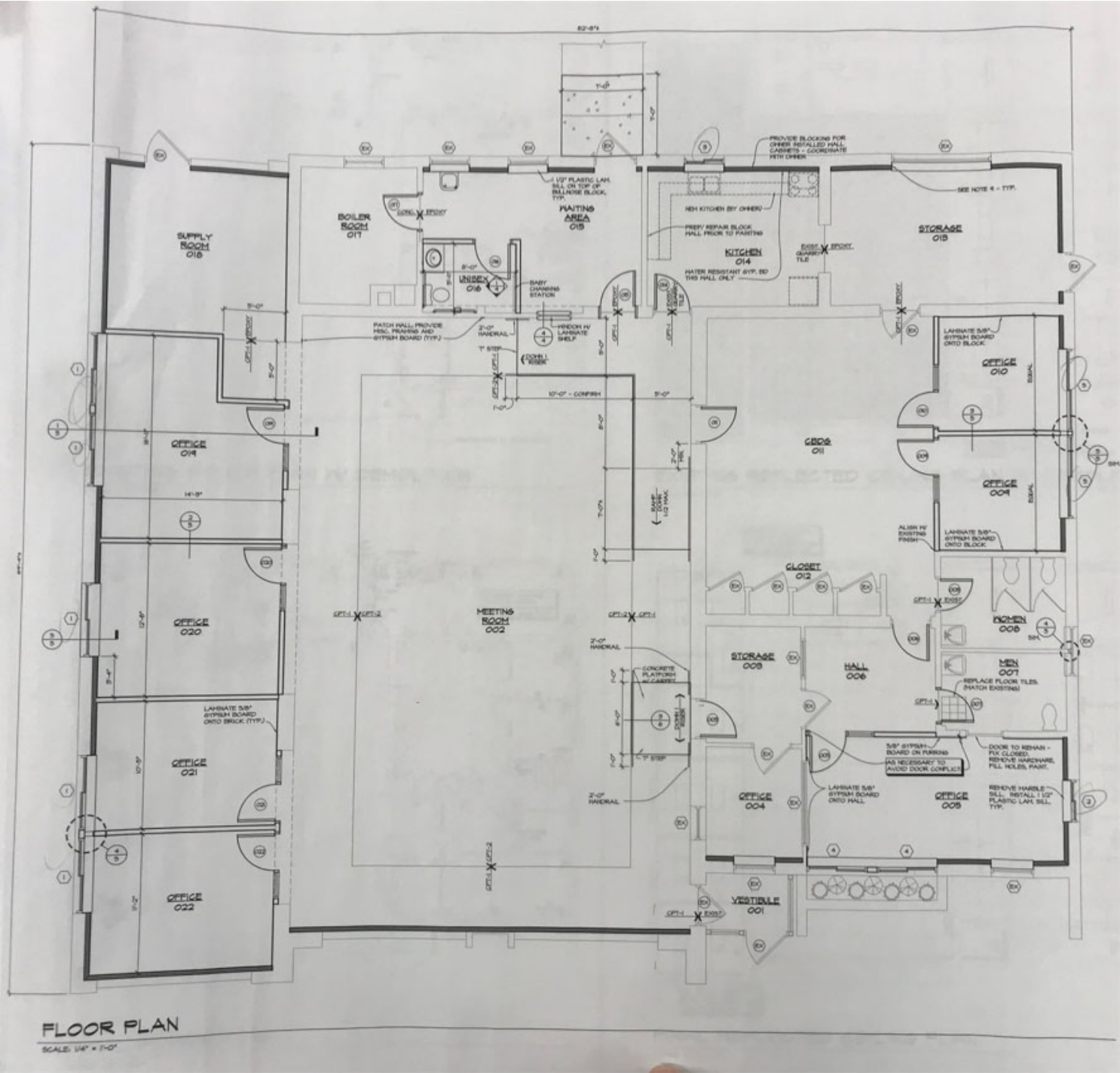
Address:	10800 Farmington Rd. Livonia MI 48150
Year Built:	~1966
Square Footage:	5,660
Site Area:	9.98 Acres
Parking Spaces:	54
Stories:	1
Basement:	No
Elevator(s):	No
Exterior Façade:	Brick
Roof:	EPDM
Fire Protection:	None

Site Plan:



Building 07 - Livonia Housing Commission

1st Floor Plan:



SECTION C | Individual Building Assessments

Building 07 – Livonia Housing Commission

Summary of Budgets:

Housing Commission		Cost Data						
Building SF		5,660		Specification Factor = Geographic Factor = Cost Escalation Factor =		Cost Escalation Factors		
						1.08	1.30	1.48
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
1.0 SITE								
Paving								
Pavement and Base Reconstruction	33000	SF	1	33,000	17.87%	\$213,840	\$0	\$0
Selective Sidewalk & Curb Replacement	1	Allowance	1	1	0.90%	\$10,800	\$0	\$0
Sealcoating/Re-striping	33000	SF	1	33,000	0.89%	\$0	\$0	\$15,824
Landscaping								
Improve Landscaping	1	Allowance	1	1	0.90%	\$10,800	\$0	\$0
Utilities								
Misc. Utility Repairs	1	Allowance	1	1	0.45%	\$0	\$7,020	\$0
Monument Sign - Powered & Electronic Display	1	EA	1	1	4.51%	\$54,000	\$0	\$0
SITE SUBTOTAL					25.54%	\$289,440	\$7,020	\$15,824
2.0 BUILDING ENVELOPE								
Roofing Work								
Misc. Roof Repairs	1	Allowance	1	1	0.90%	\$0	\$14,040	\$0
Windows								
Re-caulk Windows	1	Allowance	1	1	0.63%	\$7,560	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints	1	Allowance	1	1	1.35%	\$16,200	\$0	\$0
Tuckpointing	1	Allowance	1	1	2.26%	\$27,000	\$0	\$0
Exterior Doors								
Exterior Hollow Metal Doors/Frames/Hardware- Single Door	3	EA	1	3	0.81%	\$9,720	\$0	\$0
BUILDING ENVELOPE SUBTOTAL					5.96%	\$60,480	\$14,040	\$0
3.0 INTERIOR/FINISHES								
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling	5,660	SF	1	5,660	4.34%	\$51,959	\$0	\$0
Flooring								
Remove & Replace Flooring - Carpet	5,660	SF	1	5,660	3.42%	\$40,956	\$0	\$0
Paint								
Paint - Interior	5,660	SF	1	5,660	0.77%	\$9,169	\$0	\$0
Restrooms								
Renovate - Toilet Room (Single / Staff)	1	EA	1	1	0.90%	\$0	\$14,040	\$0
Casework & Countertops								
Replace Misc. Casework/Millwork	1	Allowance	1	1	3.16%	\$0	\$49,140	\$0
INTERIOR/FINISHES SUBTOTAL					12.59%	\$102,084	\$63,180	\$0
4.0 PLUMBING SYSTEMS								
Fire Protection								
New Fire Suppression System	5,660	SF	1	5,660	2.55%	\$30,564	\$0	\$0
Equipment & Fixtures								
Existing Bradford White Hot Water Heater, Serial # EJ11099631,2008	1	EA	1	1	0.72%	\$8,640	\$0	\$0
Replace Flush Valves & Faucets	1	Allowance	1	1	0.45%	\$0	\$0	\$7,992
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.45%	\$0	\$0	\$7,992
PLUMBING SYSTEMS SUBTOTAL					4.18%	\$39,204	\$0	\$15,984
5.0 HVAC SYSTEMS								
Equipment								
Existing Trane Roof Top Unit, Serial # 111510840L, 2011	1	EA	1	1	2.26%	\$0	\$0	\$39,960
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.45%	\$0	\$0	\$7,992
Other HVAC								
Air and Water Balance	5,660	SF	1	5,660	0.15%	\$0	\$0	\$2,714
Commissioning	5,660	SF	1	5,660	0.10%	\$0	\$0	\$1,809
Temperature Controls	5,660	SF	1	5,660	1.43%	\$0	\$0	\$25,331
HVAC SYSTEMS SUBTOTAL					4.39%	\$0	\$0	\$77,807
6.0 ELECTRICAL SYSTEMS								
Power for IT Equipment & Upgrades								
Power for new HVAC	1	Allowance	1	1	0.72%	\$0	\$0	\$12,787
Miscellaneous Power Allowance	1	Allowance	1	1	5.06%	\$0	\$0	\$89,510
Lighting								
Replace Lighting with LED's (New OS, Switching, etc.)	5,660	SF	1	5,660	3.73%	\$44,623	\$0	\$0
Building Exterior/Site Lighting Allowance	1	Allowance	1	1	1.35%	\$16,200	\$0	\$0
Fire Alarm System								
Install Fire Alarm System	5,660	SF	1	5,660	1.12%	\$0	\$0	\$19,903
ELECTRICAL SYSTEMS SUBTOTAL					12.19%	\$63,269	\$0	\$122,201

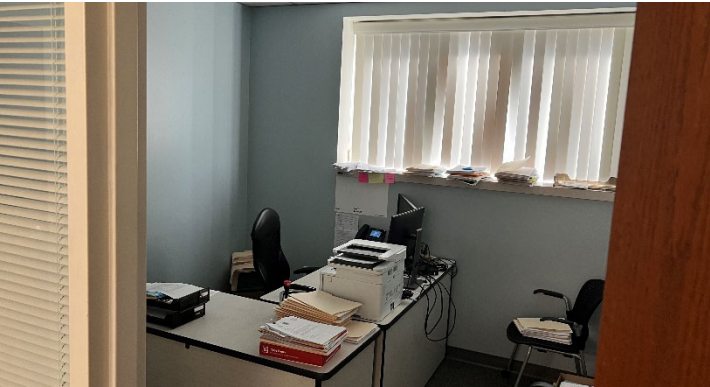
Building 07 – Livonia Housing Commission

Summary of Budgets:

Housing Commission						Cost Data				
Building SF						Specification Factor =	Geographic Factor =		Cost Escalation Factors	
5,660						Cost Escalation Factor =	1.08	1.30	1.48	
Program Area		Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)	
7.0 SECURITY										
Security										
Security Allowance - Cameras / Surveillance		1	Allowance	1	1	0.00%	\$16,200	\$0	\$0	
Security Allowance - Access Controls		1	Allowance	1	1	0.00%	\$16,200	\$0	\$0	
SECURITY SYSTEMS SUBTOTAL						2.71%	\$32,400	\$0	\$0	
8.0 ABATEMENT										
Abatement										
Abatement Allowance		1	Allowance	1	1	2.71%	\$0	\$42,120	\$0	
9.0 FURNITURE & EQUIPMENT										
General Furniture										
FFE Allowance		1	Allowance	1	1	4.51%	\$54,000	\$0	\$0	
Other FF&E										
New Fridge and Freezers Allowance		1	Allowance	1	1	1.35%	\$16,200	\$0	\$0	
FURNITURE & EQUIPMENT SUBTOTAL						5.87%	\$70,200	\$0	\$0	
SOFT COSTS										
Building Infrastructure Improvement Total:						76.14%	\$657,076	\$126,360	\$231,816	
Project Contingency:		10.00%				7.03%	\$58,688	\$12,636	\$23,182	
Permits, Testing & Printing:		2.50%				1.93%	\$16,139	\$3,475	\$6,375	
Professional Fees & Costs:		9.00%				7.77%	\$64,913	\$13,976	\$25,641	
Construction Manager Fee & Costs:		9.00%				7.13%	\$59,553	\$12,822	\$23,524	
PROJECT TOTAL						100.00%	\$856,369	\$169,270	\$310,537	

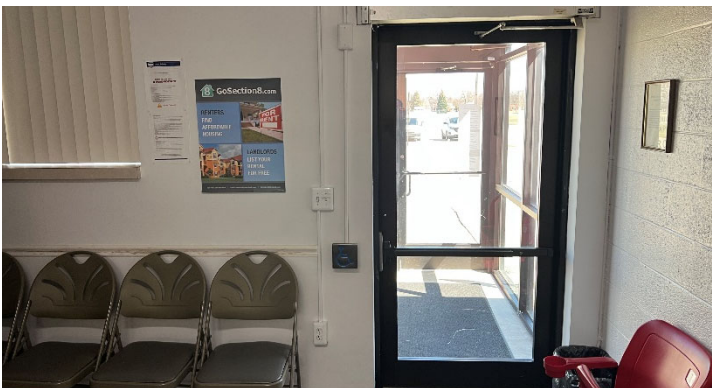
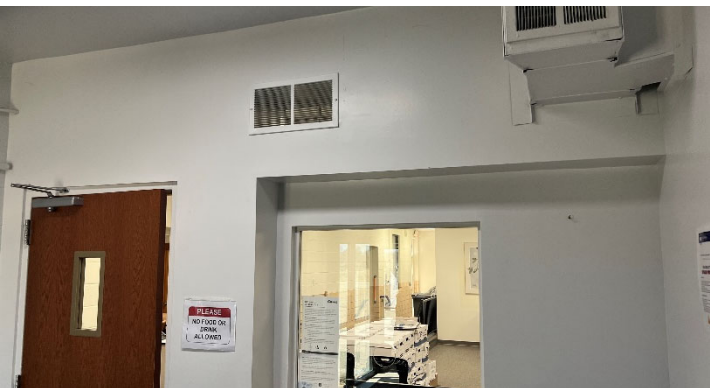
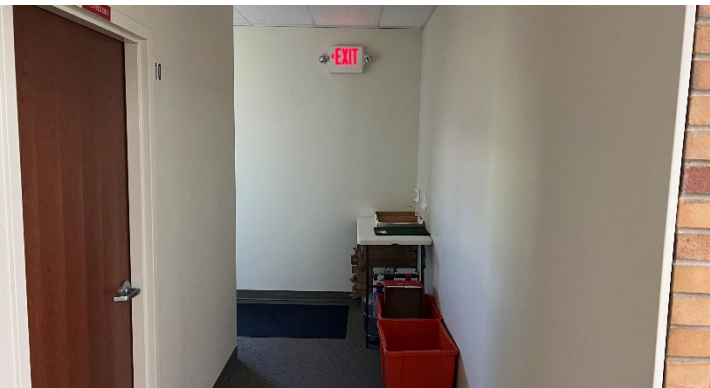
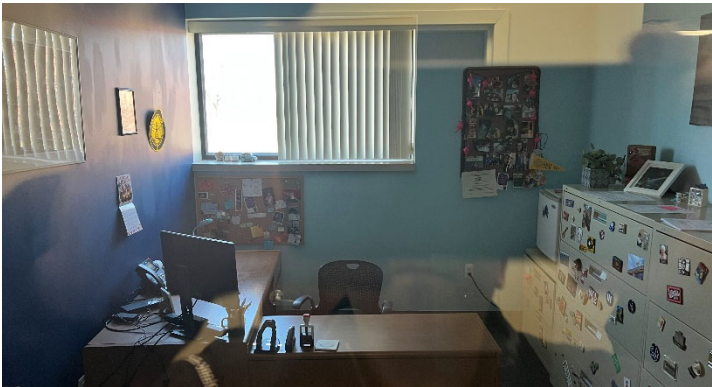
Building 07 – Livonia Housing Commission

Photos:



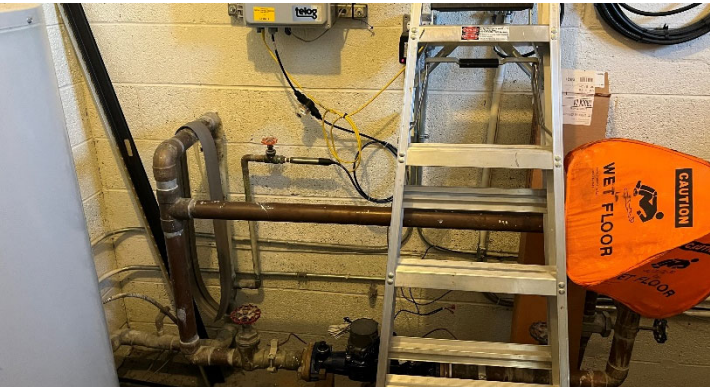
Building 07 – Livonia Housing Commission

Photos:



Building 07 – Livonia Housing Commission

Photos:

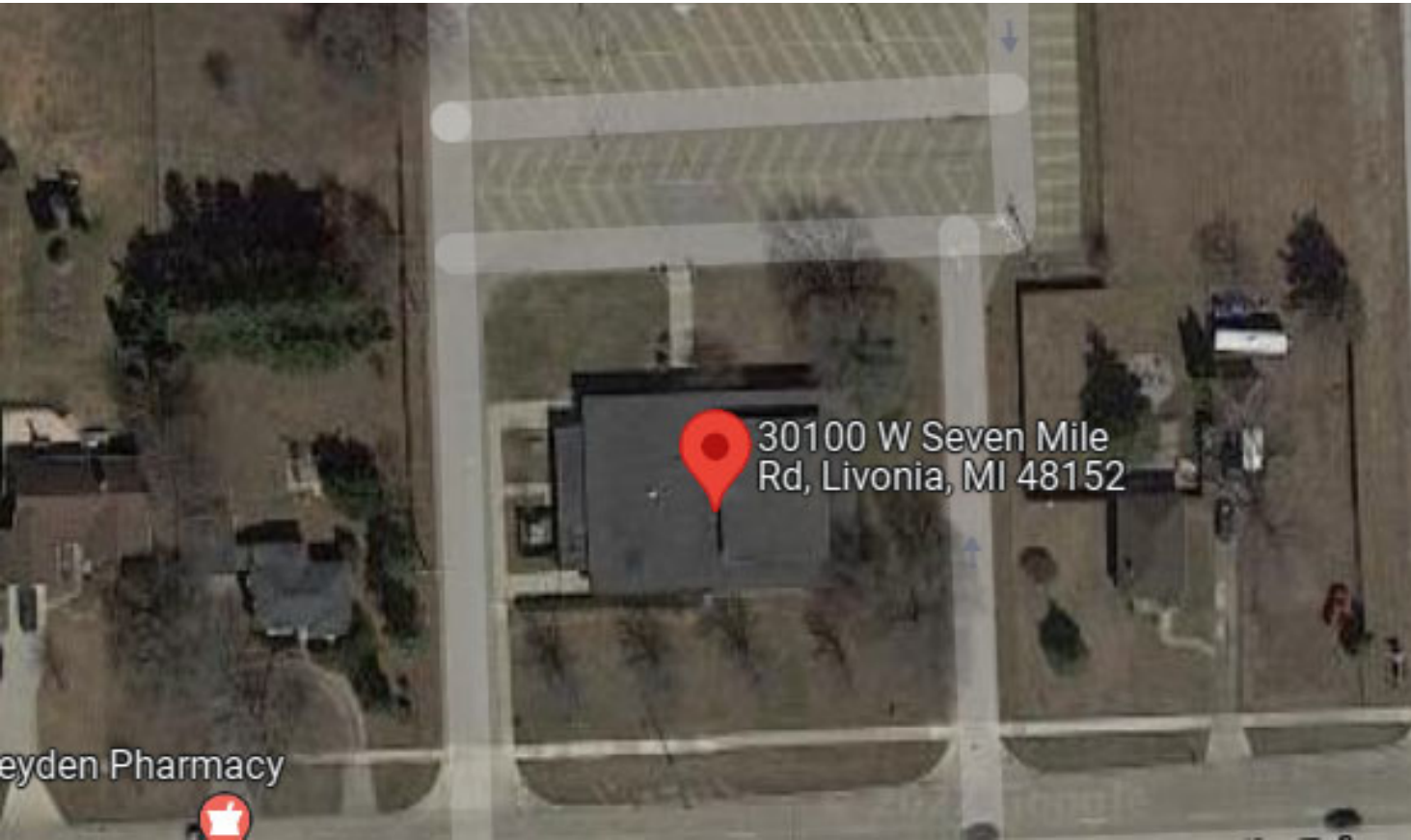


Building 08 – Carl Sandburg Library



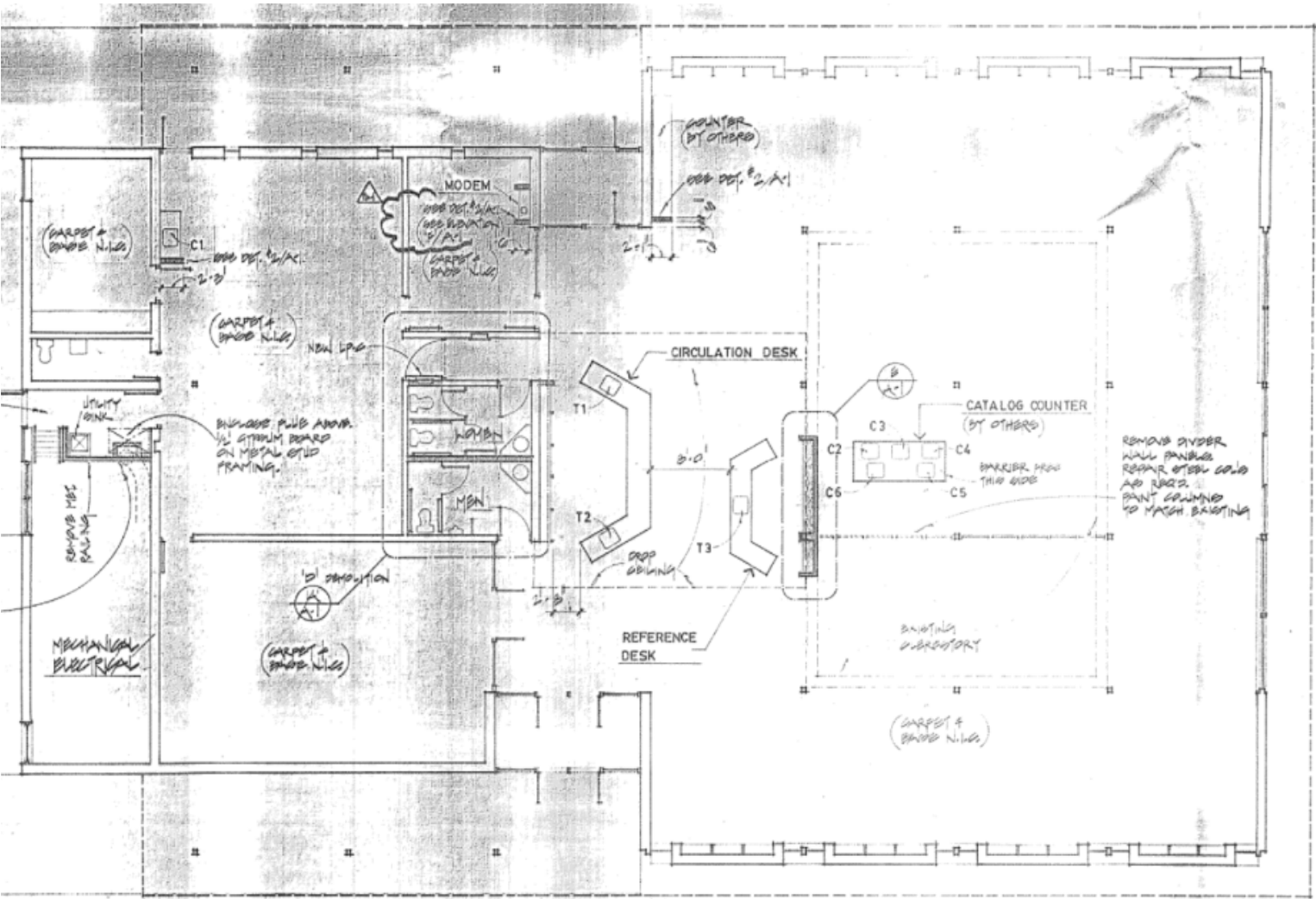
Address:	30100 W. Seven Mile Rd. Livonia MI 48152
Year Built:	1961
Square Footage:	8,600
Site Area:	2.20 Acres
Parking Spaces:	107
Stories:	1
Basement:	Yes
Elevator(s):	No
Exterior Façade:	Brick
Roof:	Tar
Fire Protection:	No

Site Plan:



Building 08 – Carl Sandburg Library

1st Floor Plan:



SECTION C | Individual Building Assessments

Building 08 – Carl Sandburg Library

Summary of Budgets:

Carl Sandburg Library						Cost Data		
Building SF						Specification Factor =	Geographic Factor =	Cost Escalation Factor =
11,000						1.08	1.30	1.48
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
1.0 SITE								
Paving								
Pavement and Base Reconstruction	55,000	SF	1	55,000	13.46%	\$0	\$463,320	\$0
Selective Sidewalk & Curb Replacement	1	Allowance	1	1	0.41%	\$10,800	\$0	\$0
Sealcoating/Re-striping	55,000	SF	1	55,000	0.67%	\$17,820	\$0	\$0
Landscaping								
Improve Landscaping	1	Allowance	1	1	0.41%	\$0	\$14,040	\$0
Utilities								
Catch Basin / Manholes	3	EA	1	3	0.55%	\$0	\$18,870	\$0
Misc. Utility Repairs	1	Allowance	1	1	1.02%	\$0	\$35,100	\$0
Monument Sign - Powered & Electronic Display	1	EA	1	1	2.04%	\$54,000	\$0	\$0
SITE SUBTOTAL					18.56%	\$82,620	\$531,330	\$0
2.0 BUILDING ENVELOPE								
Roofing Work								
Replace Roof (EPDM) - .60 Mil/Reinforced/Fully-Adhered- (In Process)	15,000	SF	1	15,000	9.44%	\$250,000	\$0	\$0
Install Roof Access Ladder	1	EA	1	1	0.09%	\$2,419	\$0	\$0
Windows								
Re-caulk Windows	1	Allowance	1	1	0.31%	\$8,100	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints	1	Allowance	1	1	0.61%	\$16,200	\$0	\$0
Tuckpointing	1	Allowance	1	1	1.63%	\$43,200	\$0	\$0
Exterior Doors								
Exterior Hollow Metal Doors/Frames/Hardware- Single Door	2	EA	1	2	0.24%	\$6,480	\$0	\$0
BUILDING ENVELOPE SUBTOTAL					12.33%	\$326,399	\$0	\$0
3.0 INTERIOR/FINISHES								
Interior Doors & Hardware								
Replace Interior Doors & Hardware	10	EA	1	10	1.63%	\$43,200	\$0	\$0
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling	3,000	SF	1	3,000	1.04%	\$27,540	\$0	\$0
Flooring								
Remove & Replace Flooring - Carpet	11,000	SF	1	11,000	3.01%	\$0	\$0	\$117,802
Paint								
Paint - Interior	11,000	SF	1	11,000	0.67%	\$0	\$23,166	\$0
Restrooms								
Renovate - Toilet Room (Single / Staff)	1	EA	2	2	1.37%	\$36,288	\$0	\$0
Casework & Countertops								
Replace Misc. Casework/Millwork	1	Allowance	1	1	4.08%	\$108,000	\$0	\$0
INTERIOR/FINISHES SUBTOTAL					11.80%	\$215,028	\$23,166	\$117,802
4.0 PLUMBING SYSTEMS								
Fire Protection								
New Fire Suppression System	11,000	SF	1	11,000	2.24%	\$59,400	\$0	\$0
Equipment & Fixtures								
Existing Lochinvar Hot Water Heater, Serial # 1213A012099, 2012	1	EA	1	1	0.33%	\$0	\$11,232	\$0
Replace Flush Valves & Faucets	1	Allowance	1	1	0.46%	\$0	\$0	\$17,902
Provide Bottle Filler Drinking Fountains	1	EA	1	1	0.27%	\$7,258	\$0	\$0
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	0.49%	\$0	\$0	\$19,181
PLUMBING SYSTEMS SUBTOTAL					3.79%	\$66,658	\$11,232	\$37,083
5.0 HVAC SYSTEMS								
Equipment								
Existing Lochinvar Boiler, Serial #J938512, 1990	1	EA	1	1	3.06%	\$81,000	\$0	\$0
Replace Boiler Pumps	1	EA	1	1	0.34%	\$9,072	\$0	\$0
Existing MagicAire Air Handler Unit, Serial # 940489444, 1994	1	EA	1	1	0.61%	\$16,200	\$0	\$0
Existing MagicAire Air Handler Unit, Serial # 940592687, 1994	1	EA	1	1	0.61%	\$16,200	\$0	\$0
Existing MagicAire Air Handler Unit, Serial # 94059286, 1994	1	EA	1	1	0.61%	\$16,200	\$0	\$0
Existing Trane Chiller, Serial # J94E81342, 1994 (Slated for replacement 2022)	1	EA	-	-	0.00%	\$0	\$0	\$0
Piping								
Replace Piping, Valves & Unions	1	Allowance	1	1	1.02%	\$27,000	\$0	\$0
Other HVAC								
Air and Water Balance	11,000	SF	1	11,000	0.13%	\$3,564	\$0	\$0
Commissioning	11,000	SF	1	11,000	0.09%	\$2,376	\$0	\$0
Temperature Controls- (In Process)	11,000	SF	1	11,000	1.26%	\$33,264	\$0	\$0
HVAC SYSTEMS SUBTOTAL					8.35%	\$221,076	\$0	\$0

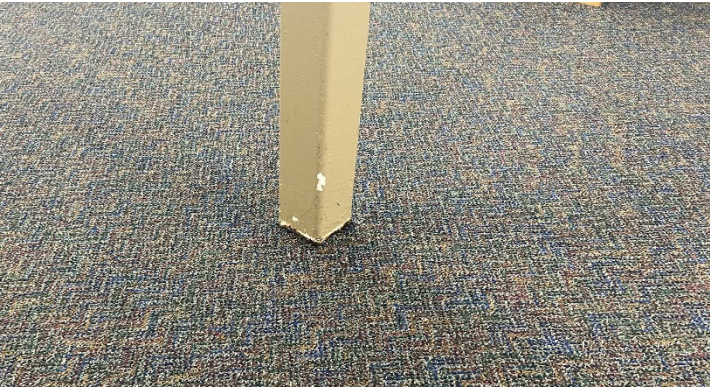
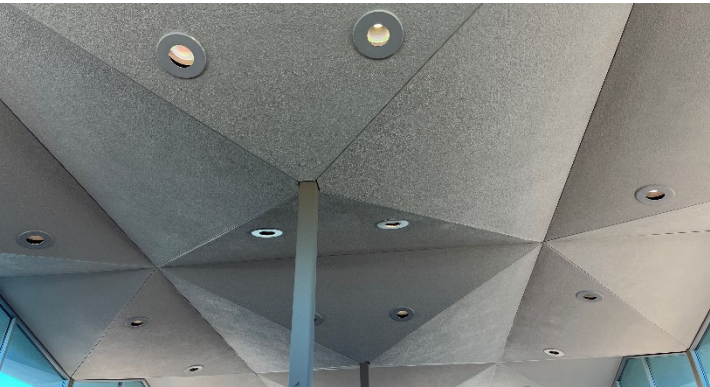
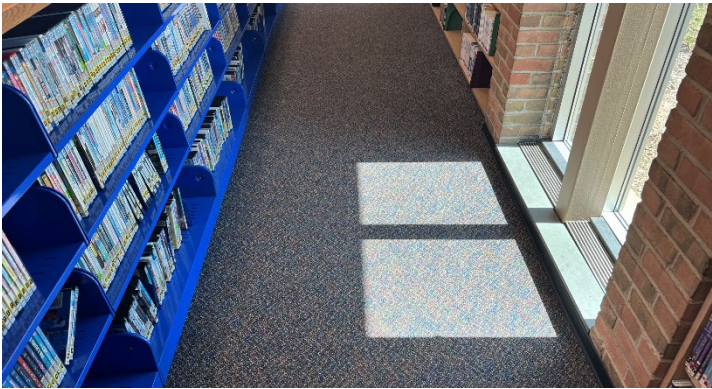
Building 08 – Carl Sandburg Library

Summary of Budgets:

Carl Sandburg Library						Cost Data		
Building SF		11,000		Specification Factor = Geographic Factor = Cost Escalation Factor =		Cost Escalation Factors		
						1.08	1.30	1.48
Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
6.0 ELECTRICAL SYSTEMS								
Power								
Power for IT Equipment & Upgrades	1	Allowance	1	1	0.61%	\$0	\$0	\$23,976
Replace Existing Electrical Panels	1	Allowance	1	1	2.04%	\$0	\$0	\$79,920
Power for new HVAC	1	Allowance	1	1	2.28%	\$60,480	\$0	\$0
Miscellaneous Power Allowance- (New Outlets Needed)	11,000	SF	1	11,000	0.18%	\$4,752	\$0	\$0
Panel Capacity Investigations and Re-tagging	1	Allowance	1	1	0.69%	\$18,144	\$0	\$0
Lighting								
Replace Lighting with LED's (New OS, Switching, etc.)	11,000	SF	1	11,000	3.28%	\$86,724	\$0	\$0
Replace Emergency & Exit Lights	11,000	SF	1	11,000	0.13%	\$3,564	\$0	\$0
Building Exterior/Site Lighting Allowance	1	Allowance	1	1	2.28%	\$60,480	\$0	\$0
Fire Alarm System								
Install Fire Alarm System	11,000	SF	1	11,000	0.99%	\$26,136	\$0	\$0
ELECTRICAL SYSTEMS SUBTOTAL					12.48%	\$260,280	\$0	\$103,896
7.0 SECURITY								
Security								
Security Allowance - Cameras / Surveillance	1	Allowance	1	1	0.61%	\$0	\$0	\$23,976
Security Allowance - Access Controls	1	Allowance	1	1	0.00%	\$0	\$0	\$23,976
SECURITY SYSTEMS SUBTOTAL					1.22%	\$0	\$0	\$47,952
8.0 ABATEMENT								
Abatement								
Abatement Allowance	1	Allowance	1	1	2.45%	\$64,800	\$0	\$0
ABATEMENT SUBTOTAL					2.45%	\$64,800	\$0	\$0
9.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance	1	Allowance	1	1	1.84%	\$0	\$63,180	\$0
New Book Shelves	1	Allowance	1	1	3.06%	\$81,000	\$0	\$0
FURNITURE & EQUIPMENT SUBTOTAL					4.90%	\$81,000	\$63,180	\$0
SOFT COSTS								
Building Infrastructure Improvement Total:					75.89%	\$1,317,861	\$628,908	\$306,733
Project Contingency:					7.10%	\$123,686	\$56,573	\$30,673
Permits, Testing & Printing:					1.95%	\$34,014	\$15,558	\$8,435
Professional Fees & Costs:					7.85%	\$136,806	\$62,574	\$33,927
Construction Manager Fee & Costs:					7.20%	\$125,510	\$57,407	\$31,126
PROJECT TOTAL					100.00%	\$1,737,877	\$821,019	\$410,894

Building 08 – Carl Sandburg Library

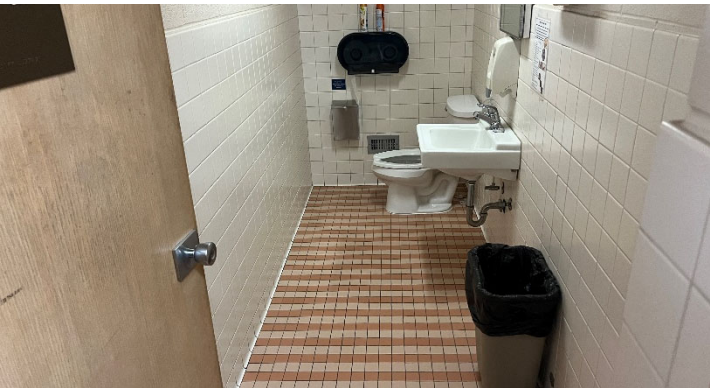
Photos:



SECTION C | Individual Building Assessments

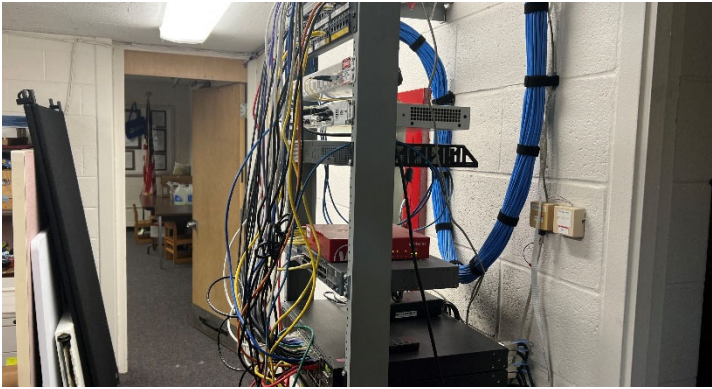
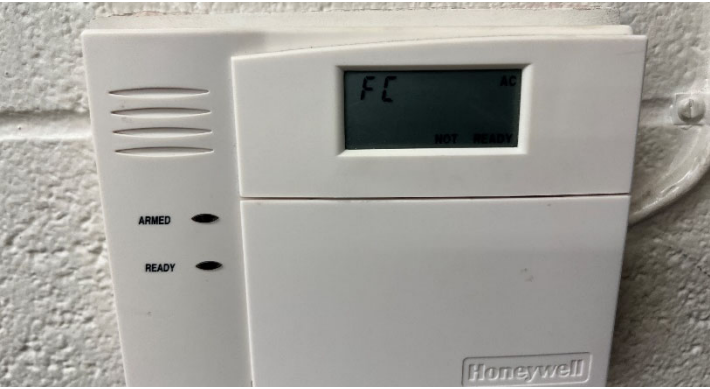
Building 08 – Carl Sandburg Library

Photos:



Building 08 – Carl Sandburg Library

Photos:



Building 08 – Carl Sandburg Library

Photos:

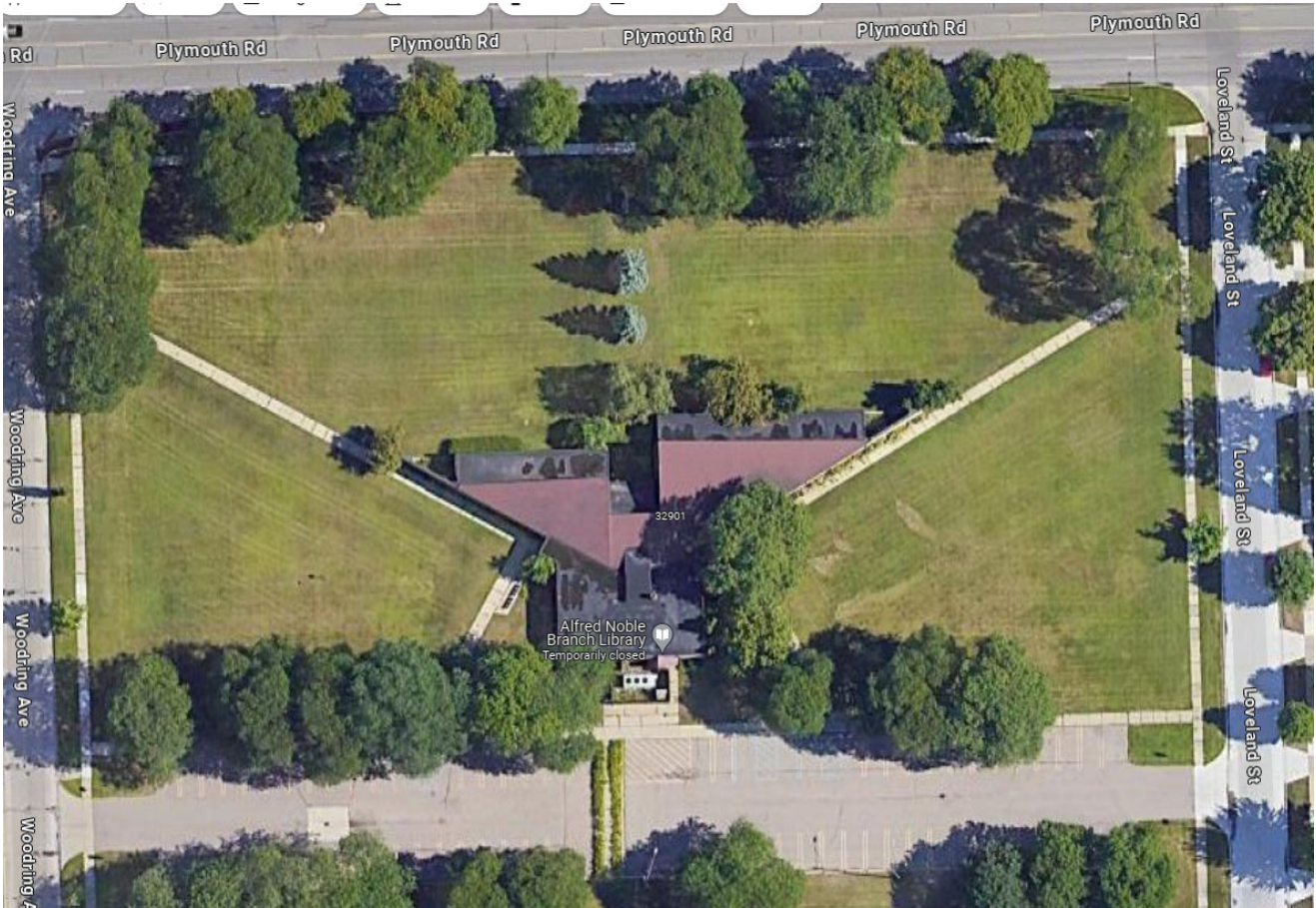


Building 09 – Alfred Noble Building



Address:	32901 Plymouth Rd. Livonia MI 48150
Year Built:	1967
Square Footage:	12,175
Site Area:	4.84 Acres
Parking Spaces:	81
Stories:	1
Basement:	Yes
Elevator(s):	No
Exterior Façade:	Brick
Roof:	EPDM & Shingles
Fire Protection:	No

Site Plan:



Building 09 – Alfred Noble Building

Summary of Budgets:

Alfred Noble Building						Cost Data		
Building SF						Specification Factor =		
16,000						Geographic Factor =		
						Cost Escalation Factor =		
						1.081.301.48		
Program Area						Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Future Need Cost (7 - 10 years)
Quantity								
Per Unit								
Unit								
# of								
Units								
Total Units								
As % of								
Total Cost								
1.0 SITE								
Demolition								
Building Demolition (Non-Abated)						\$164,160	\$0	\$0
Paving								
Pulverize Existing Parking Lot						\$20,736	\$0	\$0
Landscaping								
Landscape Restoration						\$73,440	\$0	\$0
SITE SUBTOTAL						\$258,336	\$0	\$0
SOFT COSTS								
Building Infrastructure Improvement Total:						\$258,336	\$0	\$0
Project Contingency:						\$25,834	\$0	\$0
Permits, Testing & Printing:						\$7,104	\$0	\$0
Professional Fees & Costs:						\$28,574	\$0	\$0
Construction Manager Fee & Costs:						\$26,215	\$0	\$0
PROJECT TOTAL						\$346,062	\$0	\$0

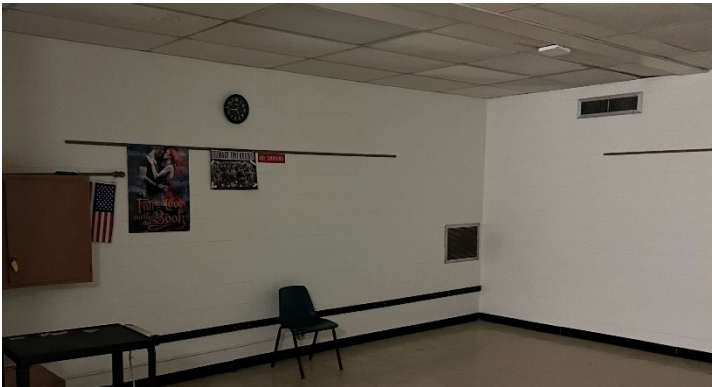
Building 09 – Alfred Noble Building

Photos:



Building 09 – Alfred Noble Building

Photos:



Building 09 – Alfred Noble Building

Photos:



SECTION C | Individual Building Assessments

Building 10 – City Wide Technology

Summary of Budgets

Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Critical Needs Cost (1 - 3 years)	Deferrable Maintenance Cost (4 - 6 years)	Property Enhancement Cost (7 - 10 years)
10.0 TECHNOLOGY								
Technology								
Run Fiber To All Buildings (In Process)	13	EA	1	13	42.19%	\$468,000	\$608,400	\$692,640
Upgrade Wireless Networks	1	Allowance	1	1	16.23%	\$540,000	\$0	\$0
Electronic Time Keeping System	1	Allowance	1	1	16.23%	\$540,000	\$0	\$0
TECHNOLOGY SUBTOTAL					74.65%	\$1,548,000	\$608,400	\$692,640
SOFT COSTS								
Building Infrastructure Improvement Total:					74.65%	\$1,548,000	\$608,400	\$692,640
Project Contingency:	10.00%				7.47%	\$154,800	\$60,840	\$69,264
Permits, Testing & Printing:	2.50%				2.05%	\$42,570	\$16,731	\$19,048
Professional Fees & Costs:	9.00%				8.26%	\$171,221	\$67,294	\$76,611
Construction Manager Fee & Costs:	9.00%				7.58%	\$157,083	\$61,737	\$70,286
PROJECT TOTAL					100.00%	\$2,073,674	\$815,002	\$927,849

Building 11 – Station No. 3



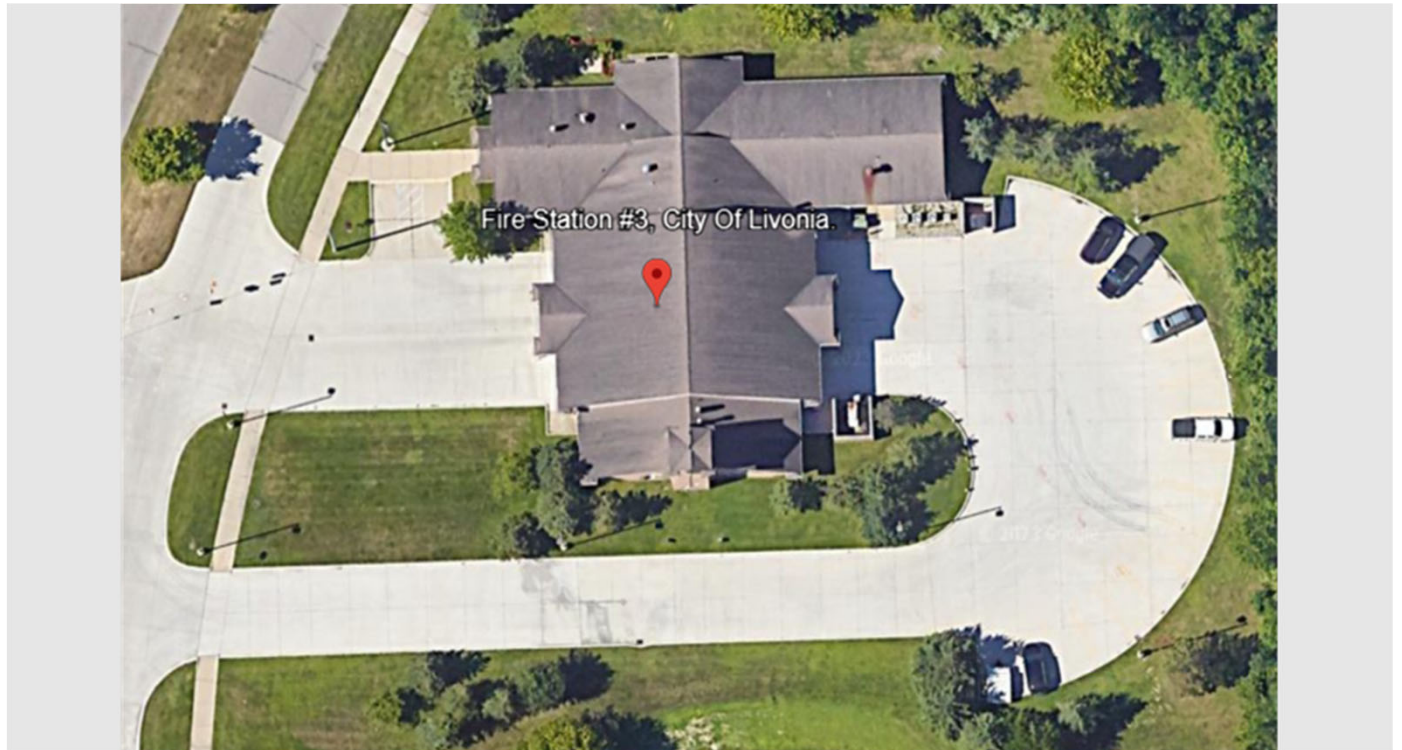
Address:	35000 Seven Mile Road
Year Built:	1999 (24 Years Old)
Square Footage:	11,050 s.f.
Site Area:	
Parking Spaces:	Approximately 19
Stories:	1
Basement:	No
Elevator(s):	No
Exterior Façade:	Brick
Roof:	Asphalt Shingles
Fire Protection:	Entire facility

Space Needs Summary:

1. Space is currently used to capacity.
2. Public open-houses are also held at this facility.
3. Drive through bays are essential to safety of personnel and equipment. Currently, the only drive through bay that can be used as designed is the middle engine bay due to the apparatus and spare equipment placed at Station No. 3.
4. Currently, there is room for six (6) personnel to work 24-hour shifts. With the addition of a second hospital, more space may be required for additional personnel to staff apparatus.
5. Storage on south side of building is at capacity for EMS supplies, biohazard, laundry, oxygen, HAZMAT, and public education, mechanical work area.
6. If staffing increases, a second officers' room may be required.
7. The addition of a public education and HAZMAT office would be appropriate, along with space for EMS supplies.

Building 11 continued

Site



*Building 11continued***Condition Summary (Building Envelope): GOOD**

Roof – The primary roofing system is asphalt shingles, which were installed in 1999 and are approximately 24 years old. Roof drainage is by gutter and downspout spilling to grade. No drainage deficiencies were observed. Overall, the roofing systems appeared to be in **FAIR** condition.

Windows – The primary glazing system is an insulated dual pane system in wood frame. Some windows have wood shutters that have been damaged by woodpeckers. Caulking around windows appeared to be in fair condition and will require replacement within the next five years. Overall, windows appeared to be in **FAIR** condition.

Facade – The primary façade material is brick. There was no evidence of cracking or spalling. Caulking at control joints appears to be in fair condition and will need to be replaced within the next five years. Overall, the façade appeared to be in **GOOD** condition.

Doors – Entry doors are primarily an aluminum frame with glass panel system, secondary doors are primarily hollow metal frame and door. Apparatus bay doors are insulated sectional overhead doors with glass vision panels. Overall, doors appeared to be in **GOOD** condition.

Overall, the Building Envelope appeared to be in **GOOD** condition.

Building 11 continued

Photos (Building Envelope)



Façade



Façade and roof



Façade and roof



Window



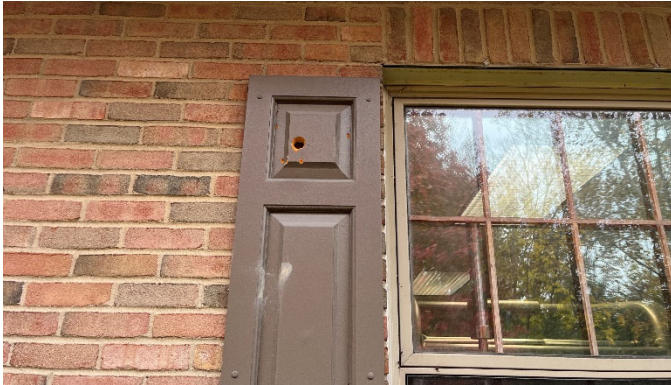
Caulking at control joint and door



Facade

Building 11 continued

Photos (Building Envelope)



Facade and window



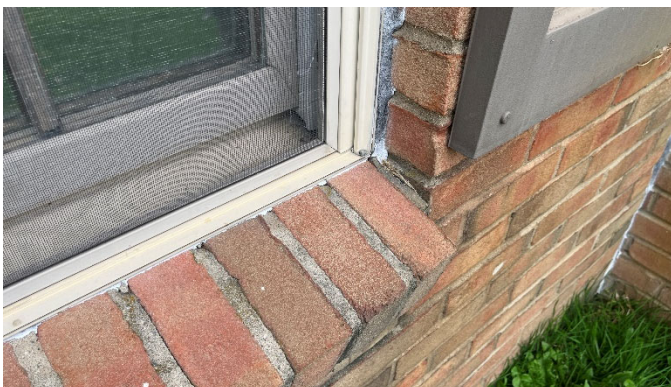
Facade



Facade and window



Roof



Window



Facade and door

*Building 11 continued***Condition Summary (Interiors): FAIR**

Flooring – Administrative areas are primarily carpet. Toilet Rooms and Locker Rooms are porcelain tile. Kitchen is resilient flooring. Physical Training area is rubber. Dorm Rooms are carpet. Apparatus Bays are epoxy. Due to the age of this facility, flooring in most areas is showing signs of wear. Overall, flooring appeared to be in **FAIR** condition.

Wall covering – Entry Vestibule, Corridors, Watch Room, and Administrative areas are vinyl wall covering. The vinyl wall covering is peeling in many areas. Removal and repainting is recommended. Toilet Rooms and Locker Rooms are porcelain tile and painted gypsum board. Apparatus bays and Storage Rooms are painted concrete masonry units (CMU). Overall, wall covering appeared to be in **FAIR** condition.

Ceilings – Corridors, Administrative Areas, Kitchen, Watch Room, Physical Training, Dorm Rooms, and Day Room consists primarily of acoustical ceiling tile (ACT). Signs of water damage was observed in multiple areas. It was not determined if the water damage is from a roof leak or a pipe leak. Overall, ceilings appeared to be in **FAIR** condition.

Windowsills - Windowsills consist primarily of granite. Overall, windowsills appeared to be in **GOOD** condition.

Window treatment – Not all windows have window treatment. Those that do have roller shades, vertical blinds, or horizontal blinds. Overall, window treatment appeared to be in **FAIR** condition.

Interior doors – Interior doors are primarily wood and hollow metal. Dorm Rooms have curtains in lieu of doors. Overall, interior doors appeared to be in **GOOD** condition.

Millwork – Watch Room and Work Room has plastic laminate cabinets and countertop. Kitchen has plastic laminate cabinets and granite countertop. Overall, millwork appeared to be in **GOOD** condition.

Overall, interiors appeared to be in **FAIR** condition.

Building 11 continued

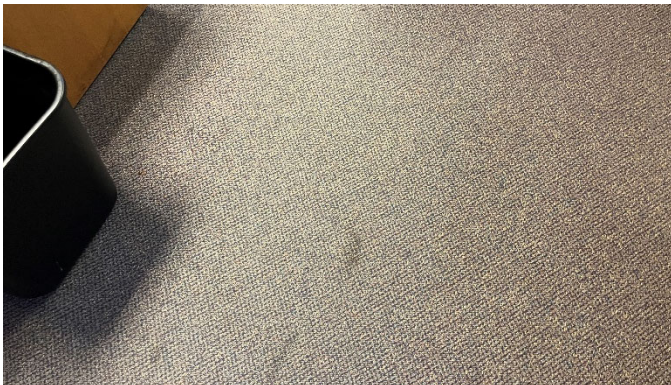
Photos (Interiors)



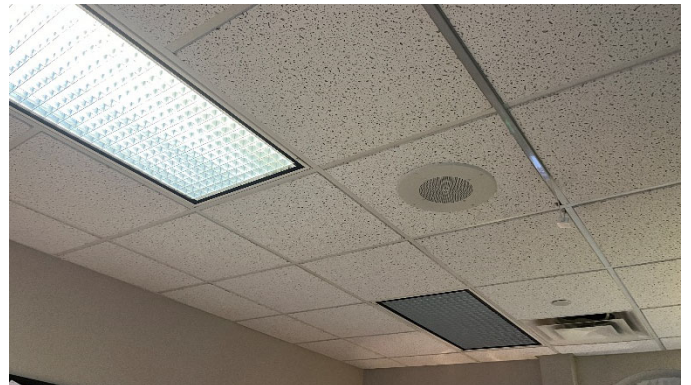
Entry vestibule



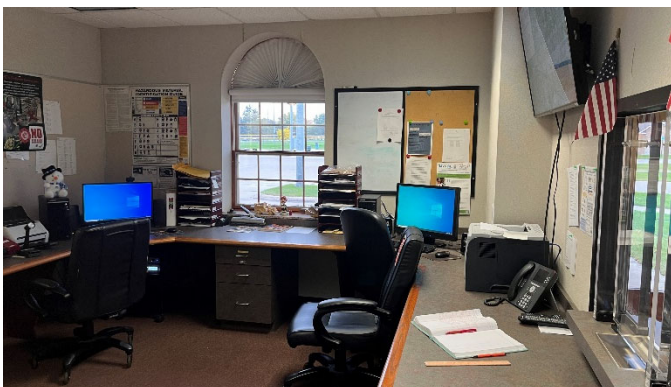
Office



Office



Office



Watch Room



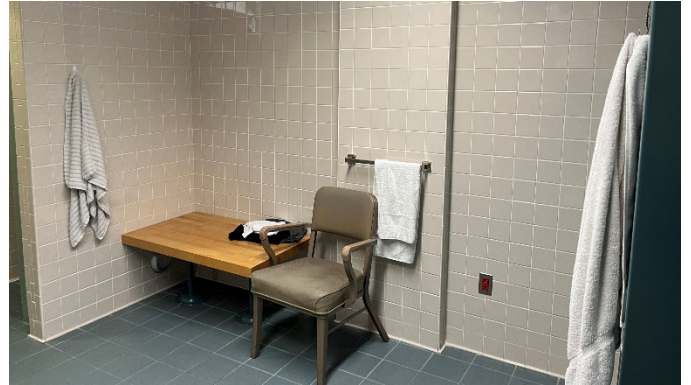
Watch Room

Building 11continued

Photos (Interiors)



Toilet Room



Locker Room



Locker Room



Kitchen



Kitchen



Kitchen

Building 11 continued

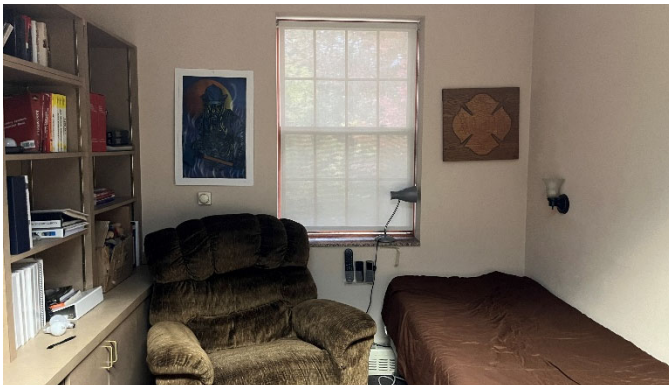
Photos (Interiors)



Day Room



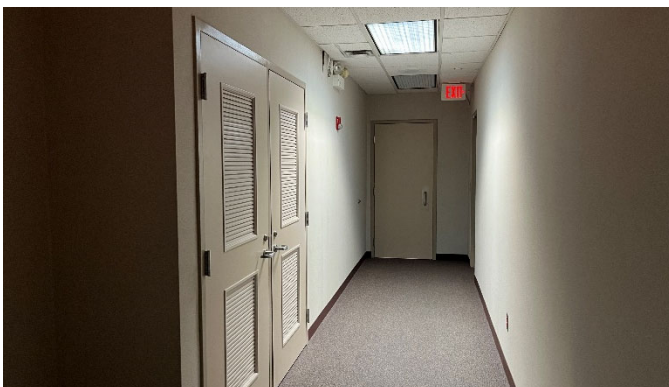
Work Room



Dorm Room



Physical Training Room



Corridor



Dorm Room

Building 11 continued

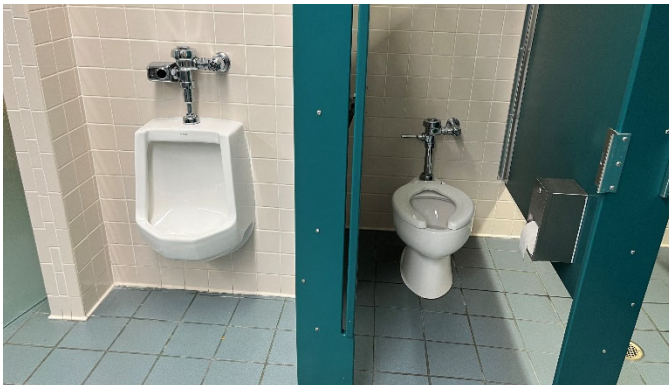
Photos (Interiors)



Locker Room



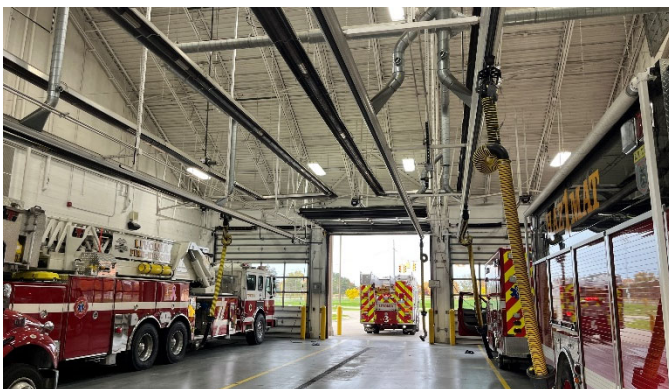
Locker Room



Locker Room



Locker Room



Apparatus Bay



Apparatus Bay

*Building 11 continued***Condition Summary (Plumbing): FAIR**

Plumbing – Domestic piping is copper. Domestic hot water is provided by a 75-gallon Lochinvar water heater that was manufactured in 2013 (approximately 10 years old), and a 40-gallon Lochinvar water heater manufactured in 2014 (approximately 9 years old). Toilet Room fixtures appear to be original. Upgrading to hands-free is recommended. Sanitary system is cast iron.

Fire Protection – The building is fully sprinklered.

Overall, plumbing appeared to be in **FAIR** condition.

Building 11 continued

Photos (Plumbing)



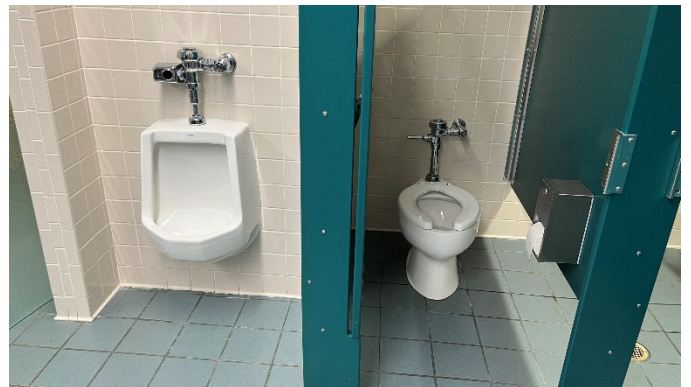
Bottle filler



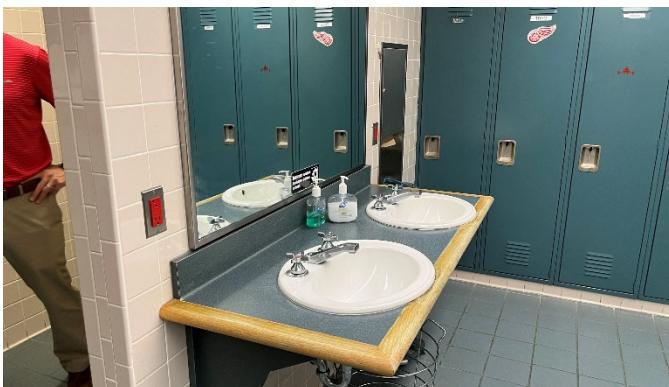
Mop sink



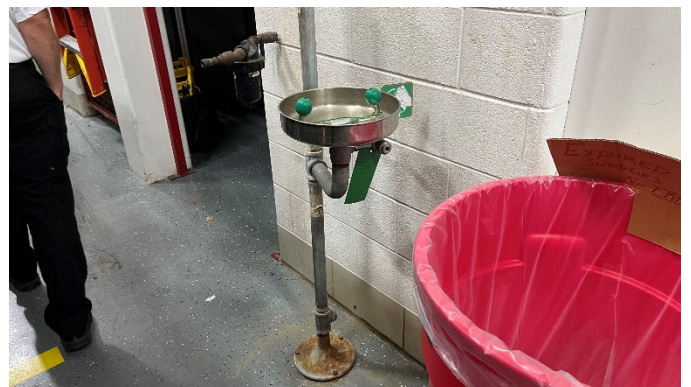
Water heater



Locker Room



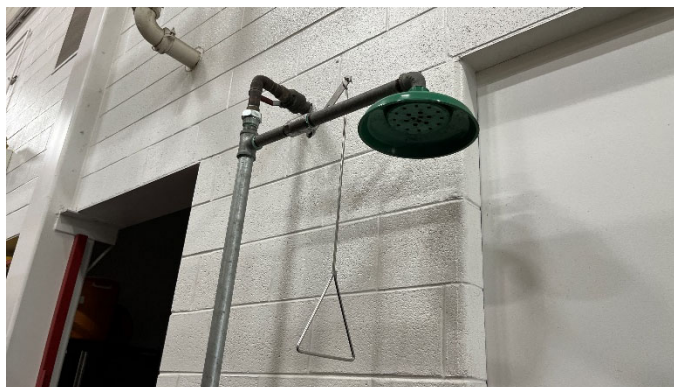
Locker Room



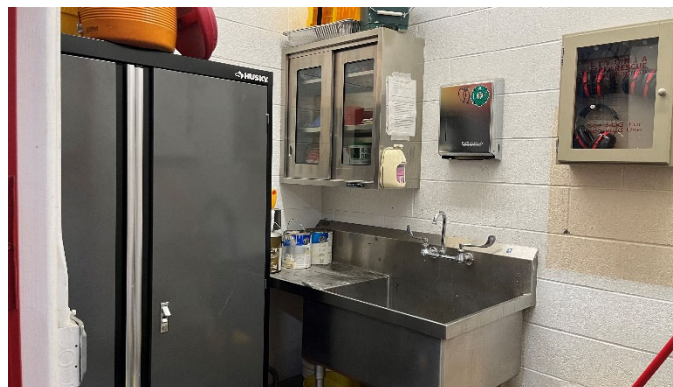
Apparatus Bay

Building 11 continued

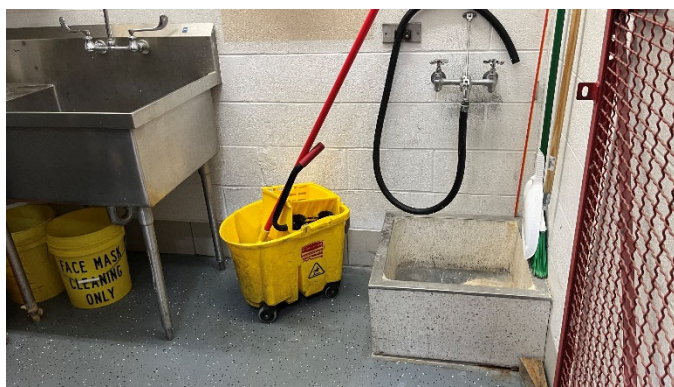
Photos (Plumbing)



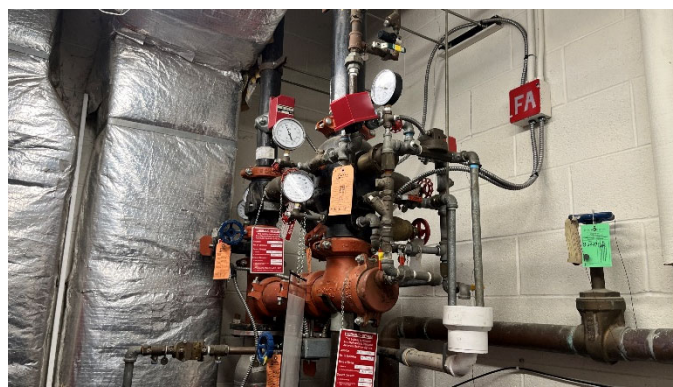
Apparatus Bay



Storage Room



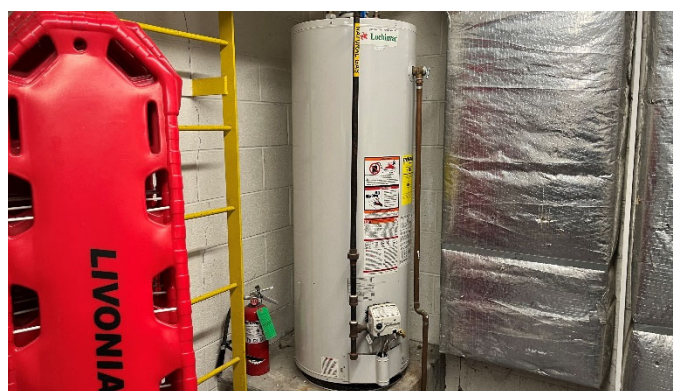
Storage Room



Fire riser



Air dryer



Water heater

*Building 11 continued***Condition Summary (HVAC): FAIR**

HVAC – Heating, Ventilation and Air Conditioning is provided by:

- Furnaces - Three (3) were install in 1999 and are approximately 24 years old; two (2) were installed in 2019 and are approximately 4 years old.
- Air Conditioning Units – Three (3) were install in 1999 and are approximately 24 years old; two (2) were installed in 2019 and are approximately 4 years old.

Overall, the HVAC systems appeared to be in **FAIR** condition.

Building 11 continued

Photos (HVAC)



Cabinet unit heater



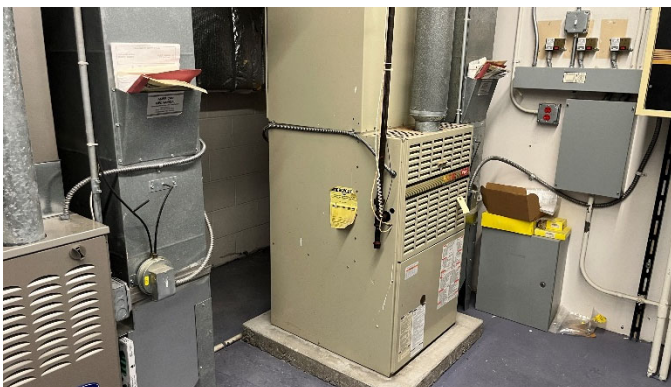
Baseboard heating



Furnace



Boiler



Furnace



Furnace

Building 11 continued

Photos (HVAC)



Vehicle exhaust vent



Vehicle exhaust vent



Air conditioning unit



Furnace



Air conditioning units



Air conditioning unit

*Building 11 continued***Condition Summary (Electrical): GOOD**

Lighting – Lighting is primarily lay-in fixtures with T8 LED retrofit lamp. Overall, lighting appeared to be in **GOOD** condition.

Power – Fire Station No. 3 has a secondary electrical service at 600 amp, 120/208v, 3 phase WYE. It was reported that the electrical service is in good condition and current power is sufficient. Overall, power appeared to be in **GOOD** condition.

Emergency Power – Emergency power is provided by one (1) Kohler model 100RZ82, natural gas, 100kW, emergency only with some AC generator, which was installed in 1999 and is approximately 24 years old. Overall, emergency power appeared to be in **FAIR** condition.

Fire Alarm – It was reported that the existing fire alarm system requires upgrading.

PA System – It was reported that the existing PA system needs replacement

Overall, electrical appeared to be in **GOOD** condition.

Building 11 continued

Photos (Electrical)



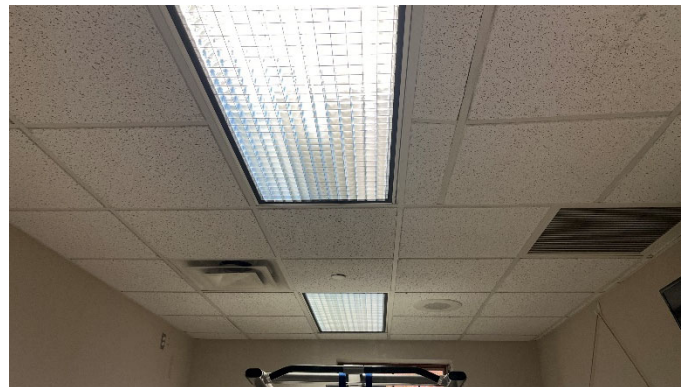
Lighting



Lighting



Electrical panels



Lighting



Switch gear and emergency main



Switch gear and transfer switch

Building 11 continued

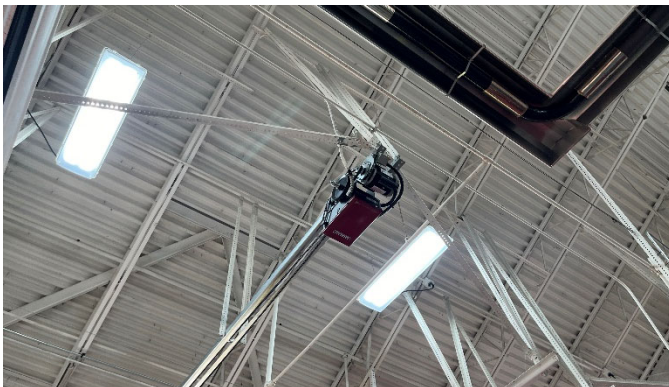
Photos (Electrical)



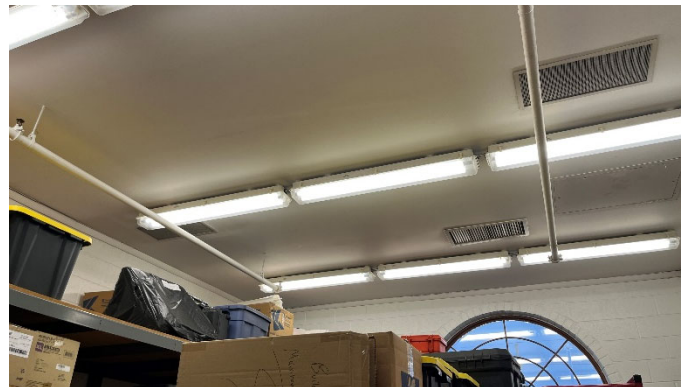
Lighting



Lighting



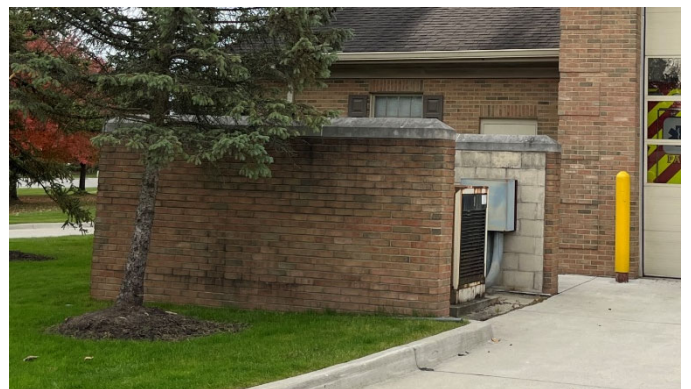
Lighting



Lighting



Transformer



Generator

*Building 11 continued***Condition Summary (Site): GOOD**

Drainage – The storm water collection and drainage system is below grade. Downspouts spill to grade. Catch basins are located throughout the site. No presence of on-site surface water was observed. Overall, site drainage appeared to be in **GOOD** condition.

Parking – The parking lot and drive aisles are concrete that is approximately two years old. Some cracking was observed. Parking lots are illuminated by light poles. Upgrading to LED fixtures is recommended. Overall, parking appeared to be in **GOOD** condition.

Sidewalks – Sidewalks are concrete. Some cracking and staining was observed. Overall, the sidewalks appeared to be in **GOOD** condition.

Landscaping – The site is moderately landscaped and well maintained. Overall, the landscaping appeared to be in **GOOD** condition.

Lighting – The site is illuminated by wall packs and pole mounted light fixtures that have been retrofit to be LED and appeared to be in **FAIR** condition.

Overall, the site appeared to be in **GOOD** condition.

Building 11 continued

Photos (Site)



Parking lot and drive aisle



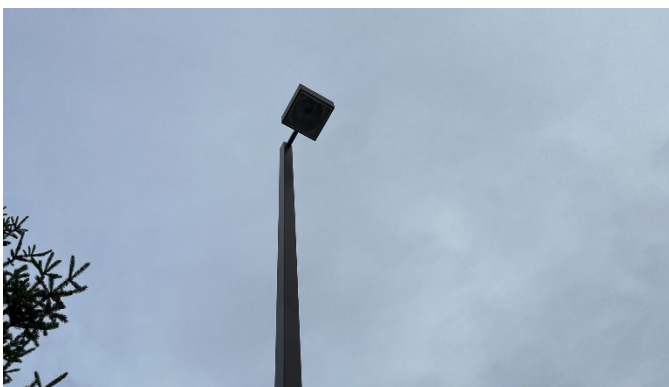
Parking lot



Dumpster enclosure



Down spout



Site lighting



Sidewalk

Building 11 continued

Photos (Site)



Drive aisle



Exterior lighting

Building 11 continued

Summary of Budgets

Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Priority I (1 - 3 years)	Priority II (4 - 6 years)	Priority III (7 - 10 years)
2.0 BUILDING ENVELOPE								
Roofing Work								
Replace Roof (Asphalt Shingle) - Non-Union		SF	1	11050	9.57%	\$0	\$108,599	\$0
Windows								
Replace Shutters		EA		4	0.25%	\$2,160	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints		Allowance		4	0.49%	\$0	\$5,616	\$0
BUILDING ENVELOPE SUBTOTAL					10.31%	\$2,160	\$114,215	\$0
3.0 INTERIOR/FINISHES								
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling		SF		3500	3.38%	\$0	\$19,165	\$21,818
Flooring								
Remove & Replace - Hard Tile (Medium)		SF		170	0.93%	\$0	\$10,526	\$0
Replace Toilet Room Flooring - Hard Tile (Medium)		SF		800	4.45%	\$0	\$50,544	\$0
Remove and replace carpet		SF		2500	2.35%	\$0	\$26,676	\$0
Windows								
Window Treatments - Manual Shades		SF		150	0.26%	\$0	\$2,944	\$0
Paint								
Remove wall covering and paint walls		SF		5000	1.05%	\$0	\$11,934	\$0
Restrooms								
Renovate - Toilet/Locker Rooms		Allowance		0.5	5.57%	\$0	\$63,180	\$0
Other								
Renovate - Kitchen		SF		215	7.02%	\$0	\$79,691	\$0
Renovate - Watch Room		SF		344	3.19%	\$0	\$36,223	\$0
INTERIOR/FINISHES SUBTOTAL					28.20%	\$0	\$300,883	\$21,818
4.0 FURNITURE & EQUIPMENT								
FFE Allowance		Allowance		2	6.19%	\$0	\$35,100	\$39,960
FURNITURE & EQUIPMENT SUBTOTAL					6.19%	\$0	\$35,100	\$39,960
5.0 PLUMBING SYSTEMS								
Equipment & Fixtures								
Replace Hot Water Heater (Domestic)		50 Gal.		2	1.98%	\$0	\$22,464	\$0
Replace Flush Valves and Faucets to be hands-free		Allowance		1	1.24%	\$0	\$14,040	\$0
Piping								
Replace Piping, Valves & Unions		Allowance		1	1.63%	\$4,752	\$6,178	\$7,033
PLUMBING SYSTEMS SUBTOTAL					4.85%	\$4,752	\$42,682	\$7,033
6.0 HVAC SYSTEMS								
Equipment								
Replace Condensing Unit (CU)		EA		3	1.86%	\$16,200	\$0	\$0
Replace Furnace		EA		3	1.86%	\$16,200	\$0	\$0
Hydronic Piping								
Replace Piping, Valves & Unions		Allowance		2	2.23%	\$9,720	\$12,636	\$0
HVAC SYSTEMS SUBTOTAL					5.94%	\$42,120	\$12,636	\$0
7.0 ELECTRICAL SYSTEMS								
Lighting								
Replace Exterior Wall Packs		EA		6	0.67%	\$0	\$7,582	\$0
Other								
Replace Existing Emergency Generator - 100 KW Natural Gas		EA		1	4.33%	\$0	\$49,140	\$0
Replace PA System		Allowance		1	3.09%	\$0	\$35,100	\$0
ELECTRICAL SYSTEMS SUBTOTAL					8.09%	\$0	\$91,822	\$0
8.0 SECURITY								
Security								
Security Allowance		Allowance		1	6.19%	\$0	\$70,200	\$0
SECURITY SYSTEMS SUBTOTAL					6.19%	\$0	\$70,200	\$0
12.0 SITE								
Paving								
Selective Sidewalk & Curb Replacement Allowance		Allowance		0.25	1.48%	\$0	\$16,848	\$0
Landscaping								
Landscaping Allowance		Allowance		1	2.47%	\$7,200	\$9,360	\$10,656
SITE SUBTOTAL					3.96%	\$7,200	\$26,208	\$10,656
Building Infrastructure Improvement Total:				\$58.24	73.72%	\$56,232	\$693,745	\$79,467
Project Contingency:	10.00%				6.75%	\$5,623	\$65,865	\$3,951
Permits, Testing & Printing:	2.50%				1.86%	\$1,546	\$18,113	\$1,086
Professional Fees & Costs:	10.00%				8.53%	\$7,101	\$83,174	\$4,989
Construction Manager Fee & Costs:	12.00%				9.14%	\$7,608	\$89,115	\$5,345
PROJECT TOTAL					100.00%	\$78,111	\$950,011	\$94,839
						ESCALATED PROJECT TOTAL		\$1,122,960

Building 12 – Station No. 4



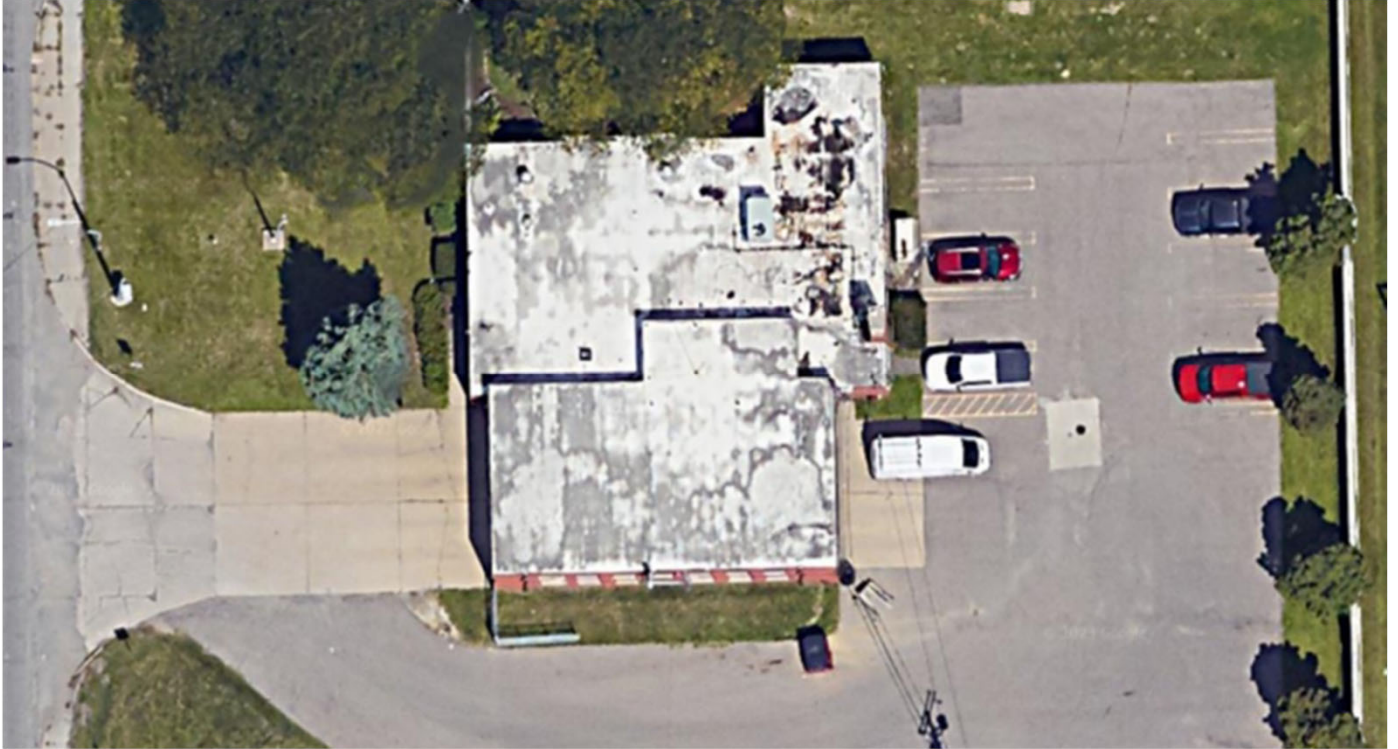
Address:	12300 Middlebelt Rd.
Year Built:	1960 (63 Years Old)
Square Footage:	5,610
Site Area:	.814 Acres
Parking Spaces:	Approximately 11
Stories:	1
Basement:	No
Elevator(s):	No
Exterior Façade:	Brick
Roof:	TPO
Fire Protection:	Hood over kitchen stove only

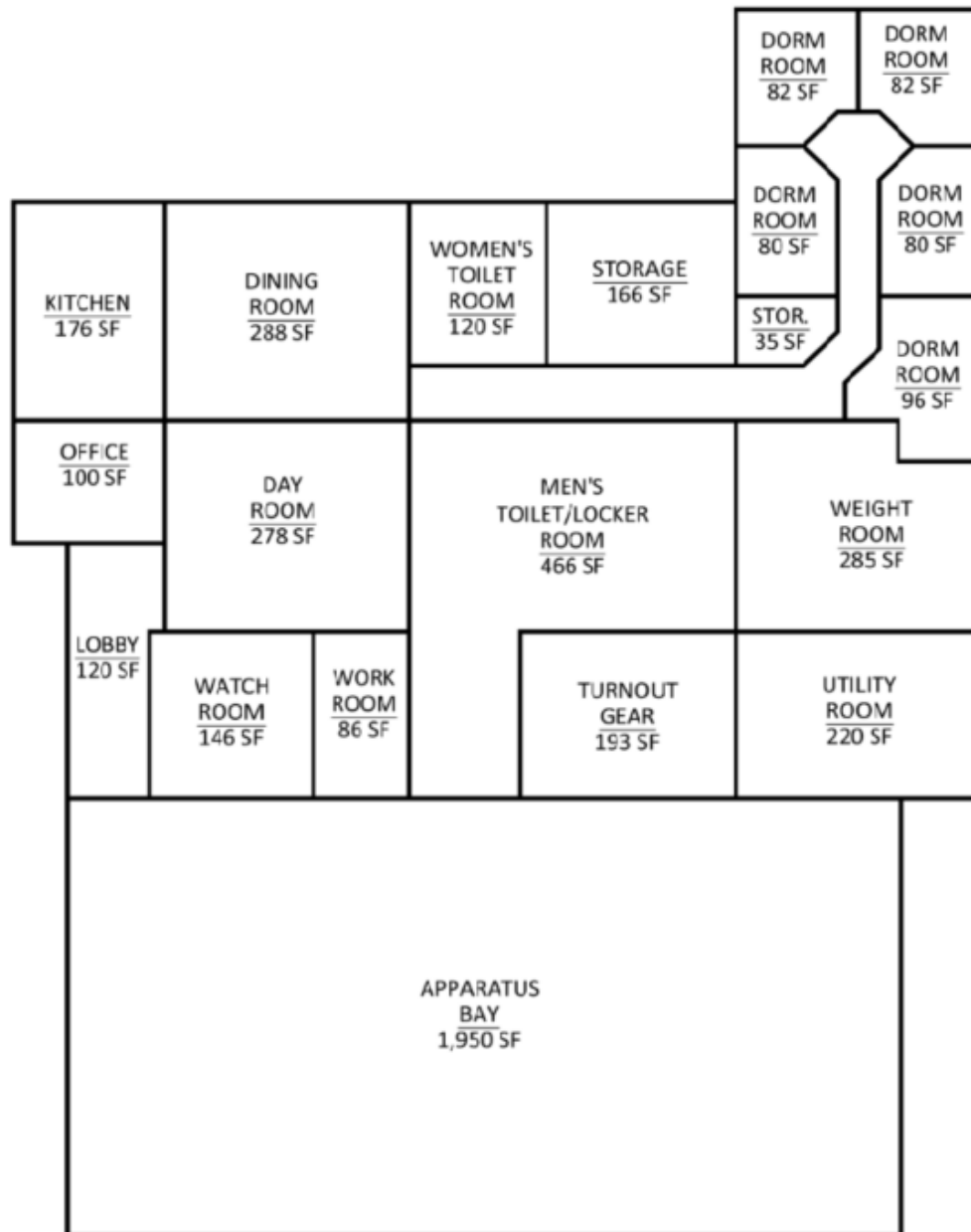
Space Needs Summary:

1. Currently, there are two drive-through bays. With the growth of the city in the 60+ years since the construction of Station No. 4, the needs of the department, city, and occupancies have changed drastically. The need for three drive through bays at a minimum is required.
2. The need for an aerial apparatus south of I-96 is imperative due to the proliferation of mid-rise buildings, big-box stores, hotels, etc.
3. Currently, there is only room for five (5) personnel to work 24-hour shifts, which is too small for current needs. Space for six (6) per day is required.
4. If staff increased, the Watch Room, Men's Toilet/Locker Room will need to be increased.
5. Additional dorms are required. Six minimum for current needs.
6. Dedicated Meeting/Training space is required.
7. Turnout Gear is currently stored adjacent to sleeping and bathroom areas. This is not desirable.
8. More storage room is required
9. Workout area is too small
10. If staffing increases, a second officers' room may be required.

Building 12 continued

Site



*Building 12 continued***1st Floor Plan**

*Building 12 continued***Condition Summary (Building Envelope): FAIR**

Roof – The primary roofing system in TPO, which was installed in 2003 and is approximately 20 years old. This roofing system is reaching the end of its useful life. Replacement is recommended. Roof drainage is by gutters and downspout. Some downspouts were filled with leaves and pine needles. Ponding was observed on the northeast quadrant of the roof. Overall, the roofing systems appeared to be in **FAIR** condition.

Windows – The primary glazing systems include an insulated dual pane system in aluminum frame; and a single pane storefront system. It was reported that the single pane storefront system develops frost on the interior side during the winter. Replacing this system with an insulated dual pane system is recommended. Caulking around windows appeared to be in fair condition and will require replacement within the next five years. Overall, windows appeared to be in **POOR** condition.

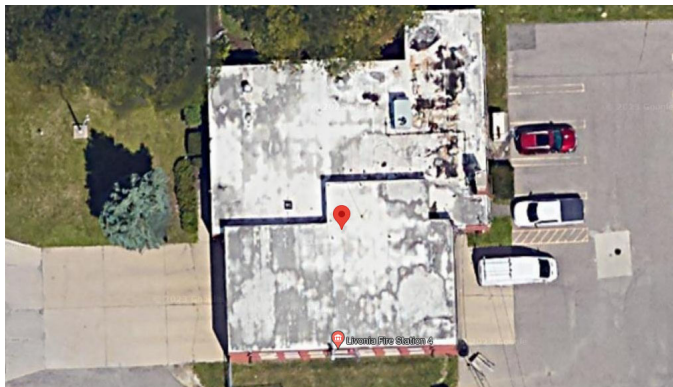
Facade – The primary façade material is brick with standing seam metal fascia. Some cracking was observed. Caulking at control joints appears to be in poor condition and needs to be replaced. Overall, the façade appeared to be in **FAIR** condition.

Doors – Entry doors are primarily a single pane storefront system. Apparatus bay doors are insulated sectional overhead doors with glass vision panels. Overall, doors appeared to be in **FAIR** condition.

Overall, the Building Envelope appeared to be in **FAIR** condition.

Building 12 continued

Photos (Building Envelope)



Thermoplastic Polyolefin roofing



Facade and apparatus bay doors



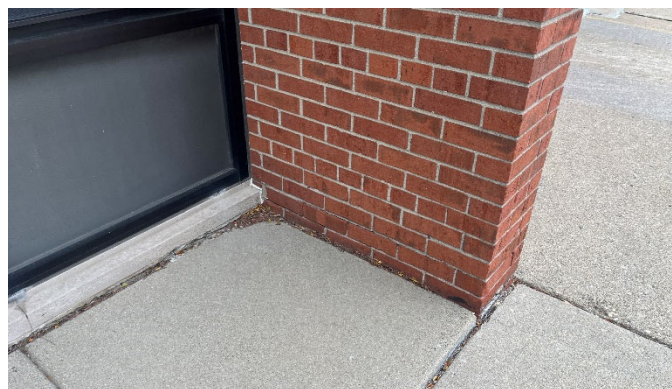
Facade



Window



Window



Facade

Building 12 continued

Photos (Building Envelope)



Uninsulated, single pane storefront



Apparatus bay doors



Facade



Glass block windows at Apparatus Bay



Facade



Facade

Building 12 continued

Photos (Building Envelope)



Facade



Window caulking



Facade and windows



Facade and windows



Roof



Gutter/downspout

*Building 12 continued***Condition Summary (Interiors): FAIR**

Flooring – Administrative areas, kitchen, corridors are Luxury Vinyl Tile (LVT). Some Toilet Rooms/Locker Rooms are terrazzo, while others are porcelain tile. Dorm Rooms are carpet. Apparatus Bays are terrazzo. It was reported that a portion of the floor slab in the apparatus bay caved in over the last two years and emergency repairs were completed. Overall, flooring appeared to be in **FAIR** condition.

Wall covering – Entry Vestibule, Corridors, Administrative areas, Storage Rooms, Day Room, and Dining Room are painted Concrete Masonry Units (CMU). The Kitchen is Glazed masonry units. Some Toilet Rooms/Locker Rooms are glazed masonry units, while others are porcelain tile. Dorm Rooms and Apparatus Bays are painted CMU and painted gypsum board. Overall, wall covering appeared to be in **GOOD** condition.

Ceilings – The primary ceiling system is Acoustical Ceiling Tile (ACT). Signs of water damage was observed in multiple areas. Overall, ceilings appeared to be in **FAIR** condition.

Windowsills - Windowsills consist primarily of glazed masonry units. Overall, windowsills appeared to be in **GOOD** condition.

Window treatment – Window treatment is primarily horizontal blinds. Overall, window treatment appeared to be in **GOOD** condition.

Interior doors – Interior doors are primarily wood and hollow metal. Dorm Rooms have curtains in lieu of doors. Overall, interior doors appeared to be in **GOOD** condition.

Millwork – Kitchen has wood cabinets with granite countertop. Overall, millwork appeared to be in **FAIR** condition.

Overall, interiors appeared to be in **FAIR** condition.

Building 12 continued

Photos (Interiors)



Entrance Lobby



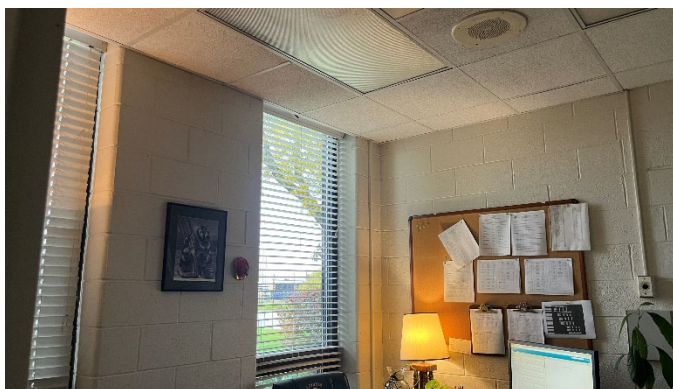
Entrance lobby



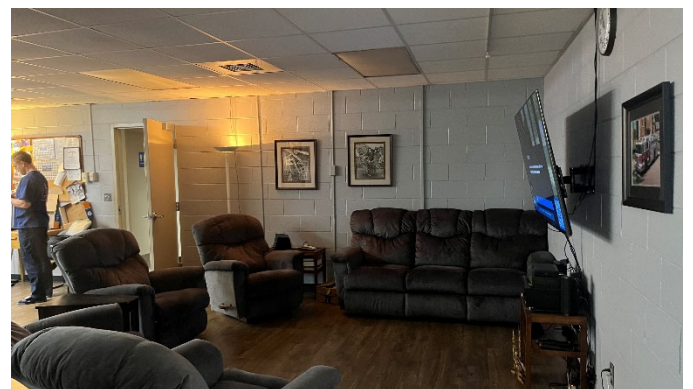
Entrance Lobby



Office



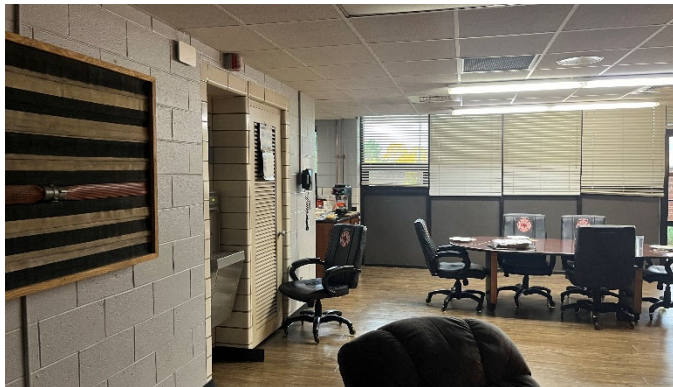
Office



Day Room

Building 12 continued

Photos (Interiors)



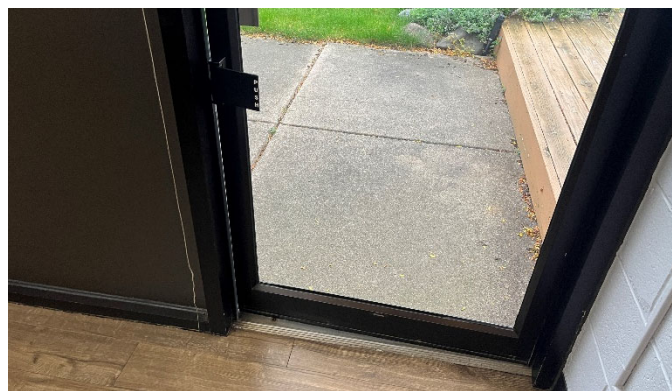
Roof – The primary roo



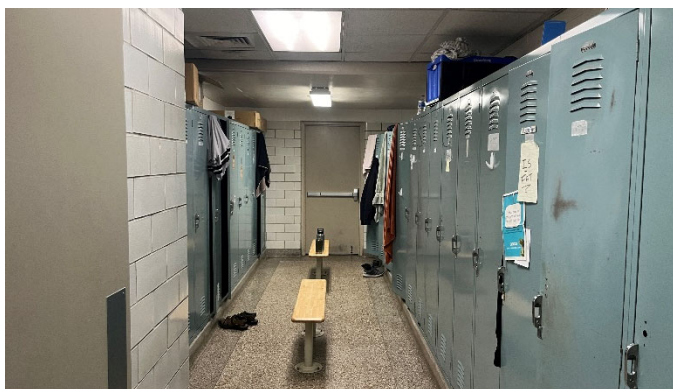
Roof – The primary roo



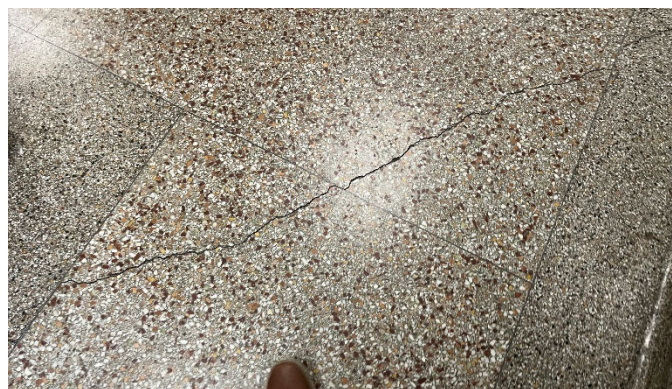
Day Room



Day Room



Toilet/Locker Room



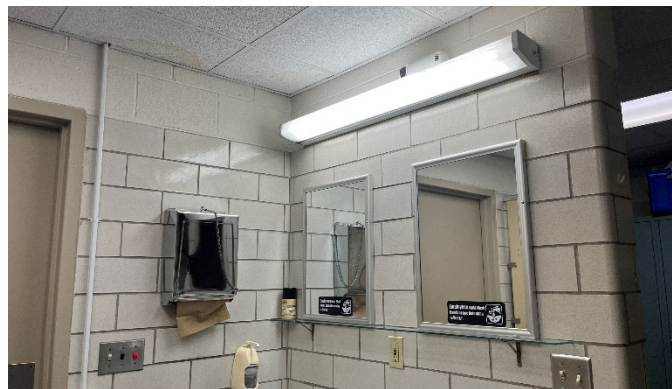
Toilet/Locker Room

Building 12 continued

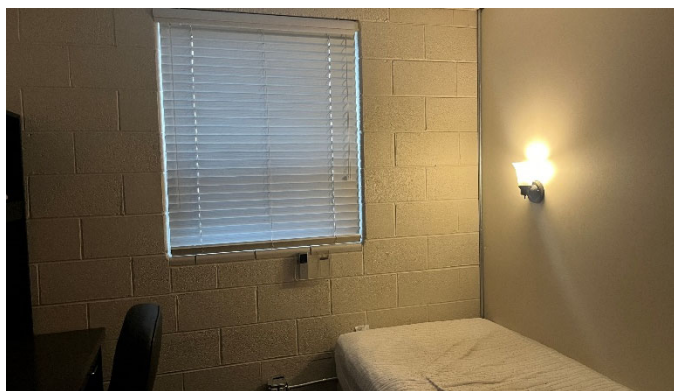
Photos (Interiors)



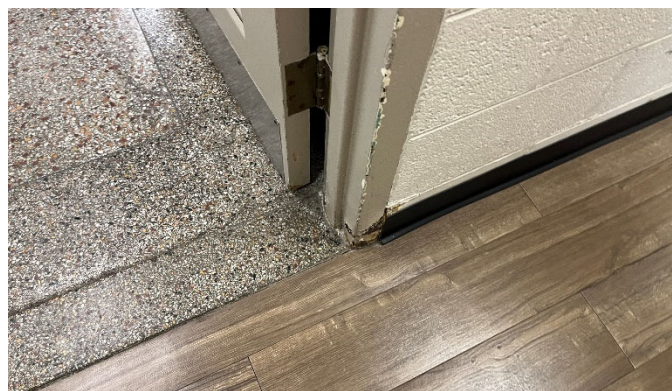
Roof – The primary roo



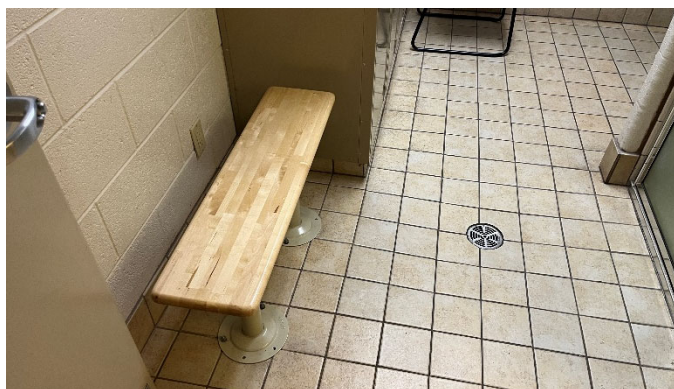
Roof – The primary roo



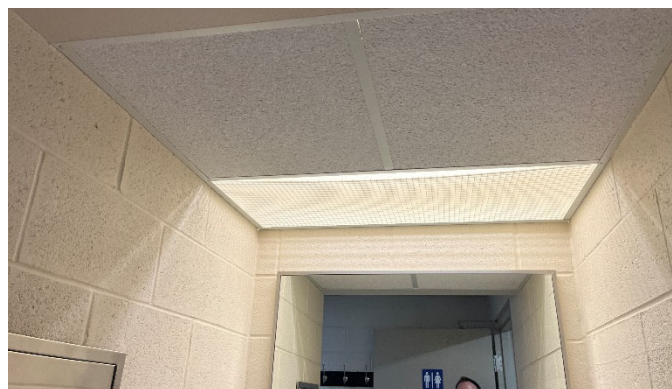
Dorm Room



Corridor



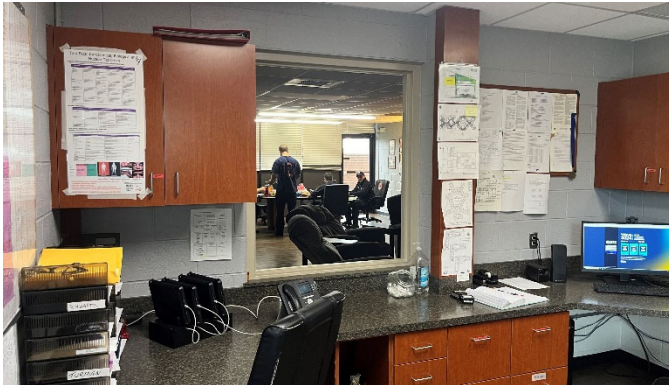
Toilet Room/Locker Room



Toilet/Locker Room

Building 12 continued

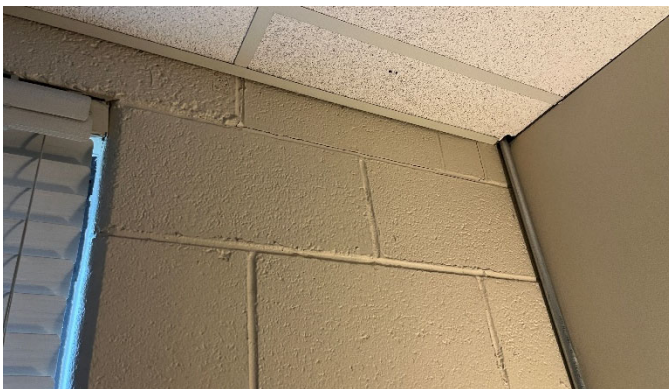
Photos (Interiors)



Watch Room



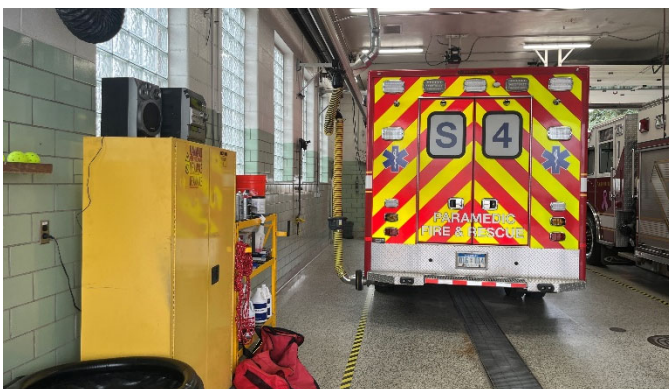
Work Room



Dorm Room



Apparatus Bay



Apparatus Bay



Apparatus Bay

*Building 12 continued***Condition Summary (Plumbing): FAIR**

Plumbing – Domestic piping is copper. Domestic hot water is provided by a 50-gallon Lochinvar water heater that was installed in 2019 and is approximately 4 years old. Toilet Room fixtures appear to be original. Upgrading to hands-free is recommended. Sanitary piping is PVC.

Fire Protection – Fire suppression is provided at the kitchen stove hood only.

Overall, plumbing appeared to be in **FAIR**

Building 12 continued

Photos (Plumbing)



Bottle filler



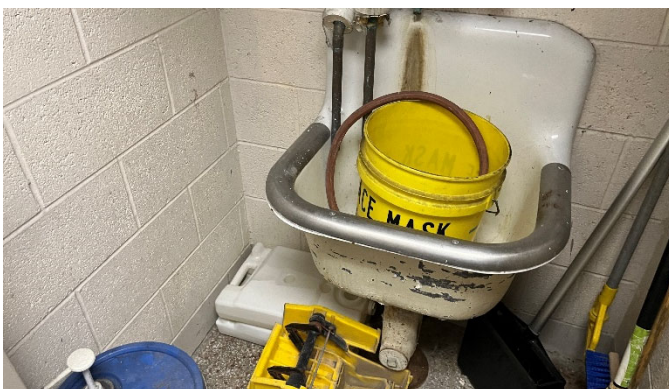
Kitchen



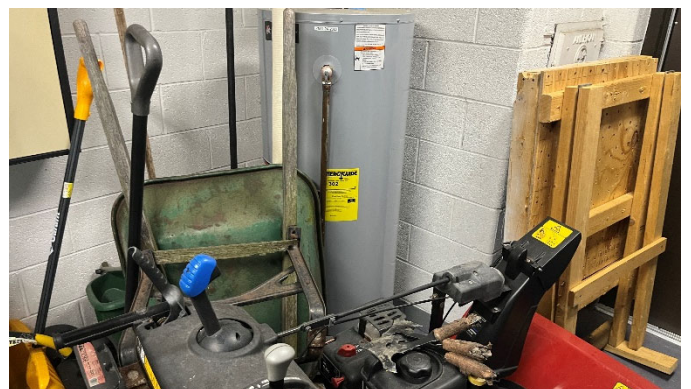
Toilet/Locker Room



Toilet/Locker Room



Janitor's Closet



Mechanical Room

*Building 12 continued***Condition Summary (HVAC): GOOD**

HVAC – Heating, Ventilation and Air Conditioning is provided by:

- Roof Top Unit (RTU) – One (1) 10-ton AC unit with 250,000 BTU furnace, which was installed in 2019 and is approximately 4 years old.

Overall, the HVAC systems appeared to be in **GOOD** condition.

Building 12 continued

Photos (HVAC)



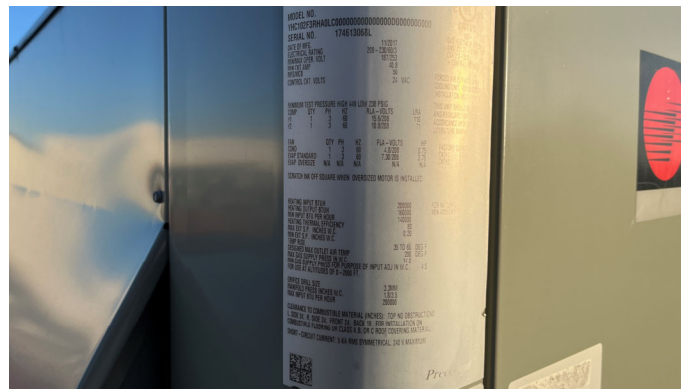
RTU



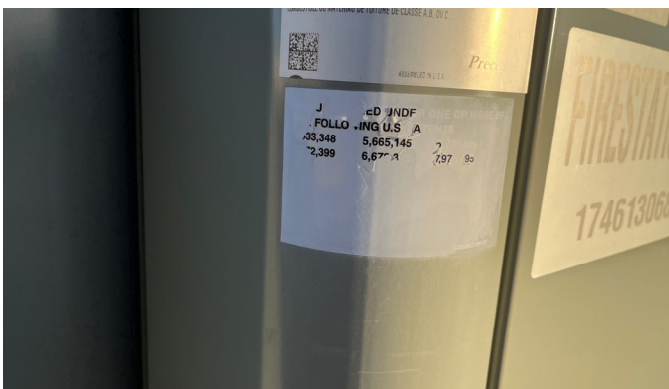
RTU



RTU



RTU



RTU

*Building 12 continued***Condition Summary (Electrical): GOOD**

Lighting – Lighting is primarily lay-in fixtures with T8 LED retrofit lamp. Overall, lighting appeared to be in **GOOD** condition.

Power – Fire Station No. 4 has a secondary electrical service at 120/240v, 3 phase Delta. It was reported that the electrical service is in good condition and current power is sufficient. Overall, power appeared to be in **GOOD** condition.

Emergency Power – Emergency power is provided by one (1) Kohler model 50RZ, natural gas, 50kW, emergency only, which was installed in 2000 and is approximately 23 years old. Overall, emergency power appeared to be in **FAIR** condition.

Fire Alarm – It was reported that the existing fire alarm system does not require updating.

PA System – It was reported that the existing PA system needs replacement

Overall, electrical appeared to be in **GOOD** condition.

Building 12 continued

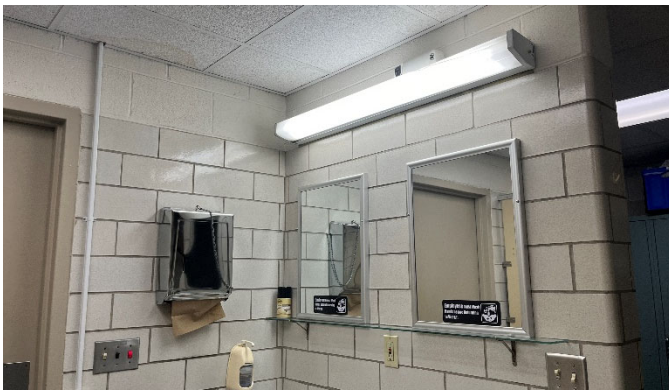
Photos (Electrical)



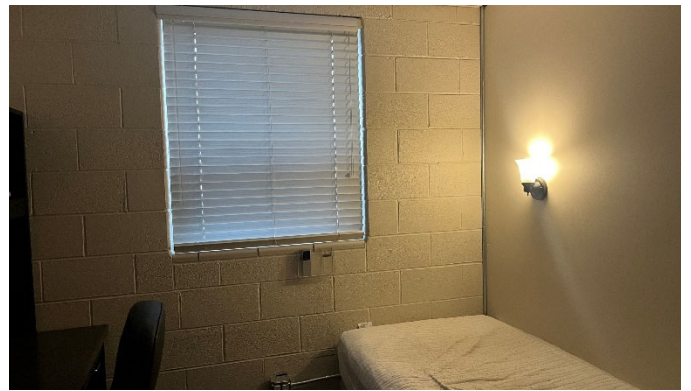
Office



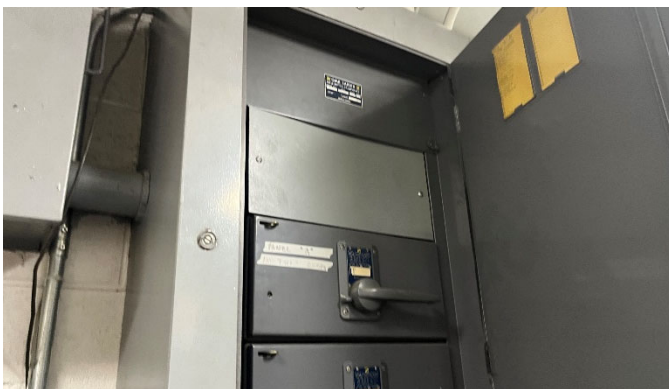
Day Room



Toilet/Locker Room



Dorm Room



Switch gear



Generator

*Building 12 continued***Condition Summary (Site): FAIR**

Drainage – The storm water collection and drainage system is below grade. Downspouts tie directly into the storm drainage system. No presence of on-site surface water was observed. Overall, site drainage appeared to be in **GOOD** condition.

Parking – The parking lot is asphalt. Some cracking was observed. Milling and repaving is recommended. The driveway is concrete. Some cracking was observed. Replacing concrete is recommended. Parking lots are illuminated by light poles. Upgrading to LED fixtures is recommended. Overall, parking appeared to be in **POOR** condition.

Sidewalks – The sidewalk to the main entrance is concrete. Some cracking was observed. Overall, the sidewalks appeared to be in **GOOD** condition.

Landscaping – The site is moderately landscaped and well maintained. Overall, the landscaping appeared to be in **GOOD** condition.

Lighting – The site is illuminated by wall packs and pole mounted light fixtures that have been retrofit to be LED and appeared to be in **FAIR** condition.

Overall, the site appeared to be in **FAIR** condition.

Building 12 continued

Photos (Site)



Landscaping



Asphalt parking lot



Concrete sidewalk



Concrete driveway



Downspout



Irrigation

Building 12 continued

Summary of Budgets

Program Area	Quantity	# of	As % of	Priority I	Priority II	Priority III		
	Per Unit	Unit	Total Units	Cost	(1 - 3 years)	(4 - 6 years)	(7 - 10 years)	
2.0 BUILDING ENVELOPE								
Roofing Work								
Replace Roof (TPO)		SF	5609	16.45%	\$173,251	\$0	\$0	
Windows								
Replace Exterior Storefront System		SF	500	3.85%	\$40,500	\$0	\$0	
Exterior Walls								
Re-Caulk Expansion Joints		Allowance	5	0.51%	\$5,400	\$0	\$0	
Tuckpointing (Allowance)		Allowance	2	1.03%	\$10,800	\$0	\$0	
Masonry Repairs		Allowance	10	5.13%	\$54,000	\$0	\$0	
BUILDING ENVELOPE SUBTOTAL				26.97%	\$283,951	\$0	\$0	
3.0 INTERIOR/FINISHES								
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling		SF	2000	1.60%	\$0	\$10,951	\$12,468	
Flooring								
Replace Toilet Room Flooring - Hard Tile (Medium)		SF	600	2.77%	\$0	\$37,908	\$0	
Remove and replace carpet		SF	600	0.47%	\$0	\$6,402	\$0	
Paint								
Painting Allowance		SF	5000	0.87%	\$0	\$11,934	\$0	
Restrooms								
Renovate - Toilet/Locker Rooms		Allowance	0.5	4.62%	\$0	\$63,180	\$0	
Other								
Renovate - Kitchen		SF	176	4.77%	\$0	\$65,235	\$0	
Renovate - Watch Room		SF	146	1.12%	\$0	\$15,374	\$0	
INTERIOR/FINISHES SUBTOTAL				16.21%	\$0	\$210,985	\$12,468	
4.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance		Allowance	1.25	3.21%	\$33,750	\$0	\$0	
FURNITURE & EQUIPMENT SUBTOTAL				3.21%	\$33,750	\$0	\$0	
5.0 PLUMBING SYSTEMS								
Equipment & Fixtures								
Replace Flush Valves and Faucets to be hands-free		Allowance	1	1.03%	\$0	\$14,040	\$0	
Piping								
Replace Piping, Valves & Unions		Allowance	1	1.35%	\$4,752	\$6,178	\$7,033	
PLUMBING SYSTEMS SUBTOTAL				2.38%	\$4,752	\$20,218	\$7,033	
6.0 HVAC SYSTEMS								
Hydronic Piping								
Replace Piping, Valves & Unions		Allowance	2	1.85%	\$0	\$12,636	\$14,386	
HVAC SYSTEMS SUBTOTAL				1.85%	\$0	\$12,636	\$14,386	
7.0 ELECTRICAL SYSTEMS								
Lighting								
Replace Exterior Wall Packs		EA	4	0.37%	\$3,888	\$0	\$0	
Replace Existing Emergency Generator - 100 KW Natural Gas		EA	1	3.59%	\$0	\$49,140	\$0	
Replace PA System		Allowance	1	2.56%	\$0	\$35,100	\$0	
ELECTRICAL SYSTEMS SUBTOTAL				6.52%	\$3,888	\$84,240	\$0	
8.0 SECURITY								
Security								
Security Allowance		Allowance	1	2.56%	\$0	\$35,100	\$0	
SECURITY SYSTEMS SUBTOTAL				2.56%	\$0	\$35,100	\$0	
9.0 ABATEMENT								
Abatement								
Abatement Allowance		Allowance	1	2.36%	\$24,840	\$0	\$0	
ABATEMENT SUBTOTAL				2.36%	\$24,840	\$0	\$0	
12.0 SITE								
Paving								
Pavement Reconstruction - 2" Mill & Cap		SF	12000	2.95%	\$0	\$0	\$46,034	
Replace Concrete Approach		SF	2500	4.59%	\$48,330	\$0	\$0	
Selective Sidewalk & Curb Replacement Allowance		Allowance	0.25	1.23%	\$0	\$16,848	\$0	
Landscaping								
Landscaping Allowance		Allowance	1	2.05%	\$7,200	\$9,360	\$10,656	
SITE SUBTOTAL				10.83%	\$55,530	\$26,208	\$56,690	
Building Infrastructure Improvement Total:								
Project Contingency:	10.00%			\$136.82	72.89%	\$406,711	\$389,386	\$90,576
Permits, Testing & Printing:	2.50%				6.97%	\$37,296	\$38,939	\$9,058
Professional Fees & Costs:					1.92%	\$10,256	\$10,708	\$2,491
Construction Manager Fee & Costs:	10.00%				8.80%	\$47,097	\$49,172	\$11,438
	12.00%				9.43%	\$50,462	\$52,684	\$12,255
PROJECT TOTAL					100.00%	\$551,822	\$540,889	\$125,817
						ESCALATED PROJECT TOTAL		\$1,218,528

Building 13 – Station No. 5



Address:	18910 Middlebelt Rd.
Year Built:	1969 (55 years old)
Square Footage:	5,772
Site Area:	.926
Parking Spaces:	Approximately 15
Stories:	1
Basement:	Yes
Elevator(s):	No
Exterior Façade:	Brick
Roof:	TPO
Fire Protection:	No

Space Needs Summary:

1. Currently, there are two drive-through bays. With the growth of the city in the 50+ years since the construction of Station No. 5, the needs of the department, city, and occupancies have changed dramatically. The need for three drive through bays at a minimum is required.
2. The future need for additional apparatus and/or squad in this area should be considered due to the proliferation of mid-rise buildings, big-box stores, hotels, etc.
3. Currently there is only room for five personnel to work 24-hour shifts; which is inadequate for current needs. Space for at least six per day is required.
4. Men's Toilet Room and Unisex Toilet Room are too small.
5. There are no Locker Rooms. Lockers and bedding storage is currently in individual dorm rooms.
6. Additional dorm rooms are required, six minimum to accommodate current staff.
7. Uniform supply office and turnout gear storage is beyond capacity.
8. The basement is used for workout area, storage for pub-ed supplies, fire extinguisher supply storage, Union office³, small sitting area, old men's room and group shower facilities are inadequate and inappropriate in current climate.
9. Need dedicated meeting/training space.
10. Storage is lacking. Need separate areas for bio-hazard, laundry, EMS, food, cleaning supplies, etc.
11. A second Officer's' Room may be required.

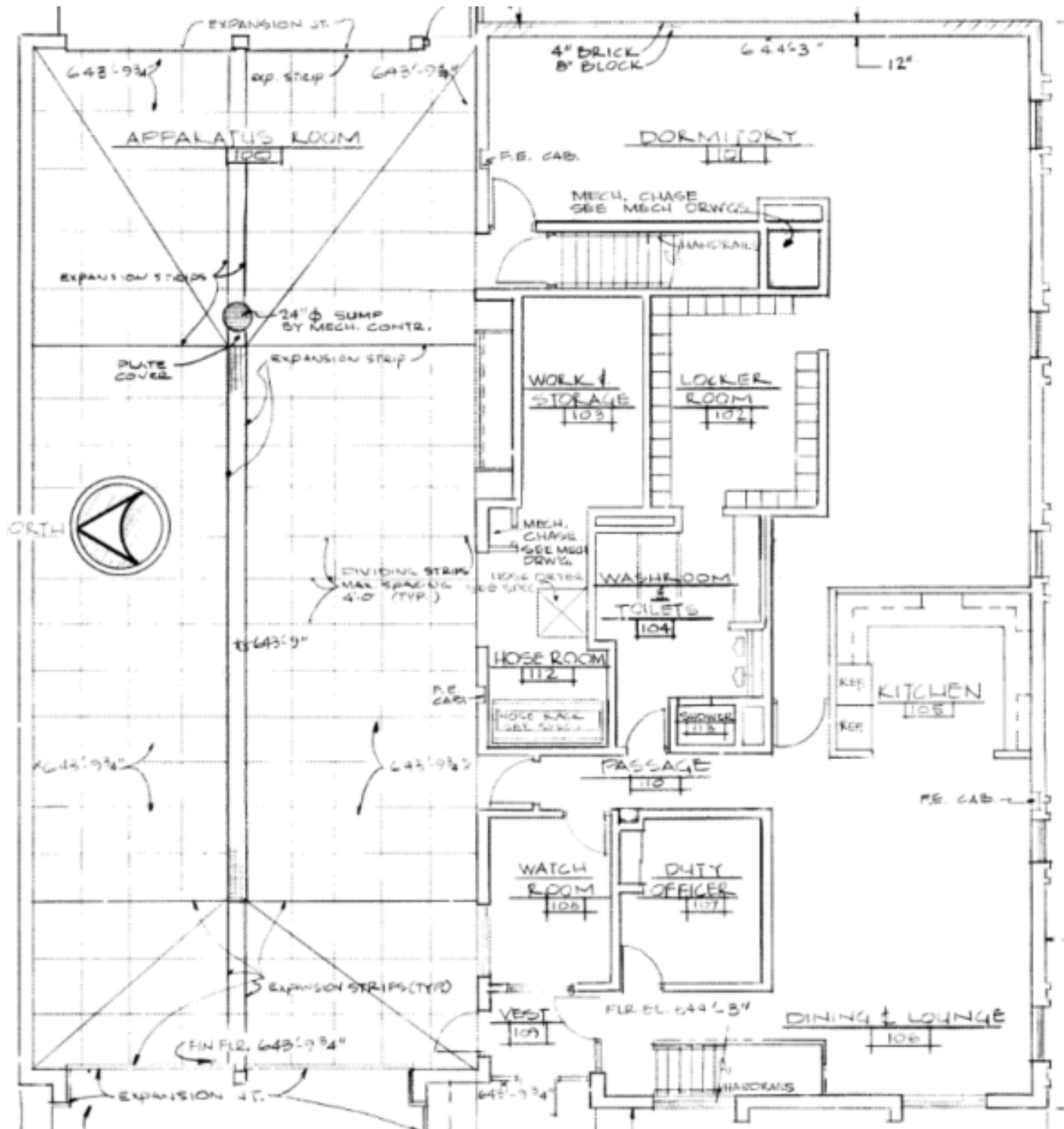
Building 13 continued

Site



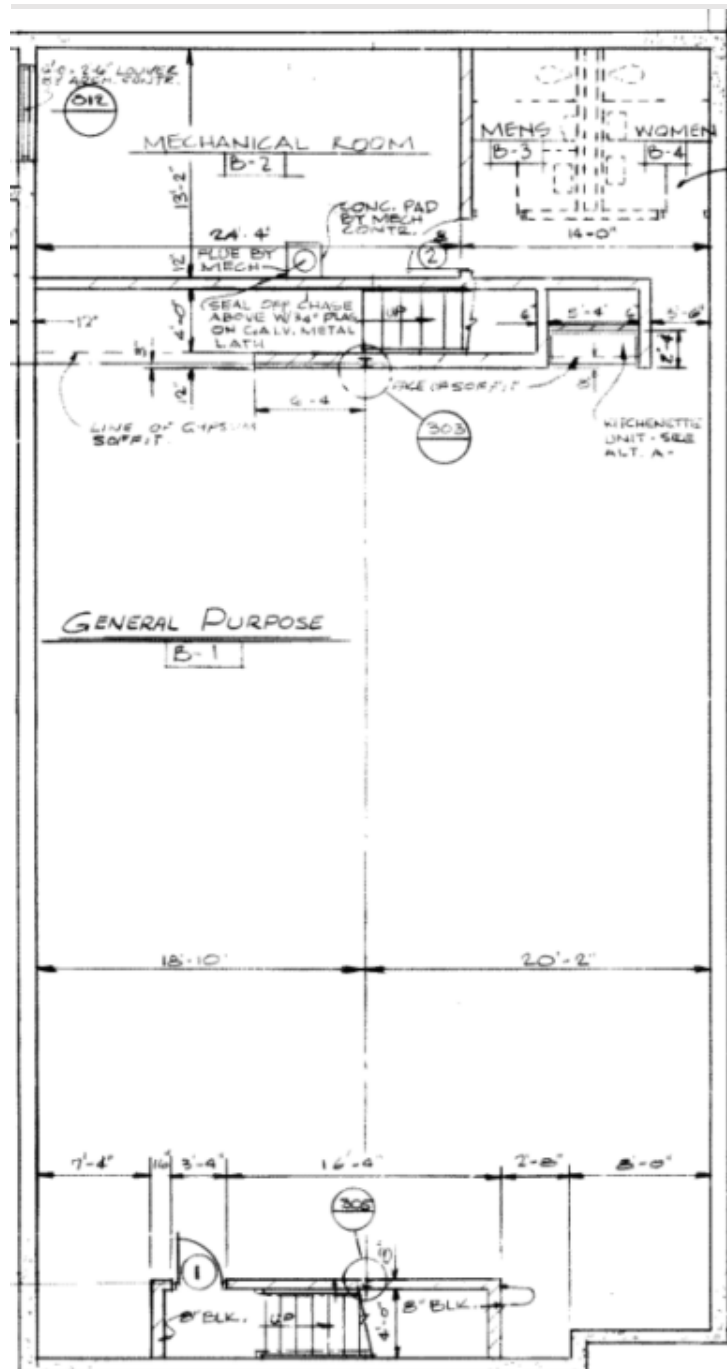
Building 13 continued

1st Floor Plan



Building 13 continued

Basement Floor Plan



*Building 13 continued***Condition Summary (Building Envelope): FAIR**

Roof – The primary roofing system is 60 mil TPO on rigid insulation, which was installed in 2023. Roof drainage is by internal roof drains. No drainage deficiencies were observed. Overall, the roofing system appeared to be in **GOOD** condition.

Windows – The primary glazing system is an uninsulated single pane system in aluminum frame. Replacing with insulated dual pane is recommended. Caulking around windows appeared to be in poor condition and requires replacement. Overall, windows appeared to be in **POOR** condition.

Facade – The primary façade material is brick. Some cracking was observed. Caulking at control joints appeared to be in poor condition and requires replacement. Overall, the façade appeared to be in **FAIR** condition.

Doors – Entry doors are primarily an uninsulated single pane storefront system. Secondary doors are hollow metal frame and door. Apparatus bay doors are insulated sectional overhead doors with glass vision panels. Overall, doors appeared to be in **FAIR** condition.

Overall, the Building Envelope appeared to be in **FAIR** condition.

Building 13 continued

Photos (Building Envelope)



Apparatus bay doors



Entry door



Facade



Facade



Facade



Window

Building 13 continued

Photos (Building Envelope)



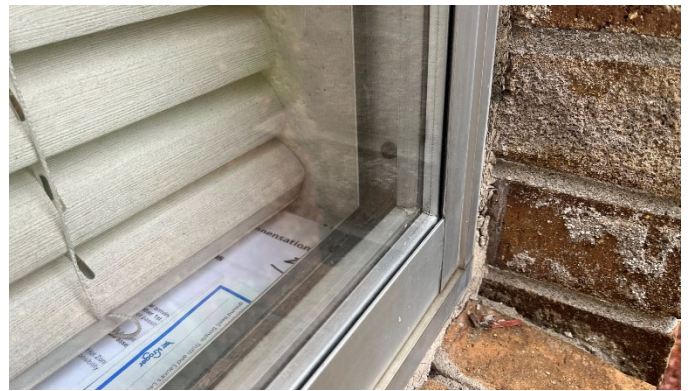
Control joint



Control joint



Window



Window



Facade

*Building 13 continued***Condition Summary (Interiors): FAIR**

Flooring – Administrative areas, kitchen, corridors, and Day Room are luxury vinyl tile. Toilet Rooms are porcelain tile. Dorm Rooms are carpet. Storage Rooms are vinyl tile. Exercise Room is rubber mats over vinyl tile. Apparatus Bays are epoxy. Overall, flooring appeared to be in **FAIR** condition.

Wall covering – Entry Vestibule, Corridors, Administrative areas, Storage Rooms, Day Room, Dining Room, Kitchen, and Apparatus Bays are painted Concrete Masonry Units (CMU). Toilet Rooms are painted Concrete Masonry Units (CMU) and porcelain tile. Dorm Rooms are painted CMU and painted gypsum board. Overall, wall covering appeared to be in **GOOD** condition.

Ceilings – The primary ceiling system is Acoustical Ceiling Tile (ACT). Signs of water damage were observed in multiple areas. Overall, ceilings appeared to be in **FAIR** condition.

Windowsills – Windowsills consist primarily of a stone material. Overall, windowsills appeared to be in **GOOD** condition.

Window treatment – Window treatment is primarily horizontal mini-blinds. Overall, window treatment appeared to be in **GOOD** condition.

Interior doors – Interior doors are primarily hollow metal. Dorm Rooms have curtains in lieu of doors. Overall, interior doors appeared to be in **GOOD** condition.

Millwork – Kitchen has wood cabinets with granite countertop. Overall, millwork appeared to be in **GOOD** condition.

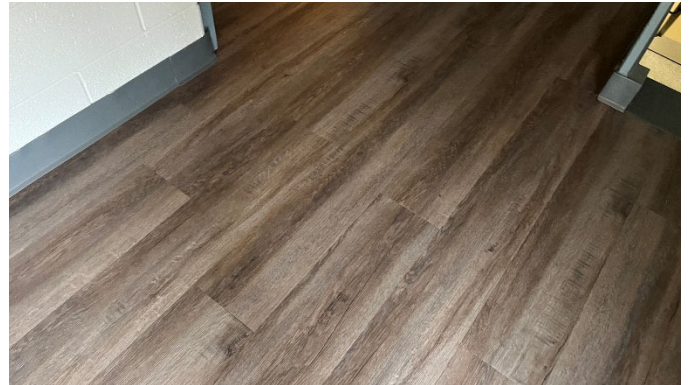
Overall, interiors appeared to be in **FAIR** condition.

Building 13 continued

Photos (Interiors)



Day Room



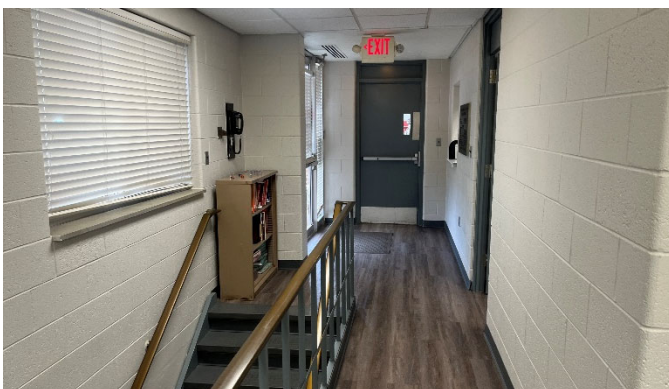
Corridor



Corridor



Kitchen



Corridor



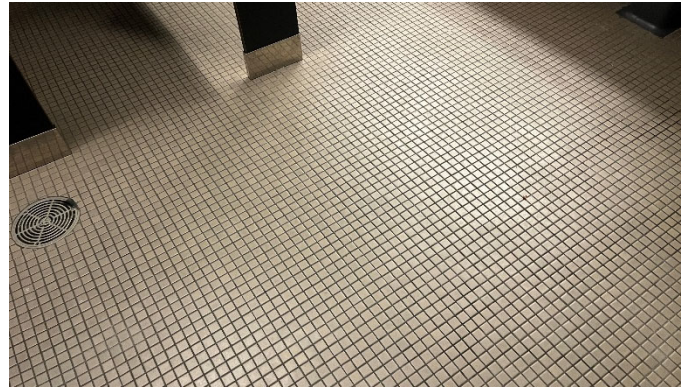
Watch Room

Building 13 continued

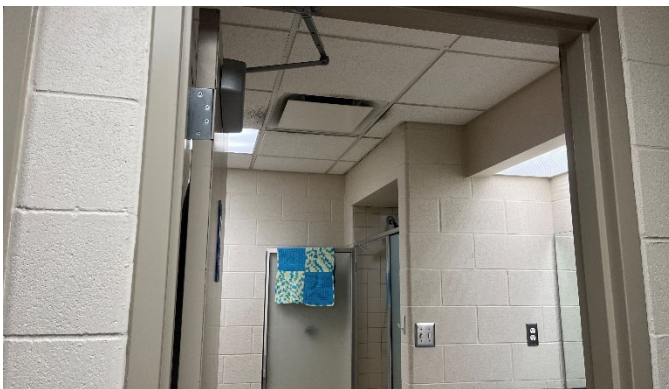
Photos (Interiors)



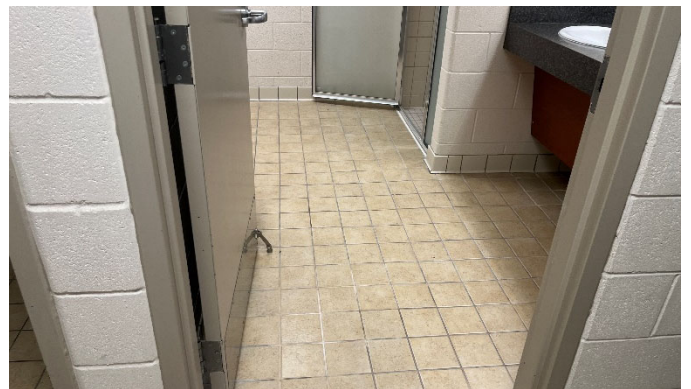
Toilet Room



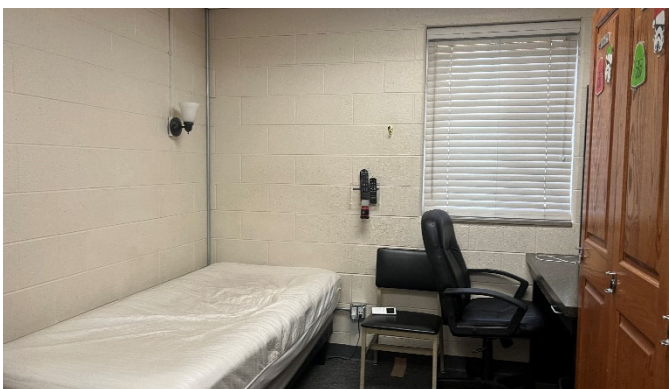
Toilet Room



Toilet Room



Toilet Room



Dorm Room



Laundry/Storage Room

Building 13 continued

Photos (Interiors)



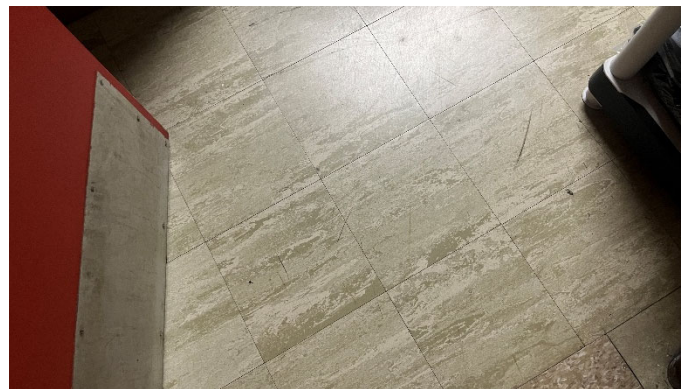
Laundry/Storage Room



Laundry/Storage Room



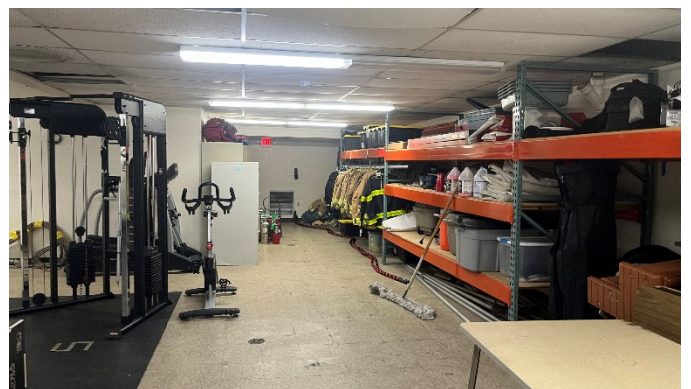
Apparatus Bay



Storage Room



Fitness Area



Storage area

*Building 13 continued***Condition Summary (Plumbing): FAIR**

Plumbing – Domestic hot water is provided by a 75-gallon water heater, which was manufactured in 2012 and is approximately 11 years old. Toilet Room fixtures appeared to be original. Upgrading to hands-free is recommended.

Fire Protection – The building is not fire suppressed.

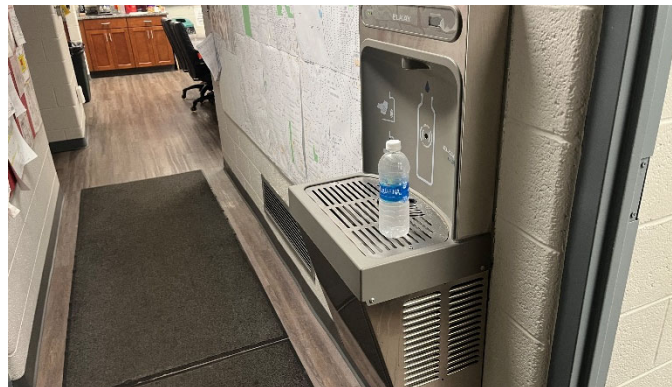
Overall, plumbing appeared to be in **FAIR** condition.

Building 13 continued

Photos (Plumbing)



Kitchen



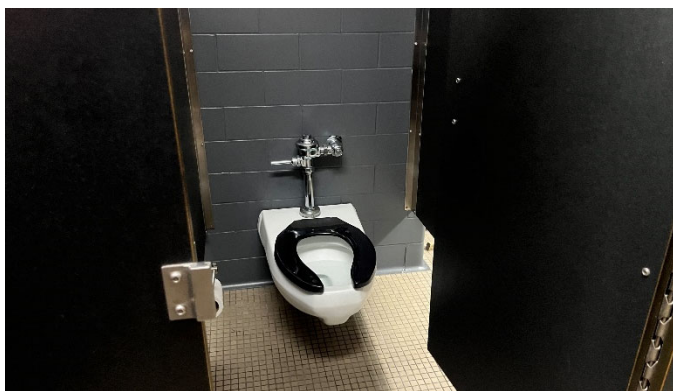
Corridor



Toilet Room



Toilet Room



Toilet Room



Toilet Room

*Building 13 continued***Photos (Plumbing)****Toilet Room****Water heater****Water heater**

*Building 13 continued***Condition Summary (HVAC): GOOD**

HVAC – Heating, Ventilation and Air Conditioning is provided by:

- Two (2) air conditioners, which were installed 2023 and are approximately one year old.
- Two (2) furnaces, which were installed 2023 and are approximately one year old.

Overall, the HVAC systems appeared to be in **GOOD** condition

Building 13 continued

Photos (HVAC)



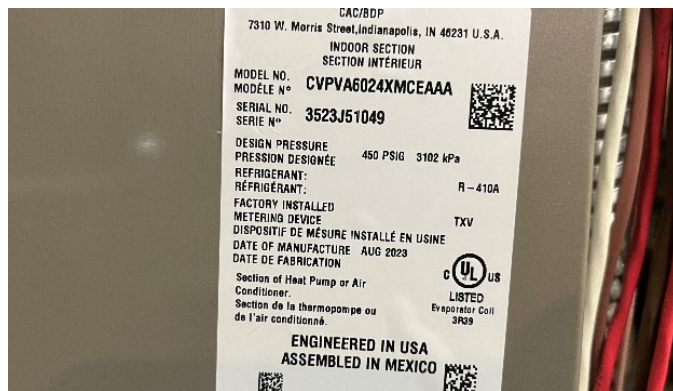
New HVAC equipment



Furnace



Furnace



Furnace



Air conditioning unit



Air conditioning unit

*Building 13 continued***Condition Summary (Electrical): GOOD**

Lighting – Lighting is primarily lay-in fixtures with T8 LED retrofit lamp. Overall, lighting appeared to be in **GOOD** condition.

Power – Fire Station No. 5 has a secondary electrical service at 120/240v, 3 phase Delta. It was reported that the electrical service is insufficient. Overall, power appeared to be in **FAIR** condition.

Emergency Power – Emergency power is provided by one (1) Honeywell, natural gas, 38kW, emergency only plus AC generator, which was installed in 2022 and is approximately 1 year old. Overall, emergency power appeared to be in **GOOD** condition.

Fire Alarm – It was reported that the existing fire alarm system does not require updating.

PA System – It was reported that the existing PA system needs replacement

Overall, electrical appeared to be in **GOOD** condition.

Building 13 continued

Photos (Electrical)



Dayroom



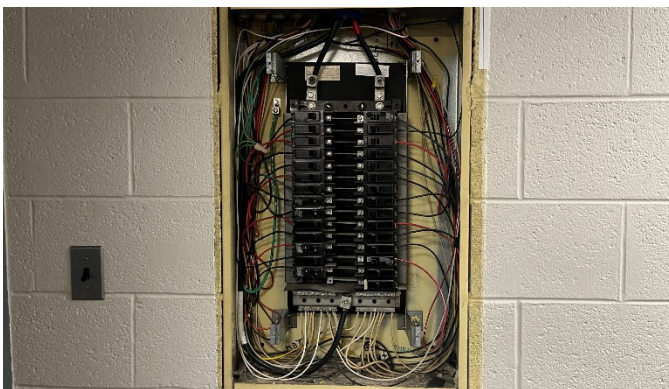
Kitchen



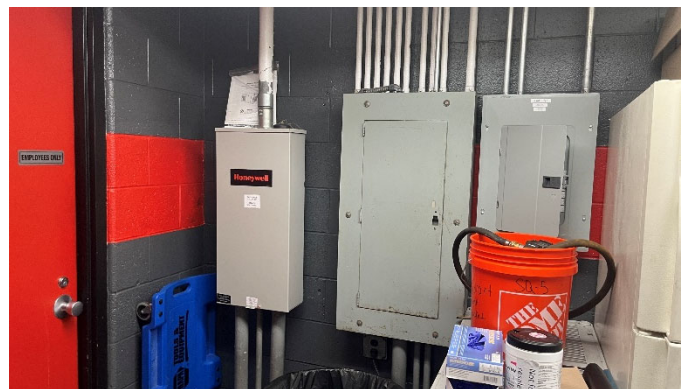
Watch Room



Watch Room



Corridor



Electrical panels

Building 13 continued

Photos (Electrical)



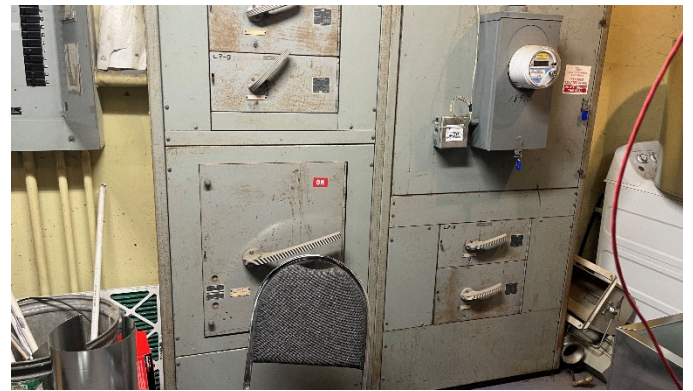
Switch gear



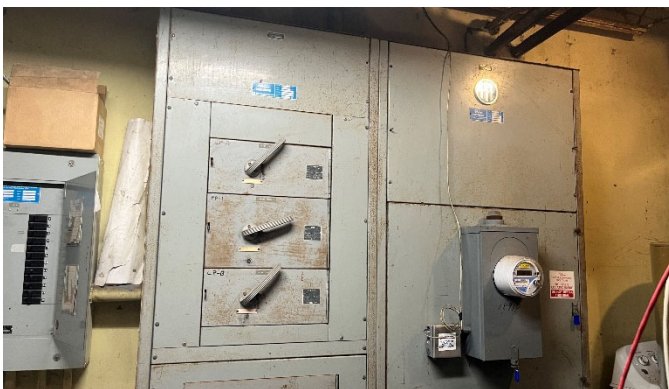
Switch gear



Storage Room



Switch gear



Switch gear



Generator

*Building 13 continued***Condition Summary (Site): POOR**

Drainage – The storm water collection and drainage system is below grade. No presence of on-site surface water was observed. Overall, site drainage appeared to be in **GOOD** condition.

Parking – The parking lot is asphalt. Some cracking was observed. Milling and repaving is recommended. The driveway is concrete. Some cracking was observed. Replacing concrete is recommended. Parking lots are illuminated by light poles. Upgrading to LED fixtures is recommended. Overall, parking appeared to be in **POOR** condition.

Sidewalks – not applicable

Landscaping – The site contains little landscaping. Overall, the landscaping appeared to be in **FAIR** condition.

Lighting – The site is illuminated by wall packs and pole mounted light fixtures that have been retrofit to be LED and appeared to be in **FAIR** condition.

Overall, the site appeared to be in **POOR** condition.

Building 13 continued

Photos (Site)



Driveway



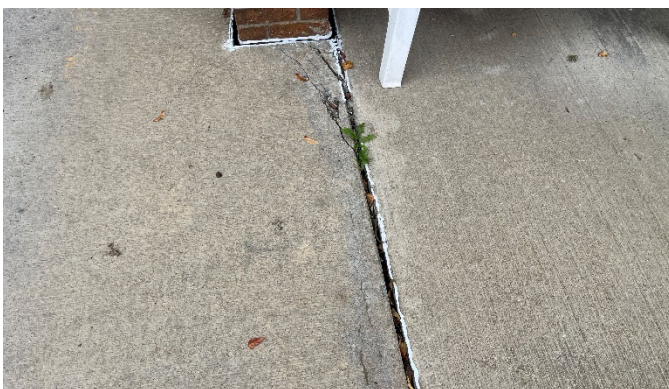
Driveway



Driveway



Site lighting



Driveway



Driveway

Building 13 continued

Summary of Budgets

Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Priority I (1 - 3 years)	Priority II (4 - 6 years)	Priority III (7 - 10 years)
2.0 BUILDING ENVELOPE								
Windows								
Replace Exterior Window Systems		SF		500	4.87%	\$44,226	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints		Allowance		5	0.59%	\$5,400	\$0	\$0
Tuckpointing (Allowance)		Allowance		2	1.19%	\$10,800	\$0	\$0
Masonry Repairs		Allowance		2	1.19%	\$10,800	\$0	\$0
BUILDING ENVELOPE SUBTOTAL					7.84%	\$71,226	\$0	\$0
3.0 INTERIOR/FINISHES								
Ceilings								
Remove Existing & Install New Ceiling Tile		SF		2000	1.85%	\$0	\$10,951	\$12,468
Flooring								
Remove & Replace Carpet		SF		600	0.54%	\$0	\$6,402	\$0
Replace Toilet Room Flooring - Hard Tile (Medium)		SF		600	3.21%	\$0	\$37,908	\$0
Paint								
Painting Allowance		SF		5000	1.01%	\$0	\$11,934	\$0
Restrooms								
Renovate - Toilet/Locker Rooms		EA		0.5	5.35%	\$0	\$63,180	\$0
Other								
Renovate - Kitchen		SF		160	5.02%	\$0	\$0	\$67,516
Renovate - Watch Room		SF		100	0.89%	\$0	\$10,530	\$0
INTERIOR/FINISHES SUBTOTAL					17.87%	\$0	\$140,905	\$79,984
4.0 FURNITURE & EQUIPMENT								
FFE Allowance		Allowance		1.25	3.71%	\$33,750	\$0	\$0
FURNITURE & EQUIPMENT SUBTOTAL					3.71%	\$33,750	\$0	\$0
5.0 PLUMBING SYSTEMS								
Equipment & Fixtures								
Replace Hot Water Heater (Domestic)		50 Gal.		1	0.95%	\$0	\$11,232	\$0
Replace Flush Valves and Faucets to be hands-free		Allowance		1	1.19%	\$0	\$14,040	\$0
Piping								
Replace Piping, Valves & Unions		Allowance		1	1.57%	\$4,752	\$6,178	\$7,033
PLUMBING SYSTEMS SUBTOTAL					3.71%	\$4,752	\$31,450	\$7,033
6.0 HVAC SYSTEMS								
Hydronic Piping								
Replace Piping, Valves & Unions		Allowance		1	1.07%	\$4,860	\$6,318	\$0
HVAC SYSTEMS SUBTOTAL					1.07%	\$4,860	\$6,318	\$0
7.0 ELECTRICAL SYSTEMS								
New Electrical Service		Allowance		1	14.26%	\$129,600	\$0	\$0
Lighting								
Replace Exterior Wall Packs		EA		6	0.64%	\$5,832	\$0	\$0
Other								
Replace PA System		Allowance		1	2.97%	\$27,000	\$0	\$0
ELECTRICAL SYSTEMS SUBTOTAL					17.87%	\$162,432	\$0	\$0
8.0 SECURITY								
Security								
Security Allowance		Allowance		1	3.09%	\$0	\$36,504	\$0
SECURITY SYSTEMS SUBTOTAL					3.09%	\$0	\$36,504	\$0
9.0 ABATEMENT								
Abatement								
Abatement Allowance		Allowance		1	2.85%	\$25,920	\$0	\$0
ABATEMENT SUBTOTAL					2.85%	\$25,920	\$0	\$0
12.0 SITE								
Paving								
Pavement Reconstruction - 2" Mill & Cap		SF		7000	2.00%	\$18,144	\$0	\$0
Remove and Replace Concrete Driveway		SF		5000	10.64%	\$96,660	\$0	\$0
Landscaping								
Landscaping Allowance		Allowance		1	2.38%	\$7,200	\$9,360	\$10,656
SITE SUBTOTAL					15.01%	\$122,004	\$9,360	\$10,656
Building Infrastructure Improvement Total:				\$114.98	73.03%	\$424,944	\$224,537	\$97,673
Project Contingency:	10.00%				6.93%	\$39,119	\$22,454	\$9,767
Permits, Testing & Printing:	2.50%				1.91%	\$10,758	\$6,175	\$2,686
Professional Fees & Costs:	10.00%				8.75%	\$49,400	\$28,355	\$12,334
Construction Manager Fee & Costs:	12.00%				9.38%	\$52,929	\$30,380	\$13,215
PROJECT TOTAL					100.00%	\$577,150	\$311,900	\$135,675
						ESCALATED PROJECT TOTAL		\$1,024,725

Building 14 – Station No. 6



Address:	37876 Plymouth Rd.
Year Built:	1971 (53 years old)
Square Footage:	8,232 SF
Site Area:	
Parking Spaces:	Approximately 8
Stories:	1
Basement:	Yes
Elevator(s):	No
Exterior Façade:	Brick
Roof:	TPO
Fire Protection:	No

Space Needs Summary:

1. Currently, there are two drive-through bays. With the growth of the city in the 50+ years since the construction of Station No. 6, the needs of the department, city, and occupancies have changed dramatically. The need for three drive through bays at a minimum is required. Storage of reserve apparatus, housing the water rescue squad and boat for response to Newburgh Lake, negate the ability to use the drive-through feature.
2. The future need for additional apparatus and/or squad in this area should be considered due to the proliferation of mid-rise buildings, big-box stores, hotels, etc.
3. Currently there is only room for four personnel to work 24-hour shifts; which is inadequate for current needs. Space for at least six per day is required.
4. Men's Toilet Room and Unisex Toilet Room are too small.
5. There are no Locker Rooms. Lockers and bedding storage is currently in individual dorm rooms.
6. Additional dorm rooms are required, six minimum to accommodate current staff.
7. The basement is used for workout area, storage for pub-ed supplies, fire extinguisher supply storage, small sitting area, men's room and group shower facilities are inadequate and inappropriate in current climate.
8. Need dedicated meeting/training space.

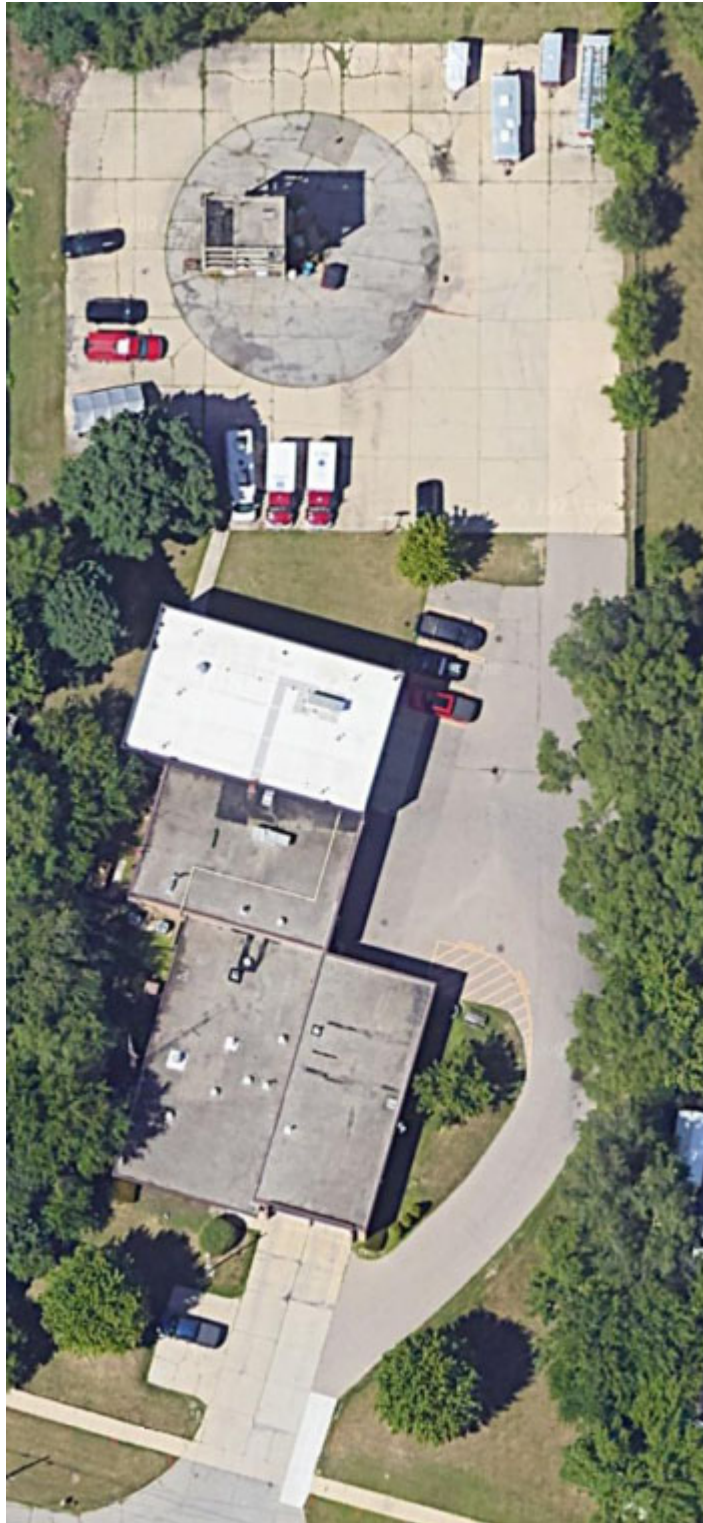
Building 14 – Station No. 6

Space Needs Summary (Continued):

9. Storage is lacking. Need separate areas for bio-hazard, laundry, EMS, food, cleaning supplies, etc.
10. A large climate-controlled facility for apparatus and other storage would solve many problems.
11. A second Officer's Room may be required.
12. The Mechanic Supervisor should have a private office.
13. The Senior and potential Junior Mechanic should share an office.

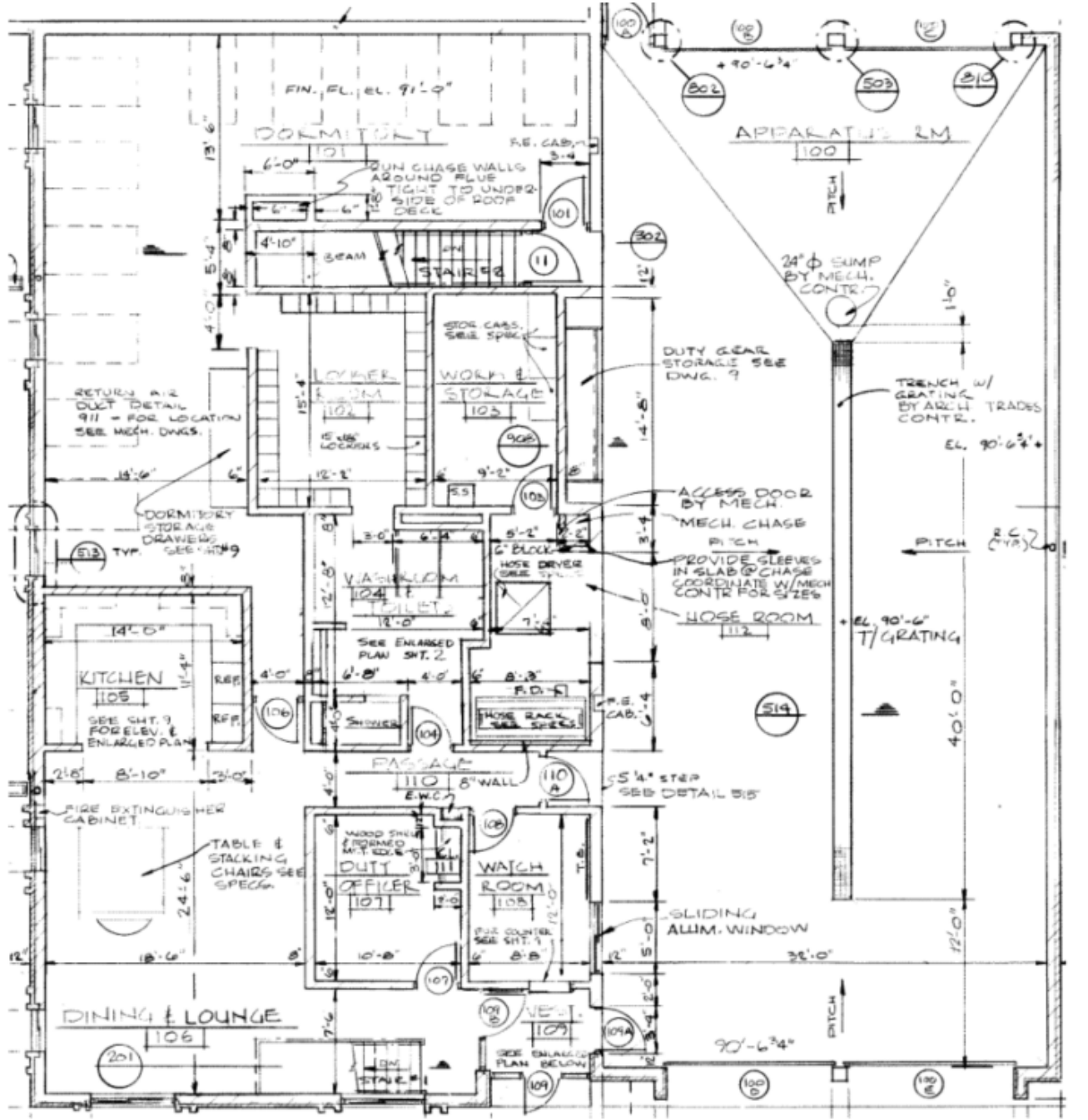
Building 14 continued

Site



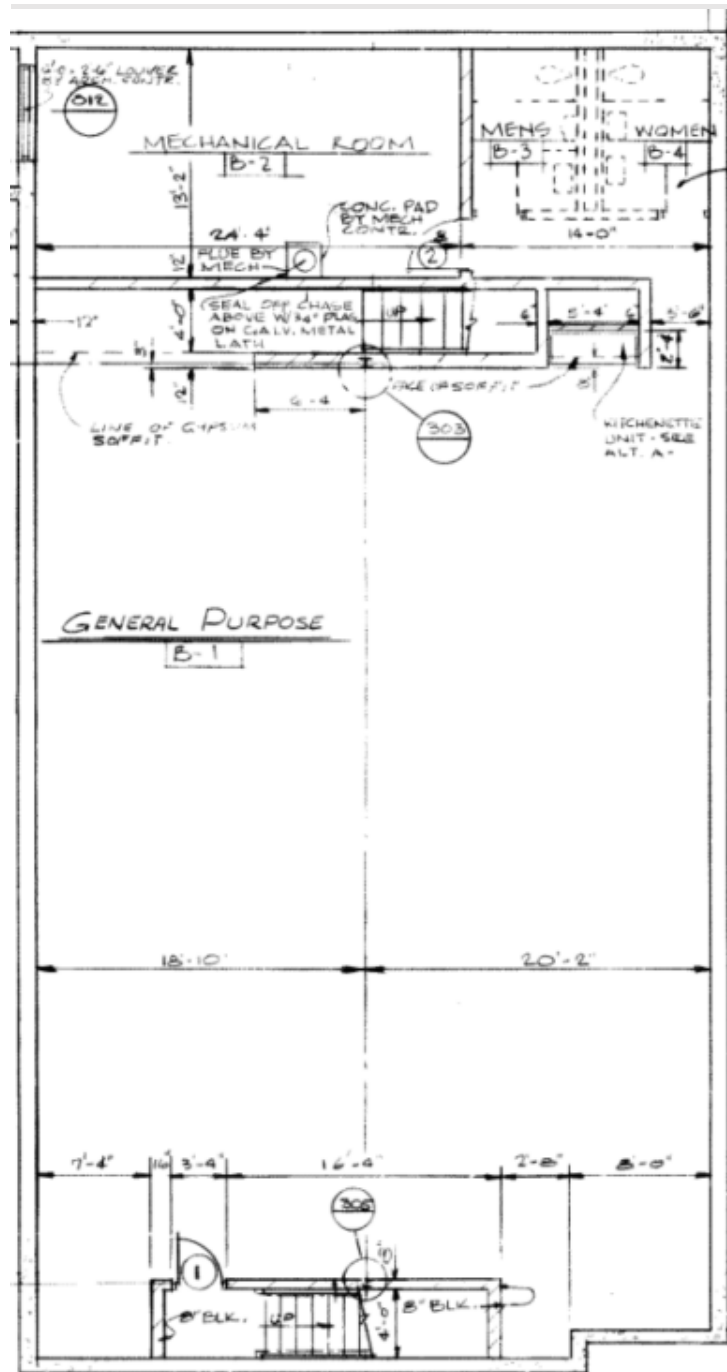
Building 14 continued

1st Floor Plan



Building 14 continued

Basement Floor Plan



*Building 14 continued***Condition Summary (Building Envelope): FAIR**

Roof – The primary roofing system is 60 mil TPO on rigid insulation, which was installed in 2023. Roof drainage is by internal roof drains. No drainage deficiencies were observed. Overall, the roofing system appeared to be in **GOOD** condition.

Windows – The primary glazing system is an uninsulated single pane system in aluminum frame. Replacing with insulated dual pane is recommended. Caulking around windows appeared to be in poor condition and requires replacement. Overall, windows appeared to be in **POOR** condition.

Facade – The primary façade material is brick. Some cracking was observed. Caulking at control joints appeared to be in poor condition and requires replacement. Overall, the façade appeared to be in **FAIR** condition.

Doors – Entry doors are primarily an uninsulated single pane storefront system. Secondary doors are hollow metal frame and door. Apparatus bay doors are insulated sectional overhead doors with glass vision panels. Overall, doors appeared to be in **FAIR** condition.

Overall, the Building Envelope appeared to be in **FAIR** condition.

Building 14 continued

Photos (Building Envelope)



Entry and Apparatus Bay doors



Entry and Apparatus Bay doors



Window



Window



Window



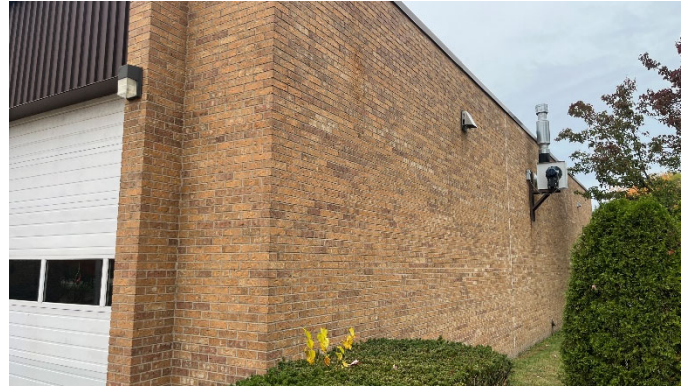
Storefront entry system

Building 14 continued

Photos (Building Envelope)



Apparatus bay door



Facade



Control joint



Apparatus bay doors



Wall pack



Apparatus Bay doors

Building 14 continued

Photos (Building Envelope)



Facade



Window



Window caulking



Window



Facade



Overflow drain

*Building 14 continued***Condition Summary (Interiors): FAIR**

Flooring – Administrative areas, kitchen, corridors, and Day Room are luxury vinyl tile. Toilet Rooms are porcelain tile. Dorm Rooms are carpet. Storage Rooms are vinyl tile. Exercise Room is rubber mats over vinyl tile. Apparatus Bays are epoxy. Overall, flooring appeared to be in **FAIR** condition.

Wall covering – Entry Vestibule, Corridors, Administrative areas, Storage Rooms, Day Room, Dining Room, Kitchen, and Apparatus Bays are painted Concrete Masonry Units (CMU). Toilet Rooms are painted Concrete Masonry Units (CMU) and porcelain tile. Dorm Rooms are painted CMU and painted gypsum board. Overall, wall covering appeared to be in **GOOD** condition.

Ceilings – The primary ceiling system is Acoustical Ceiling Tile (ACT). Signs of water damage were observed in multiple areas. Overall, ceilings appeared to be in **FAIR** condition.

Windowsills – Windowsills consist primarily of a stone material. Overall, windowsills appeared to be in **GOOD** condition.

Window treatment – Window treatment is primarily horizontal mini-blinds. Overall, window treatment appeared to be in **GOOD** condition.

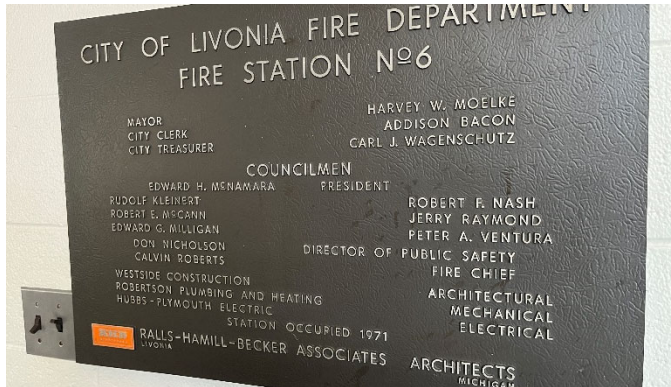
Interior doors – Interior doors are primarily hollow metal. Dorm Rooms have curtains in lieu of doors. Overall, interior doors appeared to be in **GOOD** condition.

Millwork – Kitchen has wood cabinets with granite countertop. Overall, millwork appeared to be in **GOOD** condition.

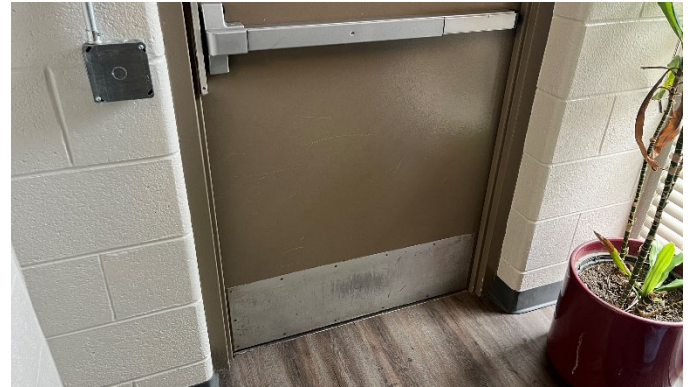
Overall, interiors appeared to be in **FAIR** condition.

Building 14 continued

Photos (Interiors)



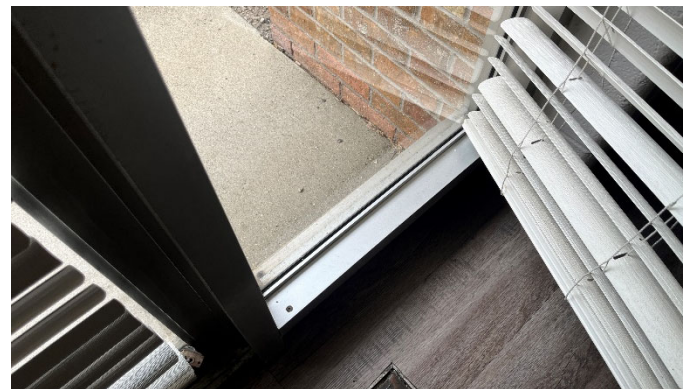
Entry



Exit



Watch Room



Window



Kitchen



Day Room

Building 14 continued

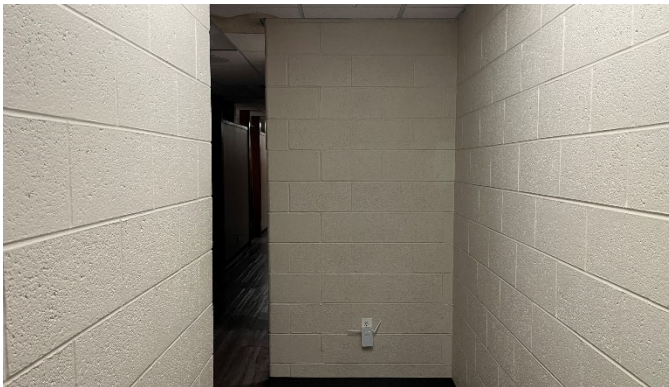
Photos (Interiors)



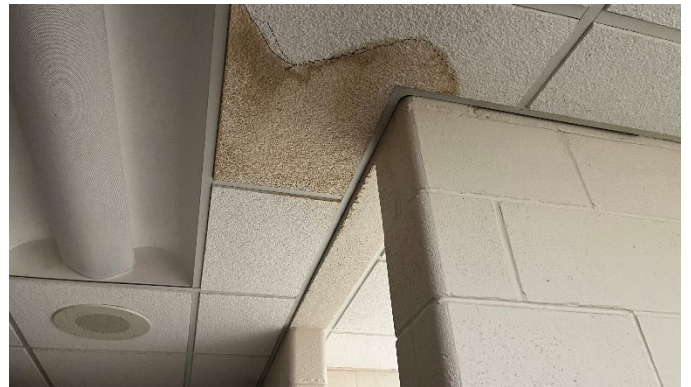
Day Room



Day Room



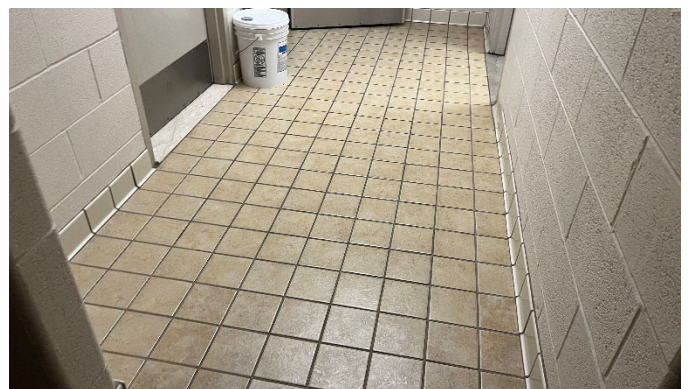
Corridor



Corridor



Dorm Room



Toilet Room

Building 14 continued

Photos (Interiors)



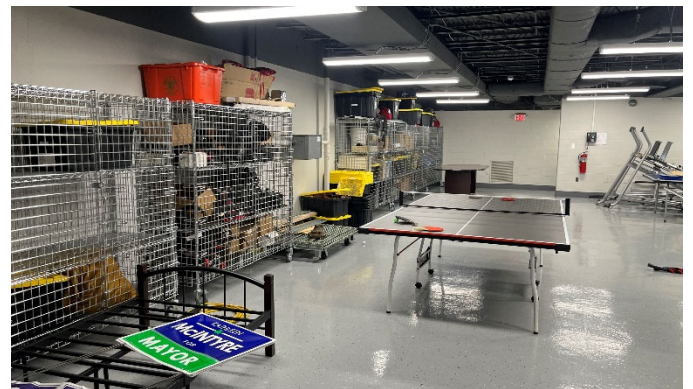
Corridor



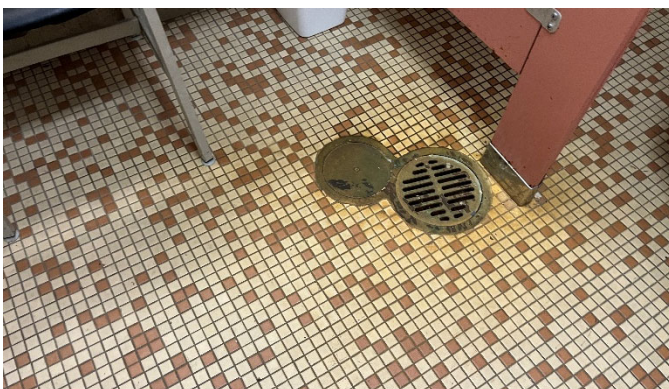
Toilet Room



Workout Room



Workout Room



Toilet Room



Office/Work Room

Building 14 continued

Photos (Interiors)



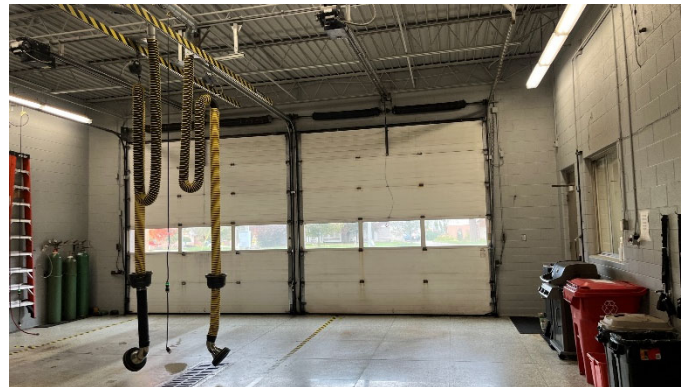
Office/Work Room



Office/Work Room



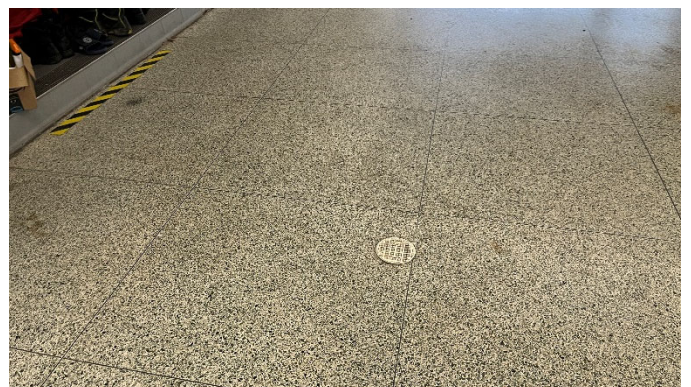
Apparatus Bay



Apparatus Bay



Apparatus Bay



Apparatus Bay

*Building 14 continued***Condition Summary (Plumbing): GOOD**

Plumbing – Domestic hot water is provided by a 75-gallon water heater, which was manufactured in 2015 and is approximately 8 years old. Toilet Room fixtures appeared to be original. Upgrading to hands-free is recommended.

Fire Protection – The building is not fire suppressed.

Overall, plumbing appeared to be in **GOOD** condition.

Building 14 continued

Photos (Plumbing)



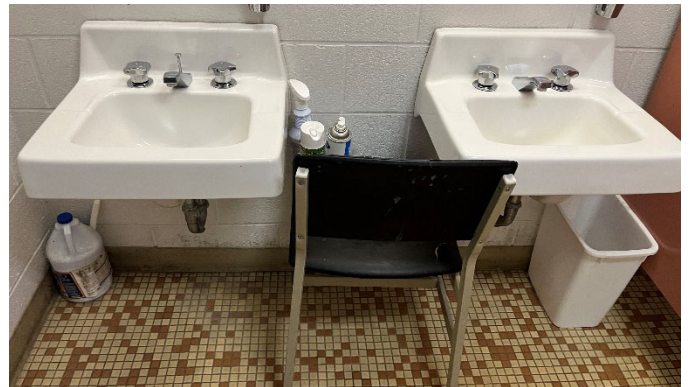
Kitchen



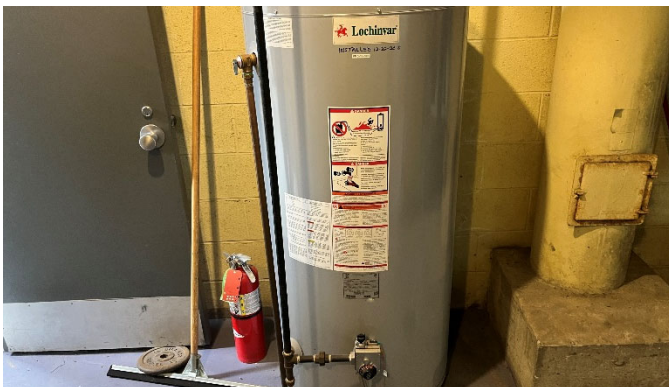
Toilet Room



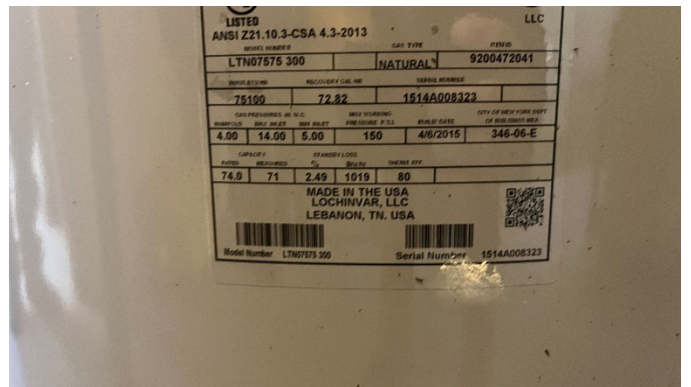
Toilet Room



Toilet Room



Water heater



Water heater

*Building 14 continued***Condition Summary (HVAC): GOOD**

HVAC – Heating, Ventilation and Air Conditioning is provided by:

- Two (2) 5-ton Carrier air conditioning units, which will be installed in 2024.
- Two (2) Carrier 135,000 BTU furnaces, which will be installed in 2024

Overall, the HVAC systems appeared to be in **GOOD** condition

Building 14 continued

Photos (HVAC)



Air conditioning units



Furnace

*Building 14 continued***Condition Summary (Electrical): GOOD**

Lighting – Lighting is primarily lay-in fixtures with T8 LED retrofit lamp. Overall, lighting appeared to be in **GOOD** condition.

Power – Fire Station No. 5 has a secondary electrical service at 120/240v, 3 phase Delta. It was reported that the electrical service is insufficient. Overall, power appeared to be in **FAIR** condition.

Emergency Power – Emergency power is provided by one (1) Generac, model 98A00422-S, natural gas, 35 kW, emergency only generator, which was installed in 1998 and is approximately 25 years old. Overall, emergency power appeared to be in **FAIR** condition.

Fire Alarm – It was reported that the existing fire alarm system does not require updating.

PA System – It was reported that the existing PA system needs replacement

Overall, electrical appeared to be in **GOOD** condition.

Building 14 continued

Photos (Electrical)



Day Room



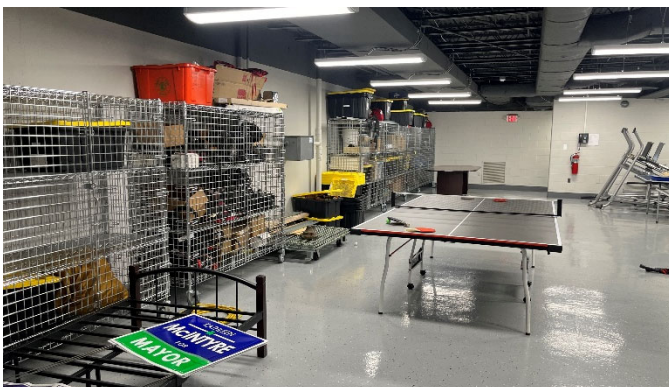
Corridor



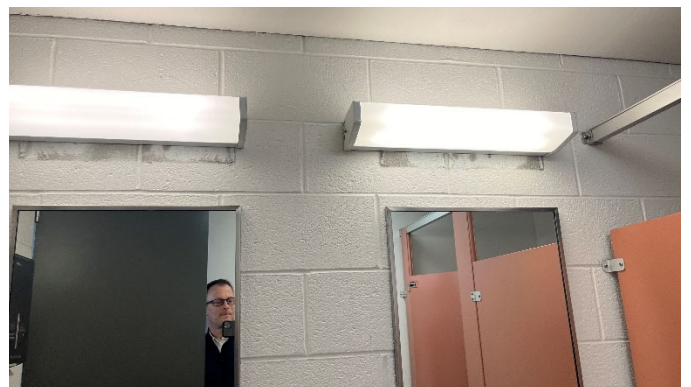
Toilet Room



Toilet Room



Storage/Workout Room



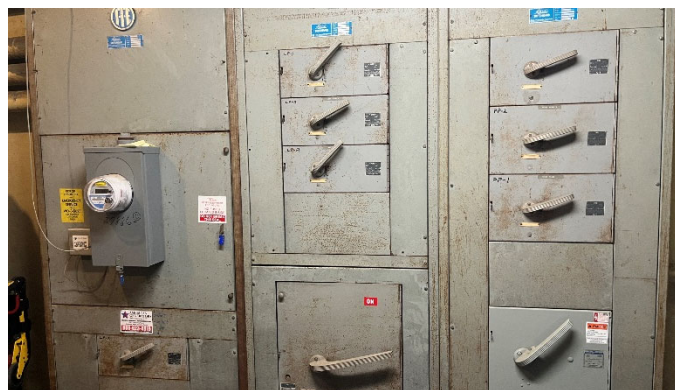
Toilet Room

Building 14 continued

Photos (Electrical)



Switch gear



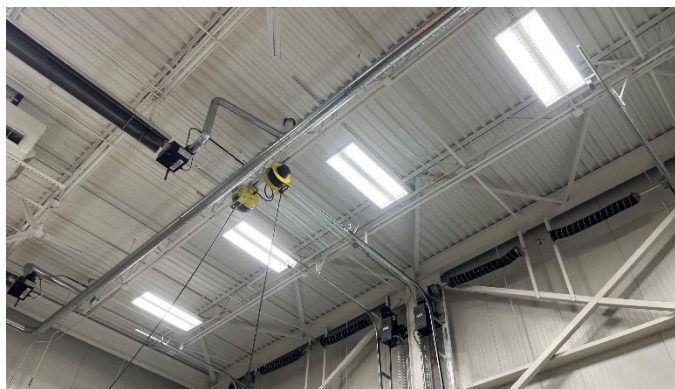
Switch gear



Electrical panel



Generator



Apparatus bay



Electrical panel

*Building 14 continued***Condition Summary (Site): FAIR**

Drainage – The storm water collection and drainage system is below grade. No presence of on-site surface water was observed. Overall, site drainage appeared to be in **GOOD** condition.

Parking – The parking lot is asphalt. Some cracking was observed. Milling and repaving is recommended. The driveway is concrete. Some cracking was observed. Replacing concrete is recommended. Parking lots are illuminated by light poles. Upgrading to LED fixtures is recommended. Overall, parking appeared to be in **POOR** condition.

Sidewalks – not applicable

Landscaping – The site contains little landscaping. Overall, the landscaping appeared to be in **FAIR** condition.

Lighting – The site is illuminated by wall packs and pole mounted light fixtures that have been retrofit to be LED and appeared to be in **FAIR** condition.

Overall, the site appeared to be in **FAIR** condition.

Building 14 continued

Photos (Site)



Training tower



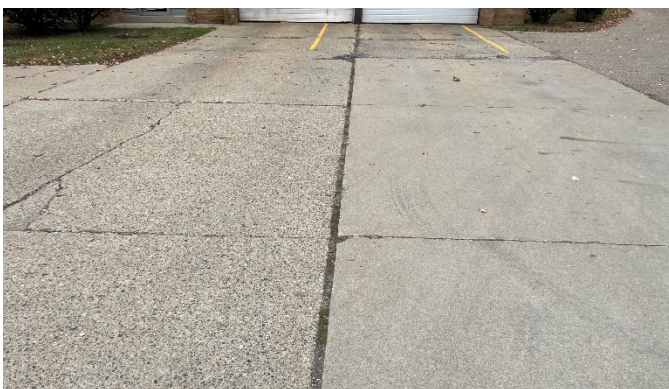
Asphalt paving



Concrete driveway



Concrete driveway



Concrete driveway



Asphalt paving

Building 14 continued

Summary of Budgets

Program Area	Quantity Per Unit	Unit	# of Units	Total Units	As % of Total Cost	Priority I (1 - 3 years)	Priority II (4 - 6 years)	Priority III (7 - 10 years)
2.0 BUILDING ENVELOPE								
Windows								
Replace Exterior Window Systems		SF		500	4.13%	\$44,226	\$0	\$0
Exterior Walls								
Re-Caulk Expansion Joints		Allowance		5	0.50%	\$5,400	\$0	\$0
Tuckpointing (Allowance)		Allowance		2	1.01%	\$10,800	\$0	\$0
Masonry Repairs		Allowance		2	1.01%	\$10,800	\$0	\$0
BUILDING ENVELOPE SUBTOTAL					6.65%	\$71,226	\$0	\$0
3.0 INTERIOR/FINISHES								
Ceilings								
Remove Existing & Install New Acoustic Tile Ceiling		SF		2000	1.57%	\$0	\$10,951	\$12,468
Flooring								
Remove & Replace Carpet		SF		600	0.46%	\$0	\$6,402	\$0
Replace Toilet Room Flooring - Hard Tile (Medium)		SF		600	2.72%	\$0	\$37,908	\$0
Paint								
Painting Allowance		SF		5000	0.86%	\$0	\$11,934	\$0
Restrooms								
Renovate - Toilet/Locker Rooms		EA		0.5	4.54%	\$0	\$63,180	\$0
Other								
Renovate - Kitchen		SF		160	4.26%	\$0	\$0	\$67,516
Renovate - Watch Room		SF		100	0.76%	\$0	\$10,530	\$0
INTERIOR/FINISHES SUBTOTAL					15.17%	\$0	\$140,905	\$79,984
4.0 FURNITURE & EQUIPMENT								
General Furniture								
FFE Allowance		Allowance		1.75	4.41%	\$47,250	\$0	\$0
FURNITURE & EQUIPMENT SUBTOTAL					4.41%	\$47,250	\$0	\$0
5.0 PLUMBING SYSTEMS								
Equipment & Fixtures								
Replace Hot Water Heater (Domestic)		50 Gal.		1	0.81%	\$0	\$11,232	\$0
Replace Flush Valves and Faucets to be hands-free		Allowance		1	1.01%	\$0	\$14,040	\$0
Piping								
Replace Piping, Valves & Unions		Allowance		1	1.33%	\$4,752	\$6,178	\$7,033
PLUMBING SYSTEMS SUBTOTAL					3.15%	\$4,752	\$31,450	\$7,033
6.0 HVAC SYSTEMS								
Equipment								
Replace Furnace		EA		1	0.50%	\$5,400	\$0	\$0
Hydronic Piping								
Replace Piping, Valves & Unions		Allowance		1	0.91%	\$4,860	\$6,318	\$0
HVAC SYSTEMS SUBTOTAL					1.41%	\$10,260	\$6,318	\$0
7.0 ELECTRICAL SYSTEMS								
Lighting								
Replace Exterior Wall Packs		EA		0	0.00%	\$0	\$0	\$0
Other								
Replace Existing Emergency Generator - 100 KW Natural Gas		EA		1	3.53%	\$0	\$49,140	\$0
Replace PA System		Allowance		1	2.52%	\$27,000	\$0	\$0
ELECTRICAL SYSTEMS SUBTOTAL					6.05%	\$27,000	\$49,140	\$0
8.0 SECURITY								
Security								
Security Allowance		Allowance		1	3.73%	\$0	\$51,948	\$0
SECURITY SYSTEMS SUBTOTAL					3.73%	\$0	\$51,948	\$0
9.0 ABATEMENT								
Abatement								
Abatement Allowance		Allowance		1	3.53%	\$37,800	\$0	\$0
ABATEMENT SUBTOTAL					3.53%	\$37,800	\$0	\$0
12.0 SITE								
Paving								
Remove and Replace Concrete Driveway		SF		15000	27.09%	\$0	\$376,974	\$0
Landscaping								
Landscaping Allowance		Allowance		1	2.02%	\$7,200	\$9,360	\$10,656
SITE SUBTOTAL					29.11%	\$7,200	\$386,334	\$10,656
Building Infrastructure Improvement Total:				\$95.22	73.23%	\$205,488	\$666,095	\$97,673
Project Contingency:	10.00%				6.88%	\$15,824	\$66,610	\$9,767
Permits, Testing & Printing:	2.50%				1.89%	\$4,352	\$18,318	\$2,686
Professional Fees & Costs:	10.00%				8.69%	\$19,982	\$84,114	\$12,334
Construction Manager Fee & Costs:	12.00%				9.31%	\$21,410	\$90,123	\$13,215
PROJECT TOTAL					100.00%	\$267,055	\$925,259	\$135,675
						ESCALATED PROJECT TOTAL	\$1,327,990	

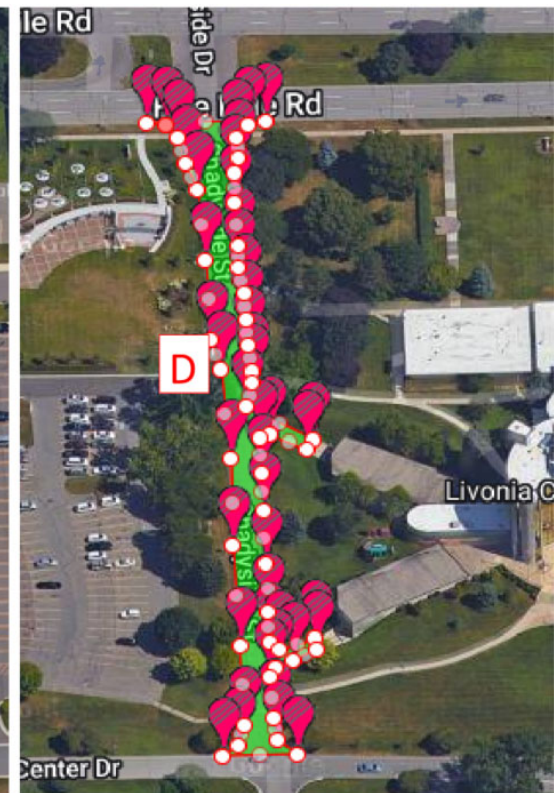
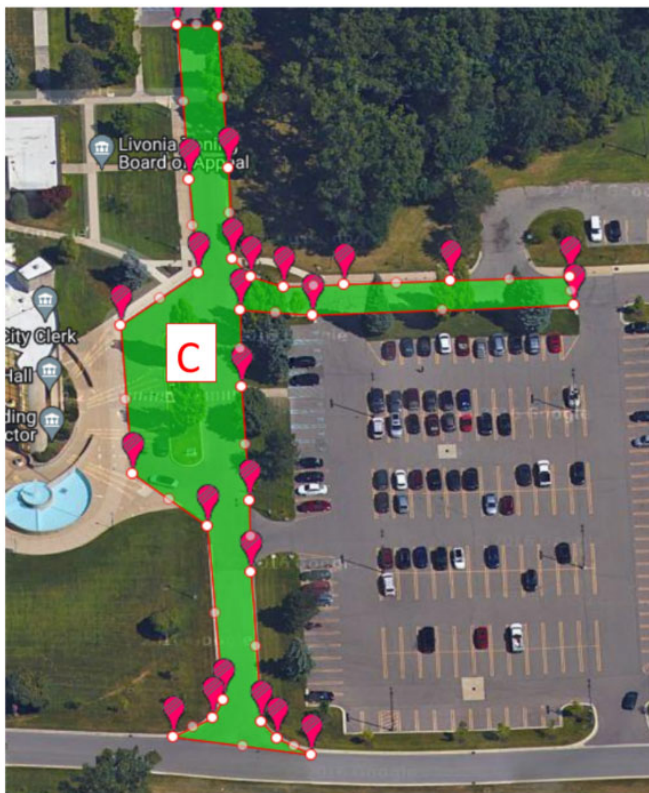
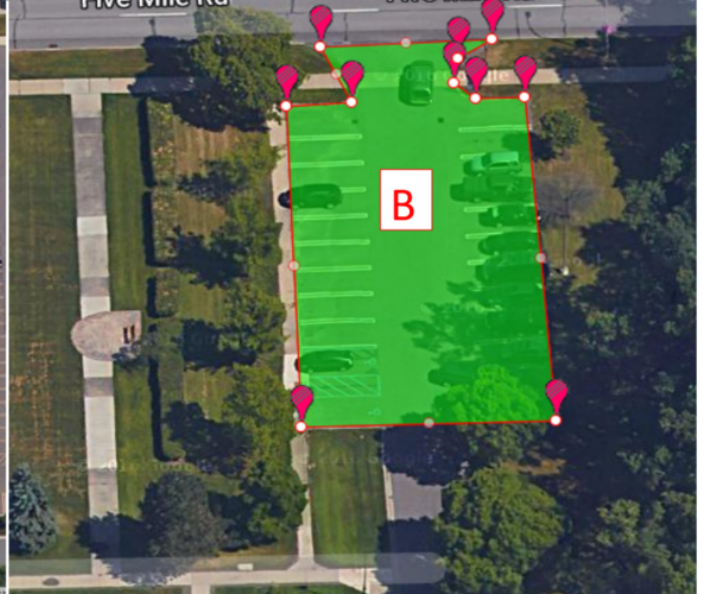
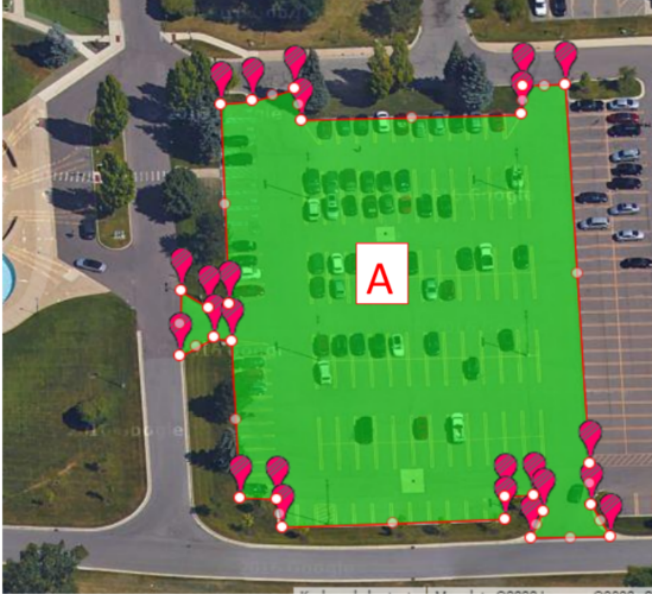


Section D

Parking Lot Take-Offs

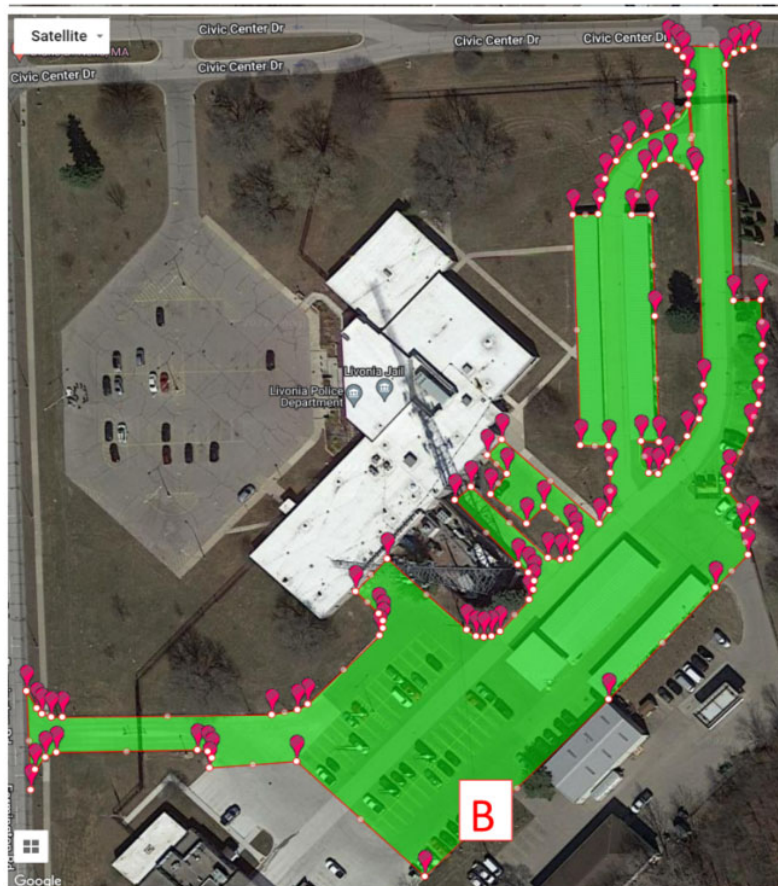
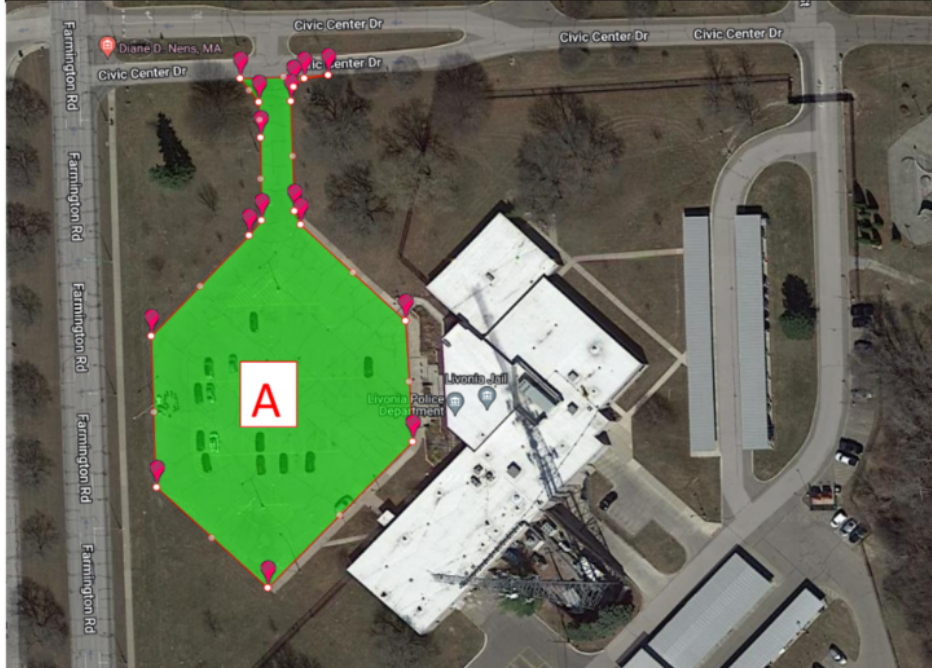
SECTION D PARKING LOT TAKE-OFFS

Bldg. No.	Name	Address	
1	City Hall	33000 Civic Center Drive, Livonia, MI 48154	
Parking Area	Material	Sq.ft.	Notes
A	Asphalt	59,369	
B	Asphalt	9,156	
C	Asphalt	22,225	Island removed from total
D	Asphalt	19,447	
TOTAL		110,197	



SECTION D PARKING LOT TAKE-OFFS

Bldg. No.	Name	Address	No
1	Police Department	15050 Farmington Rd. Livonia, MI 48154	
Parking Area	Material	Sq.ft.	
A	Asphalt	49,165	
B	Asphalt	105,749	
TOTAL		154,914	



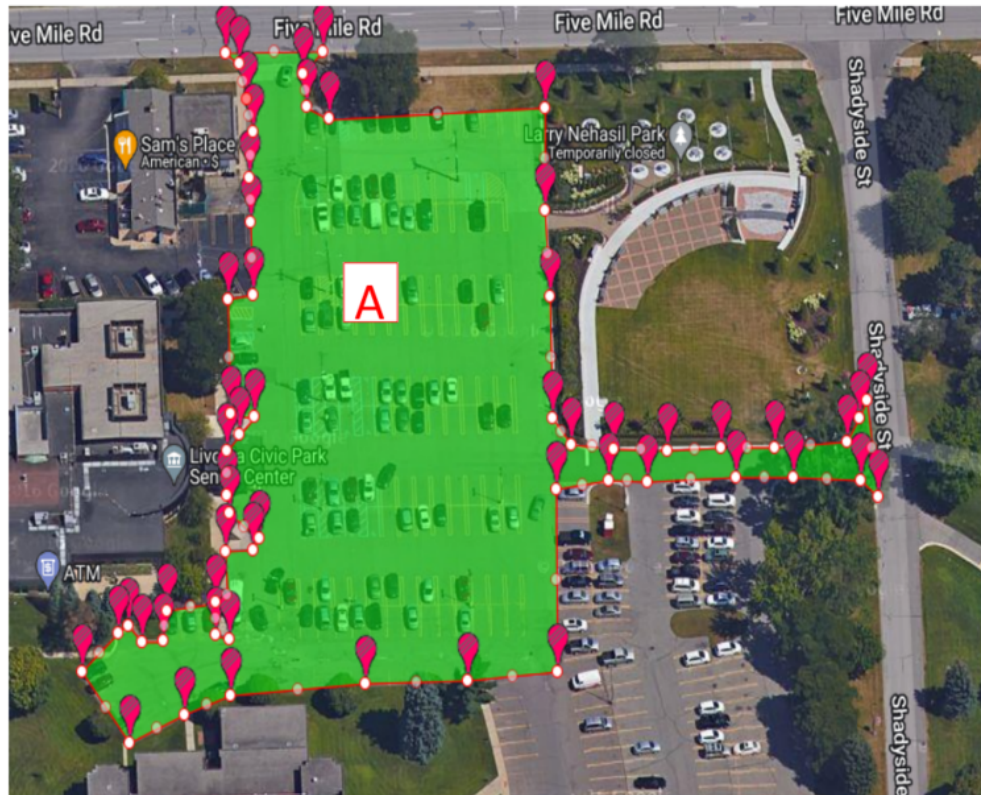
SECTION D PARKING LOT TAKE-OFFS

Bldg. No.	Name	Address
1	Livonia City Fire Department	14910 Farmington Rd. Livonia MI 48154
Parking Area	Material	Sq.ft.
A	Asphalt	16,365
B	Concrete	11,512
TOTAL		27,877

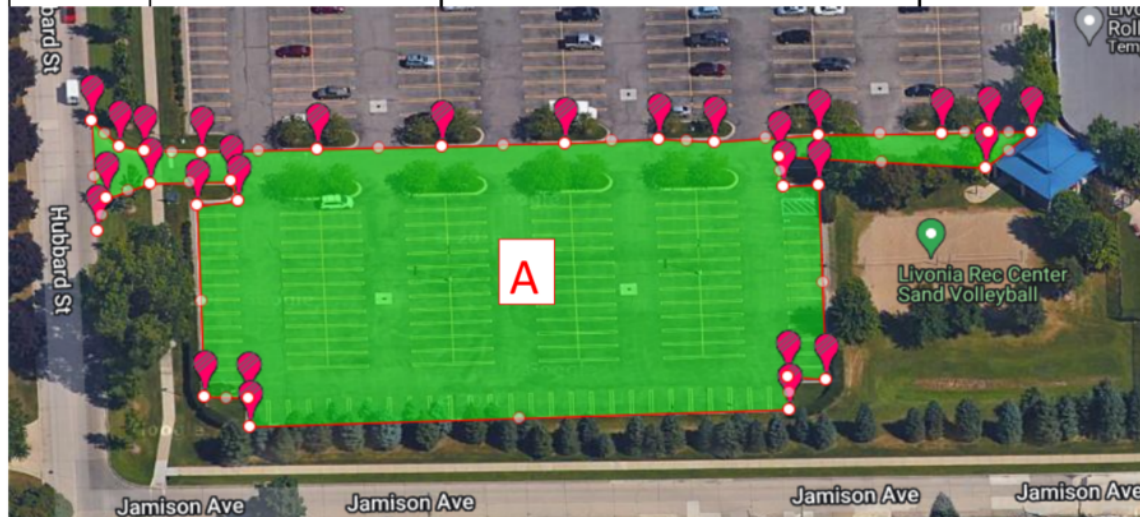


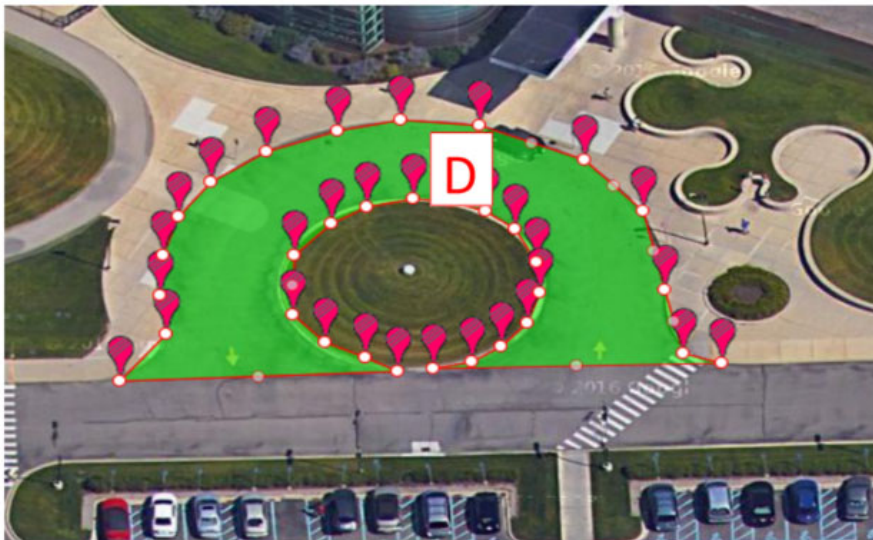
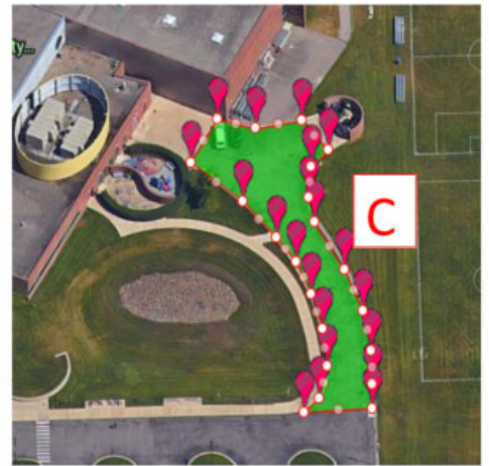
SECTION D PARKING LOT TAKE-OFFS

Bldg. No.	Name	Address	Notes
1	Senior Center	15218 Farmington Rd. MI 48154	
Parking Area	Material	Sq.ft.	
A	Asphalt	82,497	
TOTAL		82,497	



Bldg. No.	Name	Address	Notes
1	Rec Center	15100 Hubbard St. Livonia MI 48154	
Parking Area	Material	Sq.ft.	
A	Asphalt	59,129	Islands removed from total
B	Asphalt	147,576	Islands removed from total
C	Asphalt	9,013	
D	Asphalt	6,634	
TOTAL		222,352	



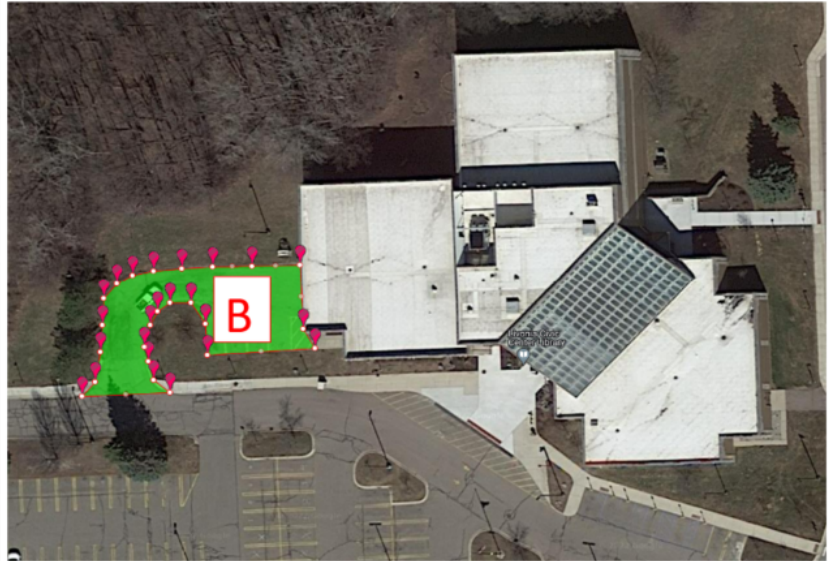


SECTION D PARKING LOT TAKE-OFFS

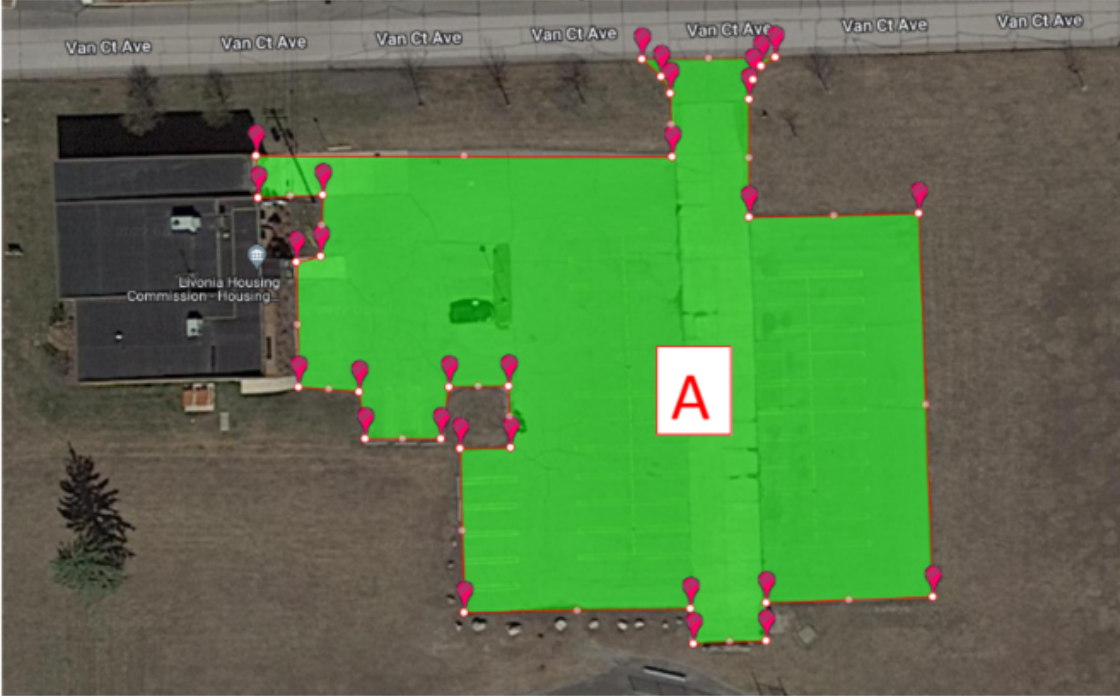
Bldg. No.	Name	Address
1	Livonia Civic Center Library	32777 Five Mile Rd. Livonia MI 48154
Parking Area	Material	Sq.ft.
A	Asphalt	77,118
B	Asphalt	5,269
TOTAL		82,387

Notes

Islands removed from total 2,681
 Islands removed from total 835
 Islands removed from total 649
 Islands removed from total 549
 4,714



Bldg. No.	Name	Address
1	Livonia Housing Commission	10800 Farmington Rd. Livonia MI 48150
Parking Area	Material	Sq.ft.
A	Asphalt	32,954
TOTAL		32,954



SECTION D PARKING LOT TAKE-OFFS

Bldg. No.	Name	Address
1	Carl Sandburg Library	30100 W. Seven Mile Rd. Livonia MI 48152
Parking Area	Material	Sq.ft.
A	Asphalt	52,073
TOTAL		52,073



Bldg. No.	Name	Address
1	Alfred Noble Building	32901 Plymouth Rd. Livonia MI 48150
Parking Area	Material	Sq.ft.
A	Asphalt	31,227
TOTAL		31,227





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Plante Moran Cresa
3000 Town Center, Suite 100
Southfield, MI 48075

**CITY OF LIVONIA – CITY COUNCIL
MINUTES OF STUDY MEETING HELD APRIL 1, 2024**

11.

Meeting was called to order at 8:23 p.m. by Council President Brandon McCullough. Present: Rob Donovic, Carrie Budzinski, Scott Morgan, Jim Jolly, Vice President Martha Ptashnik, and President Brandon McCullough. Absent: Laura Toy.

Elected and appointed officials present: Lori Miller, City Clerk; Paul Bernier, City Attorney; and Todd Zilincik, City Engineer.

Councilmember Donovic led the meeting with the Pledge of Allegiance.

5. REQUEST FOR COUNCIL APPROVAL ON A PROPOSED LOT SPLIT: Department of Assessment, re: for the property located at the Northeast corner of Seven Mile and Merriman, in the Southwest 1/4 of Section 2 (19200 Merriman Ct) and to waive lot depth and lot area issue relative to Parcel 2.

Mark Taormina, Planning and Economic Development Director, presented the request to Council.

Councilmember Donovic said he would not be in favor of this if there weren't already other properties like this on the street. He asked If this would be the last lot that could be split.

Mr. Taormina indicated another lot could be created on the other end of this site and the one across the street.

Vice President Ptashnik asked if they have talked to neighbors and what their plan is to build. She also asked what their plan would be if the Zoning Board of Appeals denied the lot split.

Toni Vacaru, 37749 Pickford Drive, said he spoke with the neighbor in front of the proposed lot and they have no problem with it, but they sold the property. The house in the back also has no problem with it. The plan is to build a 1400 square foot house with a basement for his brother. They don't have any alternate plan.

Councilmember Jolly asked if there was any thought given to splitting the southern part of the lot which would allow the lots to be more equally proportioned.

Mr. Vacaru said no because a building on the south side would be too close to the road.

Councilmember Jolly isn't in favor of the split because it wouldn't be a similar setback to the existing neighbors. He asked Mr. Taormina if it would be better if they split the southern portion of the lot to avoid the setback differences.

Mr. Taormina said it would probably be similar in size and he agrees it would be similar to the lots across Merriman Court.

Councilmember Morgan said he doesn't see how they could deny it since the parcels across the street are similar in size and they go all the way down the street.

Councilmember Donovic said the depth would be 87.66 with 16ft right of way in front. He understands the request and the southern parcel would be constricted more due to the sidewalk and they would be blocking the house to the east which would have two houses in their front yard. He said he'd rather not disturb the trees in parcel number 1 as they are a buffer for the house to the east. He also wonders about the utility make up for the proposed structure.

Vice President Ptashnik asked if the swimming pool would be on the new property line. She also wants to confirm the approval of the neighbor at 31220. She indicated the Zoning Board of Appeals won't approve the split without approval from that neighbor either.

President McCullough asked if they have spoken with the neighbor to the east. He also asked if the existing fence is a privacy or chain link fence.

Mr. Vacaru said he hasn't had a chance to talk to that neighbor. There is already a chain link fence by the pool. He explained that he didn't know he owned the lot until the neighbor behind his house told him, so he checked paperwork from the title company and found that he does own it.

Councilmember Jolly asked him to talk to neighbor at 31220 and see if they would be interested in selling off any of their property, to the rear of the proposed lot. He said if the neighbor wanted to sell about 30 feet, he wouldn't object to the lot split at all.

Mr. Vacaru said he didn't ask them if they wanted to sell any property because the neighbor asked him if he wanted to sell his property.

President McCullough asked Mr. Taormina if it would make more sense to split it into three lots.

Mr. Taormina said he looked further at the dimensions and the southern portion would be a smaller lot.

Councilmember Morgan offered an approving motion for the Regular agenda.

DIRECTION

APPROVAL

REGULAR



LETTER TO THE LIVONIA CITY COUNCIL

5.

**Assessing
March 12, 2024**

MEETING DATE

S040124

PREPARED BY

Kathie Siterlet, Property Appraiser,

AGENDA ITEM

REQUEST FOR COUNCIL APPROVAL ON A PROPOSED LOT SPLIT: Department of Assessment, re: for the property located at the Northeast corner of Seven Mile and Merriman, in the Southwest 1/4 of Section 2,(19200 Merriman Ct) and to waive lot depth and lot area issue relative to Parcel 2.

BACKGROUND DETAILS

March 12, 2024

Honorable Members City Council
City of Livonia, Michigan 48154

SUBJECT: PROPOSED LOT SPLIT (Petition 2023-08-LS-07)
TAX ITEM NUMBER: 007-99-0032-000
LOCATION: North of Seven Mile Rd., East of Merriman
ADDRESS: 19200 Merriman Court

Dear Council Members,

This office has been requested by Toni Vacaru owner of 19200 Merriman Court to split the subject property according to the attached survey and legal descriptions.

Attached are the responses from the Law, Planning, Engineering, and Inspection Departments with their comments and recommendations.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

TO APPROVE AS SUBMITTED AS THE RECOMMENDATIONS OF THE INDIVIDUAL DEPARTMENTS

ATTACHMENTS

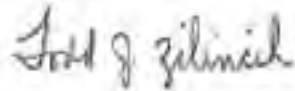
1. 19200 Merriman Ct packet

APPROVED BY



Mark Taormina, Planning and Economic Development Director

Date: March 18, 2024



Todd Zilincik, P.E., City Engineer

Date: March 18, 2024



Maureen Miller Brosnan, Mayor

Date: March 22, 2024

DEPARTMENTAL CORRESPONDENCE
DEPARTMENT OF LAW

March 8, 2024

TO: Kathie Siterlet, Residential Appraiser

FROM: Michael E. Fisher, Chief Assistant City Attorney *MEF*

SUBJECT: Proposed Lot Split 007-99-0032-000 – 19200 Merriman Ct.

Thank you for your memorandum of March 4, 2024, regarding a proposed split of the subject property.

The parcel sought to be split is road frontage on Seven Mile and Merriman Court at the northeastern corner of those two roads. Parcel 1 contains a one-story house and swimming pool, plus a little more than ½ acre of real estate. Parcel 2, the vacant portion to the north, no doubt serves as an attractive additional side/rear yard space, but would not comply with the Zoning Ordinance as a standalone property.

The property is zoned RUF. In light of the dimensions of parcel 2, the most pertinent RUF ordinance minimums are area (15,000 square feet, where parcel 2 is only 10,596.6) and lot depth (150 feet, where Parcel 2 only has 90 feet). See Zoning Ordinance Section 3.06.

Following the Michigan Land Division Act, particularly MCL 560.109(1)(d) and (5), in the case of lot splits which generate one or more lot(s) with deficient lot area, the owner can obtain relief only by a petition to City Council, via Code of Ordinances Section 16.32.030(a). By contrast, depth deficiencies are the province of the Zoning Board of Appeals.

Thank you again for the interesting question.

MEF/bks

P:\Brenda\Correspondence\Other Dept\Assessor\2024\19200 Merriman Ct.doc

PLANNING COMMISSION

IAN WILSHAW, Chairman
GLEN W. LONG, JR., Vice Chairman
SAM CARAMAGNO, Secretary
DAVID BONGERO
WAFU DINARO
PETER H. VENTURA



33000 CIVIC CENTER DRIVE
LIVONIA, MICHIGAN 48154-3097
(734) 466-2290

MAUREEN MILLER BROSNAN
MAYOR

MARK TAORMINA
PLANNING & ECONOMIC DEVELOPMENT
DIRECTOR

JACOB UHAZIE
PLANNING & ECONOMIC DEVELOPMENT
COORDINATOR

SCOTT O. MILLER
PLANNER IV

DATE: August 30, 2023
TO: Kathie Siterlet, Assessment
FROM: Scott Miller, Planner IV
SUBJECT: Proposed Lot Split (Petition 2023-08-LS-07)
Tax Item 007-99-0032-000 (19200 Merriman Court)

As requested, the Planning Department has reviewed the above-referenced lot split by Toni Vacaru for compliance with the Livonia Zoning Ordinance, as amended. The subject property is located on the northeast corner of Seven Mile Road and Merriman Court in the Southwest ¼ of Section 2. The zoning is RUF, Rural Urban Farm, which requires a minimum lot size of 15,000 square feet and minimum lot dimensions of 75 feet in width by 150 feet in depth.

The existing parcel has 380 feet of frontage on Merriman Court and 89.68 feet on Seven Mile Road, for a total land area of 34,078 square feet or 0.78 acres. The site contains a house with an attached garage. There is also an in-ground pool on the house's north side.

The submitted survey shows that the parcel would be split into two (2) parts, identified on the survey as Parcel 1 and Parcel 2. Parcel 1, the southern parcel, would measure 262.26 feet along Merriman Court and 89.68 feet along Seven Mile Road, for a total land area of 23,519 square feet or 0.54 acres. Parcel 1 would contain the existing house and pool. Parcel 2, the northern parcel, would measure 117.74 feet along Merriman Court by a depth of 87.66 feet for a total land area of 10,321 square feet or 0.24 acres.

Parcel 1 is conforming; however, Parcel 2 would be deficient in lot area and depth, requiring the approvals of the City Council and Zoning Board of Appeals (ZBA). The Livonia City Council is empowered to waive the lot area deficiency under Sections 16.32.030a) and 16.32.110 of the Livonia Code of Ordinances. The ZBA must approve the lot depth deficiency.

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

TODD J. ZILINCIK, P.E.
City Engineer

DAVID W. LEAR
Assistant City Engineer



MAUREEN MILLER BROSNAN
MAYOR

DONALD R. ROHRAFF
Director of Public Works

12973 FARMINGTON ROAD
LIVONIA, MICHIGAN 48150
(734) 466-2571
FAX: (734) 466-2195

September 1, 2023

Mrs. Kathie Siterlet
Assessor's Department
City of Livonia

Re: Lot Split Request: #19200 Merriman Court (007-99-0032-000)

Dear Mrs. Siterlet;

The Engineering Division of Public Works has reviewed the legal descriptions and drawings provided to this office on August 28, 2023 to split the above referenced parcel. We have no objections to the proposal, although we would like to note the following items:

1. Should the split be approved, Parcel "1" shall retain the existing address of **19200 Merriman Court**. The newly created parcel "2" will be assigned the address of **19226 Merriman Court**.
2. The existing parcel has access to public sanitary sewer, water main and storm sewer within the Merriman Court right-of-way.
3. The legal descriptions provided for the proposed lot configuration appear to be correct, and should be used for the new parcel descriptions should the split be approved.
4. As required for any new lot split, the owner will need to contact DTE Energy and provide a land split application for service planning. (see attached application)

If you have any questions, or need any additional information, please feel free to contact me at (734) 466-2608.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Lear", written over a horizontal line.

David W. Lear, P.E.
Assistant City Engineer

cc: File

INSPECTION DEPARTMENT

BUILDING
HEATING
PLUMBING
ELECTRICAL
ZONING
ENVIRONMENTAL PROTECTION
ORDINANCE ENFORCEMENT



MAUREEN MILLER BROSNAN
MAYOR

JEROME A. HANNA
DIRECTOR

ROBERT STROBLE
ASSISTANT DIRECTOR

33000 CIVIC CENTER DRIVE
LIVONIA, MICHIGAN 48154-3097
(734) 466-2580
FAX (734) 466-2095

DATE: October 9, 2023
TO: Kathie Siterlet
FROM: Jerome Hanna
SUBJECT: Lot Split
007-99-0032-000 – 19200 Merriman Ct.

Pursuant to your request, the Inspection Department has reviewed the proposed lot split made by Toni Vacaru, owner of 19200 Merriman Ct., Livonia, MI 48152 to divide the property referenced above. The property is located on the Northeast corner of Merriman Ct. and Seven Mile Road, between Merriman Ct. and Bainbridge Ave. in the Southwest $\frac{1}{4}$ of Section 02. The parent parcel is zoned R-U-F, which requires a minimum lot width of 75 feet, depth of 150 feet and minimum area of 15,000 square feet.

The parent property is as follows:

- A) 19200 Merriman Ct. is 90 feet wide and 380 feet deep. Currently, an existing residential dwelling with an attached accessory garage, swimming pool and fence are on the property.

Proposed is to divide 19200 Merriman Ct. into two parcels. Parcel 1, with frontage on Seven Mile Road and Parcel 2, with frontage on Merriman Ct.

The individual parcels are now described as:

- A) **Parcel '1'** contains the dwelling, garage and swimming pool becomes 90 feet wide and 262.26 feet deep, for a total area of 23,603.4 square feet (0.542 acres) and is compliant to the Livonia Zoning Ordinance for a minimum lot size, setbacks and area.
- B) **Parcel '2'**, becomes a vacant lot, 117.74 feet wide and 90 feet deep, for a total area of 10,596.6 square feet (0.243 acres). This creates a deficient lot depth of 60 feet and deficient lot area of 4,403.4 square feet. This lot is non-conforming and requires a variance granted by the Zoning Board of Appeals for deficient lot depth, area as well as front and rear yard setbacks prior to any permit issuance.

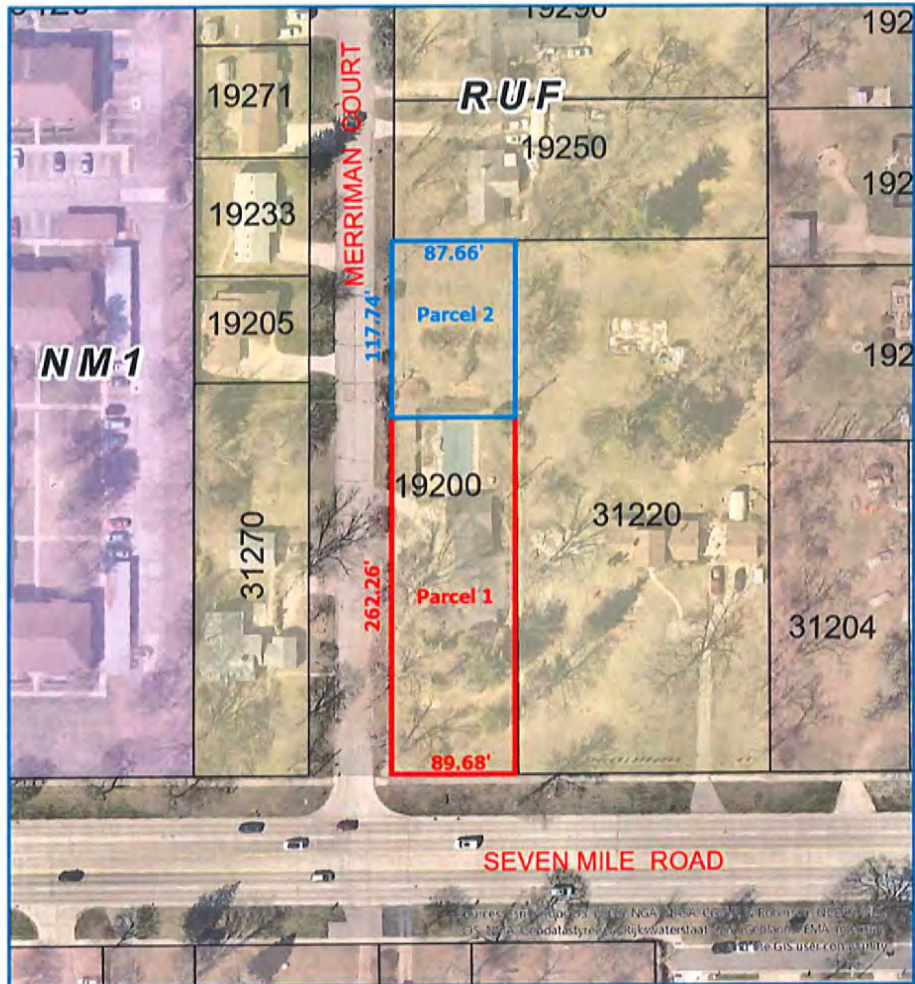
Lot Split
19200 Merriman Ct.
October 9, 2023
Page 2

The result of this proposed property division is non-conforming to the Zoning Ordinance, and if approved, will require a 2/3 majority vote by City Council.



Jerome Hanna
Director of Inspection

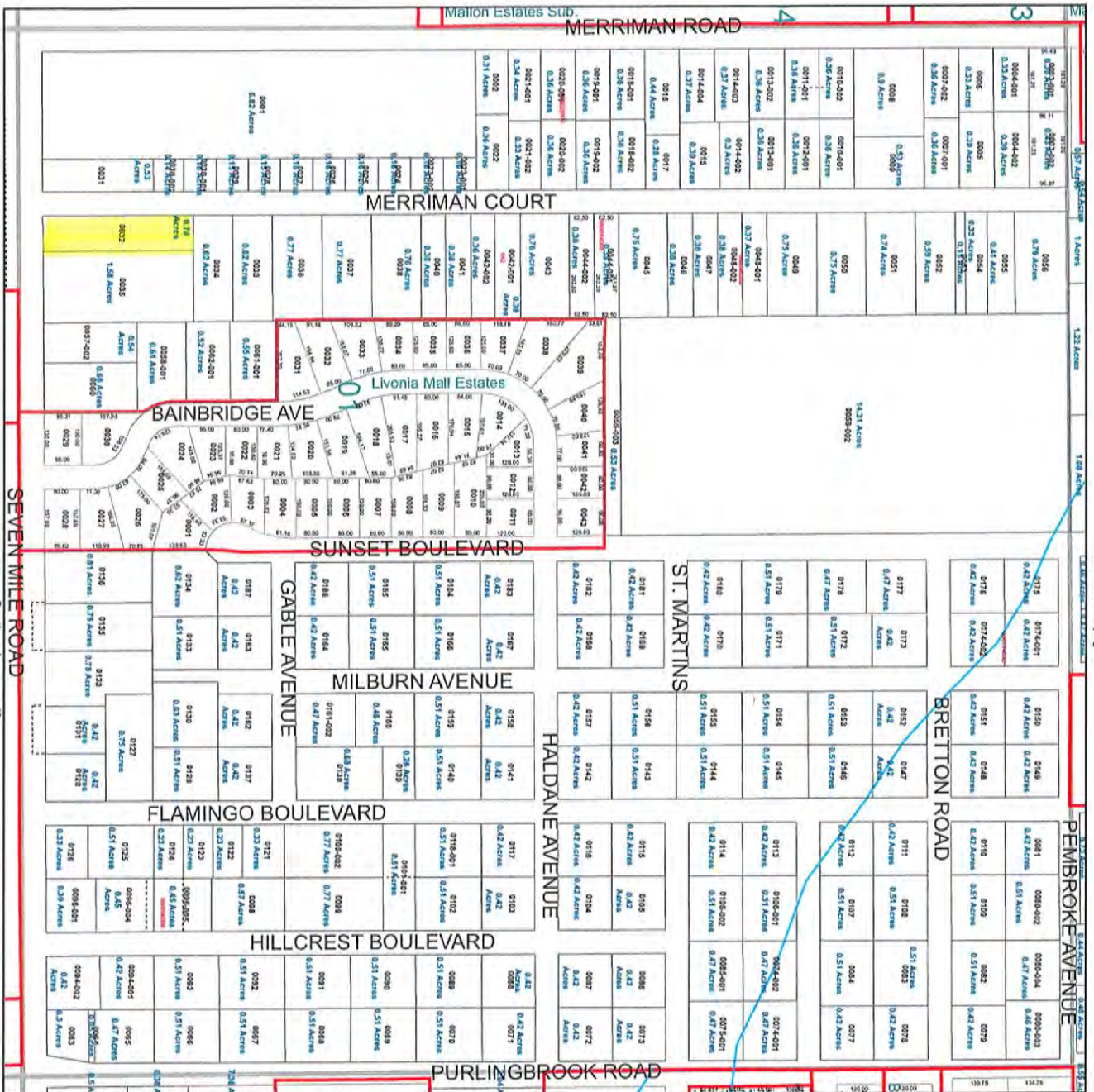
JHkdt



Map

Petition 2023-08-LS-07
Toni Vacaru
19200 Merriman Court
Lot Split





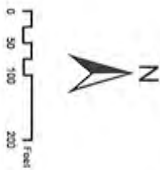
Continued on page 12

Continued on page 8

Location S.W. 1/4 Section 2

City of Livonia

T. 1 south, R. 9 east
Wayne County, Michigan
Copyright 2017, City of Livonia



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

LEGAL DESCRIPTION OF PARENT PARCEL (PARCEL ID: 007 99 0032 000)
LAND IN THE CITY OF LIVONIA, COUNTY OF WAYNE, STATE OF MICHIGAN BEING DESCRIBED AS:

LAND IN THE SOUTHWEST QUARTER OF SECTION 2, TOWN 01 SOUTH, RANGE 09 EAST, CITY OF LIVONIA, WAYNE COUNTY, MICHIGAN DESCRIBED AS FOLLOWS: BEGINNING AT A POINT ON THE SOUTH SECTION LINE A DISTANCE OF 472.50 FEET N90°00'00"E FROM THE SOUTHWEST CORNER OF SAID SECTION 2; THENCE N90°00'00"E, 90.00 FEET; THENCE N00°01'20"W, 440.00 FEET; THENCE N90°00'00"W, 87.66 FEET; THENCE S00°16'57"W (S00°16'57"W, MEASURED) ALONG THE EAST LINE OF MERRIMAN COURT, 440.00 FEET TO THE POINT OF BEGINNING, EXCEPTING THE SOUTH 60.00 FEET FOR RIGHT OF WAY.

LEGAL DESCRIPTION OF

PARCEL 1

LAND IN THE CITY OF LIVONIA, COUNTY OF WAYNE, STATE OF MICHIGAN BEING DESCRIBED AS:

LAND IN THE SOUTHWEST QUARTER OF SECTION 2, TOWN 01 SOUTH, RANGE 09 EAST, CITY OF LIVONIA, WAYNE COUNTY, MICHIGAN DESCRIBED AS FOLLOWS: BEGINNING AT A POINT N90°00'00"E ALONG THE SOUTH SECTION LINE A DISTANCE OF 472.50 FEET AND N00°16'57"E ALONG THE EAST LINE OF MERRIMAN COURT A DISTANCE OF 60.00 FEET FROM THE SOUTHWEST CORNER OF SAID SECTION 2; THENCE N90°00'00"E, 89.68 FEET; THENCE N00°01'20"W, 262.26 FEET; THENCE N90°00'00"W, 88.29 FEET; THENCE S00°16'57"W ALONG THE EAST LINE OF MERRIMAN COURT, 262.26 FEET TO THE POINT OF BEGINNING. CONTAINING ±23,337 SQUARE FEET OR ±0.54 ACRES OF LAND. SUBJECT TO ANY EASEMENTS, RIGHTS OF WAY OR RESTRICTIONS OF RECORD OR OTHERWISE.

LEGAL DESCRIPTION OF

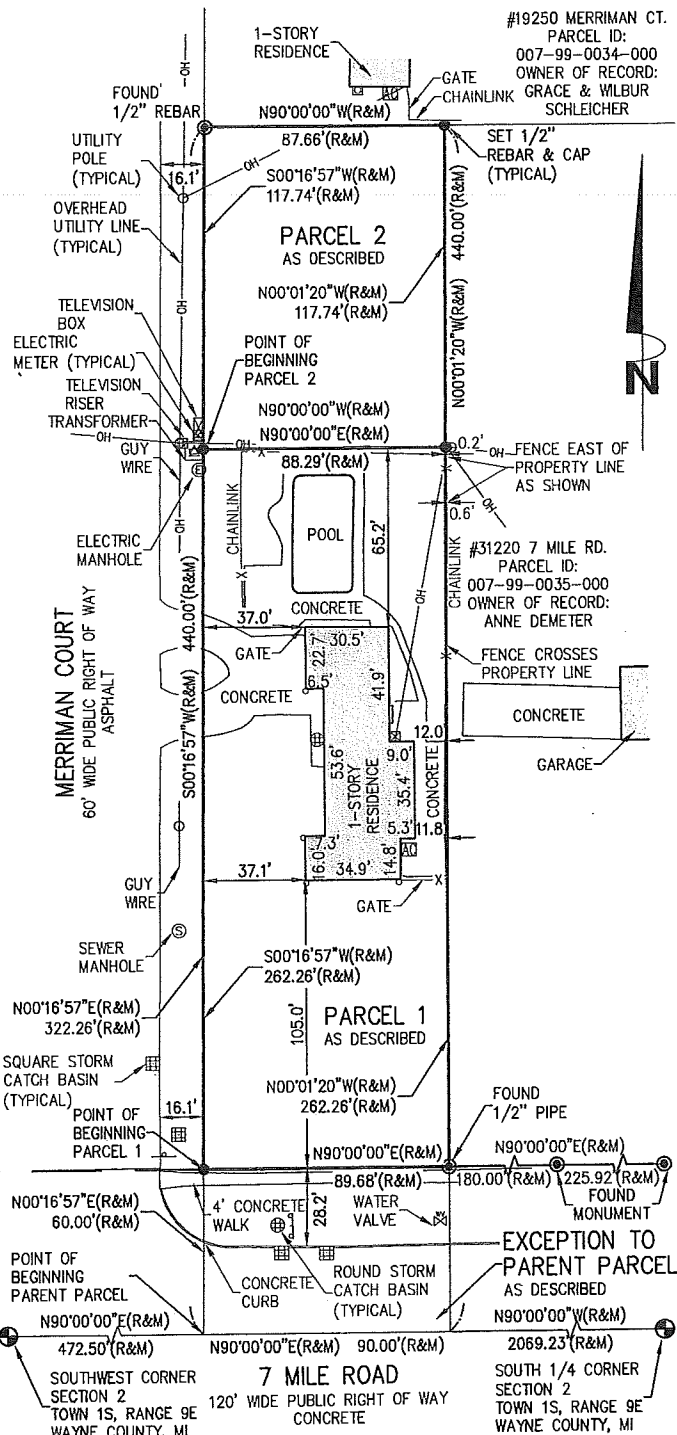
PARCEL 2

LAND IN THE CITY OF LIVONIA, COUNTY OF WAYNE, STATE OF MICHIGAN BEING DESCRIBED AS:

LAND IN THE SOUTHWEST QUARTER OF SECTION 2, TOWN 01 SOUTH, RANGE 09 EAST, CITY OF LIVONIA, WAYNE COUNTY, MICHIGAN DESCRIBED AS FOLLOWS: BEGINNING AT A POINT N90°00'00"E ALONG THE SOUTH SECTION LINE A DISTANCE OF 472.50 FEET AND N00°16'57"E ALONG THE EAST LINE OF MERRIMAN COURT A DISTANCE OF 322.26 FEET FROM THE SOUTHWEST CORNER OF SAID SECTION 2; THENCE N90°00'00"E, 88.29 FEET; THENCE N00°01'20"W, 117.74 FEET; THENCE N90°00'00"W, 87.66 FEET; THENCE S00°16'57"W, 117.74 FEET TO THE POINT OF BEGINNING. CONTAINING ±10,358 SQUARE FEET OR ±0.24 ACRES OF LAND. SUBJECT TO ANY EASEMENTS, RIGHTS OF WAY OR RESTRICTIONS OF RECORD OR OTHERWISE.

NOTES:

1. A CURRENT TITLE POLICY HAS NOT BEEN FURNISHED AT TIME OF SURVEY, THEREFORE EASEMENTS AND/OR ENCUMBRANCES AFFECTING SUBJECT PARCEL MAY NOT BE SHOWN.
2. THE BASIS OF BEARING IS THE SOUTH-LINE OF SECTION 2, TOWN 01 SOUTH, RANGE 09 EAST, CITY OF LIVONIA, WAYNE COUNTY, MICHIGAN.
3. PARENT PARCEL 1 CONTAINS ±33,685 SQUARE FEET OR ±0.77 ACRES OF LAND.



I HEREBY CERTIFY THAT I HAVE SURVEYED THE PARCEL OF LAND SHOWN AND DESCRIBED HEREON AND THAT THIS SURVEY MEETS THE REQUIREMENTS OF PUBLIC ACT 132 OF 1970, AS AMENDED.

MARK D. LAYMAN, P.S. #46674

PARCEL SPLIT SURVEY

19200 Merriman Court, Livonia, MI 48152

Client: Toni Vacaru
Date: 08/17/2023 Project No: 3767-508
Drawn By: MEB Revision No:
Scale: 1" = 50' Page 1 of 1



LAND CONSULTING
30445 Northwestern Hwy., Suite 143
Farmington Hills, MI 48334
Phone: (248) 932-7120



LETTER TO THE LIVONIA CITY COUNCIL

12.

Treasurer
April 4, 2024

MEETING DATE

R041524

PRESENTED BY

Susan Nash, City Treasurer

AGENDA ITEM

APPOINTMENT OF JULIE ALEXANDER FOR THE POSITION OF DEPUTY TREASURER: Office of the City Treasurer, re: same.

BACKGROUND DETAILS

Due to the retirement of Sharon Dolmetch as Deputy Treasurer, I will need to fill the vacant position. Under City Charter, Chapter V - Executive Division, Section 9, I am requesting your concurrence in my appointment of Julie Alexander to the position of Deputy Treasurer, effective April 26, 2024. Based on Ms. Alexander's extensive knowledge, training and experience in the Treasurer's Office, I am requesting her starting full-time salary for the Deputy Treasurer position to be \$80,766.40. This salary is according to the current and approved Appointees wage schedule, with the understanding that all benefits as previously approved by the Council for other appointed positions within the City will also be extended to this position. There is sufficient funding in the Treasurer's budget to fill this necessary and critical position in the Treasurer's Office. Thank you for your consideration.

PREFERRED COUNCIL RECOMMENDATION/RESOLUTION (Please complete this field. Attachments are not to be used in lieu of the recommendation)

To approve the appointment of Deputy Treasurer as requested.

ATTACHMENTS

None

APPROVED BY

Susan Nash, City Treasurer

Date: April 04, 2024

