PLANNING COMMISSION MEETING

LOCATION: TOWNSHIP ANNEX, 7527 HIGHLAND ROAD, WHITE LAKE, MI 48383
THURSDAY, MARCH 07, 2024 – 6:30 PM

White Lake Township | 7525 Highland Rd | White Lake, MI 48383 | Phone: (248) 698-3300 | www.whitelaketwp.com

AGENDA

1. **CALL TO ORDER**
2. **ROLL CALL**
3. **PLEDGE OF ALLEGIANCE**
4. **APPROVAL OF AGENDA**
5. **APPROVAL OF MINUTES**
   A. February 1, 2024
6. **CALL TO THE PUBLIC (FOR ITEMS NOT ON THE AGENDA)**
7. **PUBLIC HEARING**
   A. 9101 Highland - Rezoning Request
   Location: Property described as 9101 Highland Road, identified as parcel number 12-23-227-003, located south of Highland Road, west of Sunnybeach Boulevard, consisting of approximately 5.02 acres.
   Request: **Applicant requests to rezone the parcel from R1-C (Single Family Residential) to GB (General Business) or any other appropriate zoning district.**
   Applicant: Affinity 10 Investments, LLC
8. **CONTINUING BUSINESS**
   A. Master Plan Final Review
9. **NEW BUSINESS**
   A. Discussion of draft zoning ordinance amendments
10. **OTHER BUSINESS**
    A. Election of Officers
11. **LIAISON'S REPORT**
12. **DIRECTOR'S REPORT**
13. **COMMUNICATIONS**
14. **NEXT MEETING DATE:** April 4, 2024
15. **ADJOURNMENT**

Procedures for accommodations for persons with disabilities: The Township will follow its normal procedures for individuals with disabilities needing accommodations for effective participation in this meeting. **Please contact the Township Clerk's office at (248) 698-3300 X-164 at least two days in advance of the meeting.** An attempt will be made to make reasonable accommodations.

WHITE LAKE TOWNSHIP
PLANNING COMMISSION
FEBRUARY 1, 2024

CALL TO ORDER
Chairperson Seward called the meeting to order at 6:30 P.M.

ROLL CALL
Present:
Scott Ruggles, Township Board Liaison
T. Joseph Seward, Chairperson
Steve Anderson
Merrie Carlock, Vice Chairperson
Mona Sevic

Absent:
Debby Dehart
Pete Meagher
Matt Slicker
Robert Seeley

Others:
Sean O'Neil, Community Development Director
Justin Quagliata, Staff Planner
John Iacoangeli, BRI
Michael Leuffgen, DLZ
Hannah Kennedy-Galley, Recording Secretary

Chairperson Seward welcomed Commissioner Sevic to the Planning Commission.

APPROVAL OF AGENDA

Commissioner Anderson wanted to postpone the election of officers until more Commissioners were in attendance.

MOTION by Commissioner Anderson, seconded by Commissioner Carlock to approve the agenda as amended. The motion carried with a voice vote: (5 yes votes).

APPROVAL OF MINUTES
A. December 7, 2023

MOTION by Commissioner Anderson, seconded by Commissioner Ruggles to approve the minutes of December 7, 2023 as presented. The motion carried with a voice vote: (5 yes votes).

CALL TO THE PUBLIC (FOR ITEMS NOT ON THE AGENDA)

John Hunt, 871 Oxhill Drive, wanted to know how an individual would be appointed to serve on the Planning Commission.

Steve Widdet, 4639 Coastal Parkway, had concerns about the road junction near Andersonville Road.

Chairperson Seward closed the call to the public 6:38 P.M.

PUBLIC HEARING

A. Six Lakes/ The Filling Station Rezoning Request
Location: Three parcels totaling approximately 0.64 acre in size located at the northeast corner of Cooley Lake Road and Round Lake Road.
Request:
Parcel Number 12-35-476-004 (9266 Cooley Lake Road) is approximately 0.31 acre in size and currently zoned LB (Local Business). David Toma is requesting to **rezone the parcel to GB (General Business).**
Parcel Number 12-35-476-021 (9260 Cooley Lake Road) is approximately 0.11 acre in size and currently zoned LB. Stacy Orosz is requesting to **rezone the parcel to GB.**
Parcel Number 12-35-476-050 (no address) is approximately 0.22 acre in size and currently zoned NB-O (Neighborhood Business Office). Stacy Orosz is requesting to **rezone the parcel to GB.**
Applicants: David Toma, Stacy Orosz

Director O'Neil briefly went over the applicant's request.

Commissioner Ruggles asked staff if RB (Restricted Business) allowed for outdoor seating. Director O'Neil said no, but staff was considering adding it to the district via amendment. Director O'Neil said there were a few businesses during COVID that were utilizing outdoor seating and can no longer due to their zoning. The alternative was having benches or seating where people could eat carry out meals. Food service was prohibited without a special land use.

Commissioner Anderson asked staff if enforcement had spurred the rezoning request. Director O'Neil said no, it was due to the Filling Station's request for a liquor license, and it was recommended that the Filling Station rezone along with Six Lakes, to allow the properties to conform to a land use standpoint. Rezoning would also protect the landowners in case of a natural disaster. The current properties zoning was legal non-conforming in a land use aspect. If a weather event caused a major structural rebuild or repair to the properties, the businesses would be able to rebuilt with their current uses under the new appropriate zoning.

Stacy Orosz, Filling Station, was present to speak on behalf of her request. She was concerned with the staff's recommendation of RB (Restricted Business) due to the prohibition of outdoor seating. Six to eight tables outside was imperative in her opinion. She was unaware of the recommendation of RB (Restricted Business) until this evening.

Staff Planner Quagliata clarified even with the recommendation of a GB (General Business) approval, a special land use application would need to be applied for and approved as well.

Ms. Orosz stated she was told that no outdoor seating of any kind was allowed. She stated that the previous tenant had outdoor seating. Director O'Neil said the previous tenant did not utilize the outdoor seating to the same capacity the current tenant would utilize.

Staff Planner Quagliata stated that the zoning would run with the land.

Ms. Orosz said the plan was to serve self-made cider and possibly wine.

Commissioner Ruggles asked Ms. Orosz if she was leasing the building. Ms. Orosz confirmed.

David Toma, applicant, was present to speak on behalf of his request. He said he had no idea that their zoning was legal non-compliant. He said he wanted the GB (General Business) zoning on his property. He worked a lot of hours and said he wanted the zoning to be made easier for his property.

Chairperson Seward opened the public hearing at 7:21 P.M. Seeing none, he closed the public hearing at 7:21 P.M.

Commissioner Anderson said he understood the request in regards to the livelihoods of the businesses.

Commissioner Carlock said she was uncomfortable voting for the GB (General Business) zoning due to the proximity of the residential neighborhoods.

Commissioner Ruggles said he didn't personally have an issue with GB (General Business) zoning.

MOTION by Commissioner Anderson, seconded by Commissioner Ruggles to recommend the Board rezone parcel numbers 12-35-476-004, 12-35-476-021, and 12-35-476-050 to RB (Restricted Business), subject to all comments from staff and the Planning Commissioners. The motion carried with a voice vote: (5 yes votes).

B. Ginko Self-Storage
Location: located on the north side of White Lake Road, west of Old White Lake Road, consisting of 2.14 acres.
Currently zoned Light Manufacturing (LM). Identified as vacant parcel 12-01-127-004
Request: **Preliminary site plan and special land use approval**
Applicant: Ginko Investments, LLC

Staff Planner Quagliata gave a brief summary of the applicant's plan and special land use application.

Commissioner Sevic asked staff why the 24/7 hours were prohibited. Staff Planner Quagliata said the ordinance allowed for the Township to dictate operating hours, and staff felt the recommended hours of operation was appropriate. The subject site was close to residential neighborhoods and that was also taken into account.

Commissioner Ruggles asked staff if the lighting would turn off during the off hours. Staff Planner Quagliata said it would be a condition of final site plan, when the prometric plans were submitted.

Commissioner Carlock asked staff how many variances the applicant would be request. Staff Planner Quagliata said there was two required variances for landscape buffering.

Mr. Leuffgen briefly went over his engineering review.

Jim Butler, 1849 Round Run, was present to speak on behalf of the applicant. The buildings would be architectural and low level. He said the variances were needed due to the topography of the lot.

Chairperson Seward opened the public hearing at 7:48 P.M.

Mark Kuenzel, 4558 Coast Parkway, was concerned in regards to the landscaping and lighting.

Steve 4639 Coastal Parkway, wanted to know if there was an ordinance that measured upwards and sideways lighting.

Bob Smith, 4586 Coastal Parkway, was concerned with proposed gate and if the storage was heated.

Chairperson Seward closed the public hearing at 7:56 P.M.

Mr. Butler said the gate would be operated electronically through an app, there would not be a full-time operator of the gate. The storage would not be climate controlled.

MOTION by Commissioner Anderson, seconded by Commissioner Carlock, to recommend approval to the Township Board for the preliminary site plan submitted by Ginko Investments, LLC for parcel number 12-01-127-004, subject to the comments of staff and engineering and approval from the ZBA. The motion carried with a voice vote: (5 yes votes).

MOTION by Commissioner Anderson, seconded Commissioner Sevic to approve the special land use application submitted by Ginko Investments, LLC, for parcel number 12-01-127-004, subject to addressing all comments from staff and engineering and the business being closed daily from 10 P.M. to 6:00 A.M. The motion carried with a voice vote: (5 yes votes).

CONTINUING BUSINESS
None.

NEW BUSINESS
None.

OTHER BUSINESS

A. Lakepointe - Final site plan extension request

Staff Planner Quagliata briefly went over the extension request.

Commissioner Carlock asked staff Lakepointe was dependent on West Valley for utilities. Staff Planner Quagliata confirmed, as was the neighboring Comfort Care project.

Jason Emerine, Seiber Keast Lerhner, said the utility plans have been coordinated with all the parties and all three of the sites. Mr. Leuffgen said the if all went as planned; the loop would work out well for all.

Chairperson Seward asked Mr. Emerine what had happened since the extension was granted in August. Mr. Emerine said the soil erosion permit was approved, and he was waiting on the same permit to be approved for West Valley. The EGLE permits were submitted and returned back with comments to revise; Mr. Emerine added he received the permit back yesterday. Lakepointe was good on a sanitary sewer perspective, just waiting on the permit from the Township. He was awaiting comments from OCRC for both projects.

Director O'Neil said if the project still had support and the land use remained the same, it would be easiest to give an extension. The intent to move ahead was there; the timing was not there at this point.

Chairperson Seward asked staff if there was still a need to "babysit" the project. Director O'Neil said the team was moving along at a better pace than previously.

Chairperson Seward asked staff if it was realistic if a six-month extension would lead to shovels in the ground. Michael Furnari, developer, said yes, and he was engaged with his attorney to revised the planned development agreement. His intention was to break ground on his project this year.

Commissioner Ruggles said he was excited to see Lakepointe move forward and would be voting for the extension.

MOTION by Commissioner Ruggles, seconded by Commissioner Sevic to approve Lakepointe's final site plan extension request for six months, to expire July 7, 2024. The motion carried with a voice vote: (5 yes votes).

The Planning Commission took recess at 8:24 P.M. The Planning Commission returned from recess at 8:30 P.M.

B. Master Plan Update

John Iacoangeli, BRI, said he reviewed all the comments relative to the Open House and Oakland County. He wanted to discuss the concept plans and their density and intensity. He spoke with staff and based on their input, wanted to discuss text versus imagery. The biggest areas of concern was the Cedar Island/Bogie Lake area. The concept was re-visioned as primarily residential in character, with a pocket of commercial use. The commercial use would be limited to LB (Local Business), to eliminate drive throughs. The Lakes Town Center concept was reviewed due to comments regarding density. The concept was redesigned as a mixed use "village" concept. The comments were taken seriously, and each of the concepts were reprogrammed to take comments and concerns into account.

Mr. Iacoangeli said a final draft should be ready by the next Planning Commission meeting. Director O'Neil said the next Planning Commission meeting would most likely be March 7. Director O'Neil asked if the Planning Commissioners wanted to review the draft on March 7 before holding the public hearing on March 21 or April 4, or to hold the public hearing on March 7.

The Planning Commission came to the consensus of reviewing the final draft at the March 7 meeting, and then holding the public hearing on March 21 or April 4.

LIAISON'S REPORT

The Township Board met last month. The Fire Department recognized several firefighters with awards. Cemetery sexton services were approved until 2026. Alpine Valley was awarded a fireworks permit. The second reading of the fee ordinance was approved.

The Parks Committee would meet this month and discuss upcoming projects at Stanley Park and Triangle Trail.

DIRECTOR'S REPORT

There would be a rezoning for Calvary Lutheran Church scheduled for March 7 for a retail land use. West Valley could potentially be on the same agenda for final site plan approval.

COMMUNICATIONS

None.

NEXT MEETING DATE: March 7, 2024

ADJOURNMENT

MOTION by Commissioner Carlock, seconded by Commissioner Anderson, to adjourn at 9:05 P.M. The motion carried with a voice vote: (5 votes).

Director's Report

Project Name: 9101 Highland

Description: Rezoning Request

Date on Agenda this packet pertains to: March 7th, 2024

☒Public Hearing

☒Initial Submittal

☐Revised Plans

☐Preliminary Approval

☐Final Approval

☐Special Land Use

☒Rezoning

☐Other:_____

Contact	Consultants & Departments	Approval	Denial	Approved w/Conditions	Other	Comments
Sean O'Neil	Community Development Director	☐	☐	☐	☒	Based on comments from the Staff Planner
Justin Quagliata	Staff Planner	☒	☐	☐	☐	See letter dated 02/16/2024

WHITE LAKE TOWNSHIP
PLANNING COMMISSION

REPORT OF THE
COMMUNITY DEVELOPMENT DEPARTMENT

TO: **Planning Commission**

FROM: **Sean O'Neil, AICP, Community Development Director**

Justin Quagliata, Staff Planner

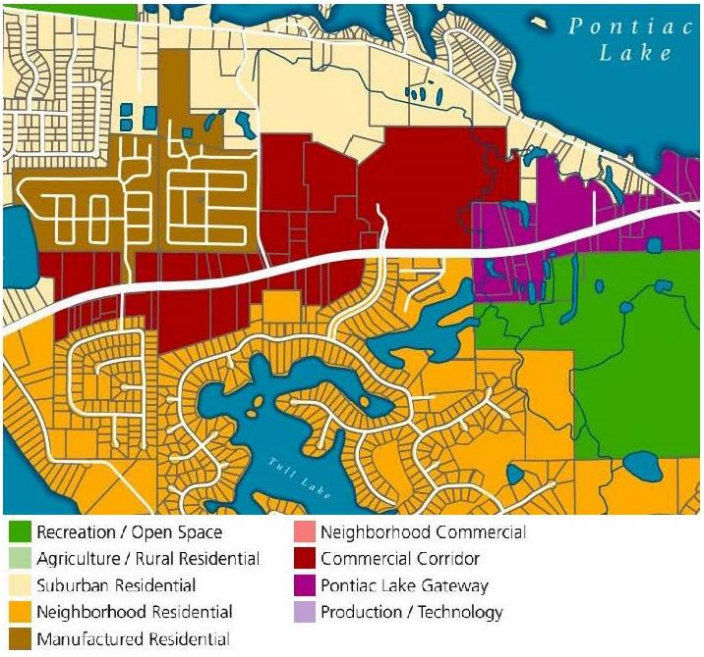
DATE: **February 16, 2024**

RE: **9101 Highland Road (Parcel Number 12-23-227-003)**
Rezoning – Review #1

Affinity 10 Investments, LLC (Tom Hannawa) has requested the rezoning of approximately five acres located at 9101 Highland Road from R1-C (Single-Family Residential) to GB (General Business). The site is located on the south side of Highland Road, west of Sunnybeach Boulevard and contains approximately 458.4 feet of frontage on Highland Road.

The Future Land Use Map from the draft 2024 Master Plan designates the subject site in the Commercial Corridor category, which is intended to provide regional goods and services (such as large box-stores and drive-thrus) to residents and non-residents.

DRAFT 2024 FUTURE LAND USE MAP

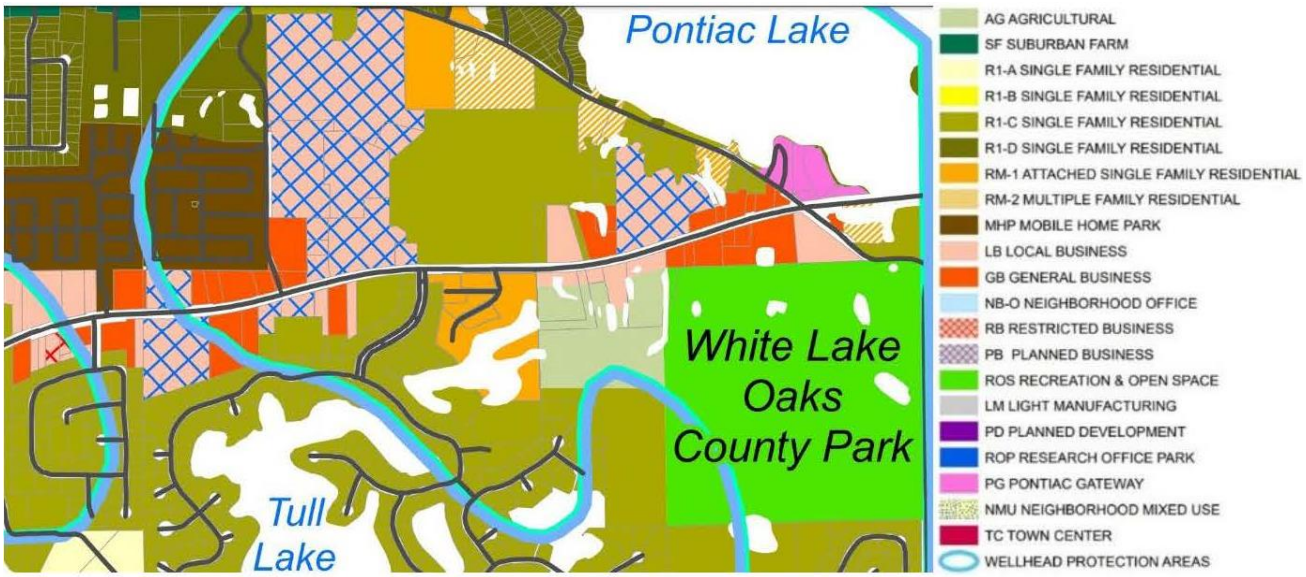


Zoning

The subject site is currently zoned R1-C, which requires a minimum of 100 feet of lot width and 16,000 square feet of lot area. The requested GB zoning district requires a minimum of 200 feet of lot width and one (1) acre of lot area. With approximately 458.4 feet of lot width on Highland Road and five acres of lot area, the site meets the minimum standards for both lot area and lot width of the existing and proposed zoning districts. The following table illustrates the lot width and lot area standards for the existing R1-C and proposed GB zoning districts:

ZONING DISTRICT	LOT WIDTH	LOT AREA
R1-C	100 feet	16,000 square feet
GB	200 feet	1 acre

ZONING MAP



Physical Features

The former Calvary Lutheran Church building and its associated parking lot occupy the property, as well as a community garden. Topography of the site is generally level. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wetland Map and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map indicate neither wetlands nor floodplain are present on or near the site.

Access

The site fronts on Highland Road, which along the property is a five-lane road (two lanes in each direction and a center turn lane).

Utilities

Municipal water and sanitary sewer are available to serve the site. The location and capacity of utilities for any proposed development will be reviewed in detail by the Township Engineering Consultant at the time of a development submittal.

Staff Analysis

In considering any petition for an amendment to the zoning map, the Planning Commission and Township Board must consider the following criteria from Article 7, Section 13 of the Zoning Ordinance in making its findings, recommendations, and decision:

A. *Consistency with the goals, policies and future land use map of the White Lake Township Master Plan, including any subarea or corridor studies. If conditions have changed since the Master Plan was adopted, the consistency with recent development trends in the area.* The Future Land Use Map from the draft 2024 Master Plan designates the subject site in the Commercial Corridor category, which aligns with the proposed GB zoning district.

B. *Compatibility of the site's physical, geological, hydrological and other environmental features with the host of uses permitted in the proposed zoning district.* If the property is rezoned to GB, it would not directly or indirectly have a substantial adverse impact on the natural resources of the Township.

C. *Evidence the Applicant cannot receive a reasonable return on investment through developing the property with one (1) of the uses permitted under the current zoning.* While no such evidence has been submitted, the property is five acres in size and located in a commercial corridor on Highland Road (M-59) with access to municipal water and sanitary sewer. It is reasonable to request commercial zoning on this type of property.

D. *The compatibility of all the potential uses allowed in the proposed zoning district with surrounding uses and zoning in terms of land suitability, impacts on the environment, density, nature of use, traffic impacts, aesthetics, infrastructure and potential influence on property values.* The majority of the permitted and special land uses in the GB district are compatible with the surrounding uses and the nature of the uses anticipated in the Township Master Plan. Only the Township Assessor may provide comment on property values.

E. *The capacity of Township utilities and services sufficient to accommodate the uses permitted in the requested district without compromising the "health, safety and welfare" of the Township.* The site is in an area intended to be serviced by public water and sanitary sewer. The Community Development Department defers to the Director of Public Services and Township Engineering Consultant on this matter.

F. The capability of the street system to safely and efficiently accommodate the expected traffic generated by uses permitted in the requested zoning district. A traffic impact study (TIS) has been submitted. For the purpose of this rezoning application, the information provided is sufficient. The TIS describes existing traffic conditions and compares the potential trip generation of the site's use under the existing and proposed zoning classifications. **If the rezoning is approved, prior to submitting a site plan review / special land use application a revised TIS shall be submitted to include Highland Road (M-59) and Sunnybeach Boulevard as a study intersection. Additionally, the site trip generation shall be revised to include potential trip generation based on two drive-thru restaurants, not one (a pick-up window (shown on the submitted concept plan) shall be calculated as a drive-thru restaurant). Also, AM peak hour trips shall be included for one of the two fast-casual restaurants (the TIS states the two potential fast-casual restaurants will not have breakfast service; however, this is an assumption and not indicative of how the proposed restaurants may be used if developed). Note when completing a full evaluation of the TIS during site plan review additional information or revisions may be required.**

G. The apparent demand for the types of uses permitted in the requested zoning district in relation to the amount of land in the Township currently zoned and available to accommodate the demand. Evidence of the demand in the Township for additional retail commercial uses has not been submitted. However, the location is appropriate for property zoned GB, given the traffic, residential units, and general density in the area.

H. The boundaries of the requested rezoning district are reasonable in relationship to its surroundings, and construction on the site will be able to meet the dimensional regulations for the zoning district listed in the Schedule of Regulations. The subject site is located in a commercial corridor on Highland Road (M-59). The Applicant provided a concept plan showing two multi-tenant buildings on the site: the west building is 7,334 square feet in size and the east building is 6,542 square feet in size. The easterly unit in each building contains a drive-thru restaurant and each building has a patio in front; drive-thru restaurants and outdoor dining require special land use approval from the Planning Commission. Parking is shown on all sides of the buildings, with one driveway accessing Highland Road near the center of the site. The Applicant did not volunteer conditions on the rezoning related to the concept plan. Site plan review and approval would be required from the Planning Commission and Township Board to construct the buildings. The concept plan is not under consideration by the Township, and it has not been reviewed for compliance with applicable Zoning Ordinance requirements. Other factors that may impact future development of the site, such as, but not limited to, soils, topography, site layout, landscape and screening, stormwater/drainage, and utilities would be considered at the time of a development proposal.

I. The requested zoning district is considered to be more appropriate from the Township's perspective than another zoning district. The uses allowed in the GB district are appropriate for the site.

J. If the request is for a specific use, is rezoning the land more appropriate than amending the list of permitted or special land uses in the current zoning district to allow the use? Rezoning would be the most appropriate way to allow for the proposed use. Amending the R1-C zoning district to allow retail commercial uses and drive-thru restaurants would not be advised.

K. The requested rezoning will not create an isolated and unplanned spot zone. The site is surrounded by R1-C (Single-Family Residential) zoning to the east and south, LB (Local Business) zoning to the west, and PB (Planned Business) zoning to the north.

L. The request has not previously been submitted within the past one (1) year, unless conditions have changed or new information has been provided. This request is a new application.

M. An offer of conditions submitted as part of a conditional rezoning request shall bear a reasonable and rational relationship to the property for which rezoning is requested. This standard is not applicable.

N. Other factors deemed appropriate by the Planning Commission and Township Board. The Planning Commission and Township Board could also consider other factors which may be relevant to the rezoning request.

Planning Commission Options

The Planning Commission may recommend approval or denial of the rezoning request, or it may recommend a different zoning designation than proposed by the Applicant to the Township Board. **The proposed rezoning is compatible with the draft 2024 Master Plan and surrounding land uses. Staff recommends approval of the rezoning from R1-C to GB.**

CHARTER TOWNSHIP OF WHITE LAKE
COMMUNITY DEVELOPMENT DEPARTMENT
7525 Highland Road, White Lake, Michigan 48383-2900
248-698-3300, Ext. 163

APPLICATION TO REZONE PROPERTY

Date: 01/17/2024

Applicant: Affinity 10 Investment LLC

Address: 4512 South Shore Street, Waterford MI 48328

Phone No.: 248-361-1666 **Fax No.:** _____

E-mail: Thomashannawa@gmail.com

Applicant's Interest in Property: LOI to purchase

Property Owner: Calvary Evangelical Lutheran Church of Clarkston

Owner's Address: 6805 Bluegrass Dr, Clarkston MI 48346

Phone No.: _____ **Fax No.:** _____

Location of Property: 9101 Highland Road

Sidwell No(s).: 12-23-227-003

Total area of change: 5.02 **acres**

I, the undersigned (owner, attorney, or option holder) hereby request that this property now classified as R1-C (Single Family Residential) **District, be reclassified as** GB (General Business) **District.**

Applicant's Signature: _____
(If owner does not sign application, attach letter signed by owner, requesting zoning change.)

Please Print Name: Tom Hannawa

Required Attachments:

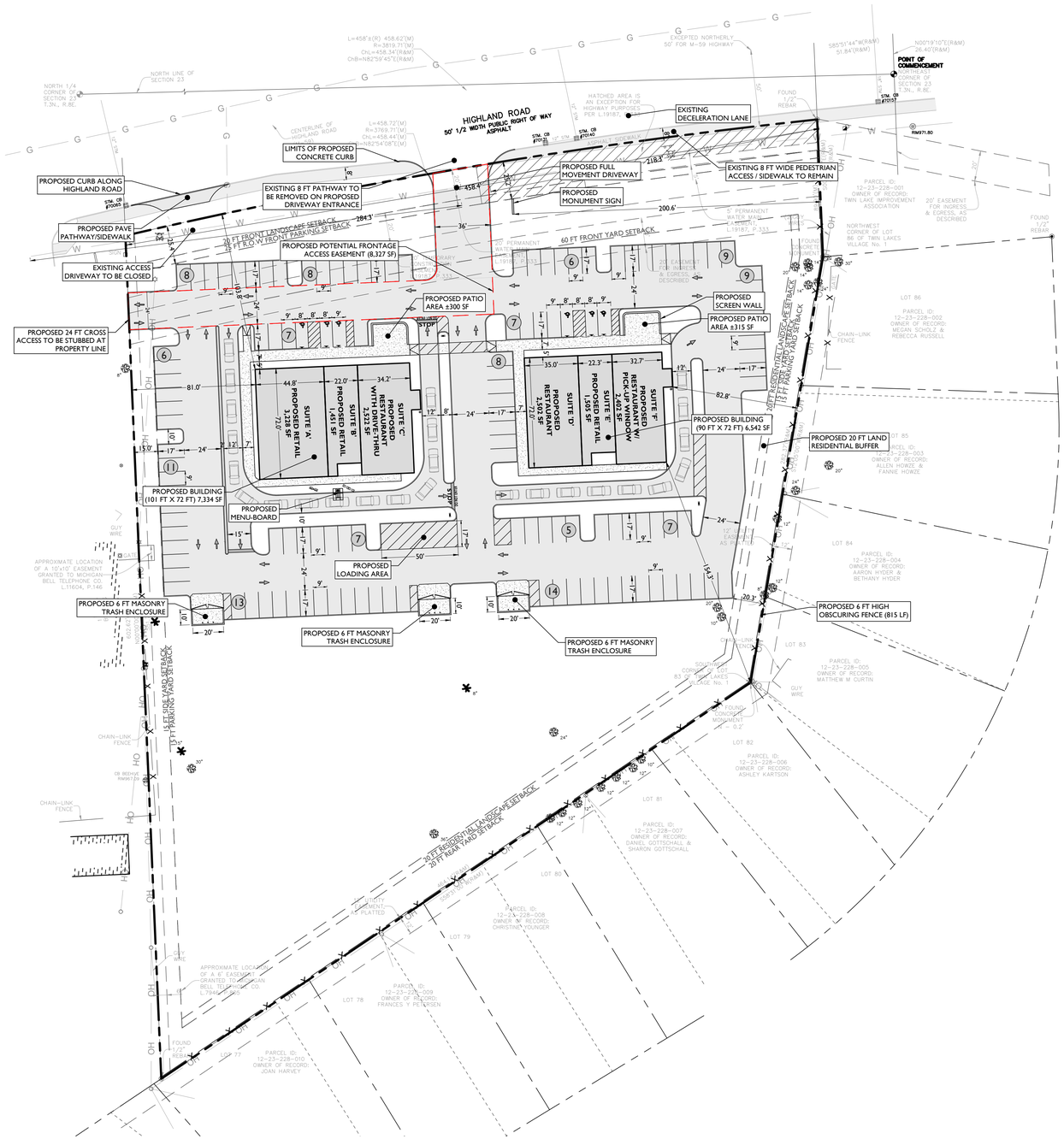
X **1.** **Legal description of the property proposed to be rezoned.**

X **2.** **Location map**

X **3.** **Rezoning sign location map**

X **4.** **Statement indicating why change is requested**

X **5.** **Review fee (check payable to the Charter Township of White Lake)**



SOURCE: USGS MAPPING SYSTEM

LOCATION MAP

SCALE: 1" = 2,000'±

SYMBOL	DESCRIPTION
▬ ▬ ▬	PROPERTY LINE
— — —	SETBACK LINE
═	PROPOSED CURB
⊸ ⊙ ○	PROPOSED SIGNS / BOLLARDS
▨	PROPOSED BUILDING
◻	PROPOSED CONCRETE
▬	PROPOSED RETAINING WALL
—×—×—	PROPOSED OBSCURING FENCE

LAND USE AND ZONING

PID:12-23-227-003

EXISTING ZONE: R1-C SINGLE FAMILY RESIDENTIAL

REZONED TO GENERAL BUSINESS DISTRICT (GB)

PROPOSED USE	
RESTAURANT OR FAST FOOD	PERMITTED USE
DRIVE-THRU WINDOW	SPECIAL LAND USE
RETAIL STORE	PERMITTED USE

ZONING REQUIREMENT	REQUIRED	PROPOSED
MINIMUM LOT AREA	1 AC	195,568 SF (4.5 AC)
MINIMUM LOT WIDTH	200 FT	458.4 FT
MAXIMUM BUILDING HEIGHT	35 FT (2 STORIES)	<35 FT (1 STORY)
MINIMUM FRONT YARD SETBACK	60 FT(1)	103.8 FT
MINIMUM SIDE YARD SETBACK (ONE)	15 FT	81.0 FT
MINIMUM SIDE YARD SETBACK (BOTH)	20 FT	163.8 FT
MINIMUM REAR YARD SETBACK	20 FT	154.3 FT
MINIMUM DRIVEWAY FROM RESIDENTIAL	200 FT (1)	218.3 FT
MINIMUM FRONT LANDSCAPE SETBACK	20 FT	25.4 FT
MINIMUM R.O.W PARKING SETBACK	25 FT(2)	25.4 FT
INTERIOR LANDSCAPING AREA	15% (29,335 SF)	>15%
MINIMUM DRIVEWAY SPACING (HIGHLAND ROAD)	455 FT	±284.3 FT TO WEST (V)
TRASH ENCLOSURE SETBACK	FRONT LOT LINE(3)	REAR YARD
MINIMUM SIDE PARKING SETBACK	15 FT	15.0 FT

(V) VARIANCE

(1) REQUIREMENT FOR RESTAURANT WITH DRIVE-THRU

(2) NO PARKING STALL SHALL BE LOCATED ADJACENT TO R.O.W LINE , STREET EASEMENT OR SIDEWALK WHICHEVER IS CLOSER

(3) NO ENCLOSURES SHALL BE PERMITTED CLOSER TO THE FRONT LOT LINE THAN THE PRINCIPAL BUILDING

OFF-STREET PARKING REQUIREMENTS

CODE SECTION	REQUIRED	PROPOSED
§ 5.11.M	FAST FOOD PARKING: 1 SPACE PER 75 OF GFA (2,522 SF +2,402 SF) =4,924 SF (4,924 SF)(1 SPACES/ 75 SF)= 66 SPACES RESTAURANT PARKING: 1 SPACE PER 100 SF OF GFA (2,502 SF)(1 SPACE/100 SF)= 25 SPACES RETAIL PARKING: 1 SPACE PER 200 SF OF GFA (3,228 SF + 1,451 SF + 1,505 SF)=6,184 SF (6,184 SF)(1 SPACE/200 SF)= 31 SPACES **TOTAL: 66 + 25 + 31= 122 SPACES**	**125 SPACES**
§ 5.11.M	STACKING SPACES (WEST FAST FOOD): 8 STACKING CARS (9 FT X 18 FT)	15 SPACES (12 FT X 20 FT)
§ 5.11.M	STACKING SPACES (EAST FAST FOOD): 8 STACKING CARS (9 FT X 18 FT)	10 SPACES (12 FT X 20 FT)
§ 5.11.Q	90° PARKING: 9 FT X 18 FT WITH 24 FT AISLE (1)	9 FT X 17 FT W/ 24 FT AISLE
§ 5.19	LANDSCAPE REQUIREMENT: 20 FT WIDTH ALONG RESIDENTIAL 3 FT HIGH BERM WITH A 2 FT CROWN	PROVIDED
§ 5.11.P.1	LOADING AREA: 10 FT X 50 FT WITH 15 FT CLEARANCE	17 FT X 50 FT

(1) PARKING SPACE LENGTH MAY BE REDUCED TO 17 FT WHERE 7 FT SIDEWALK OR LANDSCAPE IS PROVIDED

SIGNAGE REQUIREMENTS

CODE SECTION	REQUIRED	PROPOSED
§5.9.J.1.B	MULTI-TENANT SIGN HEIGHT: 15 FT(2)(3)	<15 FT
§5.9.J.1	SIGN AREA: 6 SF PER 1 FT OF SETBACK	<150 SF
§5.9.J.1	MAXIMUM SIGN AREA: 150 SF(1)	<150 SF
§5.9.J.1.A	SIGN SETBACK: 10 FT	25.2 FT
§5.9.J.1.A	RESIDENTIAL SETBACK: 100 FT	200.6 FT

(1) MAXIMUM SIGN AREA SHALL NOT INCLUDE DECORATIVE ELEMENTS SUCH AS BASES, COLUMNS OR CAPS

(2) MINIMUM HEIGHT OF A SIGN BASE SHALL NE 2 FT IN HEIGHT

(3) EACH INDIVIDUAL TENANT SIGN SHALL NOT EXCEED 4 FT IN HEIGHT

GENERAL NOTES

1. 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.
2. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND ENSURE THAT ALL REQUIRED APPROVALS HAVE BEEN OBTAINED PRIOR TO THE START OF CONSTRUCTION. COPIES OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS STONEFIELD ENGINEERING & DESIGN, LLC. AND IT'S SUB-CONSULTANTS FROM AND AGAINST ANY DAMAGES AND LIABILITIES INCLUDING ATTORNEY'S FEES ARISING OUT OF CLAIMS BY EMPLOYEES OF THE CONTRACTOR IN ADDITION TO CLAIMS CONNECTED TO THE PROJECT AS A RESULT OF NOT CARRYING THE PROPER INSURANCE FOR WORKERS COMPENSATION, LIABILITY INSURANCE, AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE.
4. 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.
5. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
6. 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.
7. 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 CONTRACTORS EXPENSE.
8. 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.
9. THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
10. 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.
11. THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
12. 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.

40' 0' 40' 80'

GRAPHIC SCALE IN FEET

1" = 40'

ISSUE	DATE	BY	DESCRIPTION
1	11/292023	JRC/JP	SUBMISSION FOR REZONING

NOT APPROVED FOR CONSTRUCTION

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engineering & design
Detroit, MI · Rutherford, NJ · New York, NY
Boston, MA · Princeton, NJ · Tampa, FL
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607 Shelby Suite 200, Detroit, MI 48226
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SITE DEVELOPMENT PLANS

9101 HIGHLAND ROAD

PROPOSED MULTI-TENANT BUILDING

PARCEL ID:12-23-227-003
9101 HIGHLAND ROAD
WHITE LAKE TOWNSHIP
OAKLAND COUNTY, MICHIGAN

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

STONEFIELD
engineering & design

SCALE: 1" = 40'	PROJECT ID: DET-230229

TITLE:

SITE PLAN

DRAWING:

C-3

V:\DET\2023\DET-230229-AFFINITY 10 INVESTMENT-9191 HIGHLAND ROAD, WHITE LAKE, MI\CADD\PLOT\SDP-03-SITE.DWG

MEMO

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

VIA EMAIL: ewilliams@stonefieldeng.com

To:	**Stonefield Engineering**
From:	**Jacob Swanson, PE** **Paul Bonner, EIT** **Fleis & VandenBrink**
Date:	**January 11, 2024**
Re:	**9101 Highland Road (M-59) – Commercial Development** **White Lake Township, Michigan** **Traffic Impact Study**

1 INTRODUCTION

This memorandum presents the results of the Traffic Impact Study (TIS) for the proposed commercial development in White Lake Township, Michigan. The project site is generally located on the south side of Highland Road (M-59), approximately 1,000-feet east of Fisk Road, as shown on the attached **Figure 1**. The proposed commercial development includes construction of commercial development that includes retail and restaurant land uses. The project site is currently vacant and was previously occupied by the Calvary Lutheran Church, which will be razed with the construction of the proposed development. Site access is proposed via one (1) full access driveway on Highland Road (M-59). The study section of Highland Road (M-59) is under the jurisdiction of the Michigan Department of Transportation (MDOT). The purpose of this TIS is to evaluate the impact of the proposed development on the adjacent roadway network, as part of the site plan approval and driveway permitting processes.

Scope of work for this study was developed based on Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, accepted traffic engineering practices, and information published by the Institute of Transportation Engineers (ITE). Study analyses were completed using Synchro/SimTraffic (Version 11) traffic analysis software. Sources of data for this study include F&V subconsultant Quality Counts (QC), MDOT, the Road Commission for Oakland County (RCOC), White Lake Township, the Southeast Michigan Council of Governments (SEMCOG), and ITE.

2 BACKGROUND

2.1 EXISTING ROAD NETWORK

Lane uses and traffic control at the study intersections are shown on the attached **Figure 2** and study roadways are further described below. For purposes of this study, all minor street and driveways were assumed to have an operating speed of 25 miles per hour (mph), unless otherwise noted.

Highland Road (M-59) generally runs in the east / west directions, adjacent to the north side of the project site. The study section of roadway is classified as an *Other Principal Arterial*, is under the jurisdiction of MDOT, has a posted speed limit of 50-mph, and has an Average Annual Daily Traffic (AADT) volume of approximately 33,400 (MDOT 2022) vehicles per day (vpd). The study section of roadway provides a typical five-lane cross-section, with two (2) lanes of travel in each direction and a center two-way left-turn lane (TWLTL). At the signalized intersection with Fisk Road, Highland Road (M-59) widens to provide an exclusive eastbound right-turn lane. Additionally, Highland Road (M-59) widens to provide an exclusive westbound right-turn lane at the intersection with the JOANN Fabric driveway.

Fisk Road generally runs in the north / south directions, west of the project site, terminating at Highland Road (M-59). The study section of roadway is classified as a *Local Road*, is under the jurisdiction of RCOC, has an assumed prima facie speed limit of 55-mph, and has an AADT volume of approximately 1,256 vpd (MDOT 2022). The study section of Fisk Road provides typical three-lane cross-section, with one (1) lane of travel in each direction and a center two-way left-turn lane (TWLTL).

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2.2 EXISTING TRAFFIC VOLUMES

F&V subconsultant QC collected existing Turning Movement Count (TMC) data on Wednesday, December 13, 2023, during the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak periods at the following study intersections:

- Highland Road (M-59) & Fisk Road
- Highland Road (M-59) & JOANN Fabric Driveway

During collection of the turning movement counts, Peak Hour Factors (PHFs), pedestrian and bicycle volumes, and commercial truck percentages were recorded and used in the traffic analysis. The peak hours of each of the study intersections were utilized and the through volumes were carried through the roadway network and balanced upwards at the proposed site driveways. Therefore, traffic volumes used in the analysis and shown on the attached traffic volume figures may not match the raw traffic volumes shown in the data collection.

The weekday AM and PM peak hours for the adjacent roadway network were observed to generally occur between 7:30 AM to 8:30 AM and 4:15 PM to 5:15 PM, respectively. F&V collected an inventory of existing lane use and traffic controls, as shown on the attached **Figure 2**. F&V also obtained the current signal timing permit for the study intersection of Highland Road (M-59) & Fisk Road from MDOT. The existing 2023 peak hour traffic volumes used in the analysis are shown on the attached **Figure 3**. All applicable background data referenced in this memorandum are attached.

3 EXISTING CONDITIONS

Existing peak hour vehicle delays and Levels of Service (LOS) were calculated at the study intersections using Synchro/SimTraffic (Version 11) traffic analysis software. This analysis was based on the existing lane use and traffic control shown on the attached **Figure 2**, the exiting peak hour traffic volumes shown on the attached **Figure 3**, and methodologies presented in the *Highway Capacity Manual, 6th Edition* (HCM6).

Descriptions of LOS "A" through "F" as defined in the HCM6, are attached. Typically, LOS D is considered acceptable, with LOS A representing minimal delay, and LOS F indicating failing conditions. Additionally, SimTraffic network simulations were reviewed to evaluate network operations and vehicle queues. The results for the exiting conditions analysis are attached and shown in **Table 1**.

Table 1: Existing Intersection Operations

Intersection		Control	Approach	Existing Conditions			
				AM Peak		PM Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Highland Road (M-59) & Fisk Road	Signalized	EBL	14.0	B	53.1	D
			EBT	27.7	C	18.2	B
			EBR	14.7	B	11.0	B
			WBL	15.9	C	11.6	B
			WBTR	22.7	C	25.3	C
			NBL	25.1	C	47.9	D
			NBTR	22.3	C	38.0	D
			SBL	27.3	C	67.0	E
			SBTR	24.7	C	47.1	D
			Overall	**25.3**	**C**	**28.6**	**C**
2	Highland Road (M-59) & JOANN Fabric Drive	Stop (Minor)	EBL	10.8	B	17.2	C
			WB	Free			
			SB	12.2	B	40.6	E

The results of the existing conditions analysis indicates that all approaches and movements at the study intersections are currently operating acceptably, at LOS D or better, during both the AM and PM peak hours, with the following exceptions:

Highland Road (M-59) & Fisk Road

- During the PM peak hour: the southbound left-turn movement currently operates at LOS E.

Review of SimTraffic network simulations indicates generally acceptable operations. Occasional periods of vehicle queues were observed for this movement; however, the majority of vehicle queues were observed to be processed within each cycle length, leaving minimal residual vehicle queueing. Additionally, any remaining vehicle queues were observed to dissipate and were not present throughout the PM peak hour.

Highland Road (M-59) & JOANN Fabric Drive

- During the PM peak hour: the southbound approach currently operates at LOS E.

The southbound approach was designed to prohibit egress left-turns; however, the left-turn traffic from this approach is causing the reported delay. The total volume of southbound egress traffic during the PM peak hour is very low (3 vehicles), which includes two (2) vehicles making an egress left-turn movement. Additionally, although the delay experienced by these vehicles causes the approach to operate at LOS E, review of SimTraffic microsimulations indicates acceptable operations; the 95th percentile queue length reported for this approach was approximately 15-feet (~1 vehicle), which is not significant.

4 BACKGROUND CONDITIONS (2025)

Historical population and economic profile data was obtained for White Lake Township from the Southeast Michigan Council of Governments (SEMCOG) database, in order to calculate a background growth rate to project the existing 2023 peak hour traffic volumes to the site buildout year of 2025. Population and employment projections from 2020 to 2050 were reviewed and show average annual growth rates of 0.41% and 0.28%, respectively. Therefore, a conservative background growth rate of **0.5%** per year was applied to the existing peak hour traffic volumes to forecast the background 2025 peak hour traffic volume ***without the proposed development***, as shown on the attached **Figure 4**.

In addition to background growth, it is important to account for traffic that will be generated by approved developments within the study area that have yet to be constructed or are currently under construction. At the time of this study, no background developments were identified within the vicinity of the project site.

Background peak hour vehicle delays and LOS ***without the proposed development*** were calculated at the study intersections based on the existing lane use and traffic control shown on the attached **Figure 2**, the background peak hour traffic volumes shown on the attached **Figure 4**, and methodologies presented in the HCM6. The results of the background conditions analysis are attached and summarized in **Table 2**.

Table 2: Background Intersection Operations

Intersection		Control	Approach	Existing Conditions				Background Conditions				Difference			
				AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Highland Road (M-59) & Fisk Road	Signal	EBL	14.0	B	53.1	D	14.1	B	56.4	E	0.1	-	3.3	D→E
			EBT	27.7	C	18.2	B	28.1	C	18.3	B	0.4	-	0.1	-
			EBR	14.7	B	11.0	B	14.7	B	11.0	B	0.0	-	0.0	-
			WBL	15.9	C	11.6	B	16.0	C	11.8	B	0.1	-	0.2	-
			WBTR	22.7	C	25.3	C	22.9	C	25.8	C	0.2	-	0.5	-
			NBL	25.1	C	47.9	D	25.2	C	48.1	D	0.1	-	0.2	-
			NBTR	22.3	C	38.0	D	23.3	C	38.0	D	0.0	-	0.0	-
			SBL	27.3	C	67.0	E	27.3	C	67.6	E	0.0	-	0.6	-
			SBTR	24.7	C	47.1	D	24.7	C	47.4	D	0.0	-	0.3	-
			Overall	**25.3**	**C**	**28.6**	**C**	**25.6**	**C**	**29.0**	**C**	**0.3**	**-**	**0.4**	**-**
2	Highland Road (M-59) & JOANN Fabric Dr.	Stop (Minor)	EBL	10.8	B	17.2	C	10.9	B	17.4	C	0.1	-	0.2	-
			WB	Free				Free				N/A			
			SB	12.2	B	40.6	E	12.3	B	41.7	E	0.1	-	1.1	-

The results of the background conditions analysis indicates that all approaches and movements at the study intersections are expected to continue operating in a manner similar to the existing conditions analysis, with minor increases in delays and the following additional impacts to LOS:

Highland Road (M-59) & Fisk Road

- During the PM peak hour: The eastbound left-turn movement is expected to operate at LOS E.

Review of SimTraffic network simulations indicates generally acceptable operations. Occasional periods of vehicle queues were observed for the eastbound and southbound left-turn movements during the PM peak hour; however, the majority of vehicle queues were observed to be processed within 1-2 cycle length, leaving minimal residual vehicle queueing. Additionally, any remaining vehicle queues were observed to dissipate and were not present throughout the peak hour.

Review of SimTraffic microsimulations throughout the remaining study roadway network indicates acceptable operations and minimal vehicle queueing during both the AM and PM peak hours.

5 SITE TRIP GENERATION

The number of weekday peak hour (AM and PM) and daily vehicle trips that would be generated by the proposed development were calculated using the rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation, 11th Edition*. The proposed project includes a commercial development with retail and restaurant land uses. For purposes of this study the following land uses were assumed in the analysis: a coffee shop with drive-through, two (2) fast-casual restaurants, and retail space. Additionally, the two potential fast-casual restaurants will not have breakfast service; therefore, AM peak hour trips were not included for this land use. The site trip generation forecast utilized for this study is summarized in **Table 3**.

Table 3: Site Trip Generation Summary

Land Use	ITE Code	Amount	Units	Average Daily Traffic (vpd)	AM Peak Hour (vph)			PM Peak Hour (vph)		
					In	Out	Total	In	Out	Total
Strip Retail Plaza (<40k SF)	822	6,184	SF	491	9	6	15	28	27	55
Pass-By (0% AM, 40% PM)				*98*	*0*	*0*	*0*	*11*	*11*	*22*
New Trips				393	9	6	15	17	15	33
Fast Casual Restaurant	930	4,904	SF	476	0	0	0	34	28	62
Pass-By (0% AM, 43% PM)				*205*	*0*	*0*	*0*	*13*	*13*	*26*
New Trips				271	0	0	0	21	15	36
Coffee Shop with Drive-Through	937	2,522	SF	1,346	111	106	217	49	49	98
Pass-By (50% AM, 55% PM)				*707*	*54*	*54*	*108*	*27*	*27*	*54*
New Trips				639	57	52	109	22	22	44
Total Trips				**2,313**	**120**	**112**	**232**	**111**	**104**	**215**
Total Pass-By				*1,010*	*54*	*54*	*108*	*51*	*51*	*102*
Total New Trips				**1,303**	**66**	**58**	**124**	**60**	**53**	**113**

As is typical of commercial developments, a portion of the trips generated by the proposed development are from vehicles already on the adjacent roadway network that will pass the site on their way from an origin to their ultimate destination. Therefore, not all traffic at the site driveway is necessarily new traffic added to the street system. These trips are therefore reduced from the total external trips generated by a study site. This percentage of the trips generated by the development are considered “pass-by”, which are already present of the adjacent roadway network. The percentage of pass-by used in this analysis was determined based on the rates published by ITE in the *Trip Generation Manual, 11th Edition*.

6 SITE TRIP DISTRIBUTION

The vehicular trips that would be generated by the proposed development were assigned to the study roadway network based on the proposed stie access plan and driveway configurations, the existing peak hour traffic patterns in the adjacent roadway network, and methodologies published by ITE. The ITE trip distribution

methodology assumes that new trips will enter the network and access the development, then leave the development and return to their direction of origin, whereas pass-by trips will enter and exit the development in their original direction of travel. The stie trip distributions utilized in the analysis are summarized in **Table 4**.

Table 4: Site Trip Distribution

New Trips				Pass-By Trips		
AM	**PM**	**To/From**	**Via**	**Direction**	**AM**	**PM**
7%	12%	North	Fisk Road			
40%	52%	East	Highland Road (M-59)	Westbound	42%	56%
53%	36%	West	Highland Road (M-59)	Eastbound	58%	44%
100%	**100%**	**Total**			**100%**	**100%**

The vehicular traffic volumes shown in **Table 3** were distributed to the study roadway network according to the distribution shown in **Table 4**. Therefore, the site generated trips shown on the attached **Figure 5** were added to the background peak hour traffic volumes shown on the attached **Figure 4**, in order to calculate the future peak hour traffic volumes, with the addition of the proposed development. Future peak hour traffic volumes are shown on the attached **Figure 6**.

7 FUTURE CONDITIONS (2025)

Future peak hour vehicle delays and LOS ***with the addition of the site-generated trips from the proposed development***, were calculated based on the proposed lane use and traffic controls shown on the attached **Figure 2**, the future peak hour traffic volumes shown on the attached **Figure 6**, and the methodologies presented in the HCM6. Results of the future conditions analysis are attached and summarized in **Table 5**.

Table 5: Future Intersection Operations

Intersection		Control	Approach	Background Conditions				Future Conditions				Difference			
				AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Highland Road (M-59) & Fisk Road	Signal	EBL	14.1	B	56.4	E	14.4	B	60.0	E	0.3	-	3.6	-
			EBT	28.1	C	18.3	B	29.4	C	18.5	B	1.3	-	0.2	-
			EBR	14.7	B	11.0	B	14.7	B	11.0	B	0.0	-	0.0	-
			WBL	16.0	C	11.8	B	16.5	C	12.0	B	0.5	-	0.2	-
			WBTR	22.9	C	25.8	C	23.5	C	26.5	C	0.0	-	0.0	-
			NBL	25.2	C	48.1	D	25.2	C	48.1	D	0.0	-	0.0	-
			NBTR	23.3	C	38.0	D	23.3	C	38.0	D	0.0	-	0.0	-
			SBL	27.3	C	67.6	E	27.5	C	70.3	E	0.2	-	2.7	-
			SBTR	24.7	C	47.4	D	24.7	C	47.4	D	0.0	-	0.0	-
			Overall	**25.6**	**C**	**29.0**	**C**	**26.5**	**C**	**29.8**	**C**	**0.9**	**-**	**0.8**	**-**
2	Highland Road (M-59) & JOANN Fabric Dr.	Stop (Minor)	EBL	10.9	B	17.4	C	11.0	B	17.8	C	0.1	-	0.4	-
			WB	Free				Free				N/A			
			SB	12.3	B	41.7	E	12.5	B	43.3	E	0.2	-	1.6	-
3	Highland Road (M-59) & Site Drive	Stop (Minor)	EB	N/A				Free				N/A			
			WBL					10.5	B	10.4	B				
			NB					21.7	C	33.1	D				

Results of the future conditions analysis indicate that all approaches and movements at the study intersections are expected to continue operating in a manner similar to the background conditions analysis, with minor increases in delays and no additional impacts to LOS. Additionally, the proposed site driveway is expected to operate acceptably, at LOS D or better during both the AM and PM peak hours.

8 ACCESS MANAGEMENT

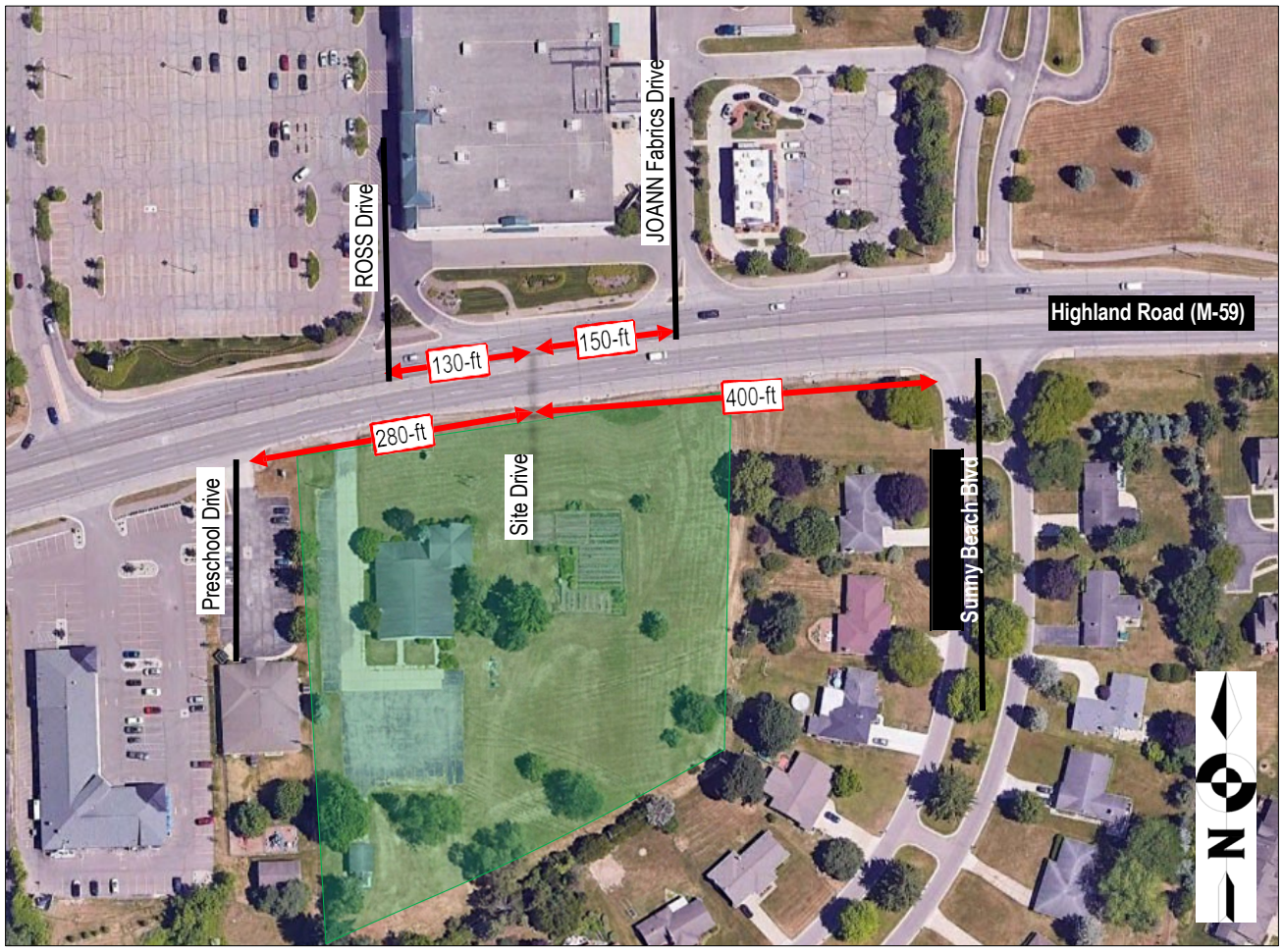
8.1 DRIVEWAY SPACING EVALUATION

The MDOT *Geometric Design Guidance* (Section 1.2.2) criteria were utilized to evaluate the location of the proposed site driveway, in relation to nearby intersections and access points within close proximity to the project site. The intersection corner clearance criteria were evaluated for the 50-mph section of Highland Road (M-59), adjacent to the project site. The distance of the proposed site driveway from nearby intersections and access points, and the warranting criteria are summarized in **Table 6** and displayed in **Exhibit 1**.

Table 6: Desirable Corner Clearance Summary

Adjacent Driveways & Intersections			Distance	Criteria	Meets
Site Drive	to	Preschool Drive	280 feet	455 feet	**NO**
Site Drive	to	Sunny Beach Boulevard	400 feet	170 feet	**YES**
Site Drive	to	JOANN Fabrics Drive	150 feet	750 feet	**NO**
Site Drive	to	ROSS Drive	130 feet	750 feet	**NO**

Exhibit 1: Proposed Driveway Spacing



The results of the driveway spacing analysis indicate that the location of the proposed site driveway on Highland Road (M-59) is not expected to meet the desirable MDOT spacing criteria, in relation to the nearby intersection and driveways. However, there is not sufficient property frontage to meet the recommended spacing criteria. Additionally, the development site plan includes proposed future cross access, stubbed at the property line to the west; this would provide improved site access, should the adjacent property ever be redeveloped, permitting this cross access between the nearby developments on the south side of Highland Road (M-59).

8.2 Auxiliary Turn Lane Evaluation

The MDOT auxiliary turn lane criteria were evaluated at the proposed site driveway on Highland Road (M-59). Highland Road (M-59) currently provides an existing center two-way left-turn lane (TWLTL); therefore, the left-turn lane criteria was not evaluated at the proposed site driveway. This analysis was based on the future peak hour traffic volumes shown on the attached **Figure 6**. The results of the analysis are shown on the attached chart and are summarized in **Table 7**.

Table 7: Right-turn Treatment Criteria Evaluation Summary

Intersection	Peak Period		Recommendation
	AM Peak Hour	PM Peak Hour	
Highland Road (M-59) at Site Drive	Right-Turn Lane	Right-Turn Lane	**Right-Turn Lane**

The result of the auxiliary turn lane evaluation indicates that a right-turn deceleration lane is warranted on Highland Road (M-59) at the proposed site driveway.

9 Future Conditions with Improvements Analysis

Signal timing optimizations were reviewed at the signalized study intersection of Highland Road (M-59) & Fisk Road and were determined to adequately improve the study intersection to LOS D or better during the PM peak hour. Additionally, the recommended right-turn lane was included in the future improvements analysis. The results of the future intersection operations, with the recommended mitigation measures are attached and summarized in **Table 8**.

Table 8: Future Intersection Operations with Improvements

	Intersection	Control	Approach	Future Conditions				Future w/ IMP				Difference			
				AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
				Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
1	Highland Road (M-59) & Fisk Road	Signal	EBL	14.4	B	60.0	E	No Change		50.7	D	No Change		-9.3	E→D
			EBT	29.4	C	18.5	B			21.2	C			2.7	B→C
			EBR	14.7	B	11.0	B			12.6	B			1.6	-
			WBL	16.5	C	12.0	B			15.8	B			3.8	-
			WBTR	23.5	C	26.5	C			46.7	D			20.2	C→D
			NBL	25.2	C	48.1	D			43.0	D			-5.1	-
			NBTR	23.3	C	38.0	D			34.1	C			0.0	D→C
			SBL	27.5	C	70.3	E			54.0	D			-16.3	E→D
			SBTR	24.7	C	47.4	D			40.9	D			-6.5	-
			Overall	**26.5**	**C**	**29.8**	**C**			**37.7**	**D**			**7.9**	**C→D**
3	Highland Road (M-59) & Site Drive	Stop (Minor)	EB	Free				Free				N/A			
			WBL	10.5	B	10.4	B	10.5	B	10.4	B	0.0	-	0.0	-
			NB	21.7	C	33.1	D	20.8	C	32.9	D	-0.9	-	-0.2	-

The results of the future conditions with improvements analysis indicate that, with the implementation of the recommended mitigation measures, all study intersection approaches and movements are expected to continue to operate acceptably, at LOS D or better during both the AM and PM peak hours. Review of SimTraffic microsimulations also indicates improved operations and reduced vehicle queues at the signalized study intersection of Highland Road (M-59) & Fisk Road during the PM peak hour.

10 QUEUEING ANALYSIS

The drive-through vehicle queueing was reviewed to determine if the proposed on-site queue lengths provide adequate storage to accommodate the projected operations. The development plan includes two (2) drive-through windows; however, only the coffee-shop has an order board. The fast casual restaurant provides a pick-up window only, for order ahead and food delivery services. Therefore, the drive-through queueing analysis was performed only for the coffee-shop, in order to insure adequate on-site storage is provided to accommodate the projected peak hour trip generation demand.

The coffee-shop is expected to have a peak trip generation of 111 trips during the AM peak hour. Coffee-shops with drive-through typically have an average service rate of approximately 80 vehicles per hour, with 80% of customers utilizing the drive-through. Therefore, of the total vehicles generated by the proposed coffee-shop during the peak period, it is estimated that approximately 89 vehicles will utilize the drive-through; the remaining vehicles will park and walk-in. The evaluation of the queue length included two criteria:

1. A queueing analysis was performed to determine if the projected demand of the site exceeds the service rate and calculate the projected queueing. The projected demand (89 veh/hr) is greater than the service rate (80 veh/hr) of the site; therefore, there is a potential for vehicles to queue past the pickup window, as the demand exceeds the capacity.
2. A Poisson Distribution was performed to determine the probability of random arrivals. The results indicate a maximum potential of five (5) vehicles arriving at any given time.

The results of the analysis are summarized in **Table 9**.

Table 9: Vehicle Queuing Analysis

DRIVE-THROUGH STACKING SPACE CALCULATOR	
Number of Arrivals	86
Time per Vehicle (s)	45
Service Rate (veh/hr)	80
Drive-Through Queue (veh)	9
Peak Arrival (veh)	5
Vehicle Length	25
TOTAL QUEUE (ft)	**350**

The results of the projected vehicle queuing analysis indicates that the maximum anticipated arrivals generated by the proposed coffee-shop with drive-through can be adequately accommodated within the available queue length, without impacting internal site circulation or the operations along Highland Road (M-59).

11 CONCLUSIONS

The conclusions of this TIS are as follows:

1. <u>Existing Conditions (2023)</u>

- The results of the existing conditions analysis indicates that all approaches and movements at the study intersections are currently operating acceptably, at LOS D or better, during both the AM and PM peak hours, with the following exceptions:
  - <u>Highland Road (M-59) & Fisk Road:</u> The SB left-turn movement is currently operating at LOS E, during the PM peak hour. Review of SimTraffic network simulations indicates generally acceptable operations. Occasional periods of vehicle queues were observed; however, the majority were observed to be processed within each cycle length, leaving minimal residual vehicle queueing.
  - <u>Highland Road (M-59) & JOANN Fabric Drive:</u> The SB approach is currently operating at LOS E during the PM peak hour. This approach was designed to prohibit egress left-turns; however, this traffic is causing the reported delay. The total volume of southbound egress traffic is very low (3 vehicles), which includes two (2) vehicles making an egress left-turn movement.

2. **Background Conditions (2025 No Build)**

- A conservative annual background growth rate of **0.5%** was utilized to project the existing 2023 traffic volumes to the buildout year of 2025.
- The results of the background conditions analysis indicates that the study intersections are expected to continue operating in a manner similar to the existing conditions analysis, with minor increases in delays due increases in background traffic volumes.
  - Highland Road (M-59) & Fisk Road: The EB left-turn movement is expected to operate at LOS E, during the PM peak hour.

3. **Future Conditions (2025 Build)**

- With the addition of the site-generated trips, the study intersections are expected to continue operating in a manner similar to the background conditions analysis, with no additional impacts to LOS.
- All approaches and movements at the proposed site driveway intersection with Highland Road (M-59) are expected to operate acceptably, at LOS D or better, during both the AM and PM peak hours.

4. **Access Management**

- The results of the driveway spacing analysis indicates that the location of the proposed site driveway on Highland Road (M-59) is not expected to meet the desirable MDOT spacing criteria, in relation to the nearby intersection and driveway.
  - However, there is not sufficient property frontage to meet the recommended spacing criteria. Additionally, the proposed development site plan includes proposed future cross access, stubbed at the property line to the west; this would provide improved site access, should the adjacent property ever be redeveloped, permitting this cross access between all of the nearby developments on the south side of Highland Road (M-59), east of Fisk Road.
- The MDOT auxiliary right-turn treatment criteria were evaluated at the proposed site driveway; the result of the analysis indicates that a right-turn lane is recommended on Highland Road (M-59).

5. **Future Conditions with Improvements**

- Signal timing optimizations were reviewed and were determined to adequately improve the study intersection to acceptable operations, to LOS D or better during the PM peak hour; additionally, the vehicle queues at the signalized intersection of Highland Road (M-59) & Fisk Road were observed to reduce, with the implementation of the recommended mitigation measures.

6. **Drive-Through Queueing Evaluation**

- The results of the drive-through queueing evaluation indicates that the proposed site plan can adequately accommodate the projected vehicle queueing generated by the proposed coffee-shop, without impacting internal site circulation or the operations along Highland Road (M-59).

12 RECOMMENDATIONS

The recommendation of this TIS are as follows:

- Provide a right-turn lane on Highland Road (M-59) at the proposed site driveway.
- Optimize the PM peak hour signal timing at the Highland Road (M-59) & Fisk Road intersection.

Any questions related to this memorandum, study, analysis, and results should be addressed to Fleis & VandenBrink.

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Michigan.

Digitally signed by Jacob Swanson
Date: 2024.01.11 15:13:09 -05'00'

Attached:
Figures 1 – 6
Proposed Site Plan
Traffic Volume Data
Signal Timing Permits
Synchro / SimTraffic Results
Auxiliary Lane Warrants

FIGURE 1

SITE LOCATION

9101 HIGHLAND ROAD TIS -WHITE LAKE TOWNSHIP, MI

LEGEND

SITE LOCATION

NORTH

SCALE:NOT TO

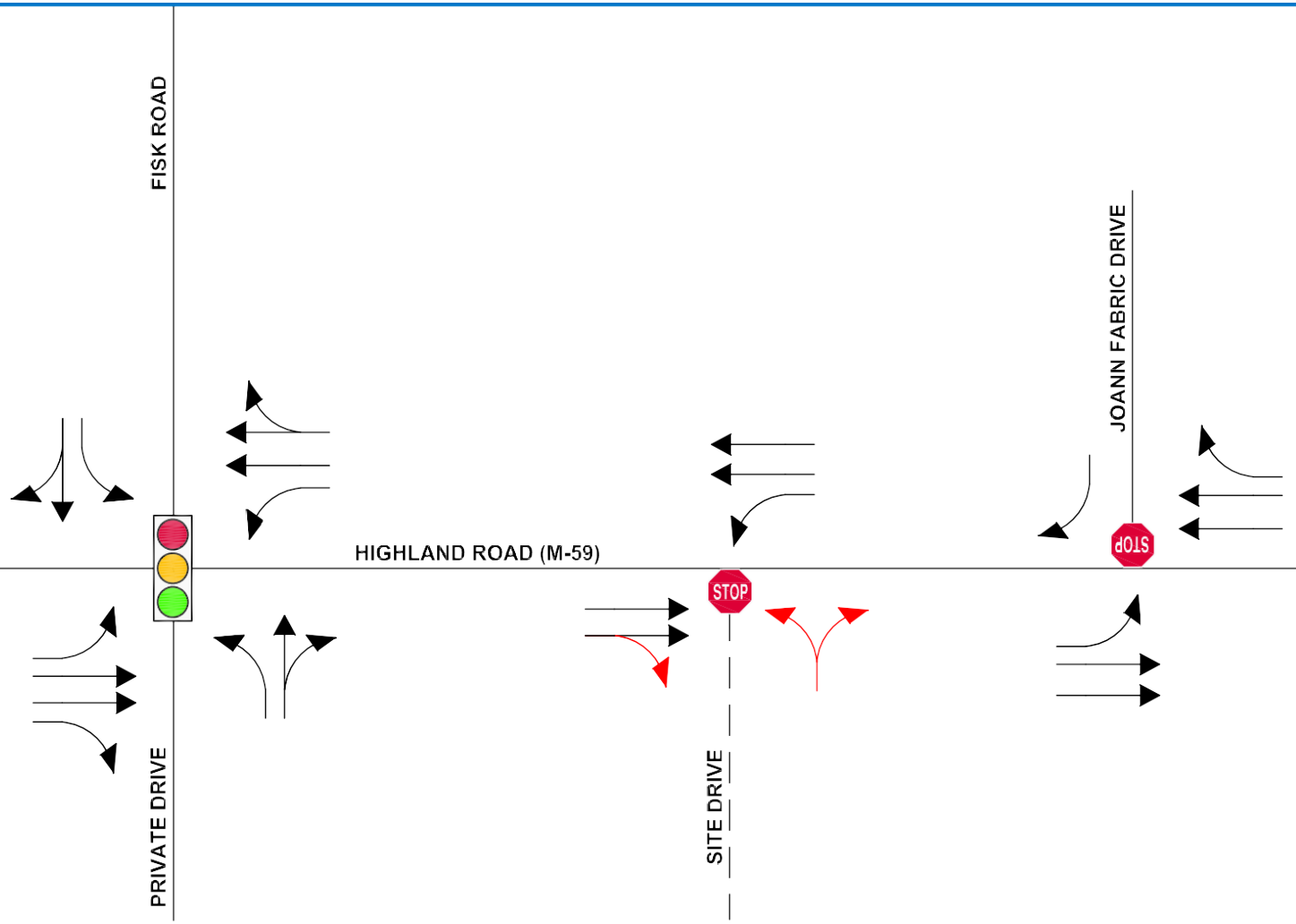


FIGURE 2

LANE USE AND TRAFFIC CONTROL

9101 HIGHLAND ROAD TIS - WHITE LAKE TOWNSHIP, MI

LEGEND

ROADS — PROPOSED ROADS

LANE USE — PROPOSED LANE USE

SIGNALIZED INTERSECTION

UNSIGNALIZED INTERSECTION

NORTH

SCALE: NOT TO SCA

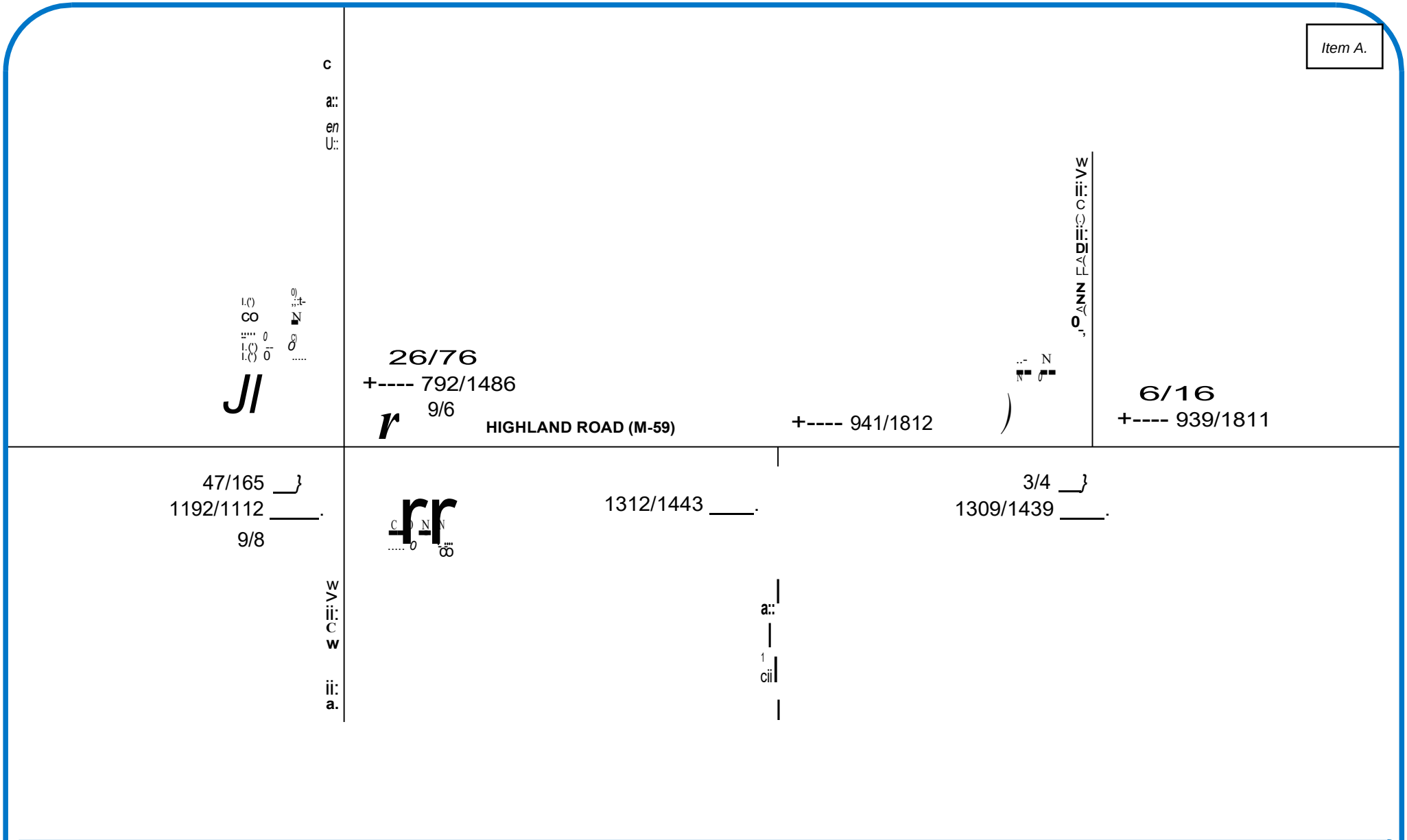


FIGURE 3

EXISTING TRAFFIC VOLUMES

9101 HIGHLAND ROAD TIS -WHITE LAKE TOWNSHIP, MI

LEGEND

ROADS

PROPOSED ROADS

TRAFFIC VOLUMES (AM/PM)

NORTH

SCALE:NOT TO

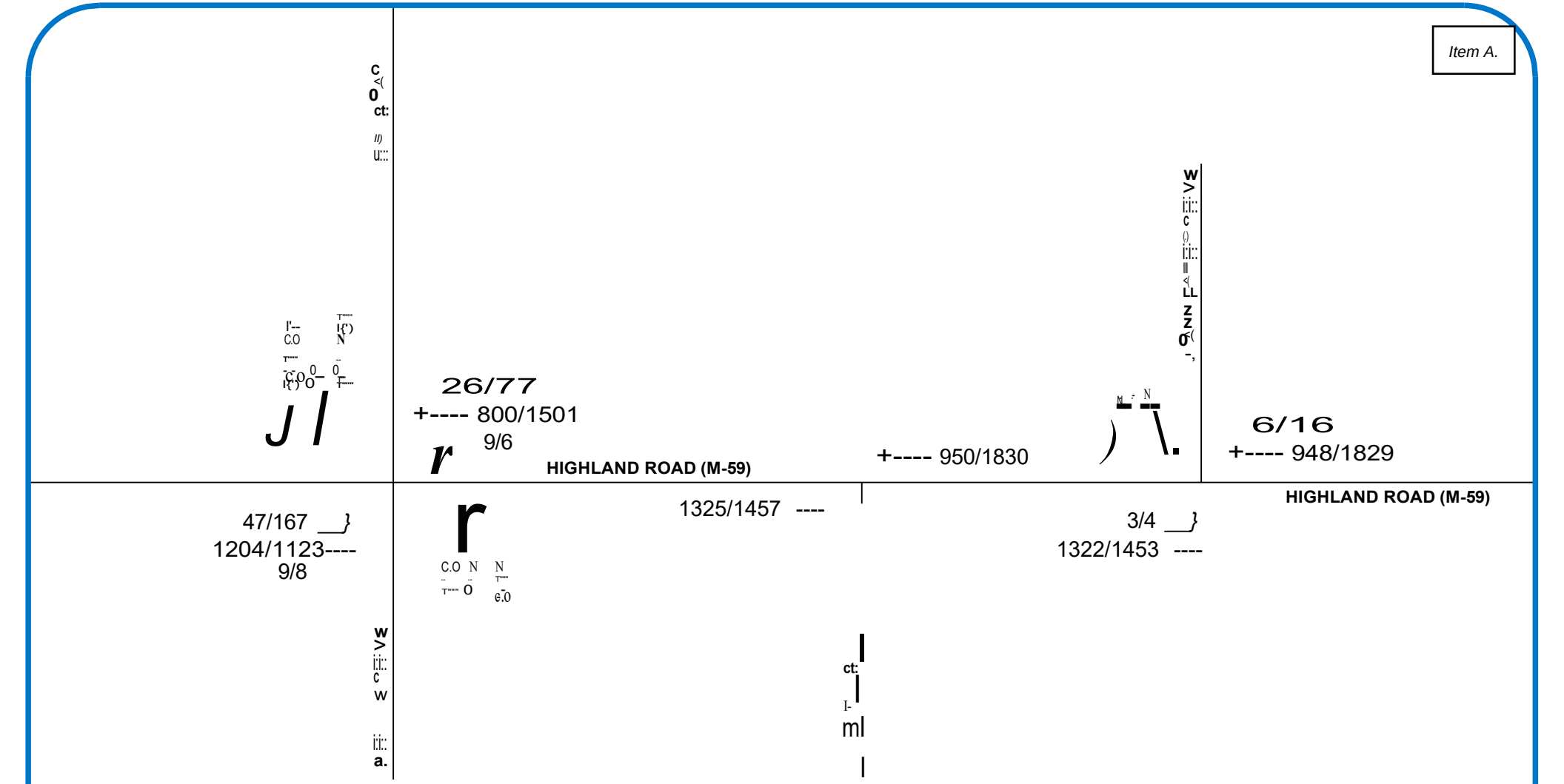


FIGURE 4

BACKGROUND TRAFFIC VOLUMES

9101 HIGHLAND ROAD TIS -WHITE LAKE TOWNSHIP, MI

LEGEND

ROADS

PROPOSED ROADS

TRAFFIC VOLUMES (AM/PM)

NORTH

SCALE:NOT TO

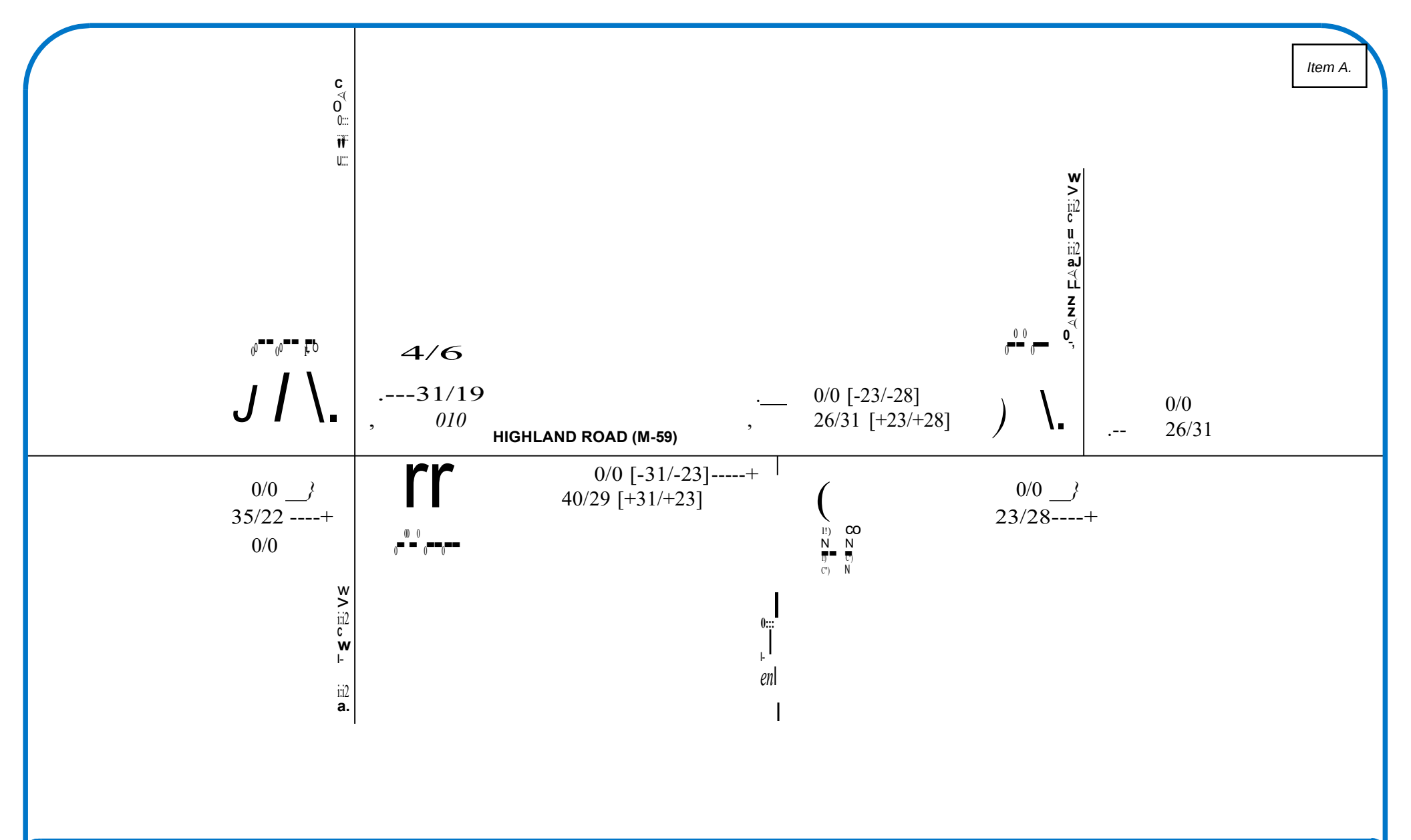


FIGURE 5
SITE-GENERATED TRAFFIC VOLUMES

9101 HIGHLAND ROAD TIS -WHITE LAKE TOWNSHIP, MI

LEGEND

ROADS

PROPOSED ROADS

TRAFFIC VOLUMES (AM/PM)

+/-[000/000] PASS-BY [AM/PM]

NORTH

SCALE:NOT TO

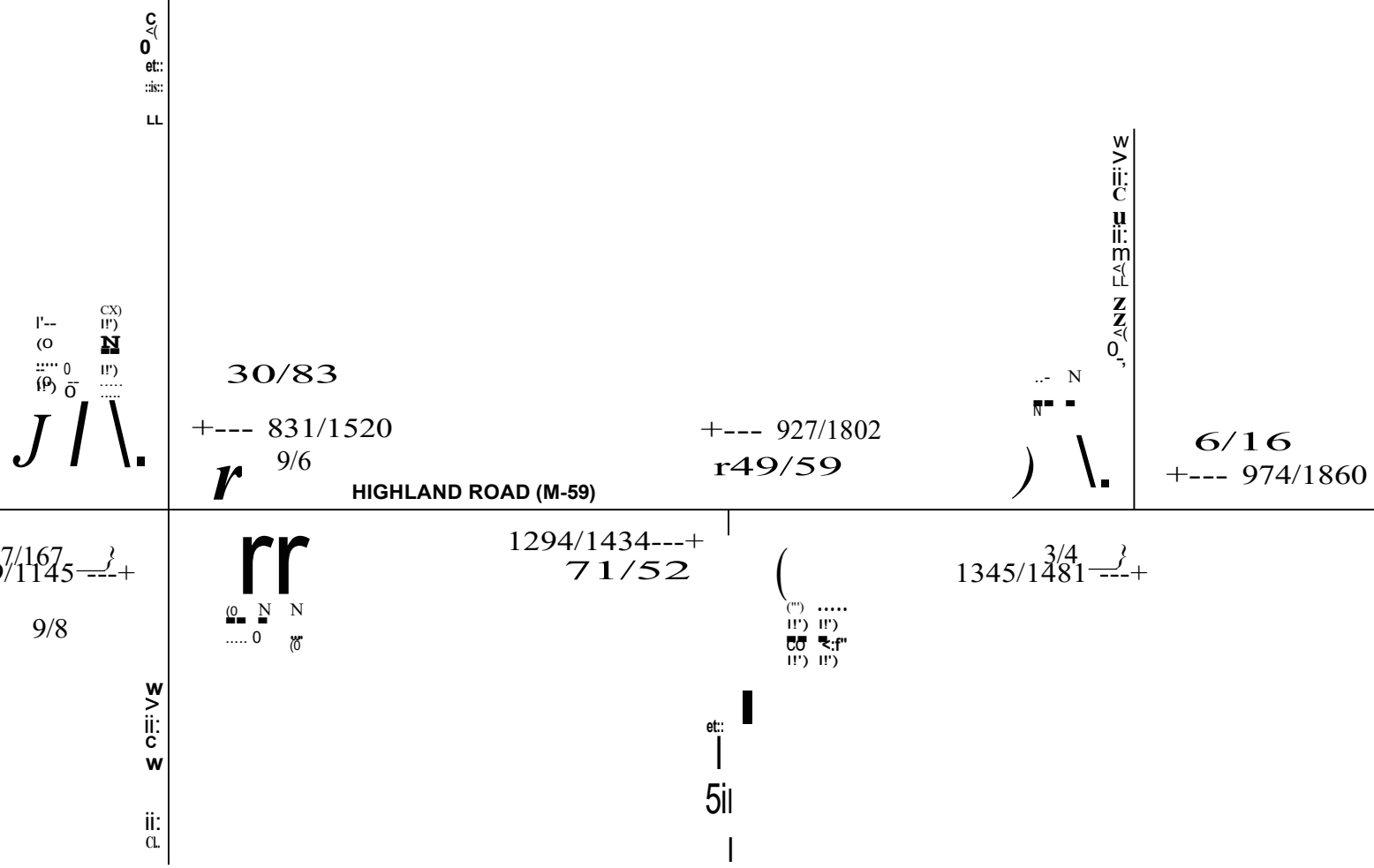


FIGURE 6

FUTURE TRAFFIC VOLUMES

9101 HIGHLAND ROAD TIS -WHITE LAKE TOWNSHIP, MI

LEGEND

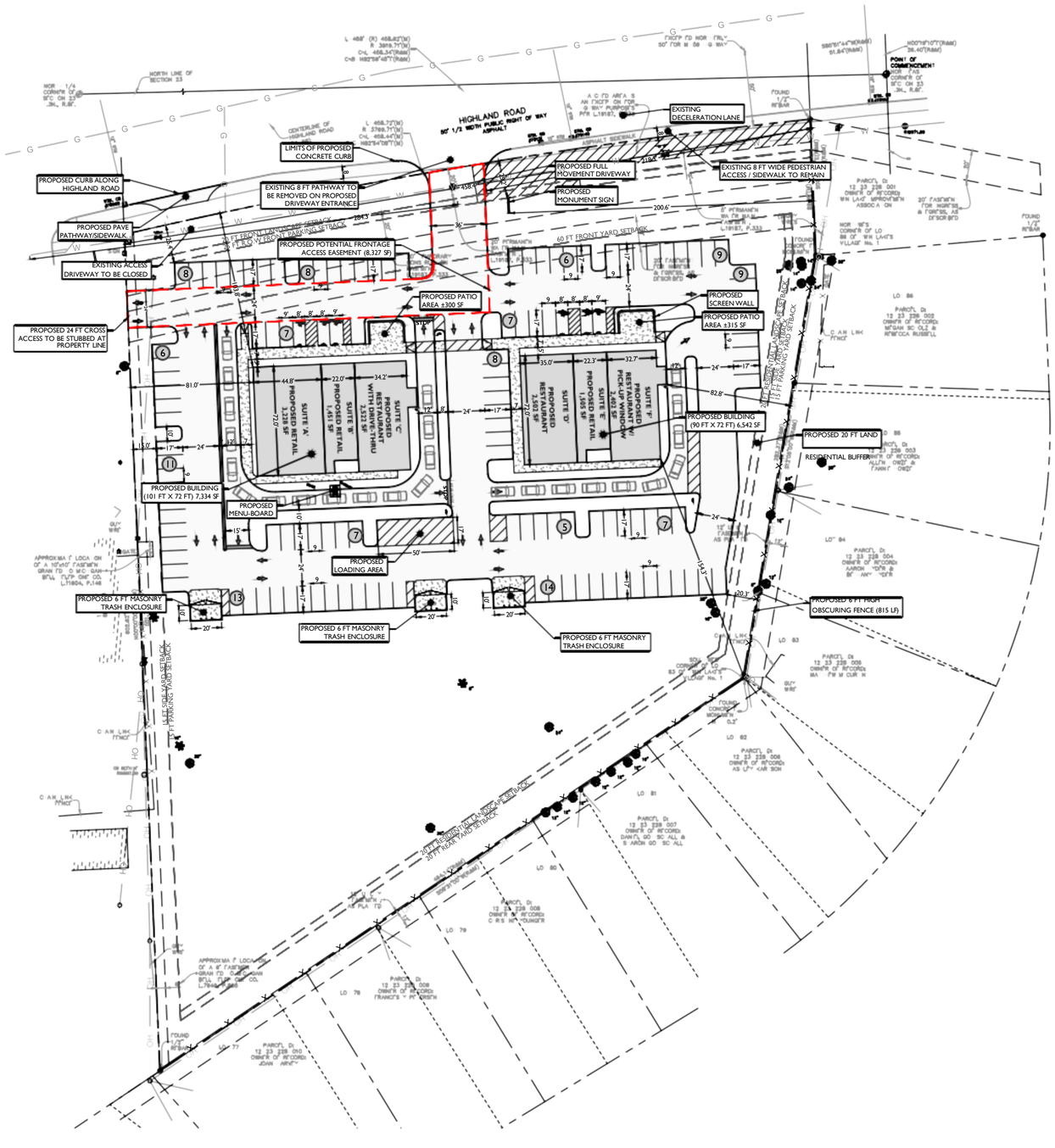
ROADS

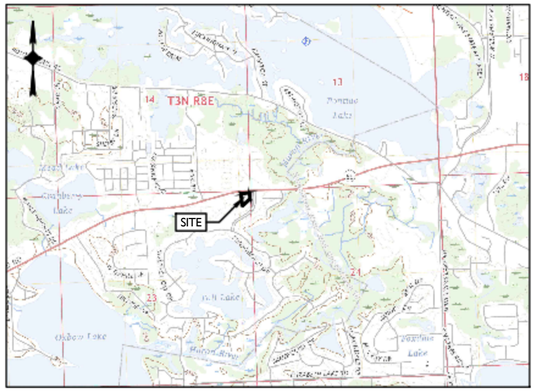
PROPOSED ROADS

TRAFFIC VOLUMES (AM/PM)

NORTH

SCALE:NOT TO





SOURCE: USGS MAPPING SYSTEM

LOCATION MAP

SCALE: 1" = 2,000'±

SYMBOL	DESCRIPTION
	PROPERTY LINE
	SETBACK LINE
	PROPOSED CURB
	PROPOSED SIGNS / BOLLARDS
	PROPOSED BUILDING
	PROPOSED CONCRETE
	PROPOSED RETAINING WALL
x x	PROPOSED OBSCURING FENCE

LAND USE AND ZONING

PID:12-23-227-003

EXISTING ZONE: R1-C SINGLE FAMILY RESIDENTIAL

REZONED TO GENERAL BUSINESS DISTRICT (GB)

PROPOSED USE

RESTAURANT OR FAST FOOD	PERMITTED USE
DRIVE-THRU WINDOW	SPECIAL LAND USE

ZONING REQUIREMENT	REQUIRED	PROPOSED
RETAIL STORE	PERMITTED USE	195,568 SF (4.5 AC)
MINIMUM LOT AREA	1 AC	
MINIMUM LOT WIDTH	200 FT	458.4 FT
MAXIMUM BUILDING HEIGHT	35 FT (2 STORIES)	<35 FT (1 STORY)
MINIMUM SIDE YARD SETBACK (ONE)	15 FT	81.0 FT
MINIMUM SIDE YARD SETBACK (BOTH)	20 FT	163.8 FT
MINIMUM DRIVEWAY FROM RESIDENTIAL	200 FT (1)	218.3 FT
MINIMUM FRONT LANDSCAPE SETBACK	20 FT	25.4 FT
MINIMUM R.O.W PARKING SETBACK	25 FT(2)	25.4 FT
INTERIOR LANDSCAPING AREA	15% (29,335 SF)	>15%
MINIMUM DRIVEWAY SPACING (HIGHLAND ROAD)	455 FT	±284.3 FT TO WEST (V)
TRASH ENCLOSURE SETBACK	FRONT LOT LINE(3)	REAR YARD
MINIMUM SIDE PARKING SETBACK	15 FT	15.0 FT

(V) VARIANCE

(1) REQUIREMENT FOR RESTAURANT WITH DRIVE-THRU

(2) NO PARKING STALL SHALL BE LOCATED ADJACENT TO R.O.W LINE , STREET EASEMENT OR SIDEWALK WHICHEVER IS CLOSER

(3) NO ENCLOSURES SHALL BE PERMITTED CLOSER TO THE FRONT LOT LINE THAN THE PRINCIPAL BUILDING

OFF-STREET PARKING REQUIREMENTS

CODE SECTION	REQUIRED	PROPOSED
§ 5.11.M	FAST FOOD PARKING: 1 SPACE PER 75 OF GFA (2,522 SF +2,402 SF) =4,924 SF (4,924 SF)(1 SPACES/ 75 SF)= 66 SPACES RESTAURANT PARKING: 1 SPACE PER 100 SF OF GFA (2,502 SF)(1 SPACE/100 SF)= 25 SPACES RETAIL PARKING: 1 SPACE PER 200 SF OF GFA (3,228 SF + 1,451 SF + 1,505 SF)=6,184 SF (6,184 SF)(1 SPACE/200 SF)= 31 SPACES **TOTAL: 66 + 25 + 31= 122 SPACES**	**125 SPACES**
§ 5.11.M	STACKING SPACES (WEST FAST FOOD): 8 STACKING CARS (9 FT X 18 FT)	15 SPACES (12 FT X 20 FT)
§ 5.11.M	STACKING SPACES (EAST FAST FOOD): 8 STACKING CARS (9 FT X 18 FT)	10 SPACES (12 FT X 20 FT)
§ 5.11.Q	90° PARKING: 9 FT X 18 FT WITH 24 FT AISLE (1)	9 FT X 17 FT W/ 24 FT AISLE
§ 5.19	LANDSCAPE REQUIREMENT: 20 FT WIDTH ALONG RESIDENTIAL 3 FT HIGH BERM WITH A 2 FT CROWN	PROVIDED
§ 5.11.P.I	LOADING AREA: 10 FT X 50 FT WITH 15 FT CLEARANCE	17 FT X 50 FT

(1) PARKING SPACE LENGTH MAY BE REDUCED TO 17 FT WHERE 7 FT SIDEWALK OR LANDSCAPE IS PROVIDED

SIGNAGE REQUIREMENTS

CODE SECTION	REQUIRED	PROPOSED
§5.9.J.I.B	MULTI-TENANT SIGN HEIGHT: 15 FT(1)(2)	<15 FT
§5.9.J.I	SIGN AREA: 6 SF PER 1 FT OF SETBACK	<150 SF
§5.9.J.I	MAXIMUM SIGN AREA: 150 SF(1)	<150 SF
§5.9.J.I.A	SIGN SETBACK: 10 FT	25.2 FT
§5.9.J.I.A	RESIDENTIAL SETBACK: 100 FT	200.6 FT

(1) MAXIMUM SIGN AREA SHALL NOT INCLUDE DECORATIVE ELEMENTS SUCH AS BASES, COLUMNS OR CAPS

(2) MINIMUM HEIGHT OF A SIGN BASE SHALL NE 2 FT IN HEIGHT

(3) EACH INDIVIDUAL TE?

GENERAL NOTES

1. 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.
2. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND ENSURE THAT ALL REQUIRED APPROVALS HAVE BEEN OBTAINED PRIOR TO THE START OF CONSTRUCTION. COPIES OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE KEPT ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. ALL CONTRACTORS WILL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS STONEFIELD ENGINEERING & DESIGN, LLC. AND IT'S SUB-CONSULTANTS FROM AND AGAINST ANY DAMAGES AND LIABILITIES INCLUDING ATTORNEY'S FEES ARISING OUT OF CLAIMS BY EMPLOYEES OF THE CONTRACTOR IN ADDITION TO CLAIMS CONNECTED TO THE PROJECT AS A RESULT OF NOT CARRYING THE PROPER INSURANCE FOR WORKERS COMPENSATION, LIABILITY INSURANCE, AND LIMITS OF COMMERCIAL GENERAL LIABILITY INSURANCE.
4. 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.
5. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE THE MEANS AND METHODS OF CONSTRUCTION.
6. 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.
7. 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 CONTRACTORS EXPENSE.
8. 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.
9. THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
10. 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.
11. THE CONTRACTOR IS REQUIRED TO RETAIN AN OSHA CERTIFIED SAFETY INSPECTOR TO BE PRESENT ON SITE AT ALL TIMES DURING CONSTRUCTION & DEMOLITION ACTIVITIES.
12. 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.

40' 0' 40' 80'

GRAPHIC SCALE IN FEET

1" = 40'

ISSUE	DATE	BY	DESCRIPTION
1	11/29/2023	JRC/JP	SUBMISSION FOR REZONING

NOT APPROVED FOR CONSTRUCTION

STONEFIELD engineering & design
Detroit, MI · Rutherford, NJ · New York, NY
Boston, MA · Princeton, NJ · Tampa, FL
www.stonefieldeng.com
607 Shelby Suite 200, Detroit, MI 48226
Phone 248.247.1115

SITE DEVELOPMENT PLANS

9101 HIGHLAND ROAD

PROPOSED MULTI-TENANT BUILDING

PARCEL ID:12-23-227-003
9101 HIGHLAND ROAD
WHITE LAKE TOWNSHIP
OAKLAND COUNTY, MICHIGAN

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

STONEFIELD engineering & design

SCALE: 1" = 40' | PROJECT ID: DET-230229

TITLE: SITE PLAN

DRAWING: C-3

TRUE DATA TO IMPROVE MOBILITY

File Name : 16432201 - Fisk Rd -- Highland R
Site Code : 16432201
Start Date : 12/13/2023
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

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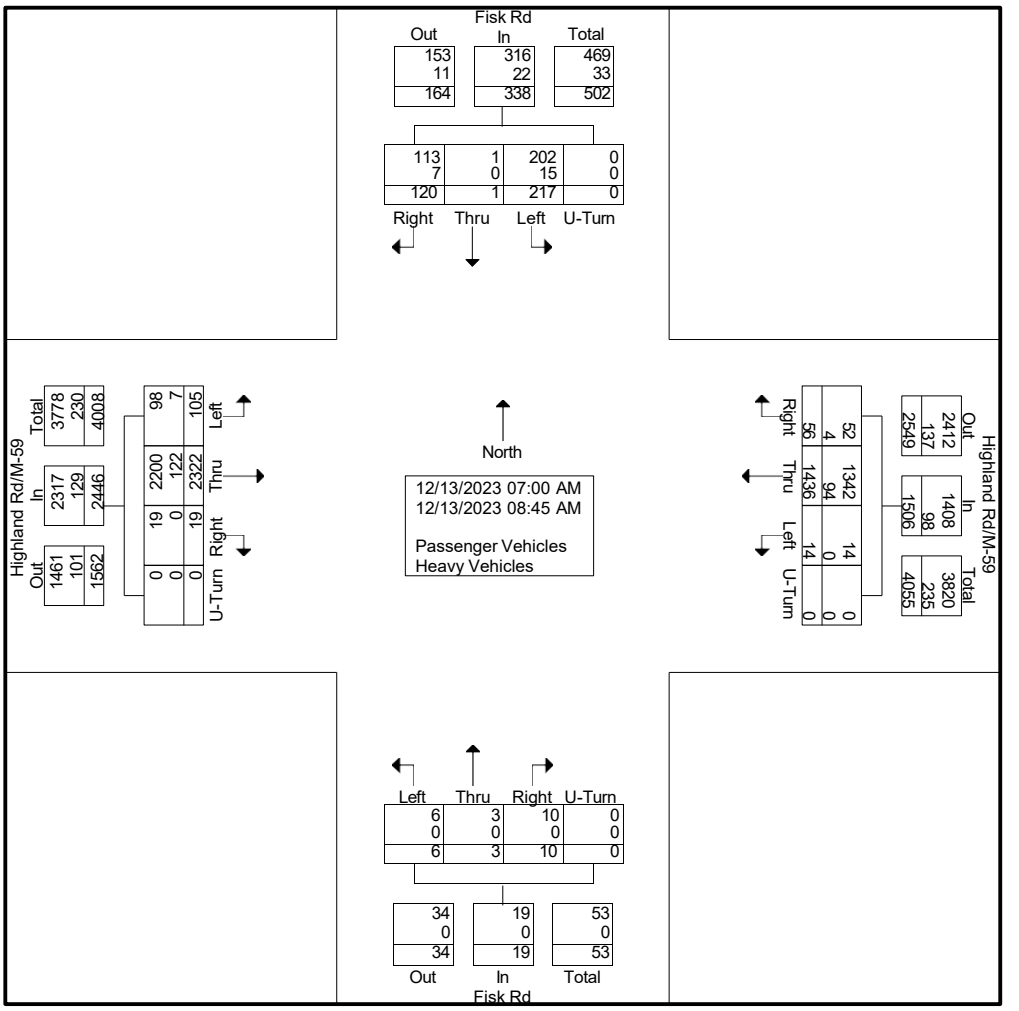
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	9	298	2	0	309	0	126	6	0	132	0	0	0	0	0	27	0	8	0	35	476
07:15 AM	12	314	2	0	328	0	151	2	0	153	0	0	2	0	2	25	0	15	0	40	523
07:30 AM	12	300	2	0	314	1	193	2	0	196	0	0	1	0	1	25	0	11	0	36	547
07:45 AM	12	319	3	0	334	2	195	6	0	203	0	0	1	0	1	29	0	13	0	42	580
Total	45	1231	9	0	1285	3	665	16	0	684	0	0	4	0	4	106	0	47	0	153	2126
08:00 AM	9	293	2	0	304	5	219	11	0	235	1	0	2	0	3	23	0	17	0	40	582
08:15 AM	14	280	2	0	296	1	185	7	0	193	0	0	2	0	2	32	0	17	0	49	540
08:30 AM	20	264	3	0	287	2	177	11	0	190	4	1	0	0	5	23	0	16	0	39	521
08:45 AM	17	254	3	0	274	3	190	11	0	204	1	2	2	0	5	33	1	23	0	57	540
Total	60	1091	10	0	1161	11	771	40	0	822	6	3	6	0	15	111	1	73	0	185	2183
Grand Total	105	2322	19	0	2446	14	1436	56	0	1506	6	3	10	0	19	217	1	120	0	338	4309
Apprch %	4.3	94.9	0.8	0		0.9	95.4	3.7	0		31.6	15.8	52.6	0		64.2	0.3	35.5	0		
Total %	2.4	53.9	0.4	0	56.8	0.3	33.3	1.3	0	35	0.1	0.1	0.2	0	0.4	5	0	2.8	0	7.8	
Passenger Vehicles	98	2200	19	0	2317	14	1342	52	0	1408	6	3	10	0	19	202	1	113	0	316	4060
% Passenger Vehicles	93.3	94.7	100	0	94.7	100	93.5	92.9	0	93.5	100	100	100	0	100	93.1	100	94.2	0	93.5	94.2
Heavy Vehicles	7	122	0	0	129	0	94	4	0	98	0	0	0	0	0	15	0	7	0	22	249
% Heavy Vehicles	6.7	5.3	0	0	5.3	0	6.5	7.1	0	6.5	0	0	0	0	0	6.9	0	5.8	0	6.5	5.8



TRUE DATA TO IMPROVE MOBILITY

File Name : 16432201 - Fisk Rd -- Highland R
Site Code : 16432201
Start Date : 12/13/2023
Page No : 2

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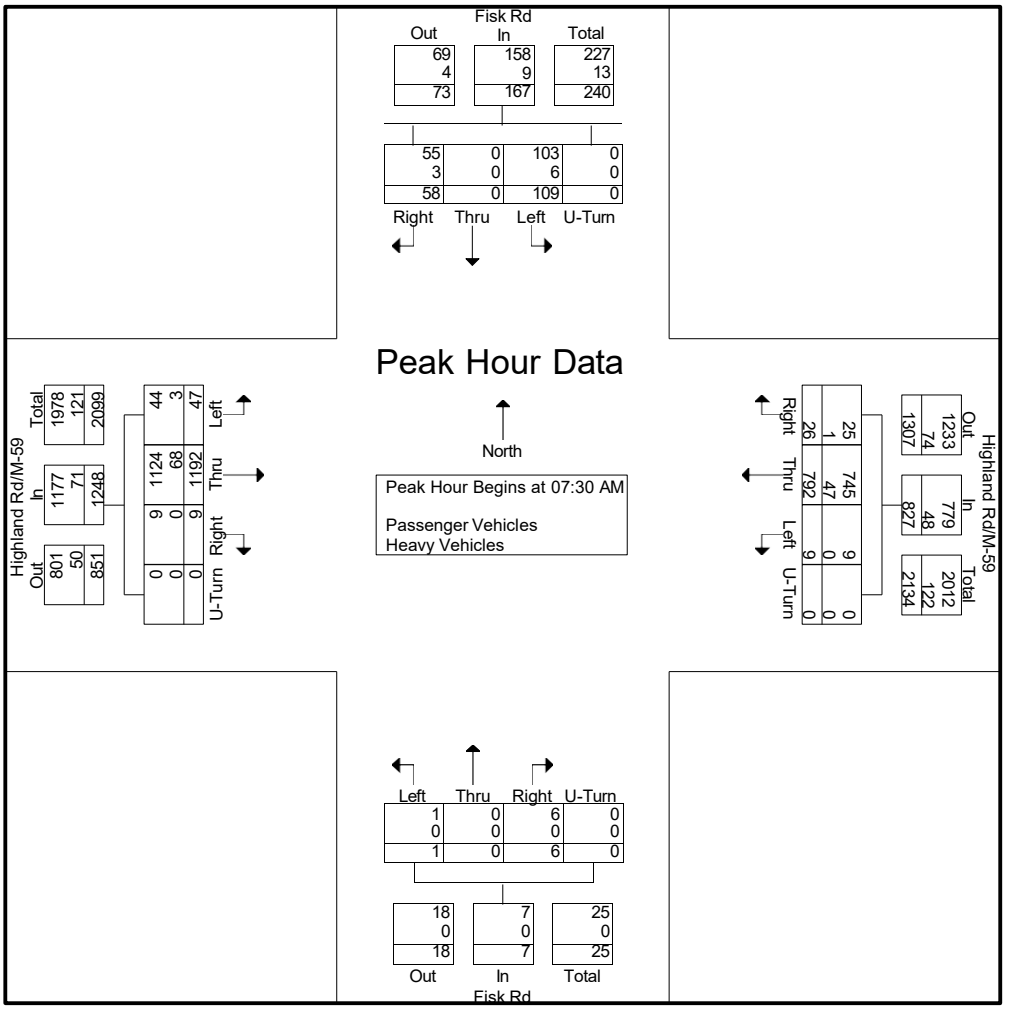
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	12	300	2	0	314	1	193	2	0	196	0	0	1	0	1	25	0	11	0	36	547
07:45 AM	12	**319**	**3**	0	**334**	2	195	6	0	203	0	0	1	0	1	29	0	13	0	42	580
08:00 AM	9	293	2	0	304	**5**	**219**	**11**	0	**235**	**1**	0	**2**	0	**3**	23	0	**17**	0	40	**582**
08:15 AM	**14**	280	2	0	296	1	185	7	0	193	0	0	2	0	2	**32**	0	17	0	**49**	540
Total Volume	47	1192	9	0	1248	9	792	26	0	827	1	0	6	0	7	109	0	58	0	167	2249
% App. Total	3.8	95.5	0.7	0		1.1	95.8	3.1	0		14.3	0	85.7	0		65.3	0	34.7	0		
PHF	.839	.934	.750	.000	.934	.450	.904	.591	.000	.880	.250	.000	.750	.000	.583	.852	.000	.853	.000	.852	.966
Passenger Vehicles	44	1124	9	0	1177	9	745	25	0	779	1	0	6	0	7	103	0	55	0	158	2121
% Passenger Vehicles	93.6	94.3	100	0	94.3	100	94.1	96.2	0	94.2	100	0	100	0	100	94.5	0	94.8	0	94.6	94.3
Heavy Vehicles	3	68	0	0	71	0	47	1	0	48	0	0	0	0	0	6	0	3	0	9	128
% Heavy Vehicles	6.4	5.7	0	0	5.7	0	5.9	3.8	0	5.8	0	0	0	0	0	5.5	0	5.2	0	5.4	5.7

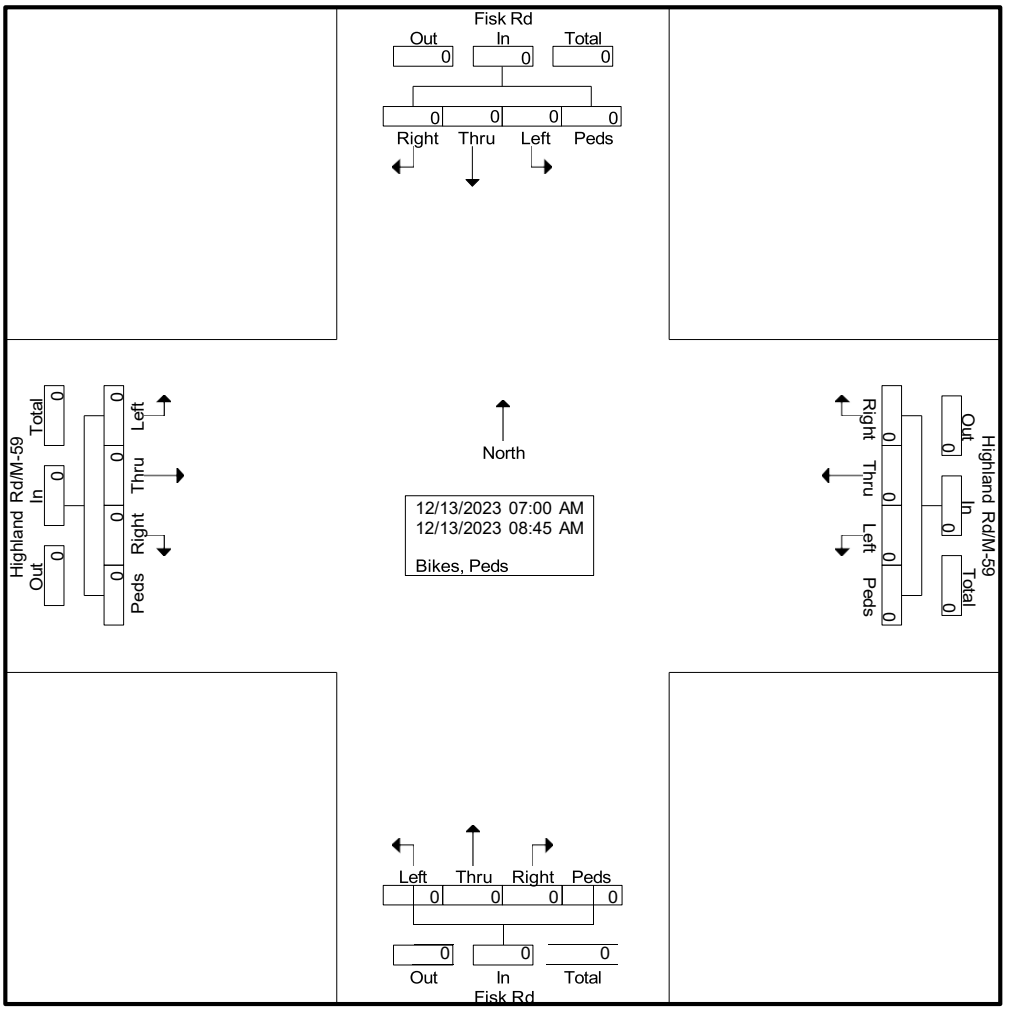


TRUE DATA TO IMPROVE MOBILITY

File Name : 16432201 - Fisk Rd -- Highland R
Site Code : 16432201
Start Date : 12/13/2023
Page No : 1

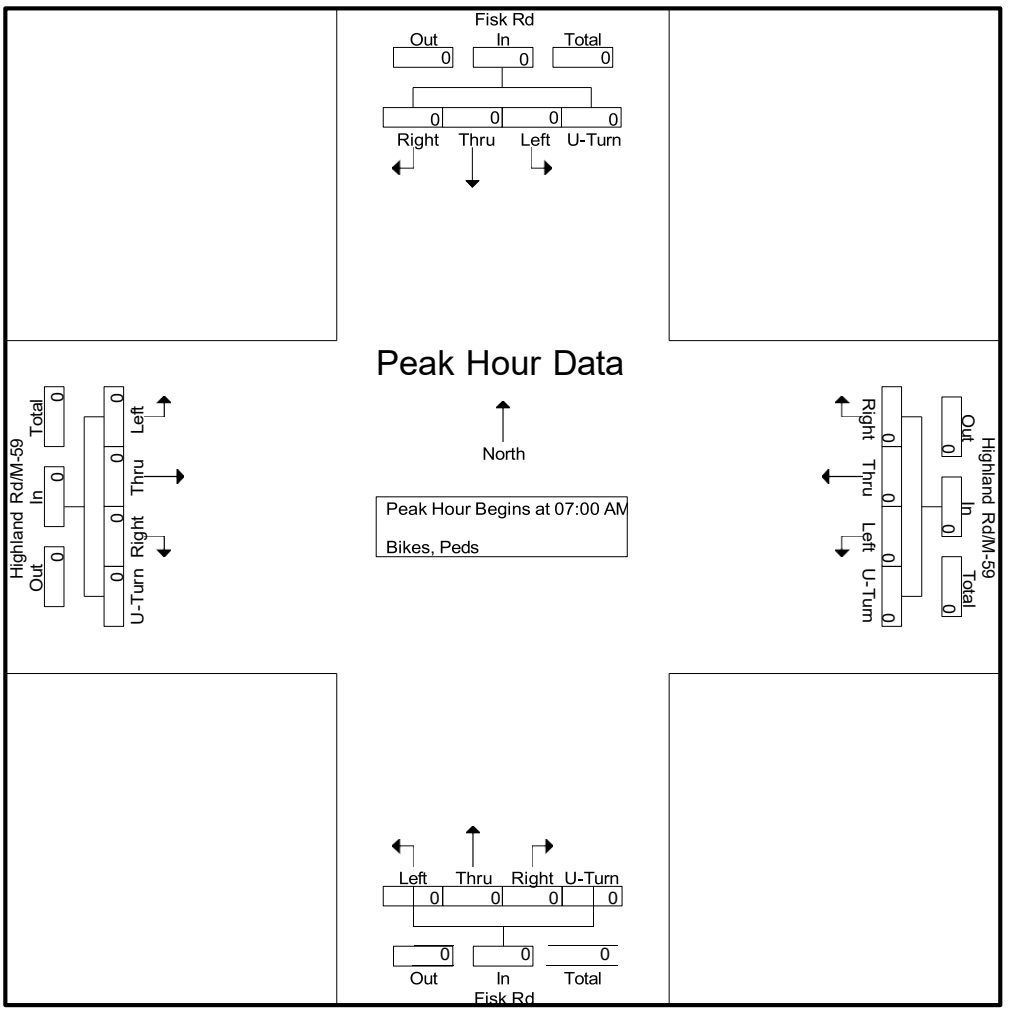
Groups Printed- Bikes, Peds

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Fisk Rd Northbound					Fisk Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					



File Name : 16432201 - Fisk Rd -- Highland R
Site Code : 16432201
Start Date : 12/13/2023
Page No : 2

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Fisk Rd Northbound					Fisk Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

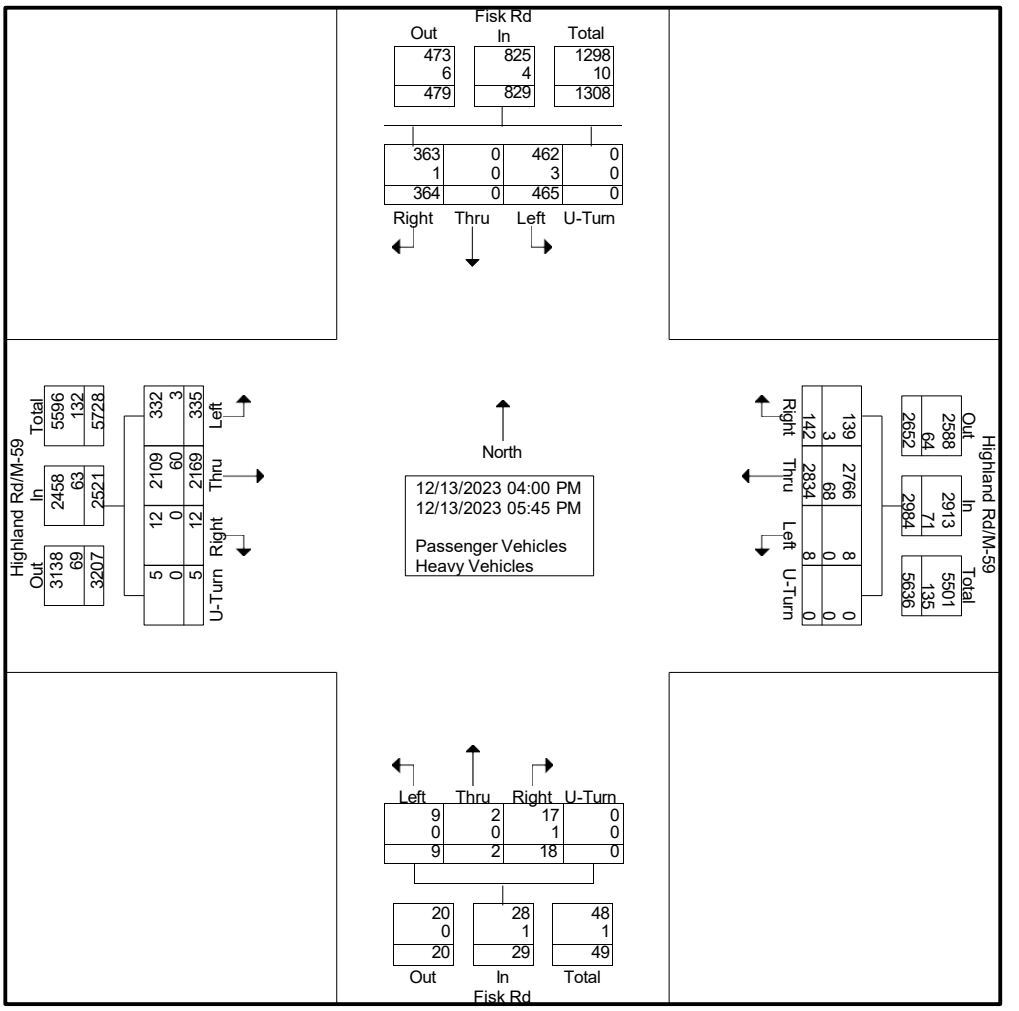


TRUE DATA TO IMPROVE MOBILITY

File Name : 16432202 - Fisk Rd -- Highland R
Site Code : 16432202
Start Date : 12/13/2023
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

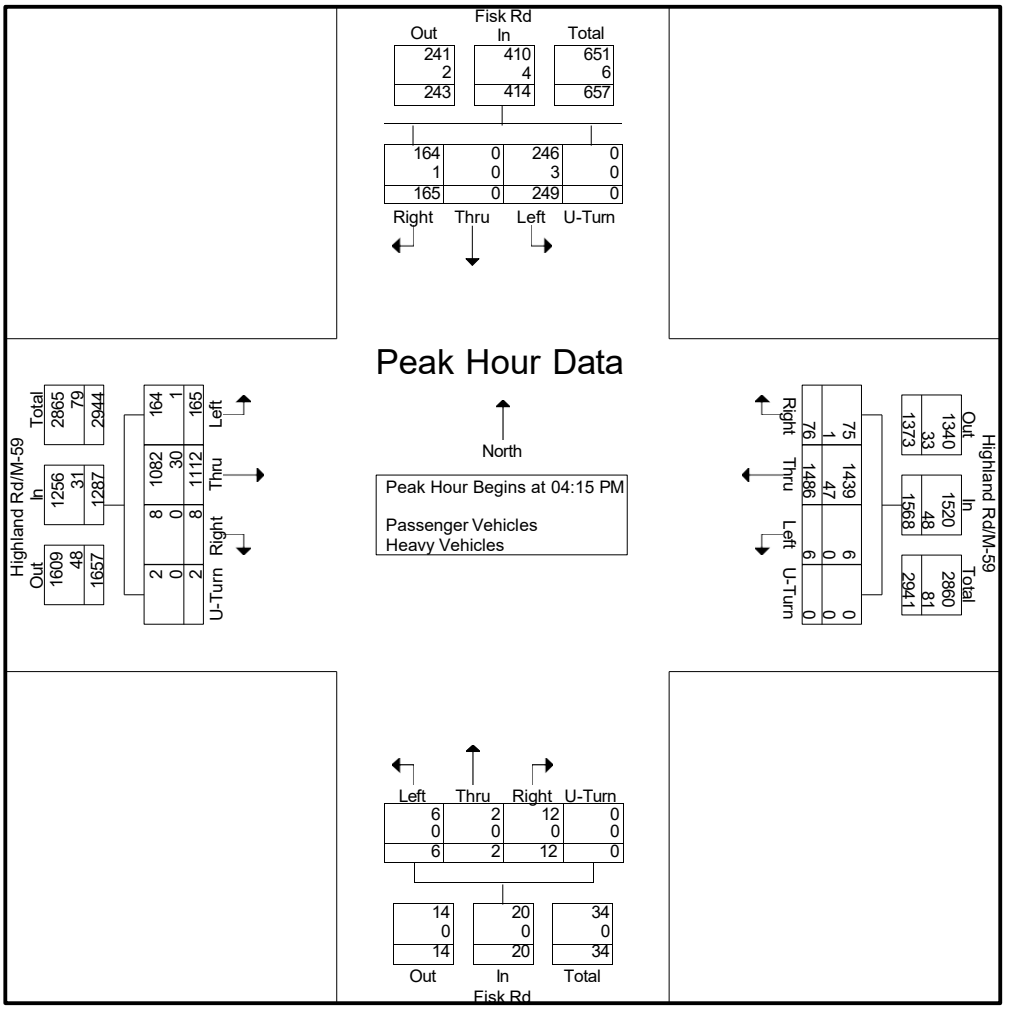
	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Fisk Rd Northbound					Fisk Rd Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	44	269	2	1	316	1	327	22	0	350	1	0	3	0	4	63	0	46	0	109	779
04:15 PM	45	329	3	0	377	2	365	21	0	388	3	0	3	0	6	55	0	44	0	99	870
04:30 PM	32	222	4	1	259	1	363	21	0	385	1	1	2	0	4	64	0	52	0	116	764
04:45 PM	36	268	1	1	306	2	394	24	0	420	2	0	7	0	9	68	0	34	0	102	837
Total	157	1088	10	3	1258	6	1449	88	0	1543	7	1	15	0	23	250	0	176	0	426	3250
05:00 PM	52	293	0	0	345	1	364	10	0	375	0	1	0	0	1	62	0	35	0	97	818
05:15 PM	42	280	1	1	324	0	363	14	0	377	1	0	0	0	1	48	0	55	0	103	805
05:30 PM	39	261	0	0	300	0	339	18	0	357	0	0	1	0	1	58	0	53	0	111	769
05:45 PM	45	247	1	1	294	1	319	12	0	332	1	0	2	0	3	47	0	45	0	92	721
Total	178	1081	2	2	1263	2	1385	54	0	1441	2	1	3	0	6	215	0	188	0	403	3113
Grand Total	335	2169	12	5	2521	8	2834	142	0	2984	9	2	18	0	29	465	0	364	0	829	6363
Apprch %	13.3	86	0.5	0.2		0.3	95	4.8	0		31	6.9	62.1	0		56.1	0	43.9	0		
Total %	5.3	34.1	0.2	0.1	39.6	0.1	44.5	2.2	0	46.9	0.1	0	0.3	0	0.5	7.3	0	5.7	0	13	
Passenger Vehicles	332	2109	12	5	2458	8	2766	139	0	2913	9	2	17	0	28	462	0	363	0	825	6224
% Passenger Vehicles	99.1	97.2	100	100	97.5	100	97.6	97.9	0	97.6	100	100	94.4	0	96.6	99.4	0	99.7	0	99.5	97.8
Heavy Vehicles	3	60	0	0	63	0	68	3	0	71	0	0	1	0	1	3	0	1	0	4	139
% Heavy Vehicles	0.9	2.8	0	0	2.5	0	2.4	2.1	0	2.4	0	0	5.6	0	3.4	0.6	0	0.3	0	0.5	2.2



TRUE DATA TO IMPROVE MOBILITY

File Name : 16432202 - Fisk Rd -- Highland R
Site Code : 16432202
Start Date : 12/13/2023
Page No : 2

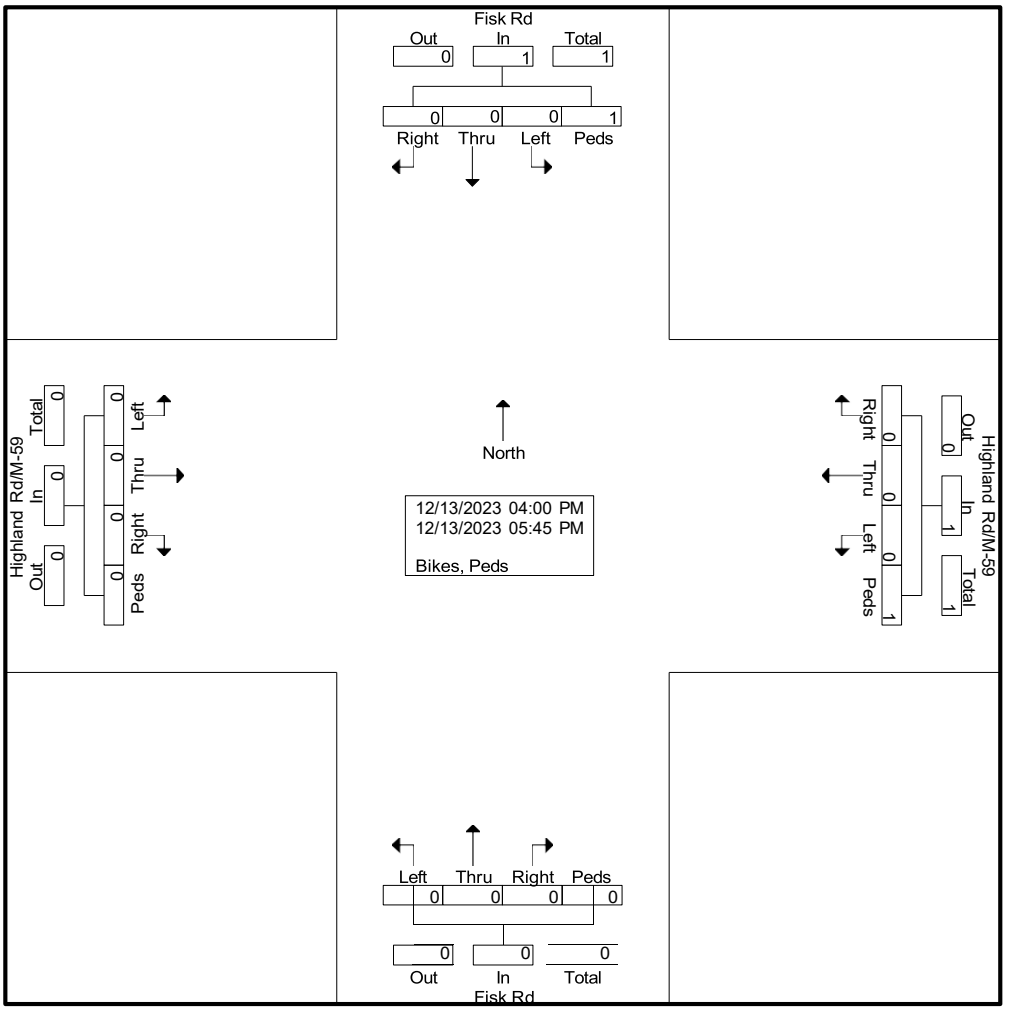
	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Fisk Rd Northbound					Fisk Rd Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	45	**329**	3	0	**377**	**2**	365	21	0	388	**3**	0	3	0	6	55	0	44	0	99	**870**
04:30 PM	32	222	**4**	**1**	259	1	363	21	0	385	1	**1**	2	0	4	64	0	**52**	0	**116**	764
04:45 PM	36	268	1	1	306	2	**394**	**24**	0	**420**	2	0	**7**	0	**9**	**68**	0	34	0	102	837
05:00 PM	**52**	293	0	0	345	1	364	10	0	375	0	1	0	0	1	62	0	35	0	97	818
Total Volume	165	1112	8	2	1287	6	1486	76	0	1568	6	2	12	0	20	249	0	165	0	414	3289
% App. Total	12.8	86.4	0.6	0.2		0.4	94.8	4.8	0		30	10	60	0		60.1	0	39.9	0		
PHF	.793	.845	.500	.500	.853	.750	.943	.792	.000	.933	.500	.500	.429	.000	.556	.915	.000	.793	.000	.892	.945
Passenger Vehicles	164	1082	8	2	1256	6	1439	75	0	1520	6	2	12	0	20	246	0	164	0	410	3206
% Passenger Vehicles	99.4	97.3	100	100	97.6	100	96.8	98.7	0	96.9	100	100	100	0	100	98.8	0	99.4	0	99.0	97.5
Heavy Vehicles	1	30	0	0	31	0	47	1	0	48	0	0	0	0	0	3	0	1	0	4	83
% Heavy Vehicles	0.6	2.7	0	0	2.4	0	3.2	1.3	0	3.1	0	0	0	0	0	1.2	0	0.6	0	1.0	2.5



File Name : 16432202 - Fisk Rd -- Highland R
Site Code : 16432202
Start Date : 12/13/2023
Page No : 1

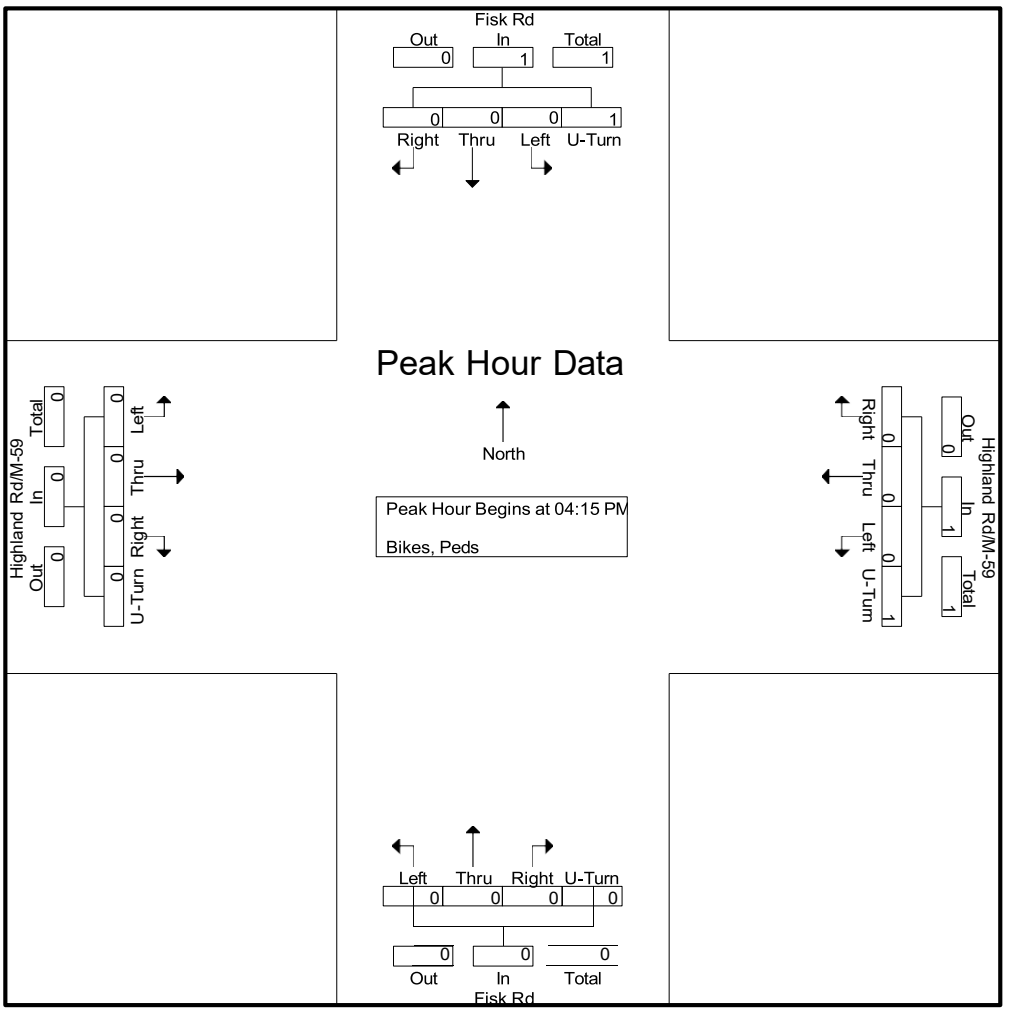
Groups Printed- Bikes, Peds

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Fisk Rd Northbound					Fisk Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
Grand Total	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
Apprch %	0	0	0	0		0	0	0	100		0	0	0	0		0	0	0	100		
Total %	0	0	0	0	0	0	0	0	50	50	0	0	0	0	0	0	0	0	50	50	



File Name : 16432202 - Fisk Rd -- Highland R
Site Code : 16432202
Start Date : 12/13/2023
Page No : 2

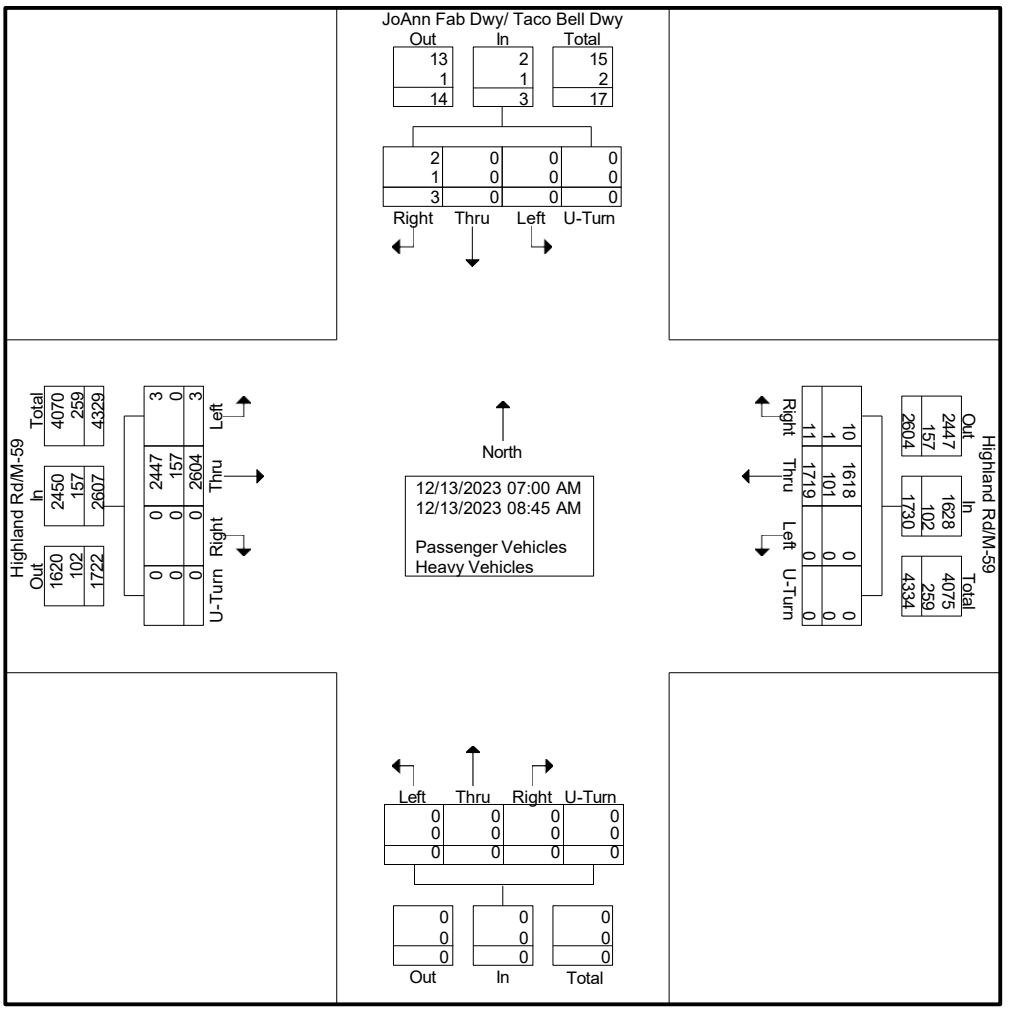
	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Fisk Rd Northbound					Fisk Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	**1**	**1**	**2**
Total Volume	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
% App. Total	0	0	0	0		0	0	0	100		0	0	0	0		0	0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.250



File Name : 16432205 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432205
Start Date : 12/13/2023
Page No : 1

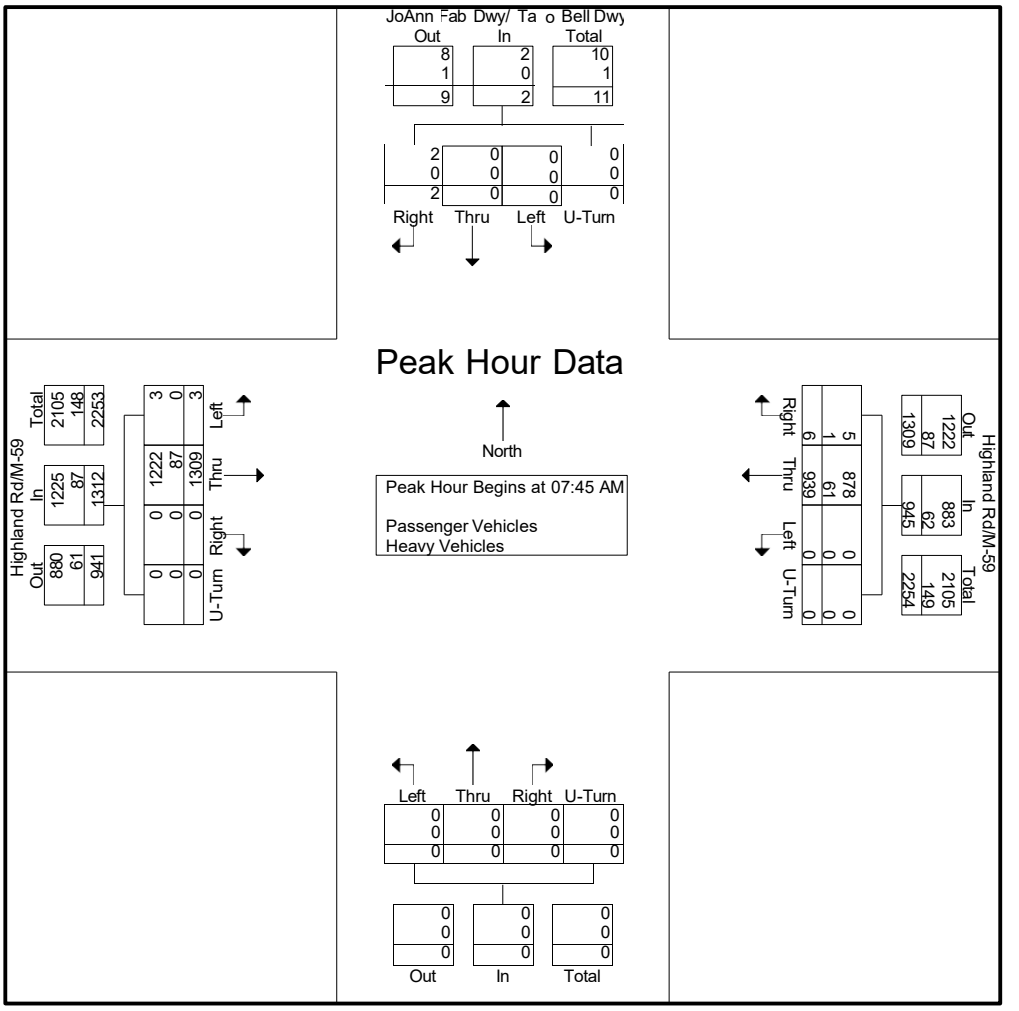
Groups Printed- Passenger Vehicles - Heavy Vehicles

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	0	328	0	0	328	0	141	0	0	141	0	0	0	0	0	0	0	0	0	0	469
07:15 AM	0	355	0	0	355	0	172	3	0	175	0	0	0	0	0	0	0	1	0	1	531
07:30 AM	0	327	0	0	327	0	214	1	0	215	0	0	0	0	0	0	0	0	0	0	542
07:45 AM	0	367	0	0	367	0	232	2	0	234	0	0	0	0	0	0	0	0	0	0	601
Total	0	1377	0	0	1377	0	759	6	0	765	0	0	0	0	0	0	0	1	0	1	2143
08:00 AM	0	307	0	0	307	0	265	0	0	265	0	0	0	0	0	0	0	0	0	0	572
08:15 AM	1	320	0	0	321	0	220	1	0	221	0	0	0	0	0	0	0	0	0	0	542
08:30 AM	2	315	0	0	317	0	222	3	0	225	0	0	0	0	0	0	0	2	0	2	544
08:45 AM	0	285	0	0	285	0	253	1	0	254	0	0	0	0	0	0	0	0	0	0	539
Total	3	1227	0	0	1230	0	960	5	0	965	0	0	0	0	0	0	0	2	0	2	2197
Grand Total	3	2604	0	0	2607	0	1719	11	0	1730	0	0	0	0	0	0	0	3	0	3	4340
Apprch %	0.1	99.9	0	0		0	99.4	0.6	0		0	0	0	0		0	0	100	0		
Total %	0.1	60	0	0	60.1	0	39.6	0.3	0	39.9	0	0	0	0	0	0	0	0.1	0	0.1	
Passenger Vehicles	3	2447	0	0	2450	0	1618	10	0	1628	0	0	0	0	0	0	0	2	0	2	4080
% Passenger Vehicles	100	94	0	0	94	0	94.1	90.9	0	94.1	0	0	0	0	0	0	0	66.7	0	66.7	94
Heavy Vehicles	0	157	0	0	157	0	101	1	0	102	0	0	0	0	0	0	0	1	0	1	260
% Heavy Vehicles	0	6	0	0	6	0	5.9	9.1	0	5.9	0	0	0	0	0	0	0	33.3	0	33.3	6



File Name : 16432205 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432205
Start Date : 12/13/2023
Page No : 2

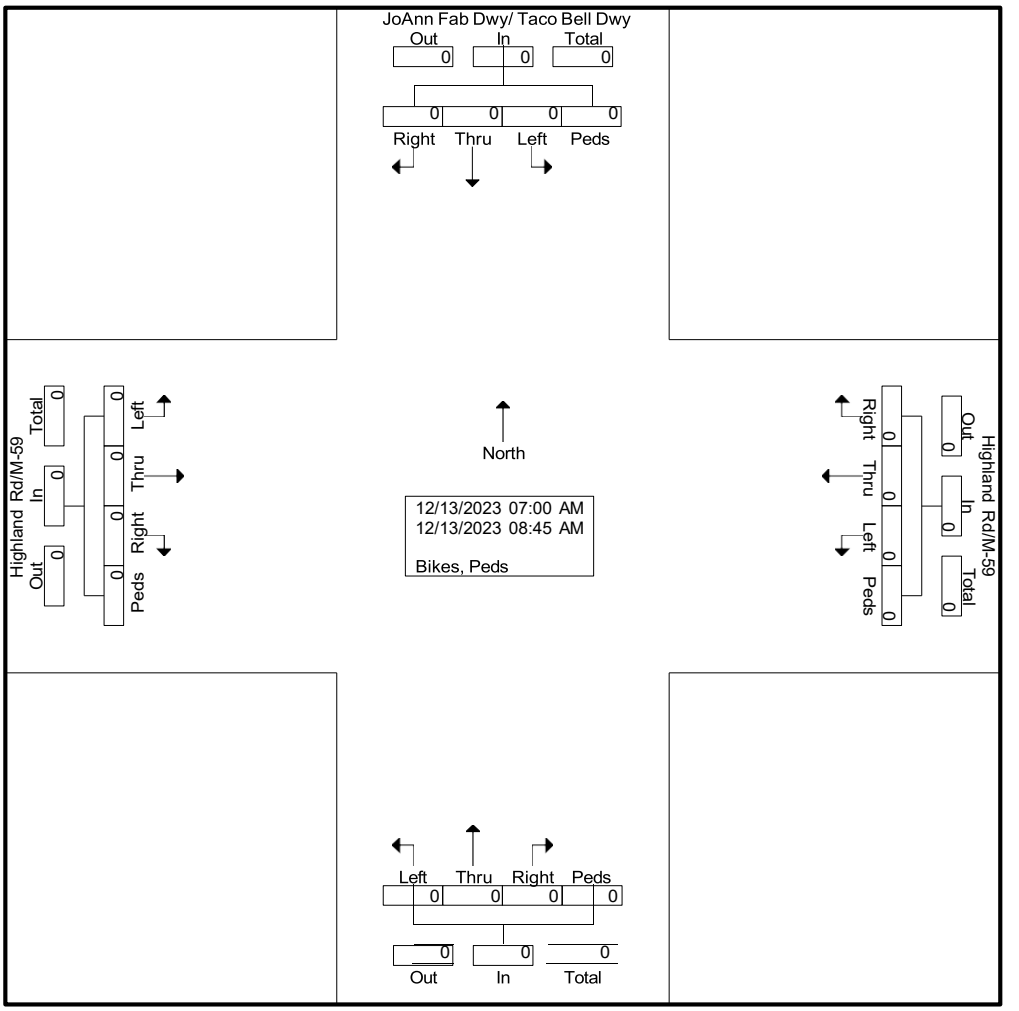
Start Time	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	**367**	0	0	**367**	0	232	2	0	234	0	0	0	0	0	0	0	0	0	0	**601**
08:00 AM	0	307	0	0	307	0	**265**	0	0	**265**	0	0	0	0	0	0	0	0	0	0	572
08:15 AM	1	320	0	0	321	0	220	1	0	221	0	0	0	0	0	0	0	0	0	0	542
08:30 AM	**2**	315	0	0	317	0	222	**3**	0	225	0	0	0	0	0	0	0	**2**	0	**2**	544
Total Volume	3	1309	0	0	1312	0	939	6	0	945	0	0	0	0	0	0	0	2	0	2	2259
% App. Total	0.2	99.8	0	0		0	99.4	0.6	0		0	0	0	0		0	0	100	0		
PHF	.375	.892	.000	.000	.894	.000	.886	.500	.000	.892	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.940
Passenger Vehicles	3	1222	0	0	1225	0	878	5	0	883	0	0	0	0	0	0	0	2	0	2	2110
% Passenger Vehicles	100	93.4	0	0	93.4	0	93.5	83.3	0	93.4	0	0	0	0	0	0	0	100	0	100	93.4
Heavy Vehicles	0	87	0	0	87	0	61	1	0	62	0	0	0	0	0	0	0	0	0	0	149
% Heavy Vehicles	0	6.6	0	0	6.6	0	6.5	16.7	0	6.6	0	0	0	0	0	0	0	0	0	0	6.6



File Name : 16432205 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432205
Start Date : 12/13/2023
Page No : 1

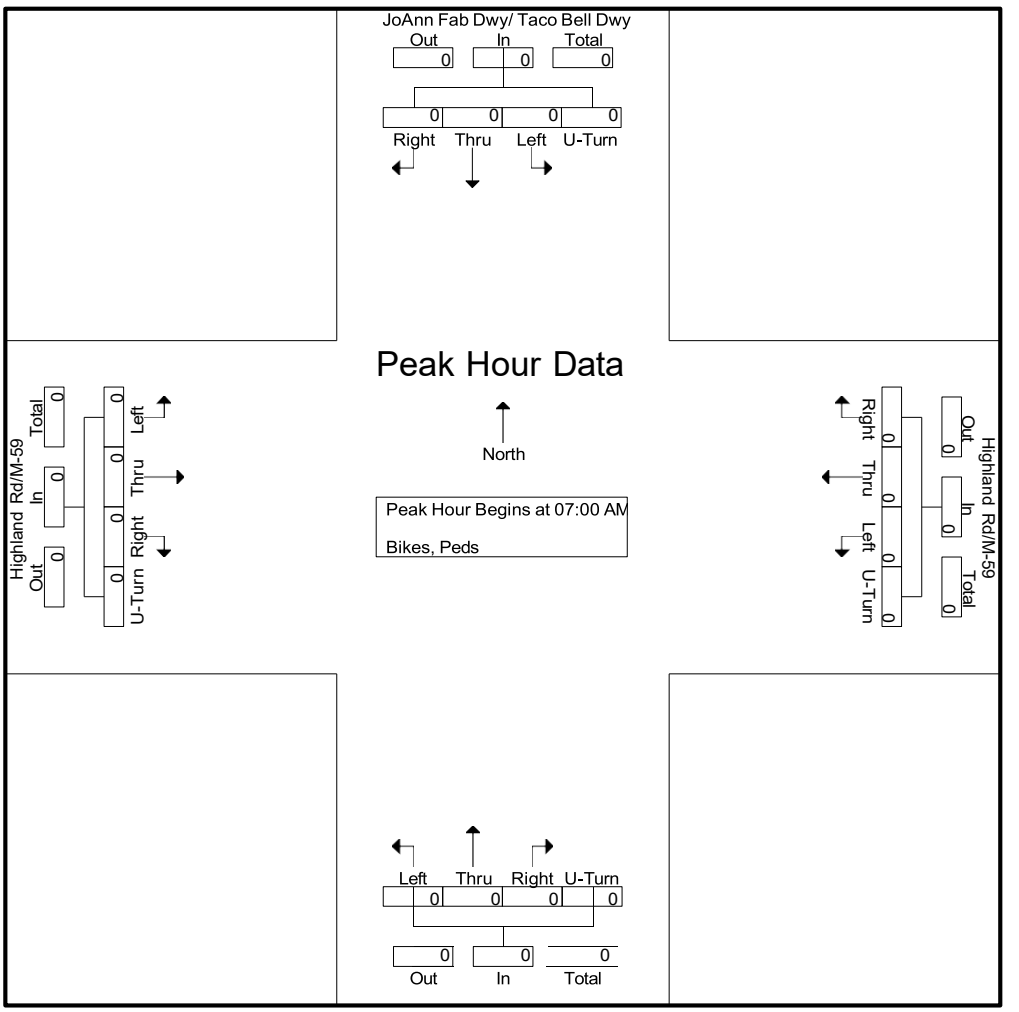
Groups Printed- Bikes, Peds

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					



File Name : 16432205 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432205
Start Date : 12/13/2023
Page No : 2

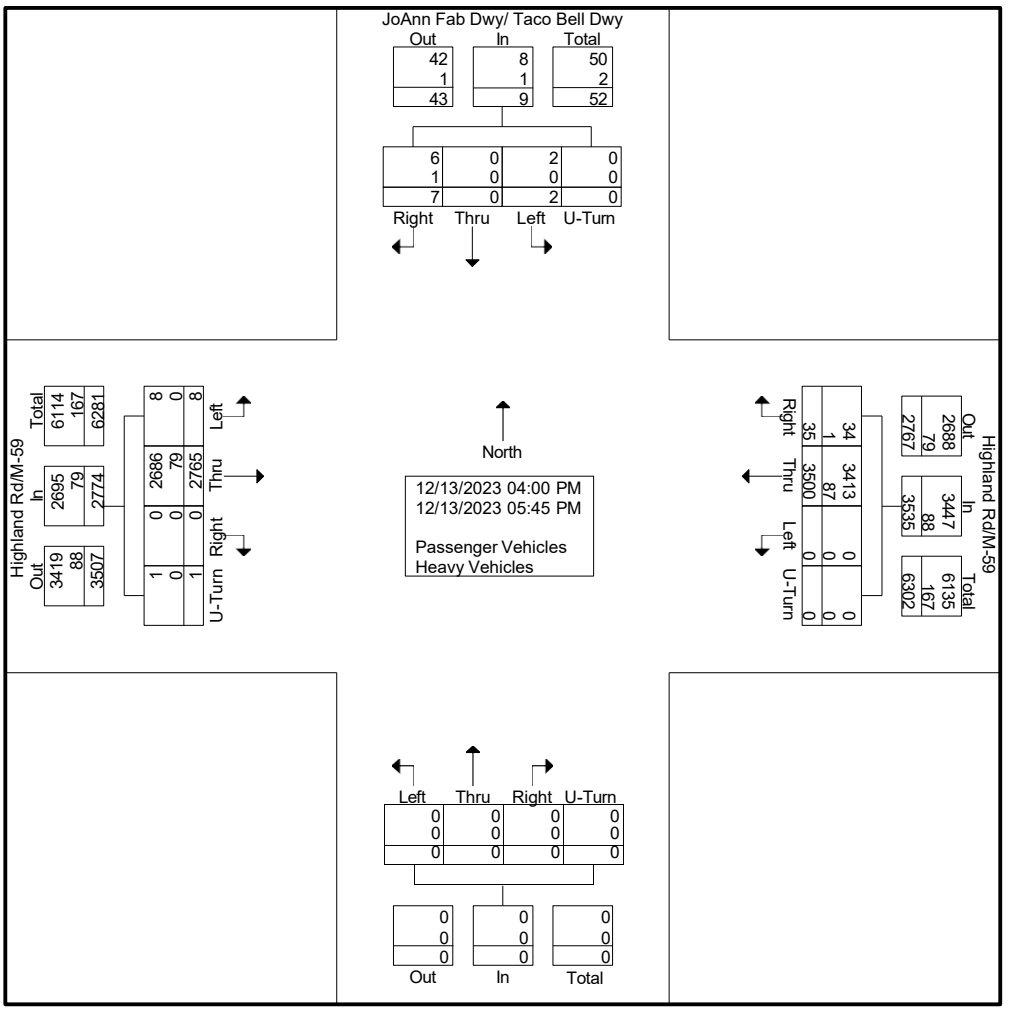
Start Time	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



File Name : 16432206 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432206
Start Date : 12/13/2023
Page No : 1

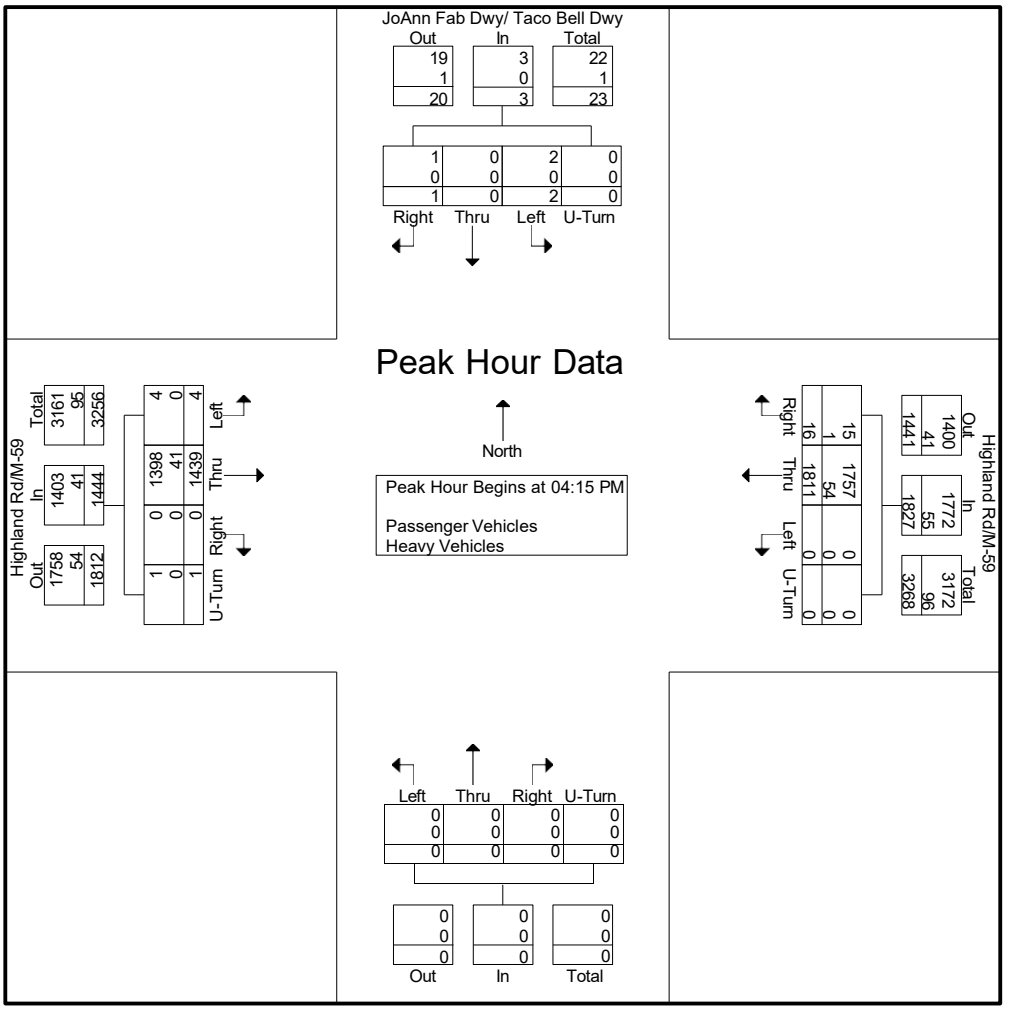
Groups Printed- Passenger Vehicles - Heavy Vehicles

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	0	337	0	0	337	0	423	7	0	430	0	0	0	0	0	0	0	0	0	0	767
04:15 PM	3	390	0	0	393	0	442	1	0	443	0	0	0	0	0	1	0	0	0	1	837
04:30 PM	0	326	0	0	326	0	447	5	0	452	0	0	0	0	0	0	0	1	0	1	779
04:45 PM	1	355	0	1	357	0	473	5	0	478	0	0	0	0	0	1	0	0	0	1	836
Total	4	1408	0	1	1413	0	1785	18	0	1803	0	0	0	0	0	2	0	1	0	3	3219
05:00 PM	0	368	0	0	368	0	449	5	0	454	0	0	0	0	0	0	0	0	0	0	822
05:15 PM	1	331	0	0	332	0	442	8	0	450	0	0	0	0	0	0	0	5	0	5	787
05:30 PM	1	350	0	0	351	0	426	0	0	426	0	0	0	0	0	0	0	1	0	1	778
05:45 PM	2	308	0	0	310	0	398	4	0	402	0	0	0	0	0	0	0	0	0	0	712
Total	4	1357	0	0	1361	0	1715	17	0	1732	0	0	0	0	0	0	0	6	0	6	3099
Grand Total	8	2765	0	1	2774	0	3500	35	0	3535	0	0	0	0	0	2	0	7	0	9	6318
Apprch %	0.3	99.7	0	0		0	99	1	0		0	0	0	0		22.2	0	77.8	0		
Total %	0.1	43.8	0	0	43.9	0	55.4	0.6	0	56	0	0	0	0	0	0	0	0.1	0	0.1	
Passenger Vehicles	8	2686	0	1	2695	0	3413	34	0	3447	0	0	0	0	0	2	0	6	0	8	6150
% Passenger Vehicles	100	97.1	0	100	97.2	0	97.5	97.1	0	97.5	0	0	0	0	0	100	0	85.7	0	88.9	97.3
Heavy Vehicles	0	79	0	0	79	0	87	1	0	88	0	0	0	0	0	0	0	1	0	1	168
% Heavy Vehicles	0	2.9	0	0	2.8	0	2.5	2.9	0	2.5	0	0	0	0	0	0	0	14.3	0	11.1	2.7



File Name : 16432206 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432206
Start Date : 12/13/2023
Page No : 2

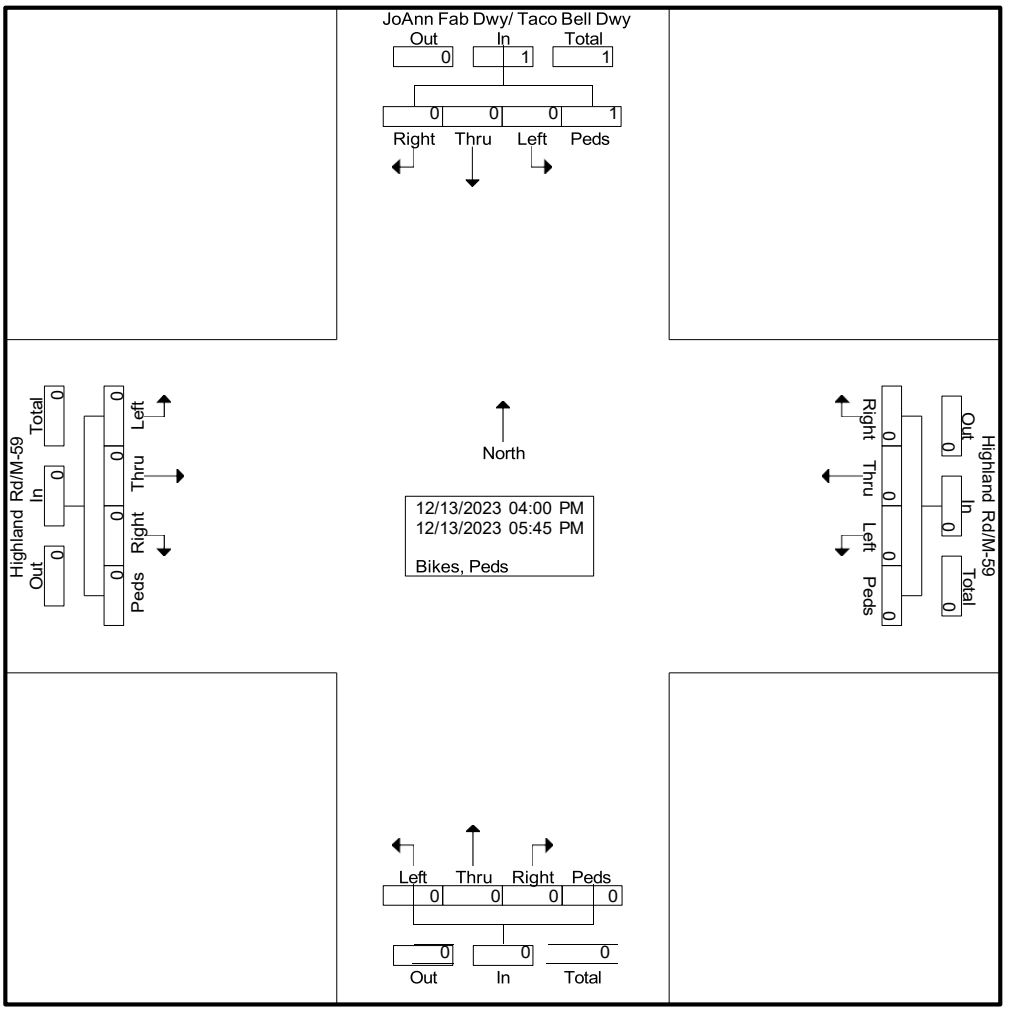
Start Time	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	**3**	**390**	0	0	**393**	0	442	1	0	443	0	0	0	0	0	**1**	0	0	0	**1**	**837**
04:30 PM	0	326	0	0	326	0	447	**5**	0	452	0	0	0	0	0	0	0	**1**	0	1	779
04:45 PM	1	355	0	**1**	357	0	**473**	5	0	**478**	0	0	0	0	0	1	0	0	0	1	836
05:00 PM	0	368	0	0	368	0	449	5	0	454	0	0	0	0	0	0	0	0	0	0	822
Total Volume	4	1439	0	1	1444	0	1811	16	0	1827	0	0	0	0	0	2	0	1	0	3	3274
% App. Total	0.3	99.7	0	0.1		0	99.1	0.9	0		0	0	0	0		66.7	0	33.3	0		
PHF	.333	.922	.000	.250	.919	.000	.957	.800	.000	.956	.000	.000	.000	.000	.000	.500	.000	.250	.000	.750	.978
Passenger Vehicles	4	1398	0	1	1403	0	1757	15	0	1772	0	0	0	0	0	2	0	1	0	3	3178
% Passenger Vehicles	100	97.2	0	100	97.2	0	97.0	93.8	0	97.0	0	0	0	0	0	100	0	100	0	100	97.1
Heavy Vehicles	0	41	0	0	41	0	54	1	0	55	0	0	0	0	0	0	0	0	0	0	96
% Heavy Vehicles	0	2.8	0	0	2.8	0	3.0	6.3	0	3.0	0	0	0	0	0	0	0	0	0	0	2.9



File Name : 16432206 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432206
Start Date : 12/13/2023
Page No : 1

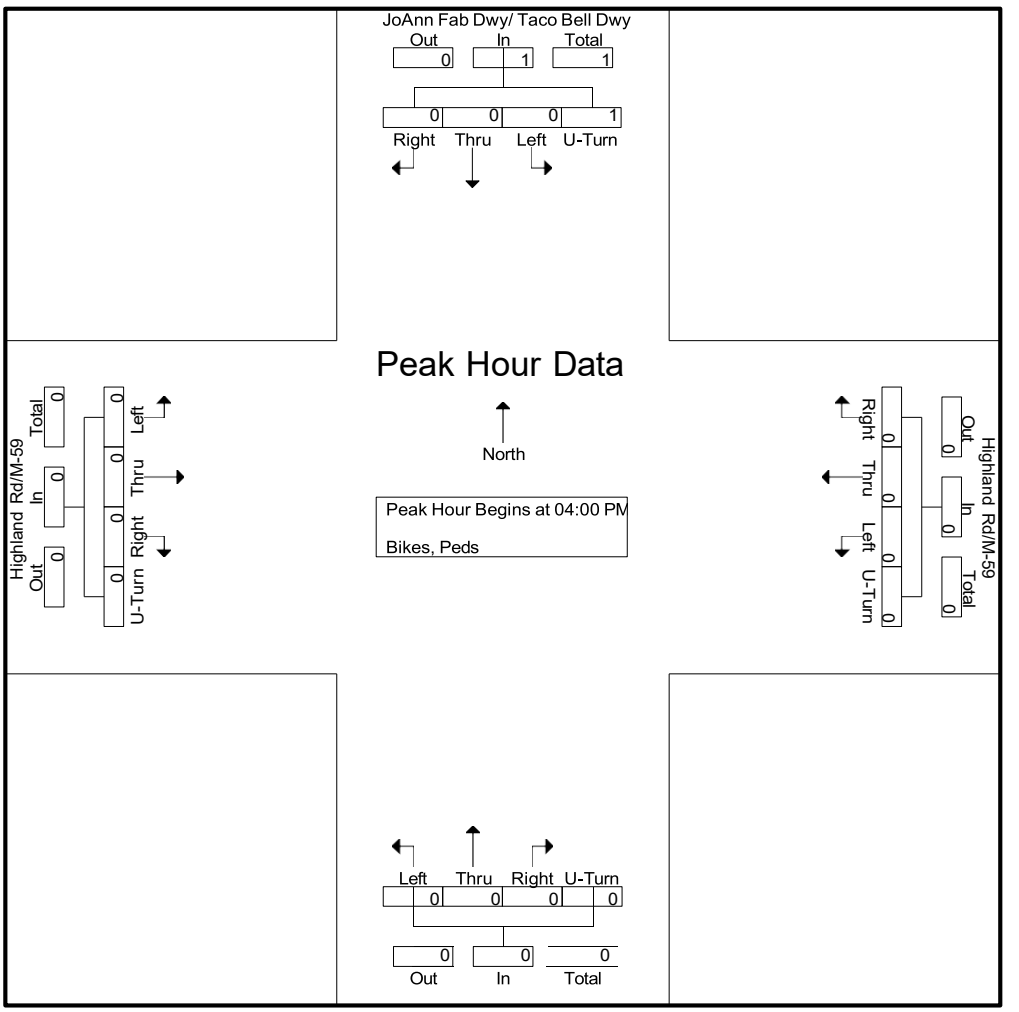
Groups Printed- Bikes, Peds

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	100		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	



File Name : 16432206 - JoAnn Fab Dwy_ Taco Bell Dwy -- Highland R
Site Code : 16432206
Start Date : 12/13/2023
Page No : 2

	Highland Rd/M-59 Eastbound					Highland Rd/M-59 Westbound					Northbound					JoAnn Fab Dwy/ Taco Bell Dwy Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	**1**
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.250



MDOT Michigan Department of Transportation

MS2

Transportation Data Management System

Disclaimer: The Michigan Department of Transportation (MDOT) works with individual agencies (cities/villages, counties, metropolitan planning organizations (MPOs), regional planning organizations (RPOs), and other areas of MDOT) to identify existing traffic count programs and/or traffic data ..... more

List View | All DIRs | Report Center

Record 1 of 1 Goto Record go

Location ID	63-0739	**MPO ID**	2717
Type	SPOT	**HPMS ID**	
On NHS	No	**On HPMS**	No
LRS ID	0704601	**LRS Loc Pt.**	0.3140493
SF Group	Local Road	**Route Type**	
AF Group	NoFactor	**Route**	
GF Group	Local Road	**Active**	Yes
Class Dist Grp	NTL_7	**Category**	
Seas Clss Grp			
WIM Group			
QC Group	Default		
Fnct'l Class	(7) Local Road or Street	**Milepost**	
Located On	Fisk Rd		
Loc On Alias			
SOUTH OF	Pontiac Lake Rd		

More Detail

STATION DATA

Directions: 2-WAY | NB | SB

AADT

	Year	AADT	DHV-30	K %	D %	PA	BC	Src
	2022	1,256	130	10		1,194 (95%)	62 (5%)	

VOLUME COUNT

	Date	Int	Total
	Mon 8/22/2022	60	1,274

VOLUME TREND

Year	Annual Growth

CLASSIFICATION

	Date	Int	Total
No Data			

NOTES/FILES

	Note	Date	

Item A.

SEMCOG | Southeast Michigan Council of Governments

Search...

Crash and Road Data

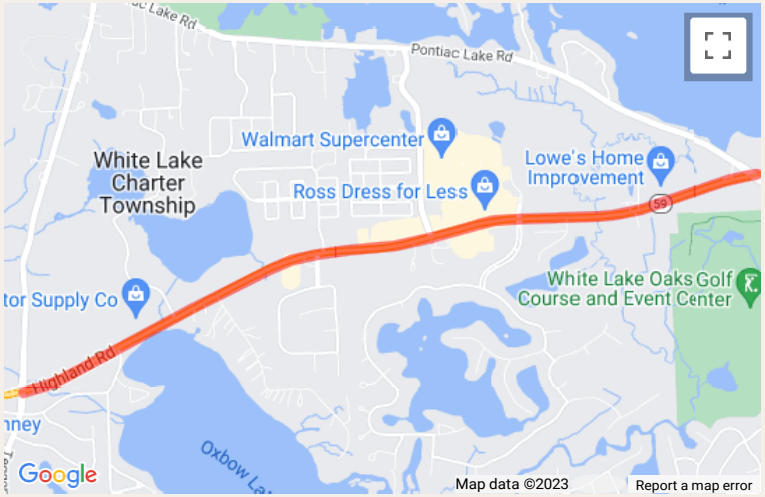
Road Segment Report

Highland Rd, (PR Number 648906)

From:	Teggerdine Rd 9.938 BMP
To:	Pontiac Lake Rd 12.354 EMP
Jurisdiction:	State
FALINK ID:	1797
Community:	White Lake Township
County:	Oakland
Functional Class:	3 - Other Principal Arterial
Direction:	2 Way
Length:	2.416 miles
Number of Lanes:	5
Posted Speed:	50 (source: TCO)
Route Classification:	M-59
Annual Crash Average 2018-2022:	82
Traffic Volume (2022)*:	33,400 (Observed AADT)
Pavement Type (2022):	Asphalt
Pavement Rating (2022):	Fair

* AADT values are derived from **Traffic Counts**

Street View



Item A.

JAN 2 3 2017

OAKLAND COUNTY ROAD COMMISSION
TRAFFJC - SAFETY DEPARTMENT
SIGNAL WORK ORDER

LOCATION: /"1 =-§ g {t--=-F ,'-"':s=l ,(DATE: .:..17-\7

c1TY/TOWNSHIP: LJJ 4 :te La1(t BY: IZ '- A-

COUNTY#: -{ / 3> &;(' STATE#: b Y)'-f I -01·0 CHARGES: .\JJ -=c:) 1 '7--=S'--={.: : / .°2 .

PLEASE PERFORM THE FOLLOWING:

ELECTRICAL DEVICE: INSTALL MODERNIZE MAINTENANCE

UNDERGROUND:

EDISON OK: YES NO JOB#:

COORDINATE W/DISTRfCT 7:

DIAL..	I	I	I	I		2	2	2	2		3	3	3	3		4	4	4	4
SPLIT.	I	2	3	4		I	2	3	4		I	2	3	4		I	2	3	4
CHANGE TIMING../. .Q. f.........	I;;><										IX								
_x_ CHANGE OFFSET........................											X								
CHANGE CYCLE LENGTH..........																			
ADD DIAL/SPLIT........................																			

CHANGE BREAKOUT OR EPROM:

_X_ CHANGE HOURS OF OPERATION:

OLD: ..,6 9.....,,M --_.Jf I-P=---=-"-""'c::.....>...-

NEW: G c< - . oe

_}{_REPROGRAMTBC (,.,._ f:..•c...E\,r k-J

INSTALL INTERCONNECT: TBC MINJTROL TONE

MBTOK: YES NO

NO CHANGE - RECORD CORRECTION

LoTHER: R v j

* MDOT RETIMING - FINAL *

APPROVED BY: DATE: 1 / 17 / 17

DATE INSTALLED: 1/21/17

INSTALLED BY: RICHARDSON CASEY

Item A.

ROAD COMMISSION FOR OAKLAND COUNTY, WATERFORD, MICHIGAN
PROGRAM LOG FOR EAGLE SIGNAL CONTROLLER Epac300, Mod 52 and 2070

INTERSECTION: \--'\ S9 (\--\\ HLJI.t-I) & F1SI<.

CITYNILLAGE/TOWNSHIP: - ----'--'-''''''''''' ''º''--1;.'--'''LA.'---'--'f.e''''''''--

COUNTY#: 4\35 MOOT#: b2o4\-Cl -026 REV#: DETROIT EDISON#_:__ _

DRAWN BY:-[l.a b1'9"1_'O APPROVED BY: __ .....:::w -=--- DATE DRAWN: .\ I \11 rJ

INSTALLED BY: ______ DATE INSTLD: I I

HOURS OF OPERATION: L DI'MS ·- G./\n - \GRh

HOURS OF FLASHING: 7 t>k1S•. \()Ph - b-Ar'\

2. UTILITIES -1. ACCESS

CODE......: \4 2.. CODE: Four digits (0000 - 9999)

4. UNIT DATA-5. RING STRUCTURE

.....NOTE: INSERT ALL RING #'S FIRST, THEN NXT & CONCUR•••**

CHANNEL:	RING	PHNXT	CONCURRENT PHASES																CHANNEL	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	VEH	PED
PHASE 1:	I	2.	1				I	I												
PHASE 2:	I	4		1			\	I											2	9
PHASE 3:					1															
PHASE 4:	I	\				1				\									4-	10
PHASE 5:	2	fo	\	I			1												S	
PHASE 6:	l	8	\	I				1											-	11
PHASE 7:									1											
PHASE 8:	2.	'S				t				1									'a	1'2.
PHASE 9:											1									
PHASE 10:												1								
PHASE 11:													1							
PHASE 12:														1						
PHASE 13:															1					
PHASE 14:																1				
PHASE 15:																	1			
PHASE 16:																		1		

CODES:

RING ....R! .9 -1'!1- ! Phase (1-4)
PHNXT ....P _se_ - -t.! . ng (1-16)
CONCUR PH _ Ph_ase To Be Concurrent (0=NO, 1=YES)

Forveh lechannel& ped channel, enter "1" under channel# shown.

3. PHASE DATA-1. BASIC TIMINGS

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	RANGE
Minimum Green	5	10		7	S;	HI		7									00-99
Passaae	3.()			3.0	3,Q			3.0									0.0-9.9
Maximum #1		0		"':1		ao											000-999
Maximum#2																	000-999
Yellow Clearance	4-1	4-1		3·0	41	4-1		l?i-0									3.0-9.9
Red Clearance	lf.	1.t.		(	·/b	1.&		("									0.0-9.9

ROAD COMMISSION FOR OAKLAND COUNTY, WATERFORD, MICHIGAN
PROGRAM LOG FOR EAGLE SIGNAL CONTROLLER Epac300, Mod 52 and 2070

3. PHASE DATA- 3. PEDESTRIAN TIMINGS

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	RANGE (SEC)
Walk		7		7		7		7									00-99
Pedest Clearance		11		11		14		11									00-99
Flashinq Walk																	
Extend Ped Clear		0		0		0		0									
Act Rest in Walk																	

3. PHASE DATA- 4. INITIALIZE & NON ACTUATED RESPONSE

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Initial	\	4-		\	I	4-		\								
NA Response																

CODES:	0	1	2	3	4
Initial	none	inactive	red	yellow	green
NA Response	none	to 1	to 2	both	

3. PHASE **DATA- 5.** VEHICLE & **PEDESTRIAN** RECALLS

Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Vehicle Recall		3		2.		3		2.								
Pedestrian Recall		2.				2										

CODES:	**0**	**1**	**2**	**3**	**4**
Vehicle	**none**	**1 call**	**min**	**max**	**soft**
Pedestrian	**none**	**1 call**	**ped**	**bot N. A.**	

3. PHASE DATA- 6. NONLOCK-& MISC CONTROLS

Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Nonlock Memory	I				!											
Dual Entrv				I				!								
Last Car Passage																
Conditional Service																

CODES: 0 = NO 1 = YES

3. PHASE DATA- 8. SPECIAL DETECTOR- 0. SPC 1-8 (EpiiC 300/M52)

Detector# on Print	1	2	S, Z	b..f	,a'	'8'	'7	' 8"
EPAC/M52 "D" Connector	1	6	7	8	**4**	**5**	2	3
Assianed Phase	\	\	,g		5,	S	4-	4

CODES: 0 1 2 3 4

See attached detection sheet for D-connector pin assignments

Operation Mode: Norm Veh Norm Ped 1 call St Bar A St Bar a

A. CONTROLS	RANGE SEC)
Extend Time	**00-99**
Delay Time	**00-999**

3. PHASE DATA - 8. SPECIAL DETECTOR - 2. VEH 9-16 (2070)

Det	
2070 "D" Conn	
Assl ned Phase	

Jl heet or pin ments

CODES: 0

Operation Mode: Norm Veh **Norm Ped 1 call St Bar A St Bar B**

	NGE (SEC)
Extend Time	0 **0-99**
Delay Time	**00-999**

4. UNIT DATA -1. STARTUP & MISCELLANEOUS

Start up time \0 (00-99) State O (0 = fl, 1 = red)
Auto ped clear O Red revert : 1 ·0 (2.0 - 9.9)
Stop time reset : 0 (0 = No, 1 = Yes)

4. UNIT DATA -2. REMOTE-FLASH

Phase	1	2	3	4	5	6	7	8	A	B	C	D	E	F	G	H
FLASH																
YEL																
ALT																
ENTER				\				I								
EXIT		I				I										

Test A= Remote Flash: O (0 = no & 1 = yes)

6. TIME BASE - 0. SPC FUNCTION **MAPPING**

FUNCTION NAME

AS - = OU - P FL G PHS
AS 8-15 = FL R PHS

SPC FUNC
1 2 3 4 5 6 7 8

: Go up after entering to get this screen.

4. UNIT 08-15

EPAC ALT SI ASE PAI REVERSE)

SEQ	.PP1.	.PP2.	.PP3.	.PP4.	L-PP'5.	.PP6.
08						
09						
10						
1-1-						

SEQ	.PP1.	2.	.PP3.	.PP4.	.PP5.	.PP6.
12						
13						
14						
15						

4. UNIT DATA - 3. OVERLAP STANDARD

Phase	1	2	3	4	5	6	7	8	CH#
OVL A Phses									13
+GRN Phses		\							
OVL B Phses									
+GRN Phses									
OVL C Phses									,S
+GRN Phses		I				I			
OVL D Phses									
+GRN Phses									

Phase	1	2	3	**4**	5	6	7	8	CH#
Overlap I									
Overlap J									
Overlap K									
Overlap L									
Overlap M									
Overlap N									
Overlap 0									
Overlap P									

Enter a "1" in the channel# shown.

0 = Phase not part of overlap; 1 = Phase part of overlap.

4. UNIT DATA - 4. OVERLAP SPECIAL

Overlap	**A**	B	C	D	E	F	G	H	I	J	**K**	L	**M**	**N**	0	p
Trail areen																
Trail vellow																
Trail red																
-Green / -yellow (-G/YI	I		5													
+Green (+GRN)																

* Overlap green omitted by# - phase green; Overlap yellow omitted by# - phase yellow
* For FYA operation, '-G/Y' entry defines the phase that is the green arrow
* For FYA operation, '+GRN' entry is the thru phase opposing the FYA phase

4. UNIT DATA· 8. 1/0 MISCELLANEOUS

Rina#	1	2	3	4	CONN	MODE
Input Response	\	2.			.D ..	
Output Select	I	2-			"D"	

Connector "D" : 0 = Standard & 1 = Alternate

1/0 Modes	INPUT	OUTPUT
"ABC" Connector		
"D" Connector	\	

Controller with Solo Detection:
EPAC300/M52 enter **"1"** under D Conn Input
2070 enter "O" under D Conn Input

5. COORDINATION DATA -1. COORD SETUP

		0	1	2	3	4	5
OPER:	I	FRE	AUT	MAN			
MODE:	0	PRM	YLO	PYL	POM	SOM	FAC
MAX :	O	INH	MX1	MX2			
CORR:	'2.	OWL	MOW	SWY	SW+		
OFST:	____	BEG	END	OF GREEN			
FRCE:	____	PLN CYC LE TIME					
MX DWELL:		YIELD PERIOD:					

5. COORDINATION DATA· 2. MANUAL CONTROL

DIAL:____ SPLIT: __ OFFSET: __ SYNC:__ _

To set cycle zero in manual control enter "1" for sync then press "E".

5. COORDINATION DATA • 3. OIAUSPLIT OATA

Mode: 0 = actuated, 1 = coord phase, 2 = minimum recall, 3 = maximum recall,
4 = pedestrian recall, 5 = maximum + pedestrian recall, 6 = phase omit,
7 = dual coord phase.

Sequence: 00 - 15 (Unit data has definition)
Ring Lag: Ring offset from local cycle zero when not barrier locked to Ring #1.
Time: 00 • 99 seconds.

ROAD COMMISSION FOR OAKLAND COUNTY, WATERFORD, MICHIGAN
PROGRAM LOG FOR EAGLE SIGNAL CONTROLLER Epac300, Mod 52 and 2070

5. COORDINATION DATA· 3. DIAL/SPLIT DATA

LEVEL 2

DIAL 1 / SPLIT 1 CYCLE LENGTH: 110 Sec. . , .

PHASE	1	2	3	4	5	6	7	8
TIME	17	C./		""I,:I	1'7	61		3
MODE	12..	,J		2.. '		I		2.

DIAL 1 / SPLIT 2 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 1 / SPLIT 3 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 1 / SPLIT 4 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

LEVEL 1

OFFSET	1	2	3
TIME	Y , -		;
SEQUENCE			
RING 2 LAG			
RING 3 LAG			
RING4LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
RING 2 LAG			
RING 3 LAG			
RING4LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
RING 2 LAG			
RING 3 LAG			
RING 4 LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
RING 2 LAG			
RING 3 LAG			
RING4 LAG			

DIAL 2 / SPLIT 1 CYCLE LENGTH: 90 Secs Program Cycle Length

PHASE	1	2	3	4	5	6	7	8
TIME	13	45		20	13	45		20
MODE	2	1		2	2	1		2

DIAL 2 / SPLIT 2 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 2 / SPLIT 3 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MOOE								

DIAL 2 / SPLIT 4 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MOOE								

OFFSET	1	2	3
TIME	22		
SEQUENCE			
RING 2 LAG			
RING 3 LAG			
RING4 LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
RING2LAG			
RING 3 LAG			
RING4 LAG·			
OFFSET	1	2	3
TIME			
SEQUENCE			
RING2LAG			
RING3LAG			
RING4 LAG			
OFFSET.	1	2	3
TIME			
SEQUENCE			
RING2LAG			
RING 3 LAG			
RING4 LAG			

5. COORDINATION DATA- 3. DIAUSPLIT DATA

LEVEL 2

DIAL 3 / SPLIT 1 CYCLE LENGTH:

PHASE	1	2	3		5	6	7	8
TIME	.3							
MODE	Q.							2

DIAL 3 / SPLIT 2 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 3 / SPLIT 3 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 3 / SPLIT 4 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

LEVEL 1

OFFSET	1	2	3
TIME	115"		
SEQUENCE			
RING 2 LAG			
RING 3 LAG			
RING 4 LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
RJNG2 LAG			
RING 3 LAG			
RING4 LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
R1NG2 LAG			
RING3 LAG			
R1NG4 LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
R1NG 2 LAG			
RING 3 LAG			
RtNG4 LAG			

DIAL 4 / SPLIT 1 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 4 / SPLIT 2 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 4 / SPLIT 3 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

DIAL 4 / SPLIT 4 CYCLE LENGTH:

PHASE	1	2	3	4	5	6	7	8
TIME								
MODE								

OFFSET	1	2	3
TIME			
SEQUENCE			
RING2 LAG			
RING3 LAG			
RaNG4 LAG			
OFFSET	1	2	3
11ME			
SEQUENCE			
R1NG2 LAG			
RfNG3 LAG			
Rf;NG4 LAG			
OFFSET	1	2	3
TIME			
SEQUENCE			
RIHG2 LAG			
RING3 LAG			
RtNG4 LAG			
OfFSET	1	2	3
rr.ue			
seQOENCE			
RING'2 LA'G			
RtNG3 LAG			
RING4LAG			

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PROGRAM LOG FOR EAGLE SIGNAL CONTROLLER Epac300, Mod 52 and 2070

6. TIME BASE DATA - 2. SET TIME/ DATE

-- DATE --	-- TIME --		BEG •• OST - END			
MMIDD/YY	HH:MM:SS	MON & WEEK:	MM	SW	MM	SW
/ /	___		3	'2.	..ll__	_j_

CYCLE ZERO: Z.4- : CO (HH:MM - EVENT)

STZ DIFF: -18000 (GPS OFFSET)

2. UTILITIES - 8._CONFIGURE PORTS - 8. GPS CONFIGURATION.

GPS: __ (0-NO, 1-YES) PORT: 4

6. TIME BASE DATA - 3. TRAFFIC EVENTS

PRO DAY	TIME H H MM	COORD PATRN	MAX 2 PHASE #S	OMIT PHASE#S
0\	00 :co	S /S /		
0\	0 :ct:>	\ / \ /		
0\	'2.. :CO	5. / S /		
02.	CO :oo	SIS /		
C1	6, :	;}.:/ \ /I		
02	oe, :oo	1 / \ /\		
02	/ S :ao	3/ I / \		
0"2..	rq :oo	I,/ I /		
OiJ...	:::11..:oo	51 _z:; I		

REFERENCE DAT A
PRO DAY = 01 - 99
(Program day)

HH:MM = 24 Hour clock

PATTERN: (D/S/O)
FLASH =5/5/
FREE =0/0/4

MAX2 & OMITS:
Gill free, set pattern to *01010.*

D = DIAL#
S =SPLIT#
0 =OFFSET#

Item A.

6. TIME BASE DATA-4. AUXILIARY EVENTS

PRO DAY	TIME HH	MM	AUX A1	A2	A3	DETVALUE D1	D2	D3	DIM DIM

REFERENCE DAT A1/.
PRO DAY= 00/9
(Progra:z:day

Hz:M. 24 Hour clock

X = Output states
DETVALUE:
= Oet diag value
= Enables report
3 = Repeat multiplier

DIM = °Dimming state

ALL: 0 = off, 1 = on

6. TIME BASE DATA - 5. TIME OF YEAR EVENTS

DATE MM/ DD / yy	SPECIAL DAY	DATE MM / DD / YY	SPECIAL DAY	WEEK-

EFERENCE DATA
Spficlal _day = Any program day OO - 99.
Speer ,week:
Week 0 =Pro Day 01-07

6. TIME BASE DATA - 6. EQUATE/TRANSFER

CODE: 0 (0 = equate, 1 = transfer)

FROM						
01 = 07						
02 = 03	04	05	06			
=						
=						
=						
=						
=						

DAY EQUATE: Care must be taken to insure days are not equated to undefined days or days that are equated to other days. The result wil be a day without events to run.

ROAD COMMISSION FOR OAKLAND COUNTY, WATERFORD, MICHIGAN
PROGRAM LOG FOR EAGLE SIGNAL CONTROLLER E c300 Mod 52 and 2070

7. PREEMPT DATA -1. ALL PREEMPTS

RING TIMES	1	2	3	4	
MIN GREEN/W ALK					
VERRIDE FL	1/2	2/3	3/4	4/5	516
ST US					

CODE 0 = NO, 1 = YES

7. PREEMPTDATA-PREEMPT1

1. MISC DATA: (0 = no, 1 = yes)

TEST..: N-LOCK.: LINK PR .
DELAY: EXTEND: DURATION:
MXCALL: LOCK OUT:

RING	1	2	3	4	5	6	7	8
EXIT								
CALLS								

2. INTERVAL TIMES:

SEL PED CLR: TRK YEL CHG:
SEL YEL CHG: TRK RED CLR:
SELRED CLR: DWELLGRE
TRACK GREEN: RET PED R:
TRKPED CLR: RETY CHG:
RE EL CLR:

4.PEDESTRI STATUS:

PHASE	1	2	3	4	5	6	7	8
TRKG								
D L								

(0=dont wlk, 1=wlk, 2=flwlk, J=dark)

CYCLE

(0 = no, 1 = act, 2 = recall)

5. OVERLAP STATUS:

0 LAP	A	B	C	D
TRK N				
DWELL				

(0=red, 1=wll, 2=flr, 3=flv, 4=dark)

CYCLE

(0 = no, 1 = t)

3. VEHICLE STATUS:

PHASE	1	2	4	5	6	7	8
TRK GRN							
DWELL							

(0=red, -grn, 2=flr, 3=flv, 4=dark)

CYCL

no, 1=act, 2=min recall, 3=max recall

6. LOW PRIORITY: (0- o, 1=yes)

TEST..: N-LOCK.: KIP.....:
DELAY: EXTEND: D TION:
DWELL: MXCALL: LOC UT:

RING	1	2	3	4	5	6	8
DWELL							
CALLS							

SIGNAL PHASING

PHASE	ROAD	PHASE	LOAD SW	FLASH
1	t=.B k 9 LT (C. ....i '2.,01,J\	C...L	I	-
2	we. .e.	A	2.	f1. A
3				
4	Se, , ,	R	4	FU
5	'V--1 r'\SS> 1..:r (C... w\	AL	5	-
6	, e. t-"li.::.!:'	C.	b	FL.A
7	,			
8	Ne.	D	8	!=Le.,
OLA	f:'e S.91..-t' I .,_"-w..Jt. ·-- -- ,.Lt>.....-.J 'tbW-Ow hQ<ZD,,,J\ 'li!..a:, W\	C.1...	9	1..A
OLB				
OLC	we,Y'I L't(\."6.'v-\\r-IC-..'-1 n - 'f (Z.c1,.1, Q+,1-.)	AL	I\	- LA
01,..D				
1PEO				
2PED	v.JL h<9 f>6;D (r-1oe.."t'--\ 1-eC-)	wA	- \ -	
3PEP				
PED.	e v; e'O "(\,JC T- t .,.c..,.'.	WR	-r4	"
;;p O				
. 6fE0.\	Mt:;9 <=-eo Sol.11"1-'(c; \	we	tS	
.7PED				
SPED	e, , P ('t;./\S:T. LEc_)	WI)	IG:,	

CONTROLLER INFORMATION SHEET
Size P44-16 Cabinet with MOD 52 EPAC w/ FYA

INTERSECTION: M-59 (Highland) & Fisk
COUNTY NO: 4135
STATE NO: 63041-01-026
PREPARED BY: Rachel Jones
DATE: 10/10/11

Backpanel :-

Load Switch 1:	EB M59 LT (G: green arrow)	CL	
Load Switch 2:	WB M-59	A	FLA
Load Switch 4:	SB Fisk	B	FLR
Load Switch 5:	WB M59 LT (G: green arrow)	AL	
Load Switch 6:	EB M59	C	FLA
Load Switch 8:	NB Fisk	D	FLR
Load Switch 9:	(OLA) EB M59 LT (G: flashing yellow arrow; Y: yellow arrow; R: red arrow)	CL	FLA
Load Switch 11:	(OLC) WB M59 LT (G: flashing yellow arrow; Y: yellow arrow; R: red arrow)	AL	FLA
Load Switch 13:	WB M59 Ped (North Leg)	WA	
Load Switch 14:	SB Fisk Ped (West Leg)	WB	
Load Switch 15:	EB M59 Ped (South Leg)	WC	
Load Switch 16:	NB Fisk Ped (East Leg)	WD	

Jumpers :-
A28-A29,A34-A35,A37-A38,A43-A44,B28-B29,B34-B35,B37-B38,B43-B44,B52-B53, B55-B56,B58-B59,B61-B62,D22-D26, C56-PB10, D56-PB10, 10R-PB9, 12R-PB9.

Signal Monitor :- 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11, 9-11.
All switches OFF EXCEPT: Dual Select A&B; G&Y Enable; FYA 1-9, 5-11; SSM 2,4,6,8,9,11.
Minimum Flash = 4+2+1

Autoscope *SOLOJ-* *(Y\ool* o

Co-#-4135

Mini-Hub O Detector Port Master
Front Panel Input/Output Pio Assignment

The Mini-Hub II has inputs and outputs available through the front panel Input/ Output connector and through the back edge connector. The pin assignments for the Mini-Hub II front connector are listed in the following table. Edge connector pins are identified by NI.JMBER on the component (front) side of the board. Edge connector pins are identified by LETTER on the backside of board

ı #	Mini-Hub II conn.	Edge conn.	Front Harness	Description	D-Conn. Term #	0- Conn. Detector Descript.	On Print Detector number	Phase
\	Output **1** LED	F	1 .	£S MS.5 *1....:-r*	I.	**9**	\ .	l
I	Output 2 LED	**W**	**14**	***EB* J-1S9 *Ltk&/***	f>	\4	2	I
I	Output 3 LED	**S**	2	**6-81--15 *Tt-tCZU..L***				
I	Output **4** LED	y	15	**E;"Sh "'f"'1W.-R**				
2	Output 5 LED	(JP1)4	3	**t-l** F"\SK. **Lt**	(	\S	5	O
?_	Output 6 LED	(JP7)5	16	**N%** \r\S.\/. 'i.it\Q'..IJ.._e..i'	8	't.t: \b	6	g
3	Output 7 LED	(JP2)8	4	L> t"\$9 *t. 1'*	4	'·t.eJ. ...\'1	l	5
3	Output 8 LED	(JP8)9	17	we.. *i"\;9 '-'"fflr;o-l*	5	◥	<a	5
3	Output 9 LED	(JP3)13	5					
3	Output 10 LED	(JP9)14	18					
	Output 11 LED	(JP4)17	6	c::, L'{	2	\0	I I	4
	Output 12 LED	(JP10)18	19	$8, **'PIS.I(** f	3	\\	\'2..	4
	Output 13 LED.		7					
	Output **14** LED		20					
	Output 15 LED		8					
	Output 16 LED		21					
	Input 1 LED	(JP5)1	9	**LS\- 12.cO** Cc-3a)				
	Input 2 LED	(JP11)2	22	**\.. '2-,Q,e\') Cc. -3.o)**				
	Input 3 LED	(JP6)3	10					
	Input 4 LED	(JP12)10	**23**	**LS4** (C.-3,)				
	Input 5 LED		**11**	LSS-**11** (.t) .. :))				
	Input 6 LED		**24**	LS b '12-.tt) (o • '3o>				
	Input 7 LED		**12**					
	Input 8 LED	**(withJP14•)**	**25**	\.S.% **e-G>** (c· 3o)				

• Input 8 with JP1 4 inserted becomes 24 VDC through Input/ Output Connector on front panel. Logic Ground is the GREY (pin I J) wire form Input/ Output connector *on* front oanel.

Chapter 5
Connecting Solo MVP Power and Communications Cables

Usllally.1he Solo cable (1he "pig1ail" cable from I.he Solo l\-lVP) is spliced to a Branch Cable, eithc!r in a junclion bo>. or in 1he hand-hole at 1he pole base. The Branch cable runs from the sphcc poin110 1h.: cabinel, and 1crmina1es to 1he ACI..P Use the chart below (copy the blan}.; rablc pro,·ided in .'\ppendix A) 10 record which pairs of 1he Solo cable are spliced 10 the. Br:lllch cable pairs. For Branch cable lengths 0f 300 ft or less. a separalc cable 10 power 1he Solo Pro is not normally necessary.

Be rnre rouse sµlicing methods and nialerials ap[)ropriare for low vol1:ige cornmunic:itions ,plici11g. \\'hen splicing is comµle1ed, properly seal the splice.

\\'hcn 1he br:inch cables arc brought into the c:ibir. 1. label each (Jble, stnr1i11g ,,·ith cable 1 from 1he Solo MVP virn·ing Ph:ises 2 a11d 5, and \\Orking clocl-:wisc ;,round the in1erscction, labeling cabks 2, 3, and 4

Tcrmin:11c lhc c11bles to th ACTP in 1hr si\me 01dcr. Tn ing c:irc 10 il - ign the Sensor numbers (in !he Autoscoµc Proµerties Edilor) i11 1hc same orde1 3s the c:iules arc terinina1ed will fJcilira1c e:isicr main1e11ancc a11d 1roublcshoo1i11g.

An example is shown in 1he 1:iblc below. In this e.,:imµlc, :i cr:irnte [)011·cr oblc is- shown 111 111 1.1lla1io11s where., 6-pair branch cable is usu.I, ro,vcr a11d coinmunic:111011s are 11su:illy combined in one cable

/\ bl:ink copy of 1his 1:ible is provided for c1uplica1io11 in /\rµc11dix A

DRAIN v.)1'2-t ..:,- 5,ic, v¼Vr> +-o w\-\1 "b (::rQN/wt+I ('.\.d'
then <.:.-'1--P,1f\6r 101t1 .h, "'::,hu:!.lcb ,i . l'\-r--c.dl-..c .A i..c:,

Appen IX
Solo System-Wide Interconnections

4-o G c '- v--..!. 1 u.J
" rc=-a- H\--c:. € f A-fl L _

O1,rli<.:atc 1he followi11g wulc 10 kccr 1r:ich of :ill Solo MVP connections·

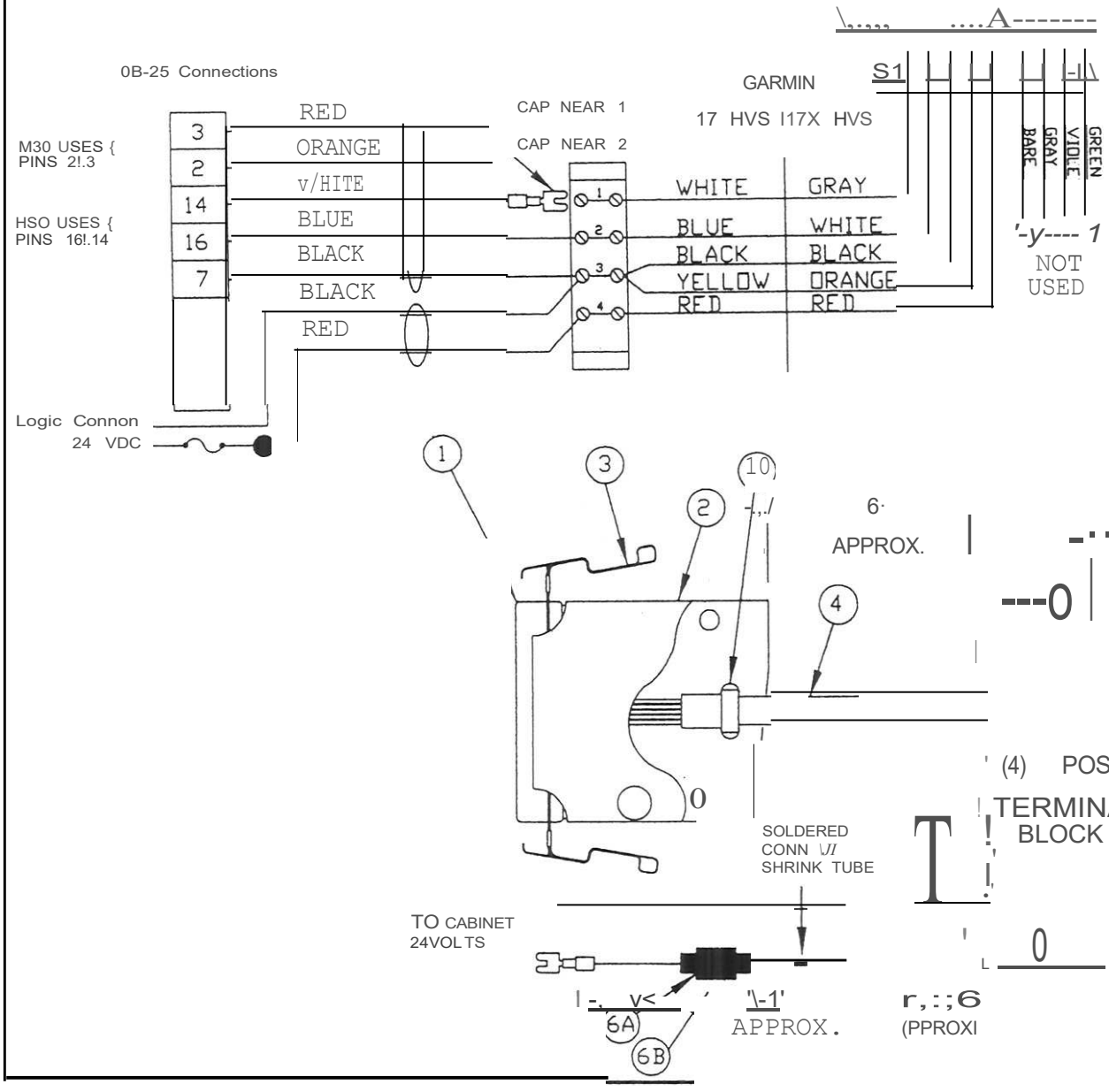
Solo MVP !.,-,It i'I w-r,,01 nvfflb,r)			Branch Power Cable (wf'flt Il\ •Yf :,lorJ	Branch Communicaliom Cable j-.,l'llt'" _.t cd'X)			Communicaliom Interlace Panel	
PIN	PAIR COLOR	WIRE COLOR	WIRE COLOR	PAIR	PAIR COLOR	WIRE COLOR	SIGNAL	1ERMINAL
A	BRN/BLK	-f BRN >t	.B		BUi/..::tt-1	(0	24V PWR	1
B	BRN/BLK	I' BLK ...,.	l.:,\1- I		8 (Z.rv/ ,.,:.,Hr	0 t4 I	24V RTN	2
N	-...	"'GRN/YELt	&e.O		&e.1:::i/ }{	6	EARTH GND	3
p	BLU/BLK	BLU	BLU	1	&It/OH	AL"v\..	SUP RX•	4
u	BLU/BLK	BLK	W r\1	1	P-t L../i,.)i-,	;._0 I	SUP RX-	5
D	R=DiBLK	RED	gf-u	2	'2J:: D/ril u	(2. C u	SUP TX+	6
R	REOIBLK	BLK	{3(_1.,\	2	fl.J::.,) iBuJ..	6Lt...L	SUP TX-	7
..	YEL/BLK	YEL	o \.;-	J	0 £!.&/ ,,:YH	O C::s-	DET•	8
_- .	YELIBLK	BLK	wr1-r	J	c)c..(,./i.j i-1-T	---.) t+-r	DET-	9
J .	·-,'."HI/BLK	WHI	bCEi	J	lA u=y /W r-1,	G l'-£.t	VIDEO•	10
rl	1··/\"HI/8LK	BLK	L,01-\1	4	'h-£2€.---1 /.,j1	I \....0'1° \	VIDEO-	11

* I5 SEPERATE POWER BLK WHT

30' 9CON. GPS
28Av/G

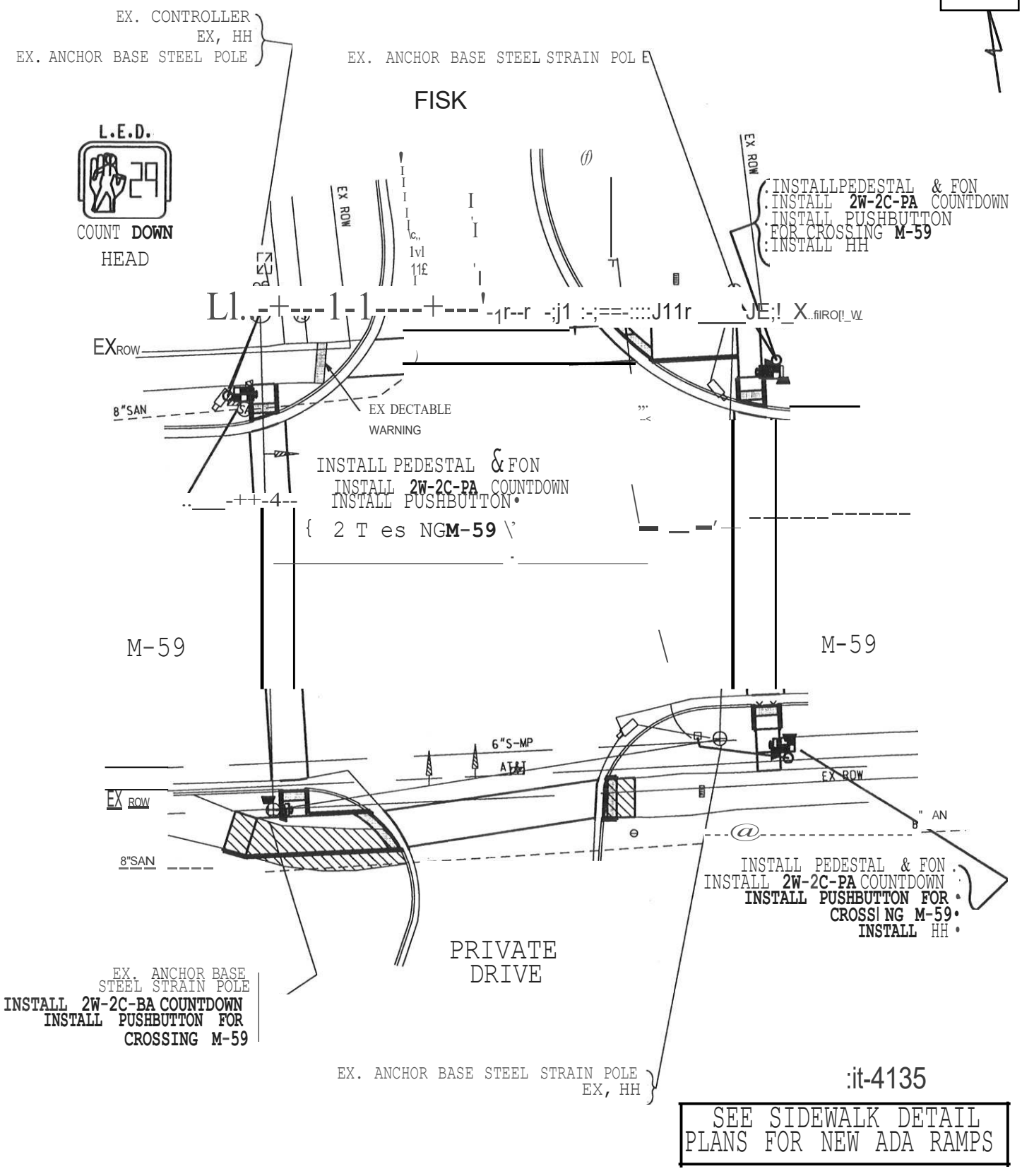
DET. No	DESCRIPTION	VENDOR	PART No.	QTY.
1	DB-25 HALE	AMP	747912-4	
2	HOUSING KIT	AMP	207345-1	
3	SPRING LATCH DB CONNECTOR	NEVARK	44F87SI	2
4	6 CONDUCTOR 22AVG	Alpha	1176C	6 FT
5	TERMINAL	3M	HVVJS-IOF"JX	7
6A	FUSE HOLDER NE',IARK 167KH34			
6B	rusE <J/2AI, NEYARK M27F654			
7	j2 CONDUCTOR BELDEN CABLE• 8205-060			
8	2> CHANNEL NUTS UNISTRUT TEAL #A400G-1032EG			
8A	2) Screw 10-32 x 1• e an head phllllps SS			
8 !3	2ec,) •10 lock washer-/flc,t wc sher-/fender- we sher			
9	j4 POSITION TERMINAL BLOCK NEIIARK •28F724			
10	jTIE-RAP			

REVISED 11/10/09 DG <17X HVS)



CARRIER AND GABLE INC.
TECH SERVICES

5020
GPS TO SEPAC

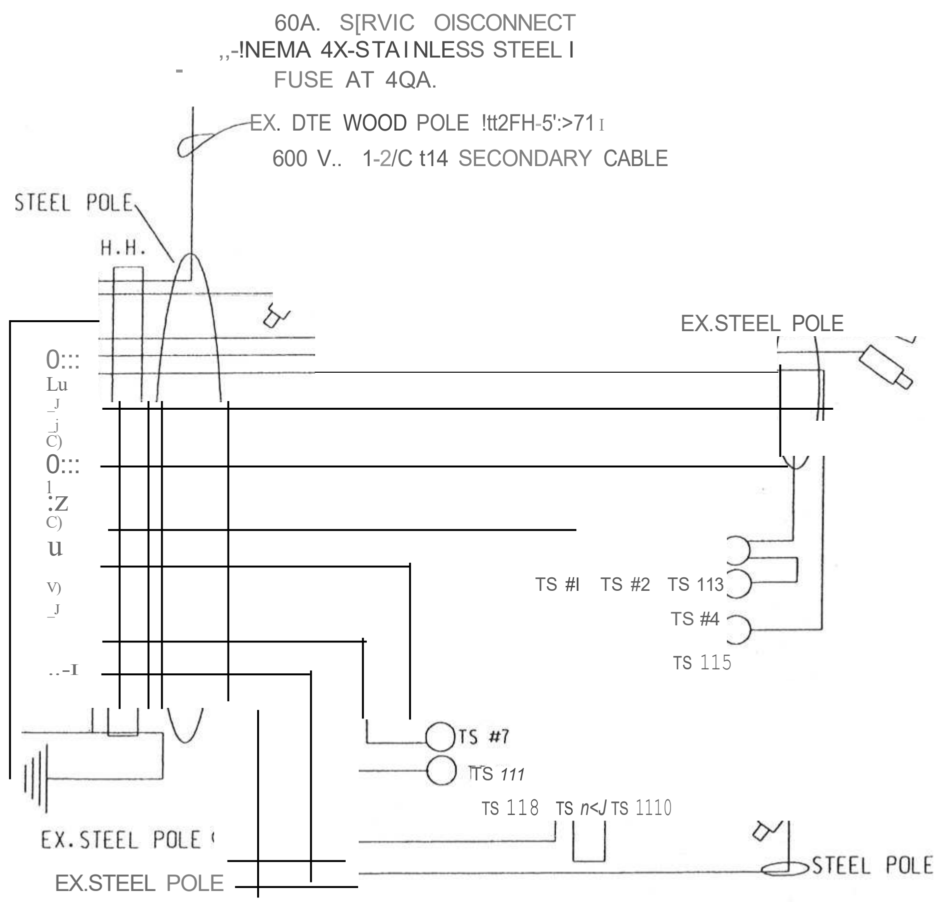


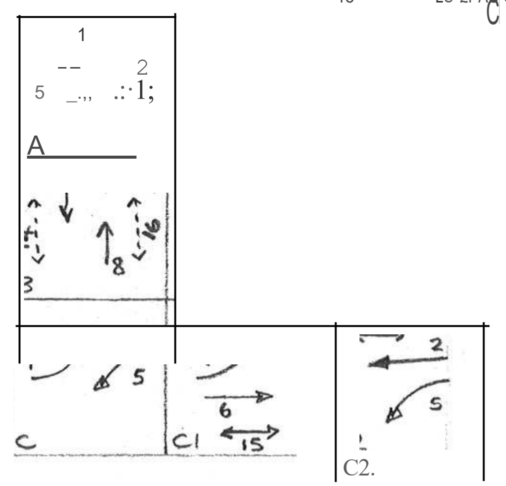
SEE SIDEWALK DETAIL PLANS FOR NEW ADA RAMPS

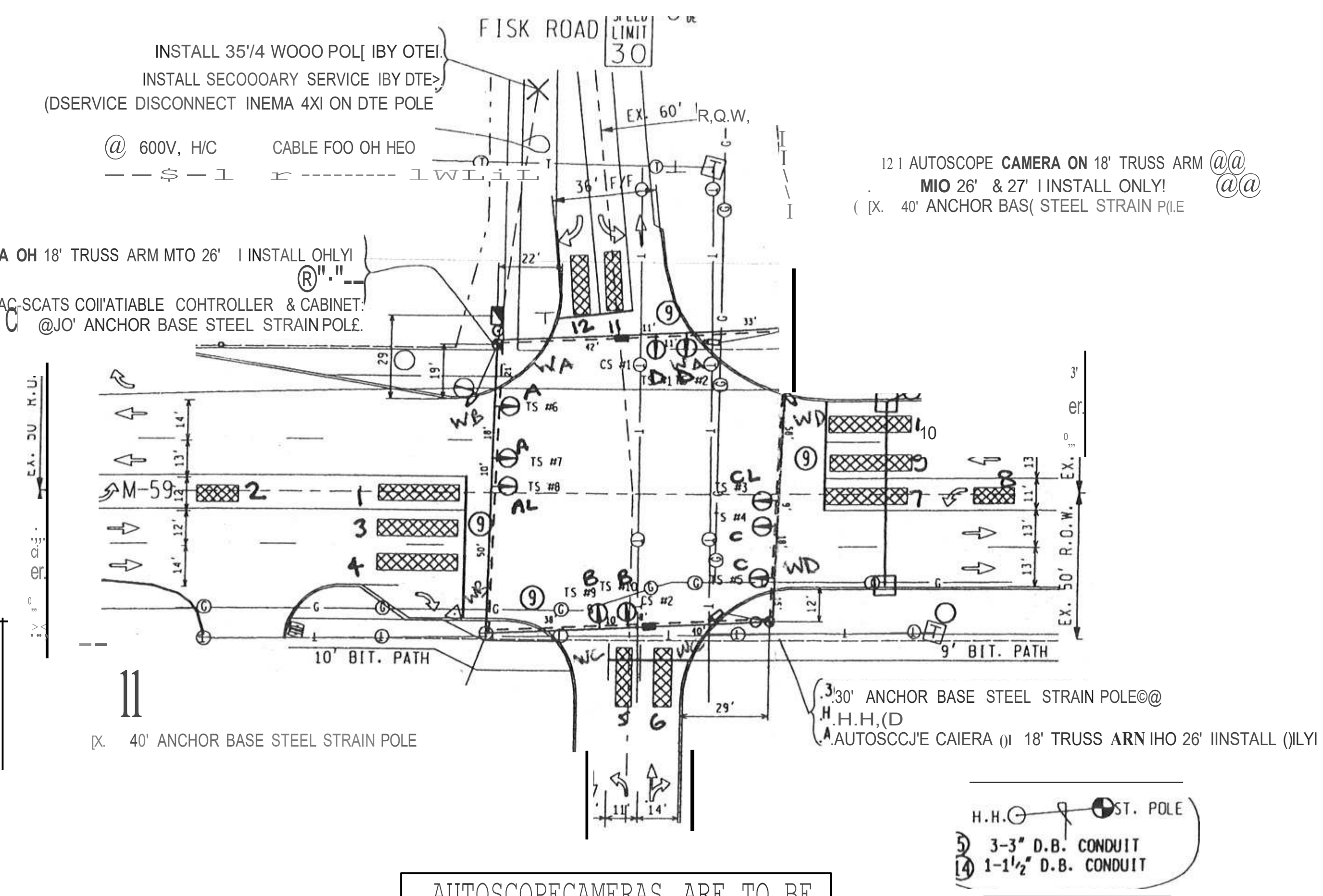
MICHIGAN DEPARTMENT OF TRANSPORTATION
TRAFFIC & SAFETY DIVISION

AUTH. NO.	DRAWN DJP
CONT. SEC. 63041	DATE 03-08-11
REF. 110761	SCALE N.T.S.
LAN 63041-01-026	SHEE 3 1 OF 2

M-59 !HIGHLAND 1 AT FISK RD
WHITE LAKE TOWNSHIP
OAKLAND COUNTY





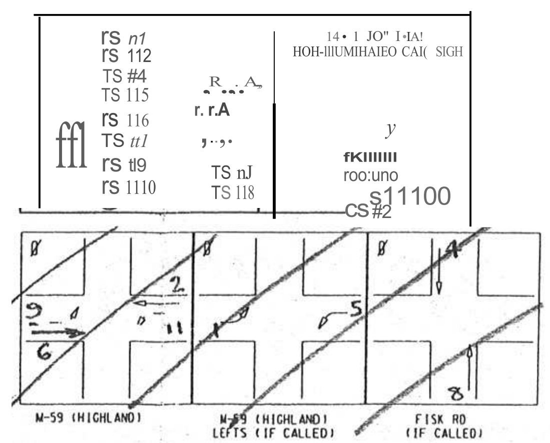


AUTOSCOPECAMERAS ARE TO BE PROVIDED BY R.c.o.c. REFER TO SPECIAL PROVISION INCLUDED

WIRING DIAGRAM

NOT TO SCALE

ALL SIGNAL CABLES SHALL BE 1-7/C # 16 P.J.
CAMERA CABLE TO BE YM 49001 OR EQUAL

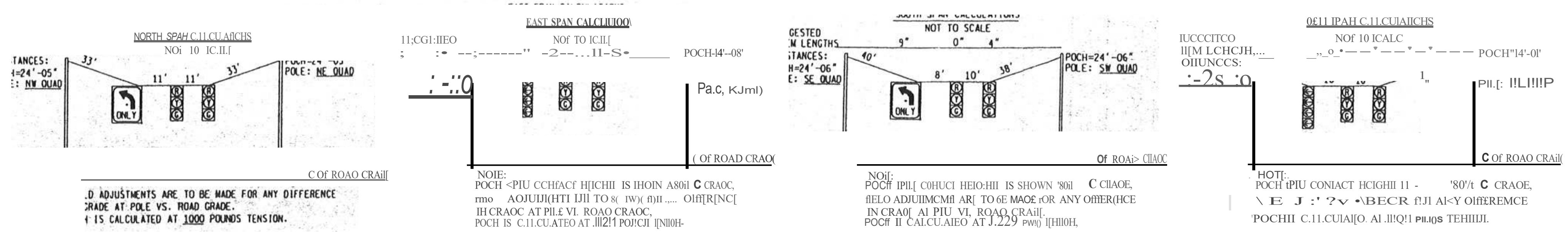


PLAN

CONTACT: MR. DENNIS MERCIER OF DETROIT ENERGY AT 248-427-2954 FOR REMOVAL OF EX. SERVICE & PROVIDE **NEW** SERVICE, COST TO CONTRACTOR: $840,64

FOR ELECTRICAL SERVICE INSPECTION CONTACT THE MICHIGAN DEPARTMENT OF LABOR AND ECONOMIC GROWTH AT 248-312-0163 COST TO BE PAID BY THE CONTRACTOR.

LIST OF MATERIAL		
NO	ITEM	QUANTITIES
1	Serv Disconnect	I Ea
2	Controller ond Cabinet, Digitol Type	1 Ea
3	Controller and Cobinet, Digitol Type. Delivered	I Ea
4	Controller Fdn, Bose oont	1 Ea
5	Hh, ROJnd	2 Eo
16	Strain Pole, Steel, Anchor Bose, 30 foot	2 Ea
7	Strain Pole Fdn, Cosed	12 Ft
8	Strain Pole Fdn, Uncased	12 Ft
9	Span **Wire**	4 Ea
10	TS, One **Woy** Span **Wire** Ntd !LEDi	10 Ea
	Cose Sign, One **Woy**, 24 inch by 30 inch, Non-Illuminated	2 Ea 4 Ea
	Brocket. Truss, **With** 18 Foot Arm	4 Eo
	Autoscope. Correro !Solo Prol	35 Ft
	Conduit, 08, I, I 1/2 inch	
	Conduit, DB, 3, 3 inch	35 Ft
	Conduit, OB, 4, 3 inch	150 Ft
I1)	Coble, Sec, 600V, I, 2/C114	



TRAFFIC SIGNAL

WHITE LAKE TOWNSHIP
OAKLAND COUNTY

M-59 (HIGHLAND) @ FISK RD

STEADY WATTS 408 166

-!IE- ITEMS TO BE NEGOTIATED, NOT BIO

SEMCOG | Southeast Michigan Council of Governments

Search...

Community Profiles

YOU ARE VIEWING DATA FOR:

White Lake Township

7525 Highland Rd
White Lake, MI 48383-2938
http://www.whitelaketwp.com/

SEMCOG MEMBER

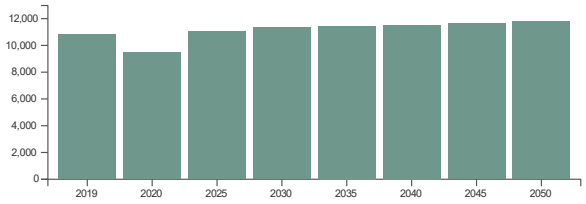
Census 2020 Population: 30,950
Area: 37.1 square miles

VIEW COMMUNITY EXPLORER MAP | VIEW 2020 CENSUS MAP

Economy & Jobs

Link to American Community Survey (ACS) Profiles: **Select a Year** 2018-2022 **Economic**

Forecasted Jobs



Note: The base year for the employment forecast is 2019, as 2020 employment was artificially low due to the COVID recession.

Source: **SEMCOG 2050 Regional Development Forecast**

Forecasted Jobs by Industry Sector

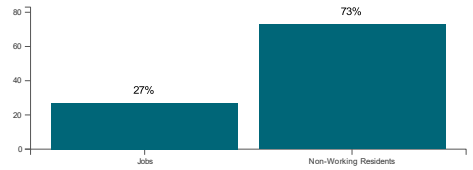
Forecasted Jobs By Industry Sector	2019	2020	2025	2030	2035	2040	2045	2050	Change 2019-2050	Pct Change 2019-2050
Natural Resources, Mining, & Construction	1,022	1,006	1,229	1,253	1,269	1,253	1,236	1,219	197	19.3%
Manufacturing	208	194	223	216	210	195	188	182	-26	-12.5%
Wholesale Trade	293	265	282	297	307	308	307	308	15	5.1%
Retail Trade	2,227	1,940	2,106	2,046	1,930	1,851	1,814	1,768	-459	-20.6%
Transportation, Warehousing, & Utilities	327	319	390	404	415	420	429	434	107	32.7%
Information & Financial Activities	1,716	1,477	1,774	1,793	1,819	1,835	1,846	1,910	194	11.3%
Professional and Technical Services & Corporate HQ	855	813	968	1,023	1,080	1,116	1,168	1,246	391	45.7%
Administrative, Support, & Waste Services	1,132	868	1,051	1,123	1,175	1,207	1,263	1,303	171	15.1%
Education Services	970	897	972	1,016	1,017	1,027	1,033	1,038	68	7%
Healthcare Services	322	284	377	407	433	465	498	532	210	65.2%
Leisure & Hospitality	1,030	762	960	1,004	1,030	1,040	1,045	1,065	35	3.4%
Other Services	557	491	560	587	603	617	621	624	67	12%
Public Administration	158	152	166	172	174	173	173	172	14	8.9%
Total Employment Numbers	10,817	9,468	11,058	11,341	11,462	11,507	11,621	11,801	984	9.1%

Note: The base year for the employment forecast is 2019, as 2020 employment was artificially low due to the COVID recession.

Source: **SEMCOG 2050 Regional Development Forecast**

Daytime Population

Daytime Population	ACS 2016
Jobs	5,496
Non-Working Residents	14,870
Age 15 and under	6,198
Not in labor force	7,856
Unemployed	816
Daytime Population	20,366



Source: **2012-2016 American Community Survey 5-Year Estimates** and **2012-2016 Census Transportation Planning Products Program (CTPP)**. For additional information, visit SEMCOG's **Interactive Commuting Patterns Map**

Note: The number of residents attending school outside Southeast Michigan is not available. Likewise, the number of students commuting into Southeast Michigan to attend school is also not known.

SEMCOG | Southeast Michigan Council of Governments

Search...

Community Profiles

YOU ARE VIEWING DATA FOR:

White Lake Township

7525 Highland Rd
White Lake, MI 48383-2938
http://www.whitelaketwp.com/

SEMCOG MEMBER

Census 2020 Population: 30,950
Area: 37.1 square miles

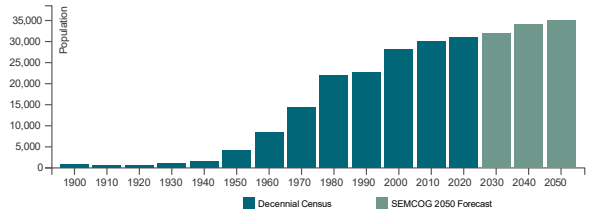
VIEW COMMUNITY EXPLORER MAP | VIEW 2020 CENSUS MAP

Population and Households

Link to American Community Survey (ACS) Profiles: **Select a Year** 2018-2022 **Social** | **Demographic**

Population and Household Estimates for Southeast Michigan, 2022

Population Forecast



Population and Households

Population and Households	Census 2020	Census 2010	Change 2010-2020	Pct Change 2010-2020	SEMCOG Jul 2022	SEMCOG 2050
Total Population	30,950	30,019	931	3.1%	30,739	35,002
Group Quarters Population	88	76	12	15.8%	105	342
Household Population	30,862	29,943	919	3.1%	30,634	34,660
Housing Units	12,776	12,214	562	4.6%	12,949	-
Households (Occupied Units)	12,089	11,262	827	7.3%	12,110	14,325
Residential Vacancy Rate	5.4%	7.8%	-2.4%	-	6.5%	-
Average Household Size	2.55	2.66	-0.11	-	2.53	2.42

Source: **U.S. Census Bureau** and **SEMCOG 2050 Regional Development Forecast**

Components of Population Change

Components of Population Change	2000-2005 Avg.	2006-2010 Avg.	2011-2018 Avg.
Natural Increase (Births - Deaths)	218	89	22
Births	424	309	284
Deaths	206	220	262
Net Migration (Movement In - Movement Out)	112	-59	58
Population Change (Natural Increase + Net Migration)	330	30	80

Source: **Michigan Department of Community Health Vital Statistics**, **U.S. Census Bureau**, and SEMCOG

Household Types

Household Types	Census 2010	ACS 2021	Change 2010-2021	Pct Change 2010-2021	SEMCOG 2050
With Seniors 65+	2,520	3,804	1,284	51%	-
Without Seniors	8,742	8,015	-727	-8.3%	-
Live Alone, 65+	882	1,141	259	29.4%	-
Live Alone, <65	1,406	1,127	-279	-19.8%	-
2+ Persons, With children	4,009	3,577	-432	-10.8%	-
2+ Persons, Without children	4,965	5,974	1,009	20.3%	-
Total Households	11,262	11,819	557	4.9%	-

Source: **U.S. Census Bureau**, **Decennial Census**, **2017-2021 American Community Survey 5-Year Estimates**, and **SEMCOG 2050 Regional Development Forecast**

Level of Service Criteria for Stop Sign Controlled Intersections

The level of service criteria are given in Exhibit 20-2. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

The average total delay for any particular controlled movement is a function three (capacity) factors: distribution of gaps in the major-street traffic stream, driver judgment in selecting gaps through which to execute the desired maneuvers, and the follow-up headways required by each driver in a queue.

The basic capacity model assumes gaps in the conflicting movements are randomly distributed. When traffic signals are present on the major street, upstream of the subject intersection, flows may not be random but will likely have some platoon structure. Although the procedures in this chapter provide a method for approximating the operations of a TWSC intersection with an upstream signal, the operations of such an intersection is arguably best handled by including it in a complete simulation

Exhibit 20-2. Level of Service Criteria for Stop-Controlled Intersections (Motor Vehciles)

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (sec/veh)
A	$\leq$ 10
B	> 10 and $\leq$ 15
C	> 15 and $\leq$ 25
D	> 25 and $\leq$ 35
E	> 35 and $\leq$ 50
F	> 50

Average total delay less than 10 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions. A total delay of 50 sec/veh is assumed as the break point between LOS E and F.

The LOS criteria for TWSC intersections differ somewhat from the criteria used in Chapter 19 for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection.

LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queueing on the minor approaches. The method, however, is based on a constant critical gap size - that is, the critical gap remains constant, no matter how long the side street motorist waits. LOS F may also appear in the form of side street vehicles' selecting smaller-than-usual gaps. In such cases, safety may be a problem and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior. The latter is more difficult to observe on the field than queueing, which is more obvious.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council

Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle. The criteria are given in Exhibit 19-8. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

LOS A describes operations with a control delay of 10 s/veh or less. This level is typically assigned when the volume-to-capacity ratio is low and either progression is extremely favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during a green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

Exhibit 19.8. Level-of-Service Criteria for Signalized Intersections (Motorized Vehicles)

LEVEL OF SERVICE	STOPPED DELAY PER VEHICLE (SEC)
A	≤10.0
B	> 10.0 and ≤20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	>80.0

1. If the v/c ratio for a lane group exceeds 1.0, a LOS F is assigned to the individual lane group. LOS for approach-based and intersection-wide assessments are determined solely by the control delay.

LOS C describes operations with control delay between 20 and 35 s/veh. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e. one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number if vehicle stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh. This level is typically assigned when when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

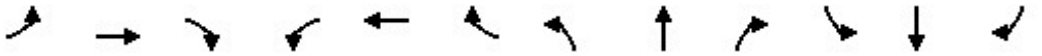
LOS E describes operations with control delay between 55 and 80 s/veh. This level is typically assigned when when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level, considered to be unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of the intersection. This level is typically assigned when the volume-to-capacity ratio is high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Existing Condition
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	1192	9	9	792	26	1	0	6	109	0	55
Future Volume (veh/h)	47	1192	9	9	792	26	1	0	6	109	0	55
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	1906	1906	1906	1906	1906	1906	2000	2000	2000	1922	1922	1922
Adj Flow Rate, veh/h	51	1282	10	10	900	30	2	0	10	128	0	65
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.60	0.60	0.60	0.85	0.85	0.85
Percent Heavy Veh, %	6	6	6	6	6	6	0	0	0	5	5	5
Cap, veh/h	354	1558	695	264	1538	51	424	0	480	463	0	461
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.28	0.00	0.28	0.28	0.00	0.28
Sat Flow, veh/h	1816	3622	1616	1816	3577	119	1358	0	1695	1371	0	1629
Grp Volume(v), veh/h	51	1282	10	10	456	474	2	0	10	128	0	65
Grp Sat Flow(s),veh/h/ln	1816	1811	1616	1816	1811	1885	1358	0	1695	1371	0	1629
Q Serve(g_s), s	1.3	28.1	0.3	0.2	17.2	17.2	0.1	0.0	0.4	6.7	0.0	2.7
Cycle Q Clear(g_c), s	1.3	28.1	0.3	0.2	17.2	17.2	2.8	0.0	0.4	7.1	0.0	2.7
Prop In Lane	1.00		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	354	1558	695	264	779	811	424	0	480	463	0	461
V/C Ratio(X)	0.14	0.82	0.01	0.04	0.59	0.59	0.00	0.00	0.02	0.28	0.00	0.14
Avail Cap(c_a), veh/h	354	1558	695	264	779	811	424	0	480	463	0	461
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.2	22.6	14.7	15.6	19.5	19.5	25.1	0.0	23.3	25.8	0.0	24.1
Incr Delay (d2), s/veh	0.9	5.1	0.0	0.3	3.2	3.1	0.0	0.0	0.1	1.5	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	11.5	0.1	0.1	7.0	7.3	0.0	0.0	0.2	2.2	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	27.7	14.7	15.9	22.7	22.6	25.1	0.0	23.3	27.3	0.0	24.7
LnGrp LOS	B	C	B	B	C	C	C	A	C	C	A	C
Approach Vol, veh/h		1343			940			12			193	
Approach Delay, s/veh		27.1			22.6			23.6			26.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	45.0		32.0	13.0	45.0		32.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 39		25.5	* 6.7	* 39		25.5				
Max Q Clear Time (g_c+I1), s	2.2	30.1		9.1	3.3	19.2		4.8				
Green Ext Time (p_c), s	0.0	5.1		0.5	0.0	5.1		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		25.3	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1309	939	6	0	2
Future Vol, veh/h	3	1309	939	6	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	425	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	60	60
Heavy Vehicles, %	7	7	7	7	0	0
Mvmt Flow	3	1471	1055	7	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1062	0	-	0	1797	528
Stage 1	-	-	-	-	1055	-
Stage 2	-	-	-	-	742	-
Critical Hdwy	4.24	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.27	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	623	-	-	-	*200	500
Stage 1	-	-	-	-	*301	-
Stage 2	-	-	-	-	*534	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	623	-	-	-	*199	500
Mov Cap-2 Maneuver	-	-	-	-	*252	-
Stage 1	-	-	-	-	*299	-
Stage 2	-	-	-	-	*534	-

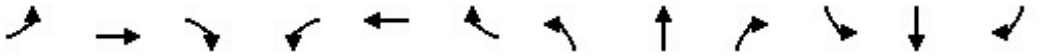
Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	623	-	-	-	500
HCM Lane V/C Ratio	0.005	-	-	-	0.007
HCM Control Delay (s)	10.8	-	-	-	12.2
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Existing Condition
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	1112	8	6	1486	76	6	2	12	249	0	165
Future Volume (veh/h)	165	1112	8	6	1486	76	6	2	12	249	0	165
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	1953	1953	1953	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	194	1308	9	6	1598	82	10	3	20	280	0	185
Peak Hour Factor	0.85	0.85	0.85	0.93	0.93	0.93	0.60	0.60	0.60	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	3	3	3	0	0	0	1	1	1
Cap, veh/h	231	2142	954	306	2056	105	200	48	319	342	0	357
Arrive On Green	0.06	0.57	0.57	0.06	0.57	0.57	0.21	0.21	0.21	0.21	0.00	0.21
Sat Flow, veh/h	1875	3741	1667	1860	3592	183	1217	225	1502	1398	0	1679
Grp Volume(v), veh/h	194	1308	9	6	822	858	10	0	23	280	0	185
Grp Sat Flow(s),veh/h/ln	1875	1870	1667	1860	1856	1920	1217	0	1727	1398	0	1679
Q Serve(g_s), s	5.1	27.6	0.3	0.1	40.8	41.5	0.9	0.0	1.3	24.0	0.0	11.7
Cycle Q Clear(g_c), s	5.1	27.6	0.3	0.1	40.8	41.5	12.6	0.0	1.3	25.3	0.0	11.7
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	231	2142	954	306	1062	1099	200	0	367	342	0	357
V/C Ratio(X)	0.84	0.61	0.01	0.02	0.77	0.78	0.05	0.00	0.06	0.82	0.00	0.52
Avail Cap(c_a), veh/h	231	2142	954	306	1062	1099	200	0	367	342	0	357
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.2	16.9	11.0	11.5	19.7	19.8	47.4	0.0	37.7	47.8	0.0	41.8
Incr Delay (d2), s/veh	28.8	1.3	0.0	0.1	5.5	5.5	0.5	0.0	0.3	19.2	0.0	5.3
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	4.8	10.9	0.1	0.1	17.1	17.9	0.3	0.0	0.6	9.7	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.1	18.2	11.0	11.6	25.2	25.3	47.9	0.0	38.0	67.0	0.0	47.1
LnGrp LOS	D	B	B	B	C	C	D	A	D	E	A	D
Approach Vol, veh/h		1511			1686			33			465	
Approach Delay, s/veh		22.6			25.2			41.0			59.1	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	75.0		32.0	13.0	75.0		32.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 69		25.5	* 6.7	* 69		25.5				
Max Q Clear Time (g_c+I1), s	2.1	29.6		27.3	7.1	43.5		14.6				
Green Ext Time (p_c), s	0.0	11.2		0.0	0.0	12.8		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		28.6	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	1439	1811	16	2	1
Future Vol, veh/h	4	1439	1811	16	2	1
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	425	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	95	95	75	75
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	4	1564	1906	17	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1924	0	-	0	2697	954
Stage 1	-	-	-	-	1907	-
Stage 2	-	-	-	-	790	-
Critical Hdwy	4.16	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.23	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	299	-	-	-	*14	263
Stage 1	-	-	-	-	*105	-
Stage 2	-	-	-	-	*462	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	299	-	-	-	*14	263
Mov Cap-2 Maneuver	-	-	-	-	*81	-
Stage 1	-	-	-	-	*104	-
Stage 2	-	-	-	-	*462	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	40.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	299	-	-	-	105
HCM Lane V/C Ratio	0.015	-	-	-	0.038
HCM Control Delay (s)	17.2	-	-	-	40.6
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	69	362	318	125	35	235	217	9	22	148	69
Average Queue (ft)	27	227	206	9	6	133	127	0	3	60	26
95th Queue (ft)	60	320	304	57	22	206	198	6	14	117	56
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)			38	0							
Queuing Penalty (veh)			3	0							

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	24	16
Average Queue (ft)	2	1
95th Queue (ft)	12	10
Link Distance (ft)		321
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 4

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	348	308	268	83	24	405	398	29	39	355	157
Average Queue (ft)	170	193	168	5	4	273	277	3	7	173	71
95th Queue (ft)	349	270	243	39	16	370	381	16	24	311	131
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)						0	0				
Queuing Penalty (veh)						0	0				
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)	0		26			0					
Queuing Penalty (veh)	0		2			0					

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	23	25
Average Queue (ft)	3	3
95th Queue (ft)	16	15
Link Distance (ft)		321
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 3

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Background Condition
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	1204	9	9	800	26	1	0	6	110	0	56
Future Volume (veh/h)	47	1204	9	9	800	26	1	0	6	110	0	56
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	1906	1906	1906	1906	1906	1906	2000	2000	2000	1922	1922	1922
Adj Flow Rate, veh/h	51	1295	10	10	909	30	2	0	10	129	0	66
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.60	0.60	0.60	0.85	0.85	0.85
Percent Heavy Veh, %	6	6	6	6	6	6	0	0	0	5	5	5
Cap, veh/h	351	1558	695	261	1539	51	423	0	480	463	0	461
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.28	0.00	0.28	0.28	0.00	0.28
Sat Flow, veh/h	1816	3622	1616	1816	3578	118	1357	0	1695	1371	0	1629
Grp Volume(v), veh/h	51	1295	10	10	460	479	2	0	10	129	0	66
Grp Sat Flow(s),veh/h/ln	1816	1811	1616	1816	1811	1885	1357	0	1695	1371	0	1629
Q Serve(g_s), s	1.3	28.5	0.3	0.2	17.5	17.5	0.1	0.0	0.4	6.7	0.0	2.7
Cycle Q Clear(g_c), s	1.3	28.5	0.3	0.2	17.5	17.5	2.8	0.0	0.4	7.1	0.0	2.7
Prop In Lane	1.00		1.00	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	351	1558	695	261	779	811	423	0	480	463	0	461
V/C Ratio(X)	0.15	0.83	0.01	0.04	0.59	0.59	0.00	0.00	0.02	0.28	0.00	0.14
Avail Cap(c_a), veh/h	351	1558	695	261	779	811	423	0	480	463	0	461
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.2	22.8	14.7	15.8	19.6	19.6	25.1	0.0	23.3	25.8	0.0	24.1
Incr Delay (d2), s/veh	0.9	5.3	0.0	0.3	3.3	3.2	0.0	0.0	0.1	1.5	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	11.7	0.1	0.1	7.2	7.4	0.0	0.0	0.2	2.2	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.1	28.1	14.7	16.0	22.9	22.8	25.2	0.0	23.3	27.3	0.0	24.7
LnGrp LOS	B	C	B	B	C	C	C	A	C	C	A	C
Approach Vol, veh/h		1356			949			12			195	
Approach Delay, s/veh		27.5			22.7			23.6			26.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	45.0		32.0	13.0	45.0		32.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 39		25.5	* 6.7	* 39		25.5				
Max Q Clear Time (g_c+I1), s	2.2	30.5		9.1	3.3	19.5		4.8				
Green Ext Time (p_c), s	0.0	4.9		0.6	0.0	5.2		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		25.6
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1322	948	6	0	2
Future Vol, veh/h	3	1322	948	6	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	425	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	60	60
Heavy Vehicles, %	7	7	7	7	0	0
Mvmt Flow	3	1485	1065	7	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1072	0	-	0	1814	533
Stage 1	-	-	-	-	1065	-
Stage 2	-	-	-	-	749	-
Critical Hdwy	4.24	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.27	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	617	-	-	-	*222	496
Stage 1	-	-	-	-	*297	-
Stage 2	-	-	-	-	*502	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	617	-	-	-	*221	496
Mov Cap-2 Maneuver	-	-	-	-	*256	-
Stage 1	-	-	-	-	*296	-
Stage 2	-	-	-	-	*502	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	617	-	-	-	496
HCM Lane V/C Ratio	0.005	-	-	-	0.007
HCM Control Delay (s)	10.9	-	-	-	12.3
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Background Condition
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	1123	8	6	1501	77	6	2	12	251	0	167
Future Volume (veh/h)	167	1123	8	6	1501	77	6	2	12	251	0	167
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	1953	1953	1953	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	196	1321	9	6	1614	83	10	3	20	282	0	188
Peak Hour Factor	0.85	0.85	0.85	0.93	0.93	0.93	0.60	0.60	0.60	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	3	3	3	0	0	0	1	1	1
Cap, veh/h	228	2142	954	302	2056	105	197	48	319	342	0	357
Arrive On Green	0.06	0.57	0.57	0.06	0.57	0.57	0.21	0.21	0.21	0.21	0.00	0.21
Sat Flow, veh/h	1875	3741	1667	1860	3592	184	1213	225	1502	1398	0	1679
Grp Volume(v), veh/h	196	1321	9	6	830	867	10	0	23	282	0	188
Grp Sat Flow(s),veh/h/ln	1875	1870	1667	1860	1856	1920	1213	0	1727	1398	0	1679
Q Serve(g_s), s	5.2	28.0	0.3	0.1	41.5	42.2	0.9	0.0	1.3	24.2	0.0	11.9
Cycle Q Clear(g_c), s	5.2	28.0	0.3	0.1	41.5	42.2	12.8	0.0	1.3	25.5	0.0	11.9
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	228	2142	954	302	1062	1099	197	0	367	342	0	357
V/C Ratio(X)	0.86	0.62	0.01	0.02	0.78	0.79	0.05	0.00	0.06	0.82	0.00	0.53
Avail Cap(c_a), veh/h	228	2142	954	302	1062	1099	197	0	367	342	0	357
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.6	17.0	11.0	11.6	19.8	20.0	47.6	0.0	37.7	47.9	0.0	41.9
Incr Delay (d2), s/veh	31.8	1.3	0.0	0.1	5.7	5.8	0.5	0.0	0.3	19.7	0.0	5.5
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	5.0	11.1	0.1	0.1	17.4	18.3	0.3	0.0	0.6	9.9	0.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	18.3	11.0	11.8	25.6	25.8	48.1	0.0	38.0	67.6	0.0	47.4
LnGrp LOS	E	B	B	B	C	C	D	A	D	E	A	D
Approach Vol, veh/h		1526			1703			33			470	
Approach Delay, s/veh		23.1			25.6			41.1			59.5	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	75.0		32.0	13.0	75.0		32.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 69		25.5	* 6.7	* 69		25.5				
Max Q Clear Time (g_c+I1), s	2.1	30.0		27.5	7.2	44.2		14.8				
Green Ext Time (p_c), s	0.0	11.4		0.0	0.0	12.8		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		29.0
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	1453	1829	16	2	1
Future Vol, veh/h	4	1453	1829	16	2	1
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	425	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	95	95	75	75
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	4	1579	1925	17	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1943	0	-	0	2724	964
Stage 1	-	-	-	-	1926	-
Stage 2	-	-	-	-	798	-
Critical Hdwy	4.16	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.23	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	294	-	-	-	*13	259
Stage 1	-	-	-	-	*102	-
Stage 2	-	-	-	-	*462	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	294	-	-	-	*13	259
Mov Cap-2 Maneuver	-	-	-	-	*78	-
Stage 1	-	-	-	-	*100	-
Stage 2	-	-	-	-	*462	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	41.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	294	-	-	-	102
HCM Lane V/C Ratio	0.015	-	-	-	0.039
HCM Control Delay (s)	17.4	-	-	-	41.7
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	81	397	406	106	32	261	239	13	17	155	66
Average Queue (ft)	31	233	213	10	5	139	136	1	2	59	24
95th Queue (ft)	67	343	342	62	22	216	218	6	12	119	52
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)			40	0							
Queuing Penalty (veh)			4	0							

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	24	17
Average Queue (ft)	1	1
95th Queue (ft)	12	8
Link Distance (ft)		321
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 4

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	331	294	286	102	24	409	381	18	24	345	173
Average Queue (ft)	154	186	174	7	3	261	261	3	6	180	78
95th Queue (ft)	297	263	253	48	16	358	357	15	20	309	144
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)						0					
Queuing Penalty (veh)						0					
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)			25			0					
Queuing Penalty (veh)			2			0					

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

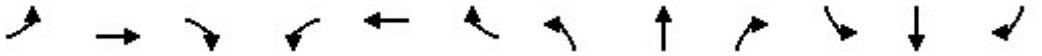
Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	34	21
Average Queue (ft)	4	2
95th Queue (ft)	21	13
Link Distance (ft)		321
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 2

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Future Condition
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	1239	9	9	831	30	1	0	6	115	0	56
Future Volume (veh/h)	47	1239	9	9	831	30	1	0	6	115	0	56
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	1906	1906	1906	1906	1906	1906	2000	2000	2000	1922	1922	1922
Adj Flow Rate, veh/h	51	1332	10	10	944	34	2	0	10	135	0	66
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.60	0.60	0.60	0.85	0.85	0.85
Percent Heavy Veh, %	6	6	6	6	6	6	0	0	0	5	5	5
Cap, veh/h	340	1558	695	254	1533	55	423	0	480	463	0	461
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.28	0.00	0.28	0.28	0.00	0.28
Sat Flow, veh/h	1816	3622	1616	1816	3566	128	1357	0	1695	1371	0	1629
Grp Volume(v), veh/h	51	1332	10	10	479	499	2	0	10	135	0	66
Grp Sat Flow(s),veh/h/ln	1816	1811	1616	1816	1811	1883	1357	0	1695	1371	0	1629
Q Serve(g_s), s	1.3	29.8	0.3	0.2	18.5	18.5	0.1	0.0	0.4	7.1	0.0	2.7
Cycle Q Clear(g_c), s	1.3	29.8	0.3	0.2	18.5	18.5	2.8	0.0	0.4	7.5	0.0	2.7
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	340	1558	695	254	779	810	423	0	480	463	0	461
V/C Ratio(X)	0.15	0.86	0.01	0.04	0.62	0.62	0.00	0.00	0.02	0.29	0.00	0.14
Avail Cap(c_a), veh/h	340	1558	695	254	779	810	423	0	480	463	0	461
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	23.1	14.7	16.2	19.9	19.9	25.1	0.0	23.3	25.9	0.0	24.1
Incr Delay (d2), s/veh	0.9	6.2	0.0	0.3	3.6	3.5	0.0	0.0	0.1	1.6	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	12.4	0.1	0.1	7.6	7.9	0.0	0.0	0.2	2.3	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	29.4	14.7	16.5	23.5	23.4	25.2	0.0	23.3	27.5	0.0	24.7
LnGrp LOS	B	C	B	B	C	C	C	A	C	C	A	C
Approach Vol, veh/h		1393			988			12			201	
Approach Delay, s/veh		28.7			23.4			23.6			26.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	45.0		32.0	13.0	45.0		32.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 39		25.5	* 6.7	* 39		25.5				
Max Q Clear Time (g_c+I1), s	2.2	31.8		9.5	3.3	20.5		4.8				
Green Ext Time (p_c), s	0.0	4.4		0.6	0.0	5.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		26.5
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1345	974	6	0	2
Future Vol, veh/h	3	1345	974	6	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	425	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	60	60
Heavy Vehicles, %	7	7	7	7	0	0
Mvmt Flow	3	1511	1094	7	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1101	0	-	0	1856	547
Stage 1	-	-	-	-	1094	-
Stage 2	-	-	-	-	762	-
Critical Hdwy	4.24	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.27	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	601	-	-	-	*196	486
Stage 1	-	-	-	-	*287	-
Stage 2	-	-	-	-	*502	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	601	-	-	-	*195	486
Mov Cap-2 Maneuver	-	-	-	-	*242	-
Stage 1	-	-	-	-	*286	-
Stage 2	-	-	-	-	*502	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	601	-	-	-	486
HCM Lane V/C Ratio	0.006	-	-	-	0.007
HCM Control Delay (s)	11	-	-	-	12.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1294	71	49	927	58	54
Future Vol, veh/h	1294	71	49	927	58	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	500	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	92	92
Heavy Vehicles, %	7	7	7	7	2	2
Mvmt Flow	1454	80	55	1042	63	59

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1534	0	2125	767
Stage 1	-	-	-	-	1494	-
Stage 2	-	-	-	-	631	-
Critical Hdwy	-	-	4.24	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.27	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	705	-	77	*563
Stage 1	-	-	-	-	473	-
Stage 2	-	-	-	-	492	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	705	-	71	*563
Mov Cap-2 Maneuver	-	-	-	-	244	-
Stage 1	-	-	-	-	473	-
Stage 2	-	-	-	-	454	-

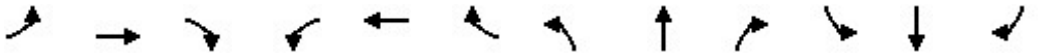
Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	21.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	336	-	-	705	-
HCM Lane V/C Ratio	0.362	-	-	0.078	-
HCM Control Delay (s)	21.7	-	-	10.5	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	1.6	-	-	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Future Condition
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	1145	8	6	1520	83	6	2	12	258	0	167
Future Volume (veh/h)	167	1145	8	6	1520	83	6	2	12	258	0	167
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	1953	1953	1953	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	196	1347	9	6	1634	89	10	3	20	290	0	188
Peak Hour Factor	0.85	0.85	0.85	0.93	0.93	0.93	0.60	0.60	0.60	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	3	3	3	0	0	0	1	1	1
Cap, veh/h	224	2142	954	296	2049	111	197	48	319	342	0	357
Arrive On Green	0.06	0.57	0.57	0.06	0.57	0.57	0.21	0.21	0.21	0.21	0.00	0.21
Sat Flow, veh/h	1875	3741	1667	1860	3580	194	1213	225	1502	1398	0	1679
Grp Volume(v), veh/h	196	1347	9	6	843	880	10	0	23	290	0	188
Grp Sat Flow(s),veh/h/ln	1875	1870	1667	1860	1856	1918	1213	0	1727	1398	0	1679
Q Serve(g_s), s	5.2	28.9	0.3	0.1	42.7	43.5	0.9	0.0	1.3	24.2	0.0	11.9
Cycle Q Clear(g_c), s	5.2	28.9	0.3	0.1	42.7	43.5	12.8	0.0	1.3	25.5	0.0	11.9
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	224	2142	954	296	1062	1098	197	0	367	342	0	357
V/C Ratio(X)	0.88	0.63	0.01	0.02	0.79	0.80	0.05	0.00	0.06	0.85	0.00	0.53
Avail Cap(c_a), veh/h	224	2142	954	296	1062	1098	197	0	367	342	0	357
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.1	17.1	11.0	11.8	20.1	20.3	47.6	0.0	37.7	48.2	0.0	41.9
Incr Delay (d2), s/veh	34.9	1.4	0.0	0.1	6.1	6.2	0.5	0.0	0.3	22.1	0.0	5.5
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	5.2	11.5	0.1	0.1	18.0	19.0	0.3	0.0	0.6	10.4	0.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	18.5	11.0	12.0	26.2	26.5	48.1	0.0	38.0	70.3	0.0	47.4
LnGrp LOS	E	B	B	B	C	C	D	A	D	E	A	D
Approach Vol, veh/h		1552			1729			33			478	
Approach Delay, s/veh		23.7			26.3			41.1			61.3	
Approach LOS		C			C			D			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	75.0		32.0	13.0	75.0		32.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 69		25.5	* 6.7	* 69		25.5				
Max Q Clear Time (g_c+I1), s	2.1	30.9		27.5	7.2	45.5		14.8				
Green Ext Time (p_c), s	0.0	11.7		0.0	0.0	12.7		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		29.8	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	1481	1860	16	2	1
Future Vol, veh/h	4	1481	1860	16	2	1
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	500	-	-	425	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	95	95	75	75
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	4	1610	1958	17	3	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1976	0	-	0	2772	980
Stage 1	-	-	-	-	1959	-
Stage 2	-	-	-	-	813	-
Critical Hdwy	4.16	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.23	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	285	-	-	-	*11	253
Stage 1	-	-	-	-	*98	-
Stage 2	-	-	-	-	*438	-
Platoon blocked, %		-	-	-	1	
Mov Cap-1 Maneuver	285	-	-	-	*11	253
Mov Cap-2 Maneuver	-	-	-	-	*75	-
Stage 1	-	-	-	-	*97	-
Stage 2	-	-	-	-	*438	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	43.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	285	-	-	-	98
HCM Lane V/C Ratio	0.015	-	-	-	0.041
HCM Control Delay (s)	17.8	-	-	-	43.3
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1434	52	59	1802	53	51
Future Vol, veh/h	1434	52	59	1802	53	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	500	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	92	92
Heavy Vehicles, %	3	3	3	3	2	2
Mvmt Flow	1559	57	62	1897	58	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1616	0	2661	808
Stage 1	-	-	-	-	1588	-
Stage 2	-	-	-	-	1073	-
Critical Hdwy	-	-	4.16	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.23	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	*726	-	*~ 16	*488
Stage 1	-	-	-	-	*460	-
Stage 2	-	-	-	-	*290	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*726	-	*~ 14	*488
Mov Cap-2 Maneuver	-	-	-	-	*159	-
Stage 1	-	-	-	-	*460	-
Stage 2	-	-	-	-	*265	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	33.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	238	-	-	* 726	-
HCM Lane V/C Ratio	0.475	-	-	0.086	-
HCM Control Delay (s)	33.1	-	-	10.4	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	2.4	-	-	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	78	404	392	90	36	253	243	9	21	151	72
Average Queue (ft)	29	247	234	8	5	133	130	0	2	64	21
95th Queue (ft)	63	359	356	48	23	211	208	5	11	125	51
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)		0	40	0							
Queuing Penalty (veh)		0	4	1							

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	24	16
Average Queue (ft)	1	1
95th Queue (ft)	12	8
Link Distance (ft)		321
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Drive & Highland Road (M-59)

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	9	85	10	194
Average Queue (ft)	0	26	0	70
95th Queue (ft)	6	59	7	143
Link Distance (ft)	408		134	190
Upstream Blk Time (%)				2
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		500		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 4

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	316	334	305	67	28	412	427	30	30	332	164
Average Queue (ft)	148	179	169	5	4	278	282	4	7	182	79
95th Queue (ft)	288	257	251	36	18	383	387	19	23	296	144
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)						0	0				
Queuing Penalty (veh)						1	0				
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)			26			0					
Queuing Penalty (veh)			2			0					

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	33	25
Average Queue (ft)	4	3
95th Queue (ft)	20	15
Link Distance (ft)		321
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Drive & Highland Road (M-59)

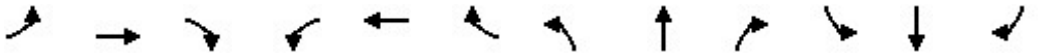
Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	12	81	72	213
Average Queue (ft)	0	28	3	197
95th Queue (ft)	6	59	32	224
Link Distance (ft)	408		134	190
Upstream Blk Time (%)			0	98
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)		500		
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Zone Summary

Zone wide Queuing Penalty: 3

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Future Conditions w/ IM
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	1239	9	9	831	30	1	0	6	115	0	56
Future Volume (veh/h)	47	1239	9	9	831	30	1	0	6	115	0	56
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	1906	1906	1906	1906	1906	1906	2000	2000	2000	1922	1922	1922
Adj Flow Rate, veh/h	51	1332	10	10	944	34	2	0	10	135	0	66
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.60	0.60	0.60	0.85	0.85	0.85
Percent Heavy Veh, %	6	6	6	6	6	6	0	0	0	5	5	5
Cap, veh/h	340	1558	695	254	1533	55	423	0	480	463	0	461
Arrive On Green	0.07	0.43	0.43	0.07	0.43	0.43	0.28	0.00	0.28	0.28	0.00	0.28
Sat Flow, veh/h	1816	3622	1616	1816	3566	128	1357	0	1695	1371	0	1629
Grp Volume(v), veh/h	51	1332	10	10	479	499	2	0	10	135	0	66
Grp Sat Flow(s),veh/h/ln	1816	1811	1616	1816	1811	1883	1357	0	1695	1371	0	1629
Q Serve(g_s), s	1.3	29.8	0.3	0.2	18.5	18.5	0.1	0.0	0.4	7.1	0.0	2.7
Cycle Q Clear(g_c), s	1.3	29.8	0.3	0.2	18.5	18.5	2.8	0.0	0.4	7.5	0.0	2.7
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	340	1558	695	254	779	810	423	0	480	463	0	461
V/C Ratio(X)	0.15	0.86	0.01	0.04	0.62	0.62	0.00	0.00	0.02	0.29	0.00	0.14
Avail Cap(c_a), veh/h	340	1558	695	254	779	810	423	0	480	463	0	461
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	23.1	14.7	16.2	19.9	19.9	25.1	0.0	23.3	25.9	0.0	24.1
Incr Delay (d2), s/veh	0.9	6.2	0.0	0.3	3.6	3.5	0.0	0.0	0.1	1.6	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	12.4	0.1	0.1	7.6	7.9	0.0	0.0	0.2	2.3	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	29.4	14.7	16.5	23.5	23.4	25.2	0.0	23.3	27.5	0.0	24.7
LnGrp LOS	B	C	B	B	C	C	C	A	C	C	A	C
Approach Vol, veh/h		1393			988			12			201	
Approach Delay, s/veh		28.7			23.4			23.6			26.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	45.0		32.0	13.0	45.0		32.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 39		25.5	* 6.7	* 39		25.5				
Max Q Clear Time (g_c+I1), s	2.2	31.8		9.5	3.3	20.5		4.8				
Green Ext Time (p_c), s	0.0	4.4		0.6	0.0	5.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		26.5
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1294	71	49	927	58	54
Future Vol, veh/h	1294	71	49	927	58	54
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	500	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	92	92
Heavy Vehicles, %	7	7	7	7	2	2
Mvmt Flow	1454	80	55	1042	63	59

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1534	0	2085	727
Stage 1	-	-	-	-	1454	-
Stage 2	-	-	-	-	631	-
Critical Hdwy	-	-	4.24	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.27	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	705	-	87	*563
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	492	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	705	-	80	*563
Mov Cap-2 Maneuver	-	-	-	-	257	-
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	454	-

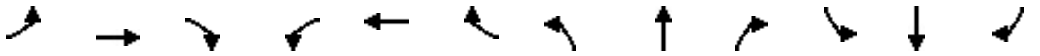
Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	20.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	348	-	-	705	-
HCM Lane V/C Ratio	0.35	-	-	0.078	-
HCM Control Delay (s)	20.8	-	-	10.5	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	1.5	-	-	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Private Drive/Fisk Road & Highland Road (M-59)

Future Conditions w/ IN
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	167	1145	8	6	1520	83	6	2	12	258	0	167
Future Volume (veh/h)	167	1145	8	6	1520	83	6	2	12	258	0	167
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	1953	1953	1953	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	196	1347	9	6	1634	89	10	3	20	290	0	188
Peak Hour Factor	0.85	0.85	0.85	0.93	0.93	0.93	0.60	0.60	0.60	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	3	3	3	0	0	0	1	1	1
Cap, veh/h	259	1986	885	270	1751	95	254	57	382	401	0	427
Arrive On Green	0.10	0.53	0.53	0.06	0.49	0.49	0.25	0.25	0.25	0.25	0.00	0.25
Sat Flow, veh/h	1875	3741	1667	1860	3580	194	1213	225	1502	1398	0	1680
Grp Volume(v), veh/h	196	1347	9	6	843	880	10	0	23	290	0	188
Grp Sat Flow(s),veh/h/ln	1875	1870	1667	1860	1856	1918	1213	0	1728	1398	0	1680
Q Serve(g_s), s	7.2	31.7	0.3	0.2	51.0	52.0	0.8	0.0	1.2	23.7	0.0	11.3
Cycle Q Clear(g_c), s	7.2	31.7	0.3	0.2	51.0	52.0	12.1	0.0	1.2	25.0	0.0	11.3
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	259	1986	885	270	908	938	254	0	439	401	0	427
V/C Ratio(X)	0.76	0.68	0.01	0.02	0.93	0.94	0.04	0.00	0.05	0.72	0.00	0.44
Avail Cap(c_a), veh/h	259	1986	885	270	908	938	254	0	439	401	0	427
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.6	20.6	13.3	15.5	28.7	28.9	42.7	0.0	33.8	43.3	0.0	37.6
Incr Delay (d2), s/veh	18.6	1.9	0.0	0.2	16.9	17.8	0.3	0.0	0.2	10.8	0.0	3.3
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	3.8	13.0	0.1	0.1	24.7	26.2	0.3	0.0	0.5	9.0	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.2	22.5	13.3	15.6	45.5	46.7	43.0	0.0	34.1	54.0	0.0	40.9
LnGrp LOS	D	C	B	B	D	D	D	A	C	D	A	D
Approach Vol, veh/h		1552			1729			33			478	
Approach Delay, s/veh		26.0			46.0			36.8			48.8	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	70.0		37.0	18.0	65.0		37.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.5	* 6.3	* 6.3		6.5				
Max Green Setting (Gmax), s	* 6.7	* 64		30.5	* 12	* 59		30.5				
Max Q Clear Time (g_c+I1), s	2.2	33.7		27.0	9.2	54.0		14.1				
Green Ext Time (p_c), s	0.0	10.9		0.7	0.1	3.7		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	38.1
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1434	52	59	1802	53	51
Future Vol, veh/h	1434	52	59	1802	53	51
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	500	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	92	92
Heavy Vehicles, %	3	3	3	3	2	2
Mvmt Flow	1559	57	62	1897	58	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1616	0	2632	780
Stage 1	-	-	-	-	1559	-
Stage 2	-	-	-	-	1073	-
Critical Hdwy	-	-	4.16	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.23	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	*726	-	*~ 18	*488
Stage 1	-	-	-	-	*460	-
Stage 2	-	-	-	-	*290	-
Platoon blocked, %	-	-	1	-	1	1
Mov Cap-1 Maneuver	-	-	*726	-	*~ 16	*488
Mov Cap-2 Maneuver	-	-	-	-	*160	-
Stage 1	-	-	-	-	*460	-
Stage 2	-	-	-	-	*265	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	32.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	239	-	-	* 726	-
HCM Lane V/C Ratio	0.473	-	-	0.086	-
HCM Control Delay (s)	32.9	-	-	10.4	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	2.3	-	-	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	78	366	360	86	38	239	246	12	25	145	65
Average Queue (ft)	31	241	223	9	6	128	131	0	3	63	24
95th Queue (ft)	65	342	330	55	25	205	218	5	16	125	54
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)			40	0							
Queuing Penalty (veh)			4	0							

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	28	16
Average Queue (ft)	1	1
95th Queue (ft)	11	9
Link Distance (ft)		321
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Drive & Highland Road (M-59)

Movement	EB	WB	WB	NB
Directions Served	R	L	T	LR
Maximum Queue (ft)	13	61	11	170
Average Queue (ft)	1	22	0	79
95th Queue (ft)	6	54	8	156
Link Distance (ft)			134	177
Upstream Blk Time (%)				5
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	100	500		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 4

Intersection: 1: Private Drive/Fisk Road & Highland Road (M-59)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	190	307	299	82	113	491	500	22	33	355	156
Average Queue (ft)	84	199	188	4	6	383	388	4	5	182	73
95th Queue (ft)	155	281	276	37	71	530	533	17	20	304	135
Link Distance (ft)		1480	1480			471	471		200		1113
Upstream Blk Time (%)						6	7				
Queuing Penalty (veh)						52	58				
Storage Bay Dist (ft)	500			50	500			100		1000	
Storage Blk Time (%)			29			6					
Queuing Penalty (veh)			2			0					

Intersection: 2: Highland Road (M-59) & JOANN Fabric Drive

Movement	EB	WB	WB	SB
Directions Served	L	T	T	LR
Maximum Queue (ft)	30	83	77	21
Average Queue (ft)	3	6	7	2
95th Queue (ft)	17	57	58	12
Link Distance (ft)		1430	1430	321
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	500			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Site Drive & Highland Road (M-59)

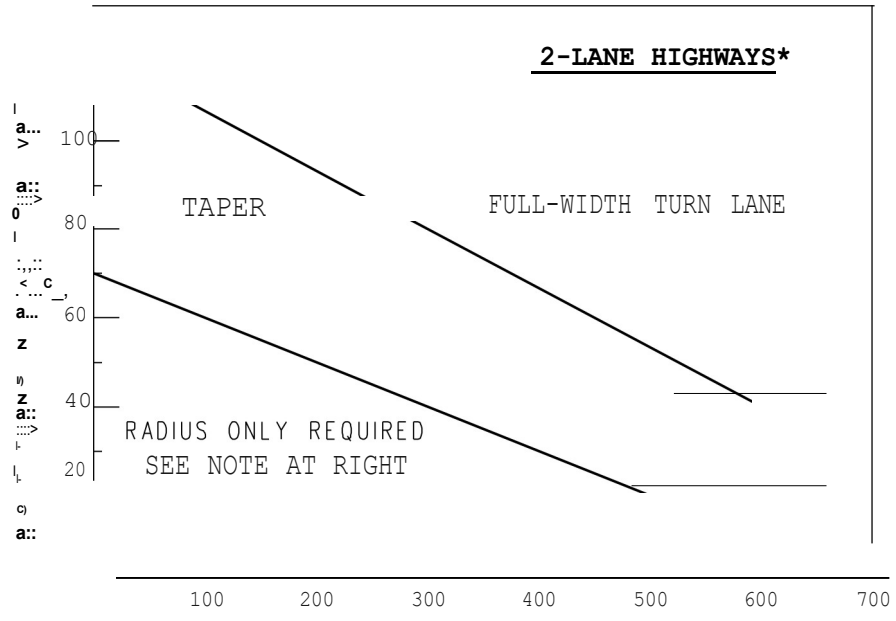
Movement	EB	WB	WB	WB	NB
Directions Served	R	L	T	T	LR
Maximum Queue (ft)	8	79	61	65	207
Average Queue (ft)	0	31	9	10	188
95th Queue (ft)	4	65	63	69	204
Link Distance (ft)			134	134	177
Upstream Blk Time (%)		0	0	1	98
Queuing Penalty (veh)		0	4	6	0
Storage Bay Dist (ft)	100	500			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Zone Summary

Zone wide Queuing Penalty: 123

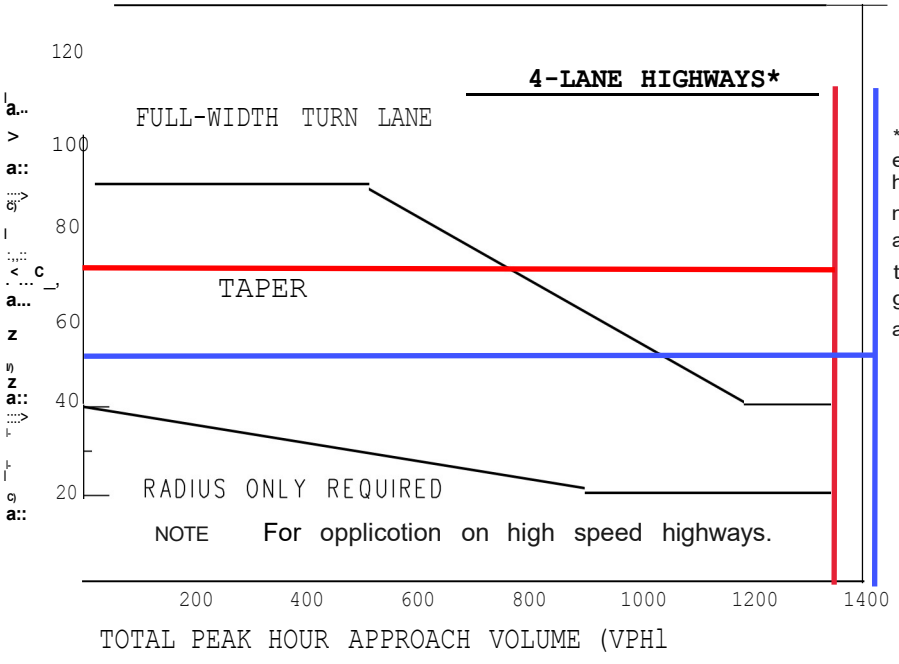
EB Highland Road (M-59) & Site Drive

Item A.



NOTE:
For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust nght turn volumes.

Adjust peak hour nght turns Peak hour nght turns - 20



*If a center left-turn lane exists(1.e. 3 or 5 lane highway l, subtract the number of left turns 1n approach volume f ram the total approach volume to get an adjusted total approach volume.

AM=71
PM=52

AM=1365
PM=1486

RT Radius Recommended

Sample Problem:
The Design Speed 1s 55 mph. The Peak Hour Approach Volume 1s 300 vph. The Number of Right Turns in the Peak Hour 1s 100 vph. Determine 1f a right turn lane 1s recommended.

Solut1on:
F1gure indicates that the 1ntersect1on of 300 vph and 100 vph 1s located above the upper trend line; thus,a nght-turn lane may be recommended.

JVIDOT M1ct11gon OeporT.ment. of Trv'l$pOrUHion	TRAFFIC VOLUME GUIDELINES FDR RIGHT-TURN LANES AND TAPERS
TRAFFIC AND SAFETY NOTE	
DRAWN BY: MTS	08/05/2004 PLAN DATE: 604A
CHECKED BY: JAT	
FILE: K:/OGN/ts notes/Note604A tsn.dgn	REV. 08/05/2004

Coffee Shop Drive Through Lane
95th Percentile Probability - Drive Through Queue Length (# of Vehicles)

Volume = 89 vph
service rate = 80 veh/hr
λ = 1.1125

λ^x	1 No Veh in Cycle	2 X	3 X!	4 P = (e^(-λ))(λ^x)/X!	5 ΣP	6 P* # Cycle containing Volume in 1	7 Σ Cycles in 6	8 Volume in Cycle (1*6)	9 Σ volume	Poisson Queue
1.0000	0	0	1	32.87%	32.87%	26	26	0	0	NO
1.1125	1	1	1	36.57%	69.45%	29	56	29	29	NO
1.2377	2	2	2	20.34%	89.79%	16	11	33	62	NO
1.3769	3	3	6	7.54%	97.33%	6	17	18	80	NO
1.5318	4	4	24	2.10%	99.43%	2	19	7	87	NO
1.7041	5	5	120	0.47%	99.90%	0	19	2	88	MET
1.8958	6	6	720	0.09%	99.98%	0	19	0	89	MET
2.1091	7	7	5040	0.01%	100.00%	0	19	0	89	MET
2.3464	8	8	40320	0.00%	100.00%	0	19	0	89	MET
2.6104	9	9	362880	0.00%	100.00%	0	19	0	89	MET
2.9040	10	10	3628800	0.00%	100.00%	0	19	0	89	MET
3.2307	11	11	39916800	0.00%	100.00%	0	19	0	89	MET

White Lake Township

2024 Master Plan

Draft: February 2024

Insert Resolution

Acknowledgments

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List of Figures

List of Maps

List of Tables

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Table of Contents

Introduction & Background

INTRODUCTION

White Lake Township's Master Plan presents an opportunity to set the course for sustainable growth and development over the next decade. This 2024 Master Plan update occurs at a favorable time: following a decade of rapid growth, the pace of growth is slowing down, household compositions are changing, the population is aging, housing preferences are diversifying, value for natural features and open space is exponentially growing in this post COVID-19 pandemic era, and land use patterns are undergoing a transformation. To capture these shifting trends, this Plan is comprehensive in scope; it evaluates existing data, trends, and land use patterns to develop and coordinate strategies for managing natural features, housing, transportation, economic development, and future land use in the Township. Propelled by community input, this Master Plan establishes a vision of the future, defines community goals and objectives, and details actions and land use patterns consistent with the defined goals and visions of the Township.

What is a Master Plan?

The Michigan Planning Enabling Act (PA 33 of 2008) enables municipalities to write a Master Plan that broadly guides development to meet current and future needs and promotes the health, safety, and general welfare of its residents. A Master Plan is a long-range, comprehensive document that guides decisions about future development based on existing and forecasted conditions and trends, community needs and preferences, and plans best practices. The Plan is intended to represent the community's consensus and serve as a guide for decision-making regarding the Township's future. The Michigan Planning Enabling Act (MPEA) also requires all municipalities to review its Master Plan every five years to determine if an update is needed. Since the adoption of White Lake Township's Master Plan for Land Use 2010-2011, changes in Township demographics and socio-economic compositions have warranted a reevaluation of the Township's policies with respect to growth, development, and land use. To this end, White Lake Township's 2024 Master Plan update aims to chart a path for a desirable future with a strong emphasis on short- and long-term goals and action strategies.

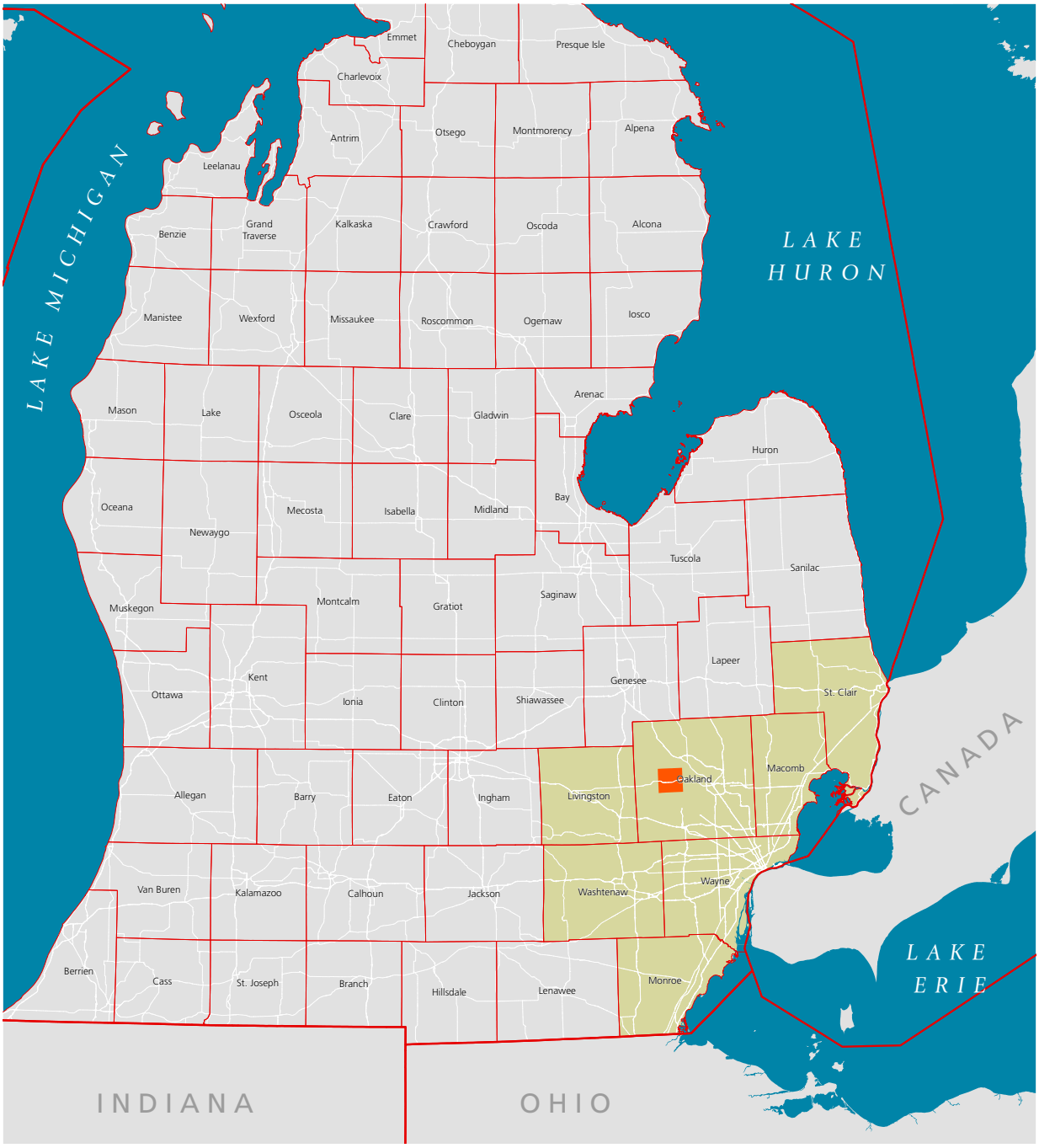
Relationship to Zoning Ordinance

The Master Plan is not a binding agreement but rather a planning framework. The Zoning Ordinance, on the other hand, is local land use law. The Zoning Ordinance is a set of regulations that provide the details for how and where development can locate to exacting specifications. Thus, the Zoning Ordinance implements the Master Plan; and, as outlined in the MPEA, a direct relationship between the two documents is required. For example, if it emerges through community engagement and research the housing types available do not adequately serve the population, then a vision statement in the Master Plan could read "to plan for housing types that meet all the preferences of all age groups, income levels, and disabilities." To ensure that this vision is implemented, a municipality would revisit the Zoning Ordinance to determine if the land use code is preventing a particular type of development through height restrictions or lot size requirements. Only when the two documents are in sync can they be effective planning tools.

REGIONAL CONTEXT

White Lake Township is located in central Oakland County in the Western Lakes area and is a suburban community within the Detroit metropolitan area, with the southeastern most area of the Township located 19 miles northwest of the Detroit city limits. The Township is spread over 37.1 square miles with a population of 30,950 in 2020.[1] The development pattern in the Township is determined by the availability of public utilities and is a mix of both urban and rural character.

Map 01: Regional Location



Regional Location

20 Miles

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

White Lake Township

SEMCOG

White Lake Township is a part of the Southeast Michigan Council of Governments (SEMCOG) region that consists of Oakland, Livingston, Macomb, Monroe, St. Clair, Washtenaw, and Wayne Counties. The Township is bordered by Springfield Township to the north, Waterford Township to the east, Commerce Township to the south, and Highland Township to the west. West Bloomfield Township meets White Lake Township at its southeast corner, forming the "Four Towns" area along Union Lake and Cooley Lake Roads, with Commerce and Waterford Townships.

The Township is bisected by State Highway M-59 running east-west through the Township. The M-59 thoroughfare continues about 10 miles west to connect the Township with US-23, which runs north to Flint and south to Brighton and Ann Arbor, and continues east through metro Detroit to find a terminus at Chesterfield & Harrison Townships. Interstate 75 (I-75), which runs north to Flint and south to southeast to Detroit, can be accessed about three miles northeast.

With an abundance of greenspace and year-round recreation opportunities (25% of the land use in the Township), the Township's slogan "Four Season's Playground" is well suited. The Township is also part of the region around the Huron River that has been established as the "Huron River Valley" by Oakland County, which expands recreational access regionally.

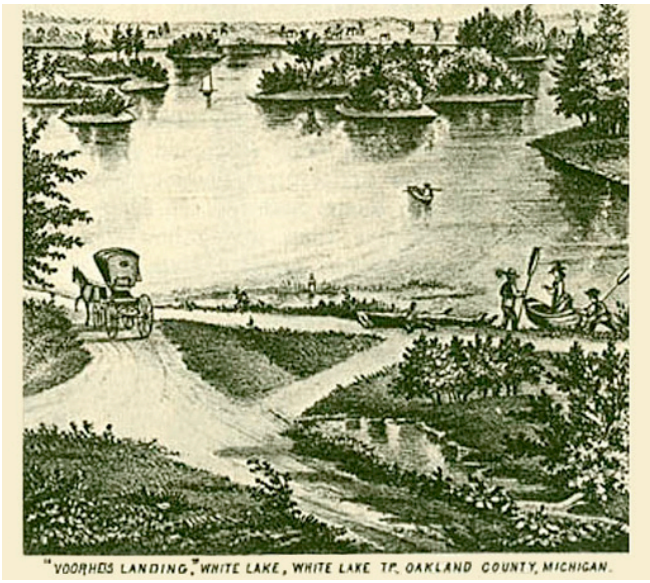
BRIEF HISTORY OF WHITE LAKE TOWNSHIP

White Lake Township was organized as a Township in Oakland County in 1836; prior to that, there were two villages: White Lake Settlement and Oxbow Lake Village.[2] The White Lake Settlement was located in the area of White Lake and Ormond Roads. The first settlers arrived around the White Lake area in the 1820s. During that time, and for several years to follow, an indigenous encampment was located on the shores of White Lake Road; that is when Lake Road began as a well-used trail of the Native Americans.[3] Harley Olmsted, came to the White Lake Settlement from Monroe County, New York, in 1830, and built the first house in 1832.[4] Oxbow Lake Village, located on what is now Elizabeth Lake Road near Oxbow Lake, was started by Erastus Hopkins, who bought 320 acres in 1833 when he came to Michigan from New York.[5] Harley Olmsted, Erastus Hopkins, and other early settlers established churches, schools, post offices, and other business operations.

Agriculture was the early predominant land use and economic driver in the White Lake Settlement and Oxbow Lake Village areas. However, arrival of a stagecoach line as early as 1836 routed through White Lake Road to run between Grand Rapids and Detroit, with a stop at the White Lake Settlement beginning in 1837, opened new opportunities for regional trade.[6] One of the area's most significant achievements was the lumbering era, the impetus for the settlement of the White Lake community.[7] Building on the longstanding history of lumber trade around White Lake and Duck Lake, the Hopkins Mills (grist mill and sawmill) was established in Oxbow Village.[8]

The turn of the 20th century and the Industrial Revolution proved Detroit as an industrial and manufacturing base, and the suburbs around White Lake were beneficiaries of the population and economic growth. During this period, the population in White Lake Township exponentially grew from 1,114 (1930) to 22,608 (1990) and so, seemingly, residential development in the Township also increased.[9] In addition to being a sought-after residential suburb of Detroit, the Township's popularity in the region was furthered by the abundance of recreational opportunities offered around its 21 named lakes.[10] Progressing into the 21st century, White Lake carried forward its rich agricultural history in the rural parts of the Township while exhibiting its industrial character in the more urbanized areas while continuing its legacy as a recreational destination in Southeast Michigan.

Figure 01: Voorheis' Landing



Source: White Lake Citizens League

Figure 02: The White Lake Inn

Source: The White Lake Inn

PLANNING EFFORTS IN WHITE LAKE TOWNSHIP

White Lake Township has engaged in multiple planning efforts in the past and the following section is a description of these efforts.

2011 | 2010-2011 White Lake Township Master Plan for Land Use[11]

This 2024 Master Plan update intends to be the next iteration of the White Lake Township Master Plan for Land Use adopted in 2011. It is, therefore, important to evaluate the 2011 Plan to determine which goals have been achieved, which goals are still relevant, and which goals haven't been achieved. For the goals that haven't been achieved, this Master Plan update presents an opportunity to evaluate potential barriers and rethink the actions required to achieve the goal(s) in the future. The 2011 Master Plan contained seven goals themed around natural features, infrastructure, residential neighborhoods, land use, services, and recreation. The associated strategies for each goal were divided into tasks in which the Planning Commission took the lead and those that required discussion and partnership with other Township boards and/or groups outside the Township.

2023 | 2024-2029 White Lake Township Capital Improvement Plan (CIP)[12]

The 2024-2029 White Lake Township Capital Improvement Plan (CIP) serves as a tool to assist White Lake Township in turning long-range policy planning into real improvements on the ground. It provides a schedule of expenditures for constructing, maintaining, upgrading, and/or replacing a community's physical inventory. The Township has several facilities in the pipeline including a new Public Safety headquarters, Township Civic Building, and a Maintenance Building totaling $35 million. The CIP has also budgeted for several of the improvements outlined in the Township's Park and Recreation Master Plan, including $1.75 million of Township funds for the construction of Stanley Park. Other major expenses include $2.2 million towards Western Outlet Sanitary Extension, $4 million towards the construction of a satellite fire station, and $5.5 million towards a new iron filtration and sewer connection at the Aspen Meadows well site.

2023 | 2023-2027 White Lake Township Parks and Recreation Master Plan[13]

White Lake Township Parks and Recreation Master Plan is intended to guide future Parks and Recreation programs, services, operations, and maintenance for the five-year term. In addition, the plan is intended to form the basis for future applications for recreation grant funding from the Michigan Department of Natural Resources and other granting agencies and foundations. White Lake operates six Township parks: Stanley Park, Ferdinand C. Vetter Park, Judy Hawley Park, Hidden Pines Park, Bloomer Park, and Fisk Farm. In addition to the Township-owned parks, the public and parochial schools in White Lake provide recreation opportunities. The plan pursues long-range recreational goals and objectives through specific short-range actions on the part of the Township, County, and State as well as private entities.

2017 | Civic District Development Study[14]

The intent of the Civic District (CiDi) Development Study was to leverage the design and planning of the proposed Civic Campus with the surrounding region to create momentum that spurred development with an emphasis on creating a walkable, active small-town center that is sustainable and attractive for residents and business. The design and planning process utilized research, analysis, and community input to develop a planning approach that was uniquely targeted to White Lake Township through a series of strategies that addressed infrastructure,

stormwater management, environment and ecology, recreation, land use, neighborhood connectivity, and development density. The recommendations were as follows:

» Implementing a focused downtown master plan integrated with the shopping center at Town Center Boulevard and adjacent to Brendel Lake could propel the region as an economic engine for the Township and create a unique destination that would epitomize the identity of the community.

» Create a higher density of development at the intersection of Elizabeth Lake Road and Town Center Boulevard that would be characterized as a walkable district.

REGIONAL PLANNING CONTEXT

Regional and County-wide demographic and socio-economic trends and changes influence growth and development patterns in the Township. To capture these larger regional planning trends, this section reviews the surrounding communities and their Master Plans, Oakland County's planning efforts, and SEMCOG's regional plans to determine how land use planning in neighboring jurisdictions and the region may impact White Lake Township.

Master Plans of Neighboring Municipalities

The Township is bordered by Springfield Township to the north, Waterford Township to the east, Commerce Township to the south, and Highland Township to the west. The Future Land Uses (FLUs) and the Future Land Use Maps (FLUMs) of these four municipalities are summarized in the table titled: "Master Plans of Neighboring Municipalities" with the purpose of ensuring compatible land usage along Township boundaries. An important consideration while reviewing the table is the Master Plans of all four surrounding Townships are either past or approaching the end of the designated adoption period. In the event the municipalities adopt a new Master Plan, the future land use along the periphery may change, warranting a reevaluation of land use compatibility along the jurisdictional boundaries.

2020 | Oakland County Economic Development Strategic Plan[15]

The purpose of this plan is to provide the Economic Development (ED) Department with the structure, programs, and resources necessary to foster sustainable economic vitality. The plan aims to catalyze innovation, investment, and growth in Oakland County through business vitality and diversification, community development and planning, and talent development and attraction. Oakland County aims to leverage its assets to build a more robust and comprehensive program that will generate long-term prosperity. The plan consists of several strategies including collaboration with the business community and local authorities.

2021 | Comprehensive Economic Development Strategy for Southeast Michigan[16]

The Comprehensive Economic Development Strategy for Southeast Michigan (CEDS) serves as a required vehicle through which the U.S. Economic Development Administration (EDA) evaluates grants and resource requests for the seven-county SEMCOG region, including Oakland County. The CEDS outlines the following economic development strategies:

» Creating and marketing quality places

» Anticipating demands for land use

» Investing in critical infrastructure

» Fostering a competitive business climate

» Advancing technology, innovation, and entrepreneurship

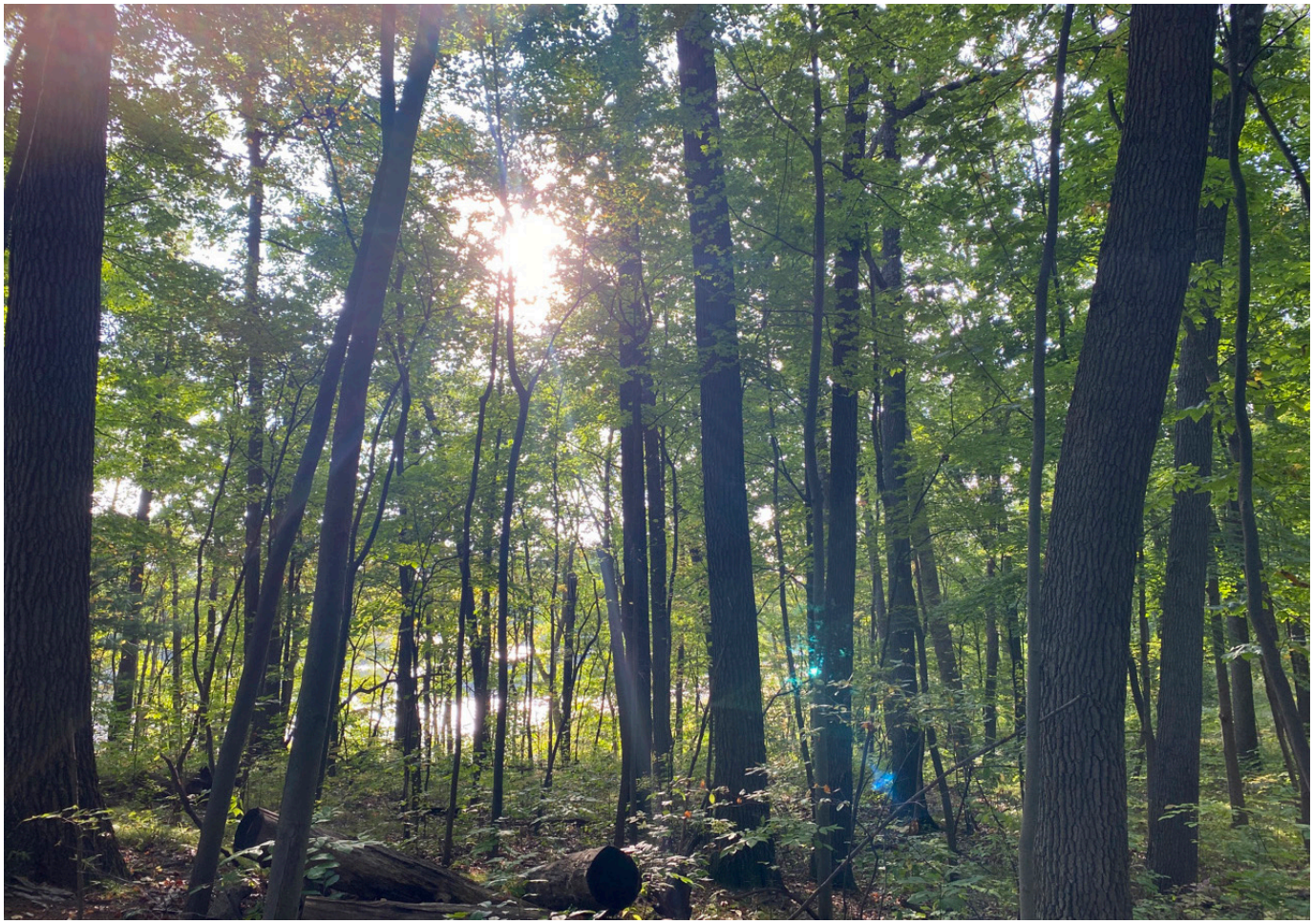
» Preparing and connecting talent with jobs.

The Township can coordinate with the County and SEMCOG to determine the current status of the CEDS and tap into potential grants and resource requests through the U.S. EDA.

Table 01: Master Plans of Neighboring Municipalities

	Springfield Township[17]	Waterford Township[18]	Commerce Township[19]	Highland Township[20]	West Bloomfield Township[21]
Location	North of White Lake Township	East of White Lake Township	South of White Lake Township	West of White Lake Township	Small portion South of White Lake Township
Document Title	Springfield Township Master Plan	Waterford Township Master Plan 2003–2023	Commerce Township Master Plan	Highland Township Comprehensive Land Use Plan 2000-2020	The Charter Township of West Bloomfield Master Plan
Year Adopted	2009 (Amended: 2016)	2003	2015	2000	2010
Future Land Uses Along Shared Boundary with White Lake Township	» Low Density Residential » Recreation-Conservation » Limited Industrial	» Residential » Public & Open Space » Regional Commerce/ Community Business	» Single-Family Residential » Multiple-Family Residential » Public	» Parks and Recreation » Agricultural & Rural Residential » Low Density Residential	» Moderate Density Single Family » Neighborhood Business
Comparison of Land Use Along Jurisdictional Boundary	» The residential land use in White Lake Township along the northern boundary is also low-density residential barring the Meadow Lake manufactured housing community in the northwest corner. » The recreation land use spills over the boundary with the Indian Springs Metropark & Golf course. » The northeast corner of White Lake Township is largely occupied by Mack Industries.	» The residential land use in White Lake Township along the eastern boundary is predominantly residential with large areas of recreational land within the Pontiac Lake State Recreation Area and White Lake Oaks Golf Course. » The residential development along this periphery is denser than other areas of White Lake Township. » The commercial land use along Cooley Lake Road extends across the boundary.	» The land use in White Lake Township along the southern boundary is also predominantly residential.	» The Highland State Recreation Area occupies a large portion of the Township south of M-59 along the western boundary of White Lake Township. » There are several recreational/ campgrounds and supporting commercial uses around White Lake.	» The land use in White Lake Township along the southern boundary is also predominantly residential.

	Springfield Township[17]	Waterford Township[18]	Commerce Township[19]	Highland Township[20]	West Bloomfield Township[21]
Considerations for White Lake Township's FLUM	» Future residential land uses along the periphery must be planned carefully depending on the availability of public utilities. » Recreation/ Conservation Areas should be buffered from industrial uses.	» Future residential land uses along the periphery must be planned carefully depending on the availability of public utilities. » Integrate neighborhood scale commercial land uses along its periphery to support the dense residential land uses.	» There are several lakes and natural features scattered along the southern boundary making more intense land uses unsuitable.	» Commercial land uses along this boundary can be consolidated to control development around White Lake.	» Neighborhood businesses and commercial uses around "Four Towns" can be consolidated to control development.



Bloomer Park

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Demographics

A demographic analysis provides insights into a community's socio-economic characteristics, growth, and development patterns, and changing needs and preferences. An understanding of demographic trends is a precursor to determining future goals and planning strategies for White Lake Township. It is equally important to recognize demographic trends and growth patterns in a community are not isolated events, but tend to be responses to broader regional socioeconomic shifts. Collectively, an awareness of local and regional trends can enable the Township to make the most of its assets while addressing any challenges. To this end, this section examines data and trends relating to the Township's population, households, and economy in comparison to other surrounding communities in Oakland County to provide regional context.

DATA SOURCES

The demographic data in this chapter is derived from the following sources, in this preferred order:

2020, 2010, 2000, and 1990 U.S. Decennial Censuses

Mandated by the United States Constitution, the decennial census is the most accurate source of information recorded by the U.S. Census Bureau as it aims to count 100% of the population. The decennial census is valuable because it provides comparable data points at regular 10-year intervals since 1790. This data is also the basis for congressional apportionment and redistricting which determines funding and resource allocation for a community over the next decade. However, it is important to note the data provided by the decennial census is limited, as the intention is to count 100% of the U.S. population. The survey is intentionally short and covers limited information about household composition, sex, race, and occupancy type (own v. rent). Additionally, the 10-year gap between surveys means demographic and housing patterns between the decades are not captured in this census.

American Community Survey (ACS)

The American Community Survey (ACS) was initiated in 2000 and collects more detailed information on social, economic, and housing characteristics compared to the decennial census. Instead of collecting data every 10 years, this survey collects data on an ongoing basis and releases data periodically. However, the long-form format of the ACS makes it logistically difficult to administer the survey for 100% of the population. Instead of surveying the complete population, the ACS samples a percentage of the population to determine estimates for the overall population; therefore, the accuracy of the ACS depends on the population size of the sampling area. To maintain statistical validity, the Census Bureau collects sample data over two different time frames, a one-year or five-year frame, depending on the size of a community. In communities where the population is less than 65,000, data is collected over 60 months (five years) to achieve a valid sample size and generate estimates for the overall population. Since White Lake Township and the surrounding communities (for regional comparison) have a population less than 65,000, this plan uses the ACS five-year estimates.

Southeast Michigan Council of Governments (SEMCOG)

SEMCOG is a regional planning partnership of governmental units serving the seven-county region of Southeast Michigan including Oakland County. SEMCOG's Regional Forecast provides a long-range and comprehensive view of future demographic and economic changes in Southeast Michigan. This plan uses the 2045 regional forecasts.

Figure 03: Summary of Key Community Indicators

SUMMARY OF KEY COMMUNITY INDICATORS

White Lake Township, MI

Geography: County Subdivision

Population

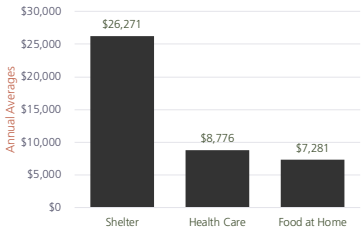
Total Population	Population Change (2010-2020)	Daytime Population*	Median Age	Average Household Size
30,950	3.1%	22,600	43.7	2.60

Income

Per capita Income	Median Household Income	Overall Poverty Rate	ALICE Threshold**
$49,433	$81,633	8.8%	22%

Economy & Market

Dominant Tapestry Segment***	Median Home Value	Number of Businesses
Green Acres	$247,200	611



Key Spending Sectors

* Daytime population, refers to the number of people who are present in an area during normal business hours, including workers. This is in contrast to the resident population who are typically present during the evening and nighttime hours.

** Asset Limited, Income Constrained, Employed (ALICE) is a measure that captures individuals who may be above the federal poverty level but still struggle with regular expenses and costs.

*** Tapestry segmentation profiles are select consumer groups developed by ESRI, defined by shared traits such as demographics, socioeconomic status, and behavior.

This infographic contains data provided by the Decennial Census, American Community Survey (ACS), United Force – ALICE, ESRI, ESRI and Data Axle, ESRI and Bureau of Labor Statistics.

Beckett&Raeder

DEMOGRAPHIC PROFILE

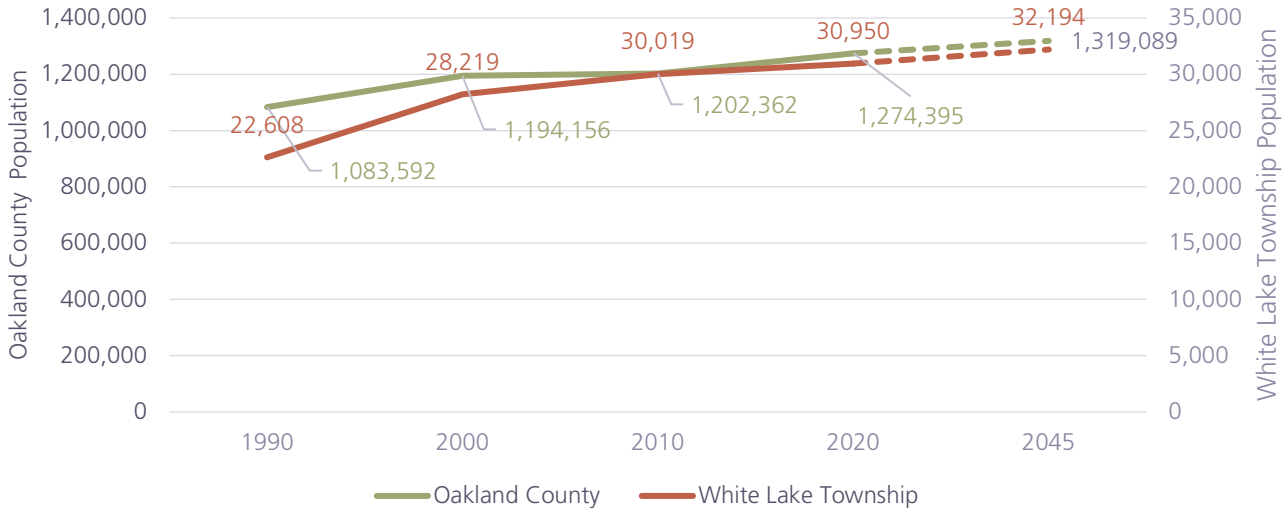
Population

The population of White Lake Township has continually grown in the last three decades to 30,950 in 2020. With the highest growth rate of 25% occurring between 1990–2000, the rate of population growth gradually slowed down to 3.1% between 2010–2020. Even though the Township's population grew in the last decade, the pace has been slower than the County (6% growth rate) and most surrounding communities, barring Highland Township and Waterford Township where the population declined. The surrounding communities of Commerce Township, Lyon Township, and Orion Township witnessed a higher growth rate than White Lake Township likely due to their proximity to urban centers such as Novi and Auburn Hills. These Townships are likely growing as a result of the out-migration from the densely populated cities, where housing opportunities are scarce, and the cost of living is high.

Population Forecast

SEMCOG's 2045 Regional Forecast provides an overview of future population trends in Southeast Michigan. The table titled "Population Forecast" outlines the population forecasts from SEMCOG for the Township and Oakland County over the next 25 years. SEMCOG anticipates a slow growth to occur

Figure 04: Population: White Lake Township & Oakland County (1990-2045)



Source: U.S. Census Bureau Decennial Census (1990, 2000, 2010, 2020)

Table 02: Population: White Lake Township & Other Communities (1990-2020)

	1990	2000		2010		2020	
	Count	Count	Change	Count	Change	Count	Change
White Lake Twp	22,608	28,219	24.8%	30,019	6.4%	30,950	3.1%
Commerce Twp	26,955	34,764	29.0%	40,186	15.6%	43,058	7.1%
Highland Twp	17,941	19,169	6.8%	19,202	0.2%	19,172	-0.2%
Lyon Twp	9,450	11,041	16.8%	14,545	31.7%	23,271	60.0%
Orion Twp	24,076	33,463	39.0%	35,394	5.8%	38,206	7.9%
Springfield Twp	9,927	13,338	34.4%	13,940	4.5%	14,703	5.5%
Waterford Twp	66,692	73,150	9.7%	71,707	-2.0%	70,565	-1.6%
Oakland County	1,083,592	1,194,156	10.2%	1,202,362	0.7%	1,274,395	6.0%

Source: U.S. Census Bureau Decennial Census (1990, 2000, 2010, 2020)

Table 03: Population Forecast: White Lake Township & Oakland County (2020–2045)

	Census	SEMCOG Regional Forecast					
	2020	2030		2040		2045	
	Count	Count	Change	Count	Change	Count	Change
White Lake Twp	30,950	31,578	2.0%	32,236	2.1%	32,194	-0.1%
Oakland County	1,274,395	1,286,750	1.0%	1,314,016	2.1%	1,319,089	0.4%

Source: United States Census Bureau Decennial Census (2020); Southeast Michigan Council of Governments (SEMCOG)

within both White Lake Township and Oakland County until 2040. The growth is expected to plateau for Oakland County and marginally decline in the Township by 2045.

Households

Consistent with the population growth in the Township, the total number of households also increased from 10,985 to 11,991 from 2010–2020. However, while the population grew by only 3.1%, the number of households increased by 9.2%. In comparison, Oakland County's population growth rate (6%) was proportionate to the increase in households (5.9%). This pace of growth in the total households in the Township is likely an outcome of changing household dynamics. On one hand, the number of seniors (65 years and above) living alone increased to 10.6% in 2020 from 6.4% in 2010, and the households with at least one senior leaped to 33% from 20%. Additionally, the households with children (under 18 years) slumped to 30% from 37% in 2010.[1] Consequently, the average household size decreased from 2.68 in 2010 to 2.60 in 2020, indicating the population spread out into a greater number of households. The average household size remains larger than the County (2.44) which is typical of townships due to the presence of housing typologies with larger footprints suited for bigger households. In summary, households in White Lake Township are getting smaller but the population is continuing to increase. The changing household structure will create a demand for more housing units and infrastructure, which will impact land use in the Township.

Components of Population Change

Natural Change = Total number of Births - Total number of Deaths

If the number of births is higher than deaths, then the population has undergone a natural increase.

Net Migration = Inward Migration - Outward Migration

Population Change = Natural Change + / - Net Migration

Age

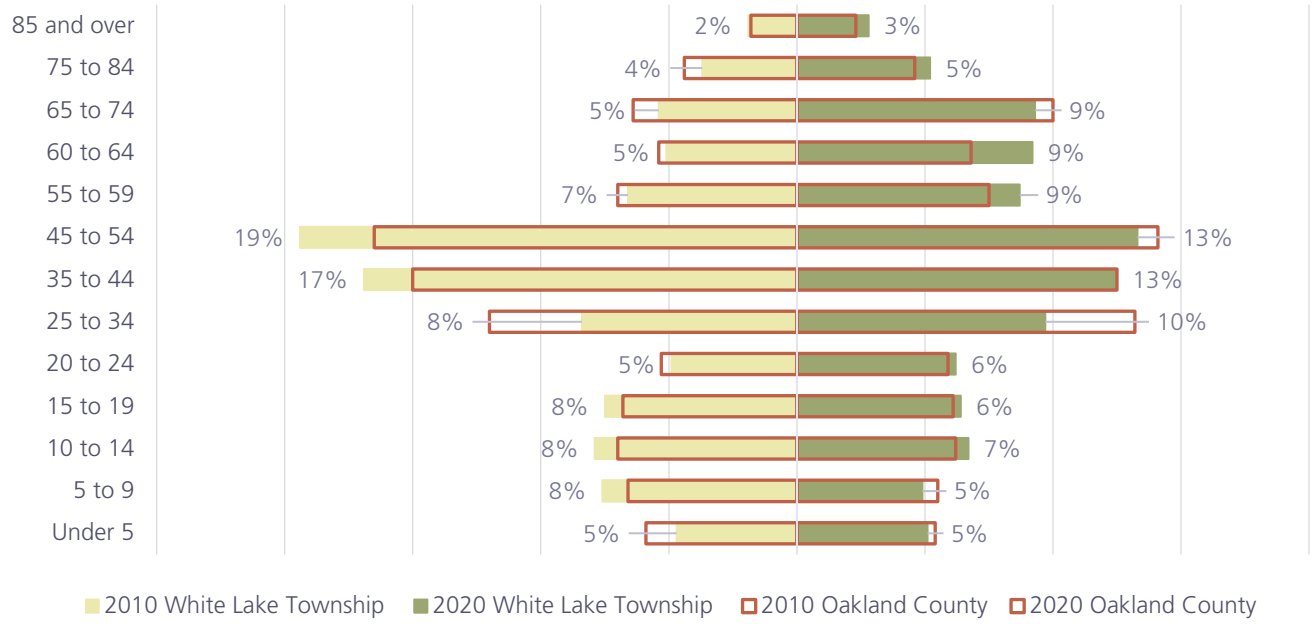
The population of White Lake Township is aging. In 2020, the median age of White Lake Township residents increased to 43.7 years from 41.3 years in 2010. Though the population is also aging in Oakland County (41.0 years median age) and the State of Michigan (39.8 years median age), the median age of the Township is higher.

Table 04: Households: White Lake Township & Oakland County (2010-2020)

	Total Households			Average Household Size		Average Family Size	
	2010	2020	Change	2010	2020	2010	2020
White Lake Twp	10,985	11,991	9.2%	2.68	2.60	3.05	3.00
Oakland County	481,040	509,589	5.9%	2.47	2.44	3.08	3.10

Source: United States Census Bureau ACS Five-Year Estimates (2010, 2020)

Figure 05: Age Distribution: White Lake Township & Oakland County (2010–2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2010, 2020)

The figure titled "Age Distribution: White Lake Township & Oakland County (2010–2020)" illustrates how the age distribution of the Township's population compares to Oakland County from 2010 to 2020. The 35-44 years (13%) and 45-54 years (13%) cohorts are the largest in the Township. Children and young adults aged 19 years and below represent almost a quarter of the population.

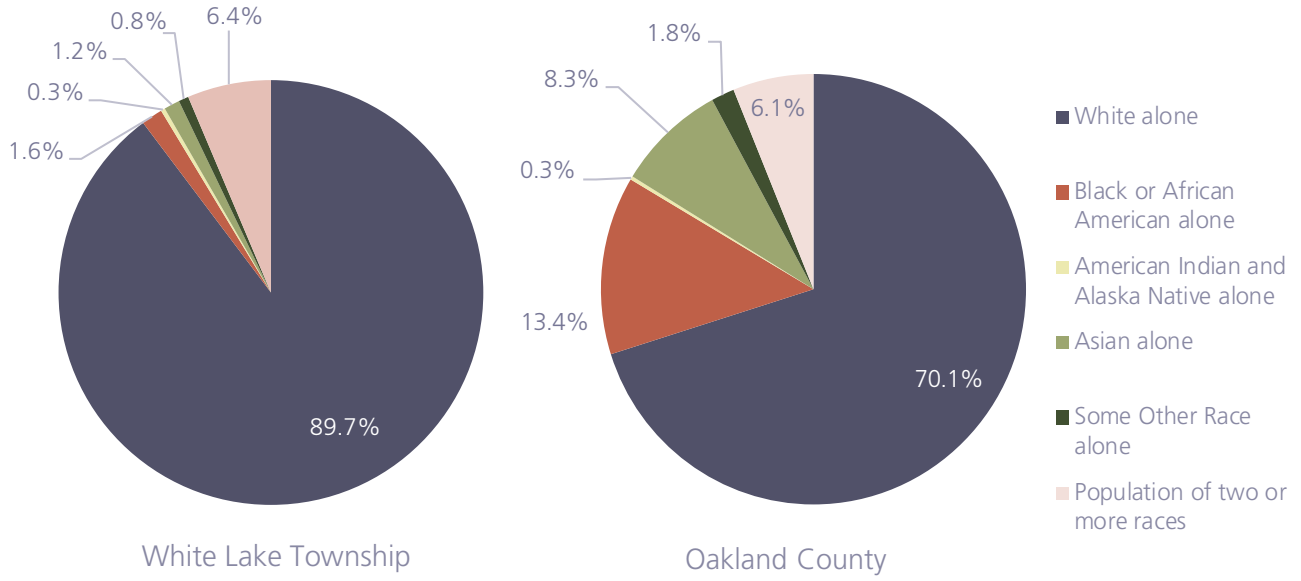
The Township has a lower percentage of younger households in the 25-34 years cohort compared to the County and a relatively low overall concentration of adults in the 20-24 years age group (6%). This depressed number of younger residents may be a consequence of two factors. First, young adults are likely to move out of the Township after graduating high school to pursue higher education or employment opportunities. Second, this cohort may be migrating out in pursuit of wider housing opportunities (smaller units, lesser price points, more rental units, etc.) or quality of life opportunities (vibrant downtowns, better programming for youngsters, etc.). Since the 20-34 years group represents the age at which most people begin to start families, providing diverse housing opportunities and adequate leisure and recreation opportunities tailored to this age group is key to attracting and retaining new and young families.

The term "empty nesters" generally refers to households that no longer have children living at home. Typically aged 55-64 years, this age cohort grew from 12% to 18% between 2010–2020 to surpass the County percentages (14%).[2] Indicative of an aging population, the senior population (65 years and above) in the Township grew from 11% to 17%.[3] SEMCOG's 2045 Regional Forecast predicts between 2015 and 2045 the senior age cohort will add 3,834 residents while the distribution of population in all other cohorts will decrease.[4] The aging population will result in an increased demand for specific housing options (assisted living, nursing homes, etc.), healthcare facilities, and leisure options so residents can age in place. Land use patterns will also have to be planned for proximity of services for the elderly to address concerns of limited mobility. Altogether, the age dynamics in the Township present challenges to retain (and potentially attract) young households while ensuring mature households and seniors have resources to transition through life and age in the Township.

Racial and Ethnic Composition

White Lake Township's racial and ethnic composition has undergone marginal change over the last decade. In 2020, nearly 90% of the Township's population identified as solely White compared to 94% in 2010.[5] This change is a result of 6.4% of the residents identifying as biracial or multiracial in 2020

Figure 06: Racial Composition: White Lake Township & Oakland County (2020)



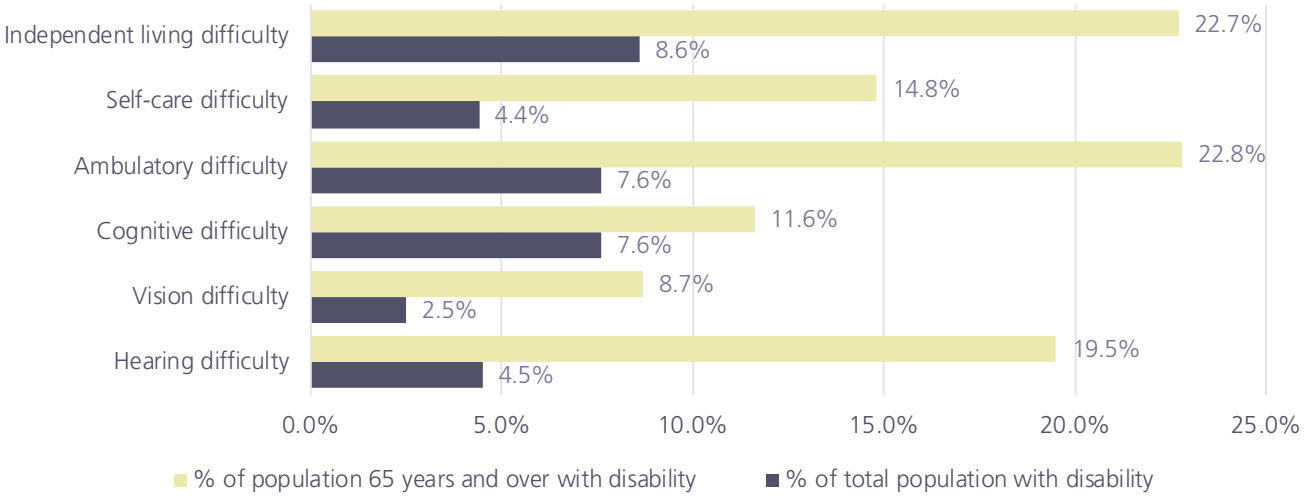
Source: U.S. Census Bureau Decennial Census (2010, 2020)

compared to only 1.3% in 2010. African Americans and Asians account for 1.6% and 1.2% of the population, respectively. All other races together only account for 1% of the population. The percentage of the population identifying as Hispanic or Latino (considered an ethnicity and not a race in the U.S. Census as of 2020) in the Township increased from 3.0% to 3.6% between 2010 to 2020.[6] The Township's population is racially homogeneous compared to Oakland County's population wherein only 70% of the population identify as solely White.

Disability

Land use patterns impact the lives of people with disabilities, especially in aging communities accommodating needs and requirements of the disabled population. Approximately 15% of White Lake Township's population and almost 40% of seniors have a disability.[7] Independent living difficulty affects 8.6% of the population followed by cognitive difficulty (7.6%) and ambulatory difficulty (movement difficulty, 7.6%). Amongst the elderly population (65 years and above), ambulatory

Figure 07: Disability Characteristics (2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

difficulty (22.8%) and independent living difficulty (22.7%) are most prevalent. Much of the Township's aging population will require support facilities including mobility assistance, accessible living facilities, or other specialized healthcare services. The needs of this population also have implications for the design of housing and public services and spaces.

SOCIOECONOMIC PROFILE

Education

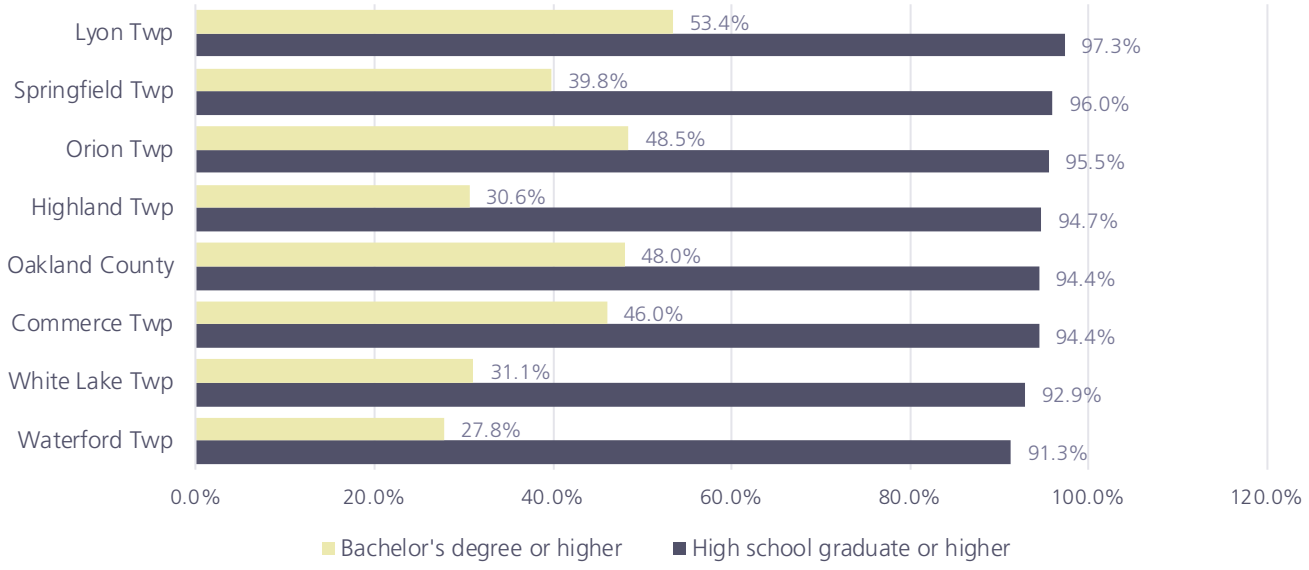
Educational attainment is a key indicator of socio-economic status as it influences employment opportunities for residents, and relatedly, the companies located in a community. In 2020, roughly 93% of White Lake Township adults over the age of 25 possess at least a high school diploma and 32% have at least a bachelor's degree.[8] The age of 25 is used as the benchmark for educational attainment because it is assumed most people will have completed their education by the age of 25. In addition to the 32% of residents that have a bachelor's degree, 27% of residents above the age of 25 years have at least some college education, indicating a presence of an educated and skilled workforce.[9] However, in comparison to other nearby communities and the County as shown in the figure titled "Education Attainment: White Lake Township & Other Communities (2020)," the Township ranks next to last in the percentage of residents with a high school degree and third to last in percentage of residents that have a bachelor's degree. The highly qualified regional population represents a competitive yet economically strong region presenting diverse employment and business opportunities to the Township residents.

Income & Poverty

Median household income is a metric used to measure the economic strength of a region, and higher educational attainment levels generally correlate with higher income potential and lower poverty rates. The 2020 median household income (inflation-adjusted dollars) in White Lake Township was $81,633, which is only $46 higher than the County ($81,587) but higher than the State of Michigan ($59,234). Over the last decade, the median income in the Township has risen continually and remained higher than the County, but followed a trajectory similar to the County. However, in comparison to the other communities (listed in Figure 08), only Waterford Township has a median income ($62,893) lower than White Lake Township.[10]

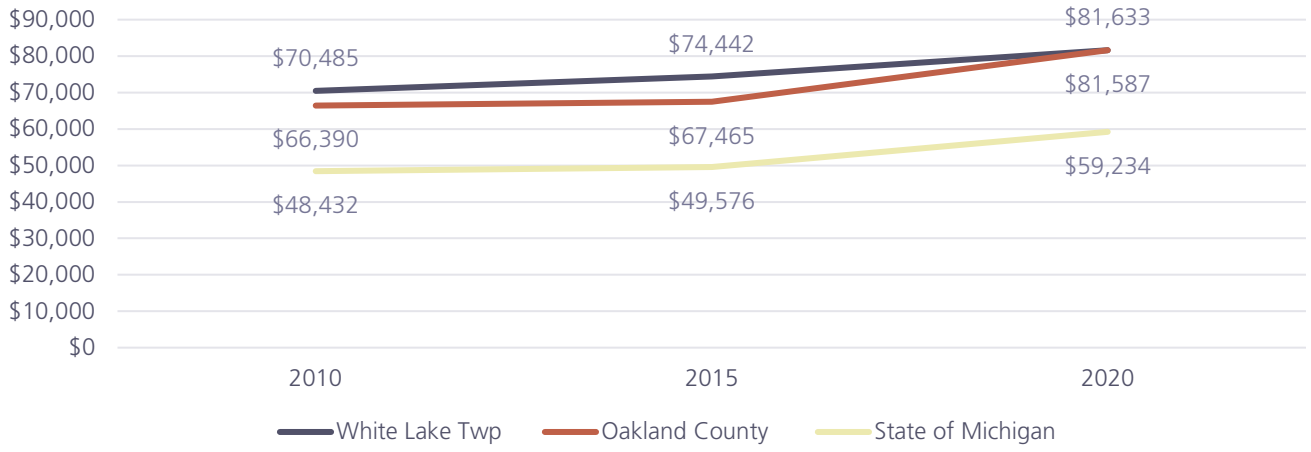
The figure titled "Household Incomes: White Lake Township and Oakland County (2020)" charts the distribution of household incomes in the Township against the County. At the higher end of the income spectrum, roughly 40% of Township households earn more than $100,000. At the lower end of the spectrum, around 13% of Township households

Figure 08: Educational Attainment: White Lake Township & Other Communities (2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Figure 09: Median Income: White Lake Township, Oakland County, and State of Michigan (2010-2020)



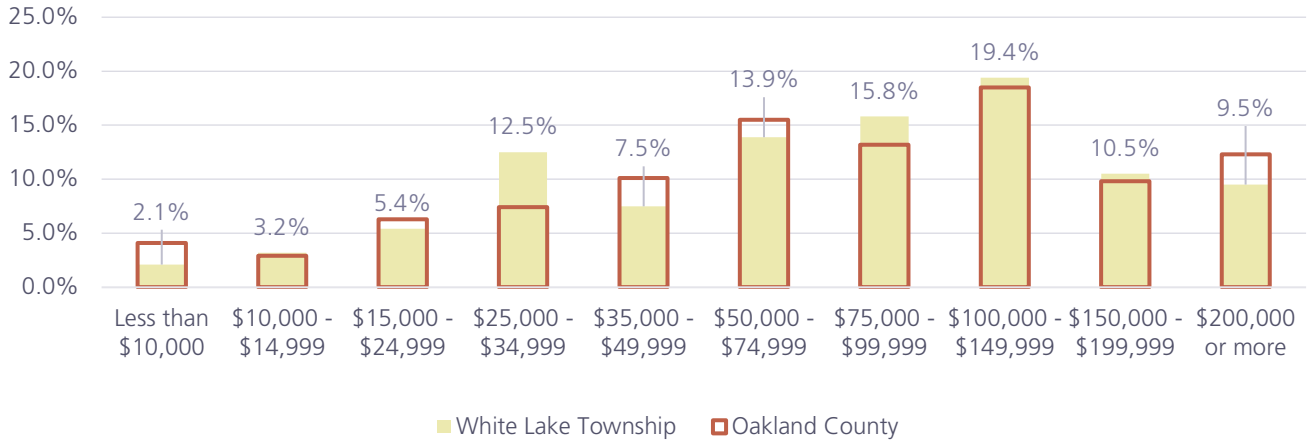
Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Table 05: Median Income: White Lake Township & Other Communities (2020)

	Median Income (Inflation-Adjusted Dollars)
Lyon Township	$115,600
Orion Township	$99,063
Commerce Township	$97,886
Springfield Township	$91,266
Highland Township	$88,061
White Lake Township	$81,633
Waterford Township	$62,893
Oakland County	$81,587
State of Michigan	$59,234

Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Figure 10: Household Incomes: White Lake Township and Oakland County (2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

earn below $25,000. The Township has a higher percentage of households in the $25,000-$34,999 income range than the County which likely includes some of the Township's retirees living on a fixed income.[11]

The U.S. Census Bureau determines poverty by comparing household annual income with the number of individuals in the household. In 2020, 8.8% of all residents were under the poverty line, slightly higher than the County (7.8%). More importantly, the 8.8% poverty rate in 2020 was an increase from 6.4% in 2010. This increase in poverty rate is partially a result of the economic downturn triggered by the COVID-19 pandemic where earning potential fell nationwide. Single-mother households with children have the highest poverty rate at 30%.

While poverty is a helpful measure for determining the percentage of people experiencing high levels of financial hardship, it does not capture those who are one accident or large financial cost from falling below the poverty line. ALICE, which stands for Asset Limited, Income Constrained, and Employed, is a measure that captures individuals who may be above the federal poverty level but still struggle with regular expenses and costs. This metric is calculated by totaling minimum basic expenses for food, housing, healthcare, childcare, transportation, technology, etc.[12] In White Lake Township, an estimated 28% of households fall under the ALICE threshold, slightly higher than the County (22%).[13]

Figure 11: Demographics: Key Takeaways

White Lake Township's population has continually grown until 2020; however, the pace of growth is slowing down and SEMCOG's 2045 Regional Forecast anticipates a marginal decline (-0.1%) by 2045.

Household size in White Lake Township is becoming smaller, so as a result, the total number of households in the Township increased by 9% between 2010 and 2020. Land use patterns and housing opportunities in the Township will have to cater to the shifting household compositions in the Township.

White Lake Township's population is aging. Mature households (35-54 years) continue to remain the largest age cohort (26%), while the percentage of empty nesters and seniors in the Township increased to roughly 18% in 2020. The Township is presented with a challenge to retain younger (20-34 years) households while ensuring mature households and seniors can age in place.

Roughly 15% of the Township's population and almost 40% of seniors have a disability and will require support facilities including mobility assistance, accessible living facilities, or other specialized healthcare services.

The percentage of individuals in poverty has increased to 8.8% in 2020, and an estimated 28% of households fall under the ALICE threshold. Providing affordable housing and economic opportunities will be key in ensuring these households can navigate their way out of poverty.

Sources

1 United States Census Bureau, DP02 Selected Social Characteristics in the United States, American Community Survey 5-Year Estimates, 2010 & 2020.

2 United States Census Bureau, DP05 ACS Demographic and Housing Estimates, American Community Survey 5-Year Estimates, 2010 & 2020.

3 United States Census Bureau, DP05 ACS Demographic and Housing Estimates, American Community Survey 5-Year Estimates, 2010 & 2020.

4 SEMCOG, White Lake Township Community Profiles, https://semcog.org/data-and-maps/community-profiles/communities=2290.

5 United States Census Bureau, DP05 ACS Demographic and Housing Estimates, American Community Survey 5-Year Estimates, 2010 & 2020.

6 United States Census Bureau, Decennial Census, 2010 & 2020.

7 United States Census Bureau, DP02 Selected Social Characteristics in the United States, American Community Survey 5-Year Estimates, 2020.

8 United States Census Bureau, DP02 Selected Social Characteristics in the United States, American Community Survey 5-Year Estimates, 2020.

9 United States Census Bureau, DP02 Selected Social Characteristics in the United States, American Community Survey 5-Year Estimates, 2020.

10 United States Census Bureau, S1901 Income in the Past 12 Months (In 2020 Inflation-Adjusted Dollars), American Community Survey 5-Year Estimates, 2020.

11 United States Census Bureau, DP02 Selected Social Characteristics in the United States, American Community Survey 5-Year Estimates, 2020.

12 United Way. Alice in Michigan: A Financial Hardship Study. 2019 Michigan Report. https://static1.squarespace.com/static/52fbd39ce4b060243dd722d8/t/5c902a7e971a186c0a29dff2/1552951937149/HR19ALICE_Report_MI_Refresh_02.26.19b_Final_Hires+%283%29.pdf.

13 United for ALICE, Research Center, https://www.unitedforalice.org/county-profiles/michigan.

Carolling in White Lake Township

Natural Features & Open Space

Originating around White Lake, the Township was founded amidst treasures of lakes and natural features. The Township boasts a wealth of natural resources, including 21 named lakes and sprawling acres of woodland and farms. The Township's proximity to the growing metro-Detroit region attracts development, fueling the built environment at the cost of the natural environment. However, recognizing management of natural resources is essential to the well-being of residents and the local economy, the Township has strived to create a balance between development and preserving and protecting natural assets. This section of the Master Plan inventories White Lake Township's natural features and open spaces and discusses strategies to coordinate the natural environment, the built environment, and future land uses.

LAND

Soils[1]

Of the eight soil associations found in Oakland County, three can be found in White Lake Township. The majority of the eastern half and a small area in the northwest corner of the Township is characterized by the "Urban land-Spinks-Oshtemo" soil association. This association is composed of well-drained sandy soil, located on nearly level to rolling topography. Urban land consists of soils that have been so altered by development that it is no longer possible to determine the original soil type. The "Oshtemo-Spinks-Houghton" soil association is located in a band running from the southwest corner to the northeast corner of the Township. It is found on nearly level to hilly terrain and is composed of well-drained to very poorly-drained loamy, sandy, and mucky soil. The northern border of the Township and a small area in the southwest corner are made up of the "Fox-Oshtemo-Houghton" association. It is an area of nearly level to steep topography. This soil association is also well-drained to very poorly drained sandy, mucky soil.

Limitations for Septic Fields[2]

Septic system development in the Township is limited by its extensive network of water bodies. The wetland, lake, and river areas are identified as unsuitable for septic uses. Most of the Township, in fact, is not considered suitable for septic uses, although there are small areas scattered around the Township designated as marginally suitable. It is therefore vital to regulate septic systems to ensure proper function. Regular inspection and maintenance of septic systems are essential for preserving water quality, as failing systems can pollute groundwater and nearby surface waters with human waste. The Oakland County Health Division regulates private wells and septic fields in the Township. Currently, septic inspections have to be initiated by the property owner or more commonly are requested during a home inspection during the home buying process.

Soil Erosion Control[3]

Soil erosion and sedimentation is the greatest pollutant by volume entering lakes and streams. Increased flooding causes damage to plant and animal life while also causing structural damage to buildings and roads. The Oakland County Water Resources Commissioner's Office regulates soil erosion control in the Township and grants soil erosion permits to development within the Township.

Woodlands and Tree Canopy

Despite White Lake Township's residential and commercial growth and development during the last several decades, there are still many woodland areas scattered throughout the Township. The vast majority of the trees are upland hardwoods. The Highland State Recreation Area and the Pontiac Lake State Recreation Area both have large stands of protected upland hardwoods. White Lake also has a few small areas of upland conifers dispersed throughout the Township. These wooded areas are a resource to both the residents and the wildlife in

the Township. Existing trees can also be "credited" to a development's landscaping requirements to encourage tree preservation, which includes the practice of replacing any damaged trees during the development process.

WATER

Lakes

The abundance of lakes and easy access to them is one of the biggest attractions in the Township. The Township has a total of 21 named lakes accounting for 3.7 square miles or 9.9% of the Township's area which are used for both passive and active recreational purposes. The lakes and surrounding recreation areas draw a large seasonal population into the Township year-round and also creates a competitive market for lakefront homes in southeast Michigan.

Floodplains

A floodplain is the land surrounding a river, stream, lake, or drain that becomes regularly inundated by the overflow of water. Inundation or flooding typically takes place after rain or snow, and floodplains retain the excess floodwaters. For this reason, keeping floodplains as natural as possible helps to prevent flooding in adjacent low-lying areas.

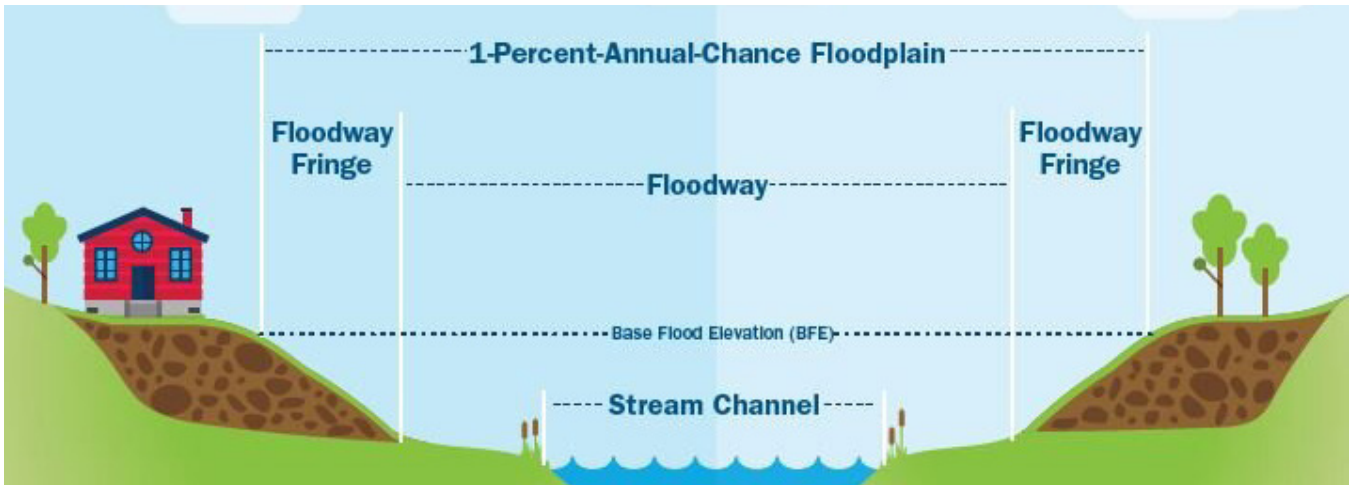
The Federal Emergency Management Agency (FEMA) designated floodways in White Lake Township to follow existing lakes, portions of the Huron River, and its tributaries which are largely present only south of M-59. The blue floodplain on the map below represents a 1% chance of annual flooding, also known as the 100-year flood area, and the yellow floodplain represents a 0.2% chance of annual flooding, known as the 500-year flood area. However, these definitions are becoming more inaccurate as severe precipitation and flooding become more common. The floodway is the channel directly adjacent to a body of water that is above water during periods of normal water elevation. As seen on the map titled "FEMA Flood Hazard Zones" (p. 28), only small tracts of land around Brendel Lake, Cedar Island Lake, Oxbow Lake, and Tull Lake are susceptible to flooding.

It is worth noting properties outside of the floodplains are still subject to flooding. In fact, due to more frequent and intense storms, instances of flooding are expected to increase in the region. Development around the flood hazard areas must be carefully reviewed to mitigate the effects of flooding in the Township. As of March 2023, most of the land around the flood zones appears to be undeveloped. The Township should encourage the protection of wetlands and the installation of green infrastructure measures along the FEMA flood zones to mitigate the harm caused by flooding. Additionally, the Township can designate the areas around the flood plain as conservation areas to limit development and impervious surfaces. Furthermore, the Township can regulate lakefront development by mandating greenbelts with native vegetation in a buffer zone between the setback and the water's edge to reduce flooding impacts.

Watersheds

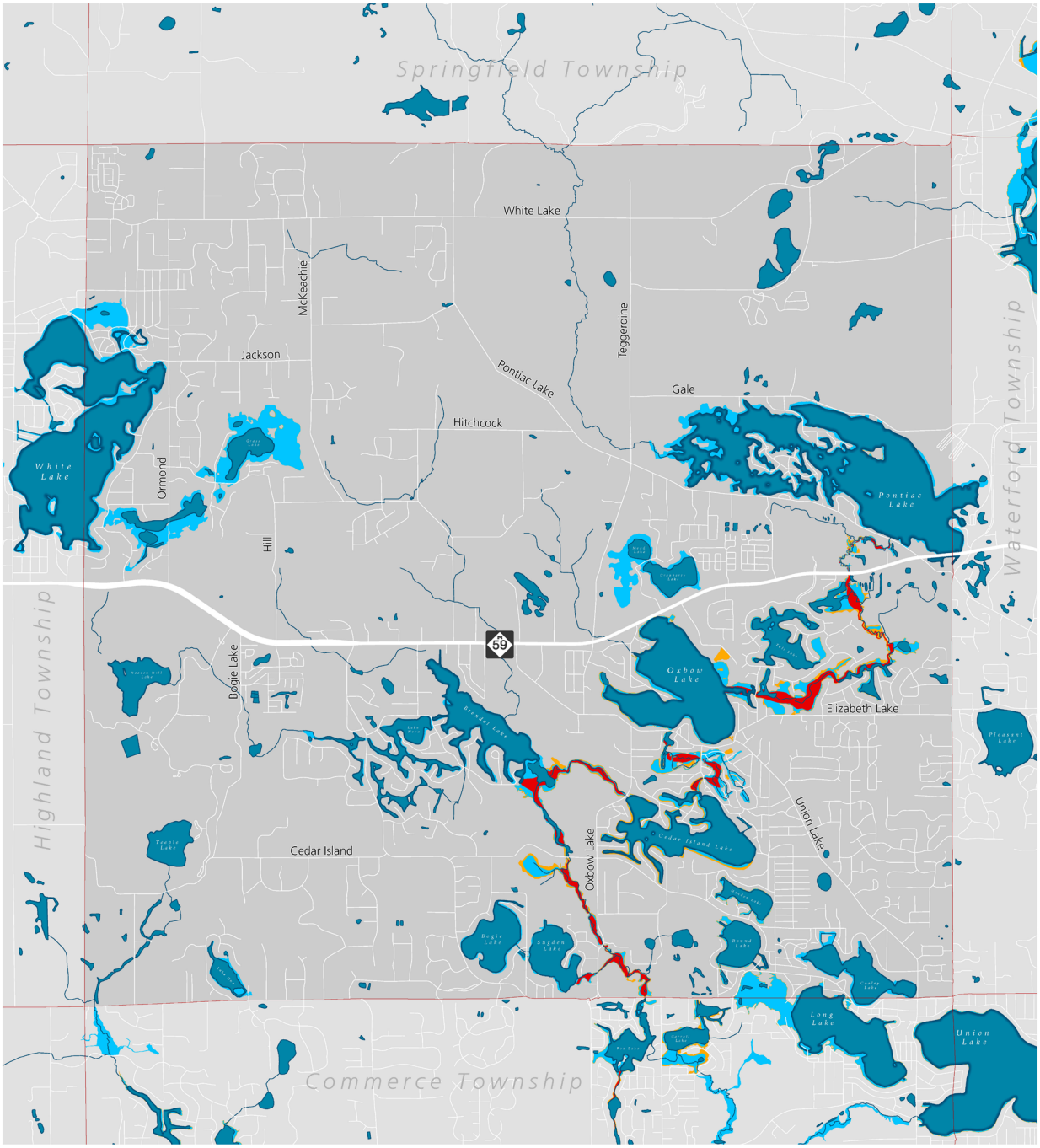
A watershed is an area of land in which all surface waters drain to a common outlet such as a creek,

Figure 12: Floodplain Vs. Floodway



Source: Tulsa Engineering & Planning

Map 02: FEMA Flood Hazard Zones



FEMA Flood Hazard Zones

3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

- Floodway
- 1% Annual Flood Hazard
- 0.2% Annual Flood Hazard

river, or lake. Since water and topography do not follow jurisdictional boundaries, jurisdictions are often in more than one watershed. The majority of the Township lies in the Huron River Watershed and small portions of the Township in the northeast corner and southeast edge lie in the Clinton River Watershed.

Within the Huron River Watershed, there are three sub-watersheds (sub-watersheds and sub-basins function like watersheds but on a much smaller scale). Runoff from the northwest corner of the Township flows into Pettibone Creek, then into the Huron River; water from the southeast corner of the Township flows into Hayes Creek, then into the Huron River; and water from the central portion of the Township flows directly into the Huron River.

The Huron River Watershed Council (HRWC) produces Watershed Management Plans (WMP) outlining best practices and resources to address problems in the watershed.[4] White Lake Township falls in the portion of the Huron River Watershed known as the Upper Huron, associated with the Kent Lake/Upper Huron River Watershed Management Plan developed in 2006.[5] For the sub-watersheds, the HRWC provides sub-watershed reports to guide and educate communities on sub-watershed management. Some key takeaways from the WMP and sub-watershed reports are presented in the table titled "Watershed and Sub-watershed Management Plans." Part of the Township falls in the Upper Clinton sub-watershed, managed by the Clinton River Watershed Council, associated with the Upper Clinton Subwatershed Management Plan developed in 2005.[6]

Groundwater Recharge Areas

White Lake Township has a mix of public and private water and wastewater systems. There are 11 community wells in the Township that provide for municipal or communal use, and at last count there were approximately 6,185 individual domestic wells.[7] The map titled "Annual Groundwater Recharge" (p. 32) shows the groundwater recharge capacity throughout the Township, which are highly permeable areas that readily permits water to move into an aquifer underground. The northeast quadrant of the Township has the highest groundwater permeability, 10-12 inches of groundwater recharge per acre, due to the presence of large open spaces under the Pontiac Lake Recreation Area. Similarly, land under the Highland Recreation Area provides high groundwater permeability in the southwest section of the Township. The central area of the Township south of M-59, around Brendel Lake, has large areas of wetlands with 10 inches per acre annual recharge capacity.

Since 100% of the Township's drinking water comes from groundwater, maintaining the quality of groundwater is extremely important. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) assists communities in protecting their groundwater through the Wellhead Protection Program (WHPP).[8] Wellhead protection areas are defined as a 10-year travel distance for contaminants around the wellhead. In other words, if a contaminant were spilled at the edge of the wellhead protection area it would take 10 years for the contamination to reach the wellhead.[9] White Lake Township has developed a joint Wellhead Protection Program with neighboring communities along with County and State agencies to protect drinking water in identified protection areas through cooperative management strategies and public education.[10] It is important to plan with these wellhead protection areas in mind so no potential pollutant sources, like heavy industry, are not located within the wellhead protection area.

The 2021 Consumer Confidence Report recorded there were no known significant sources of contamination in the Township's water supply.[11] The Township has undertaken rigorous efforts to protect the water sources by participating in the Wellhead Protection Program, signage, fencing, site plan reviews, periodic water analysis, and other water management programs.[12]

Wetlands

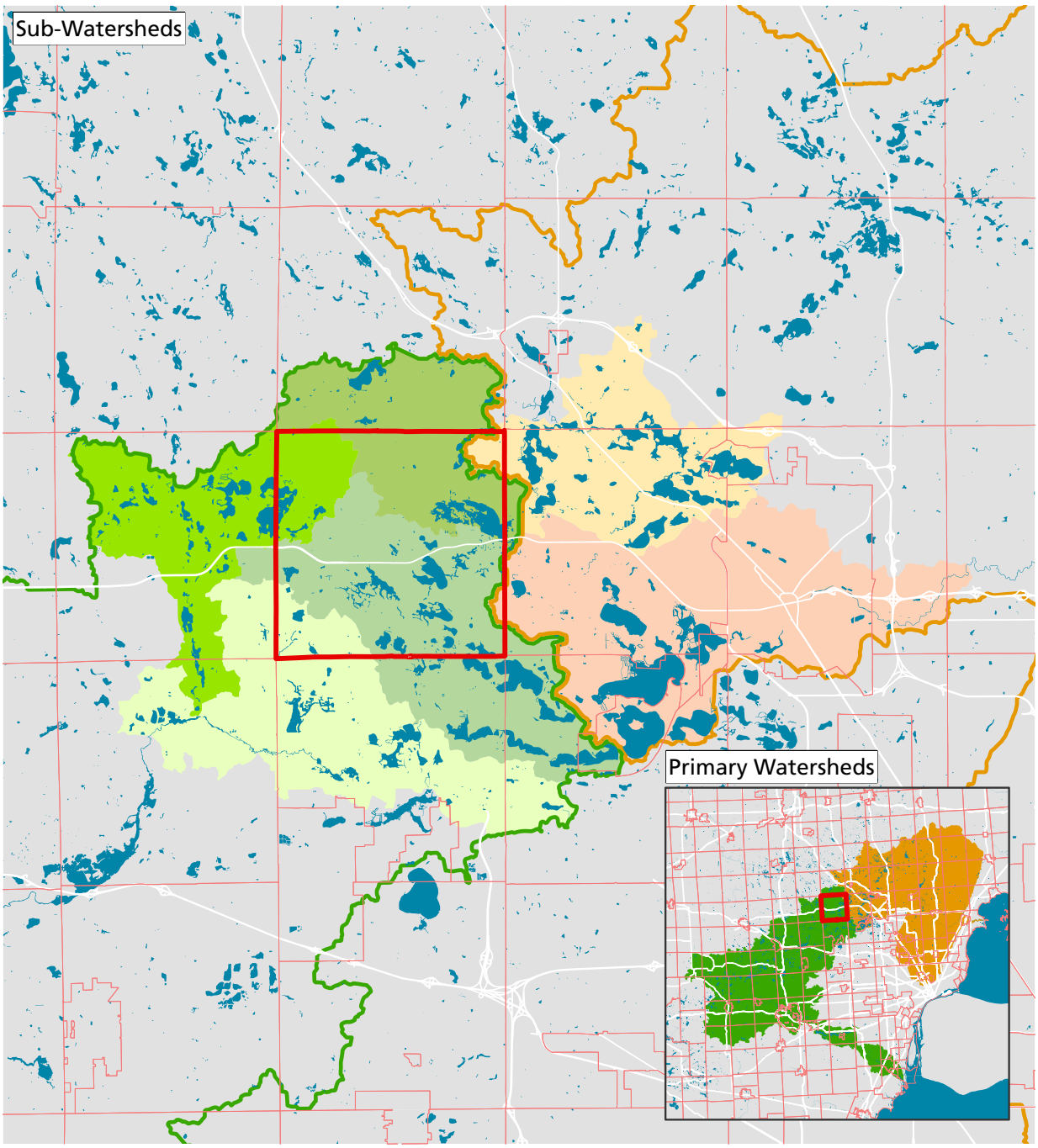
Wetlands are one of the most valuable and sensitive natural features in Michigan due to the unique ecosystem services they provide. Wetlands absorb excess water and act as a filtration device by capturing surface water runoff and slowly infiltrating it into the groundwater. Wetlands also nurture wildlife and biodiversity, purify water, and provide recreational benefits.

Due to the numerous benefits wetlands provide, it is essential the Township preserve both the quantity and quality of its wetlands. While wetland areas are found throughout the Township, the map titled "Wetlands" (p. 35) shows the greatest concentration is south of M-59 and adjacent to the Huron River. Roughly 20% (7.5 square miles) of White Lake Township is covered by wetlands.

Table 06: Watershed and Subwatershed Management Plans

Kent Lake/Upper Huron River Watershed Management Plan (2006)[13]	
Concerns	Nutrient and bacterial loading, decreased water quality, erosion and sedimentation, flooding, trash and litter on roadways and within stream corridors.
Best Management Practices and Community Action Plans	» Ordinances, Regulations, and Standards: including such issues as local fertilizer ordinances, onsite sewage disposal system, native landscaping, natural features setbacks, and soil erosion and sedimentation control improvements. » Coordinated Planning Activities: including such opportunities as recreation plans and integrating natural resources protection into land use planning practice. » Public Education and Stewardship Opportunities: include programs designed to address specific stewardship messages. » Municipal/Organization Housekeeping Practices: includes programs such as training and education for employees and decision-makers, identifying and eliminating illicit discharges, and improved management of other public facilities. » Structural Improvements: includes specific construction, maintenance or repair projects associated with stormwater management and similar projects.
Pettibone Creekshed Report[14]	
Concerns	Loss of biodiversity, nutrient and bacterial loading, decreased water quality, pollution from recreational uses such as duck hunting, and loss of natural features.
Best Management Practices and Community Action Plans	» Inspect septic systems regularly to avoid leakage into water bodies. » Work with a land conservancy to establish an easement to protect natural areas from future development. » Establish and maintain a riparian buffer to minimize erosion and nutrient runoff.
Hay Creekshed Report[15]	
Concerns	Loss of biodiversity, nutrient and bacterial loading, decreased water quality, and loss of natural features.
Best Management Practices	» Inspect septic systems regularly to avoid leakage into water bodies. » Work with a land conservancy to establish an easement to protect natural areas from future development. » Maintain a 25-foot vegetated buffer, ideally made of native plants, from all waterways: ditches, creeks, lakes, and wetlands.
Upper Clinton Sub-watershed Management Plan[16]	
Concerns	Nutrient and bacterial loading, decreased water quality, and sedimentation.
Best Management Practices	» Inspect septic systems regularly to avoid leakage into water bodies. » Work with a land conservancy to establish an easement to protect natural areas from future development. » Establish and maintain a riparian buffer to minimize erosion and nutrient runoff.

Map 03: Watersheds



Watersheds

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

10,000 Feet

Beckett & Raeder, Inc.

White Lake Township

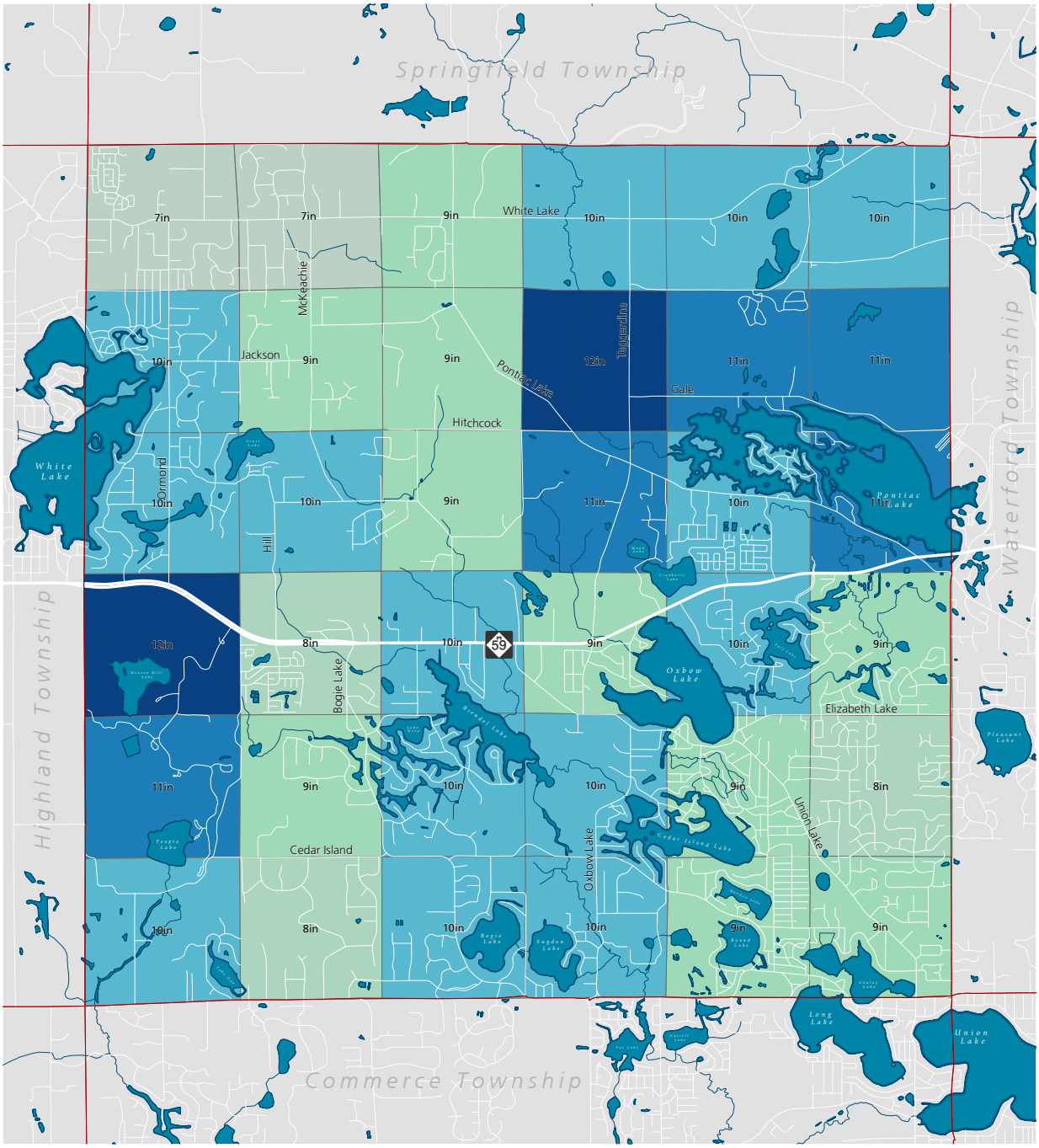
Primary Watersheds

- Huron River
- Clinton River

Sub-Watersheds

- Pontiac Creek
- Loon Lake
- Pontiac Lake
- Sherwood Creek
- Pettibone Creek
- Hayes Creek

Map 04: Annual Groundwater Recharge



Annual Groundwater Recharge

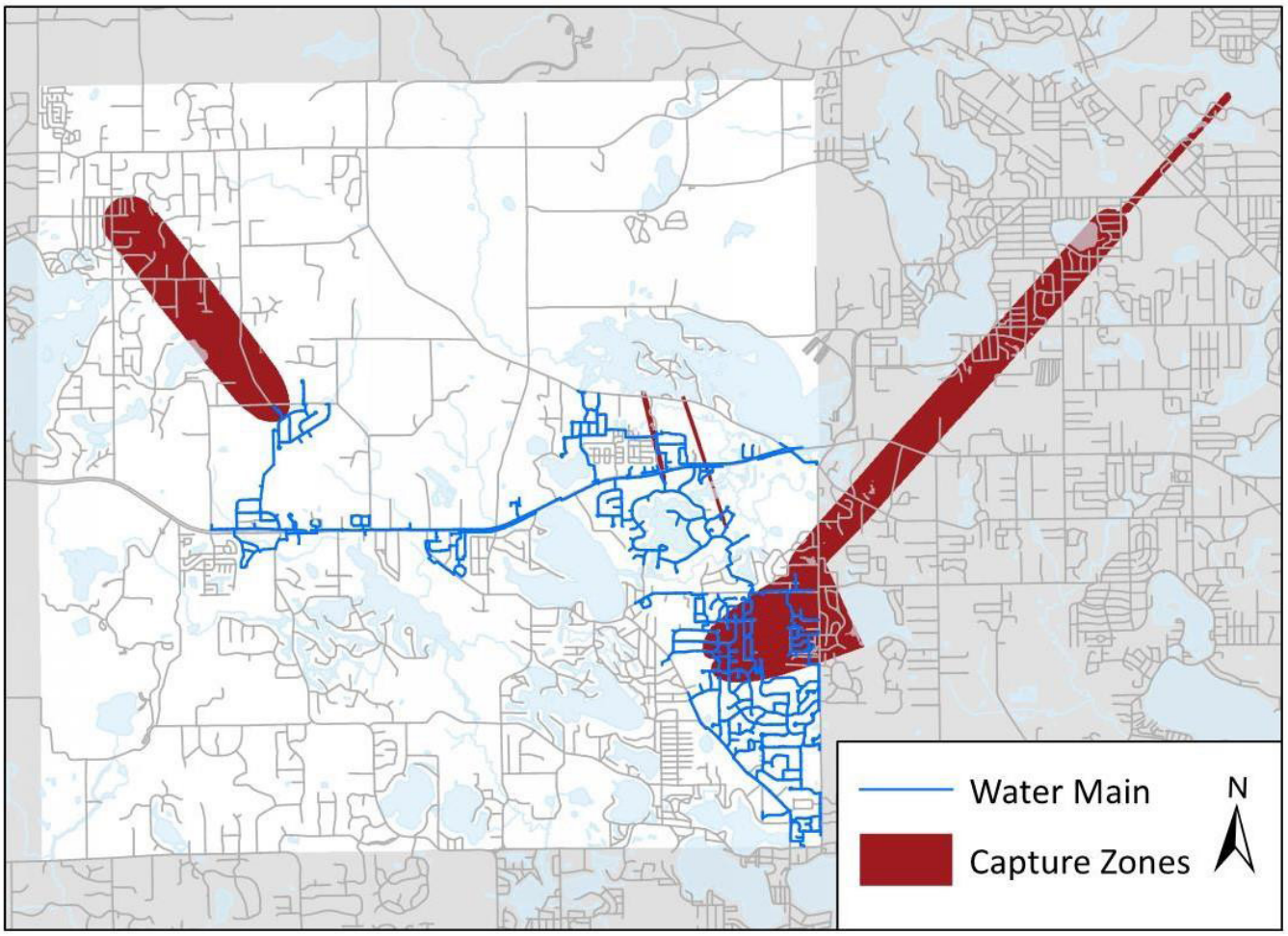
3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

- 7" per acre
- 8"
- 9"
- 10"
- 11"
- 12"

Map 05: White Lake Township Wellhead Protection Area Map-Wellhead Capture Zones



Source: White Lake Township Wellhead Protection Program

Among the Township's wetlands, 14% of all wetlands are emergent wetlands and nearly 55% are forested wetlands. Restorative wetlands, wetlands that were historically present and are absent or need intervention to become fully operational again, constitute about 32% of all wetlands.

To protect these fragile areas, wetlands of five acres or more, or smaller wetlands hydrologically connected to large wetlands, are strictly controlled by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Any development that deposits, fills, dredges, removes, drains, or constructs on a wetland must receive a permit.[17]

CONSERVATION AREAS[18]

Oakland County and the Michigan Natural Features Inventory (MNFI) coordinated efforts to inventory the County's potential high-quality lands to propel efforts in prioritizing conservation efforts to improve

Types of Wetlands

Emergent: Characterized by rooted herbaceous hydrophytes, like moss and lichen.

Forested: Characterized by woody plants taller than six feet and are usually farther away from water than emergent wetlands.

Restorative: Areas where wetlands can be fully, or as closely, as possible restored to their pre-existing conditions.

Source: Michigan Department of Environment, Great Lakes, and Energy (EGLE)

Table 07: Type of Wetlands

Wetland Type	Acres	Percent of Wetlands
Emergent	653	20%
Forested	2,649	80%
Existing Wetland Total	3,302	100%
Restorative	1,532	-

natural resource-based decision-making. The information is used to help find opportunities to establish an open space system of linked natural areas throughout Oakland County. The Map titled "Potential Conservation Areas" (p. 36) displays the conservation areas identified within White Lake Township. The yellow circles, depicting the existing Existing Conservation Easement layer, represents land protected from development by a Conservation Easement recorded with the State of Michigan. The potential natural areas (PNAs) are defined as places on the landscape dominated by native vegetation that have various levels of potential for harboring high-quality natural areas and unique natural features. These areas may provide critical ecological services such as maintaining water quality and quantity, soil development and stabilization, pollination, wildlife corridors, migratory bird stopover sites, sources of genetic diversity, and floodwater retention. The High-Quality Habitat, represented on the map in green, is a spatial representation of specific patches of natural vegetation within larger intact landscapes that have the potential to harbor high-quality natural communities and/or for harboring rare/sensitive plants and animals. The location of these high-quality natural lands should be considered whenever development takes place within the community. Additionally, White Lake Township can provide information about voluntary conservation easements to residents, especially those living in the designated areas on the map.

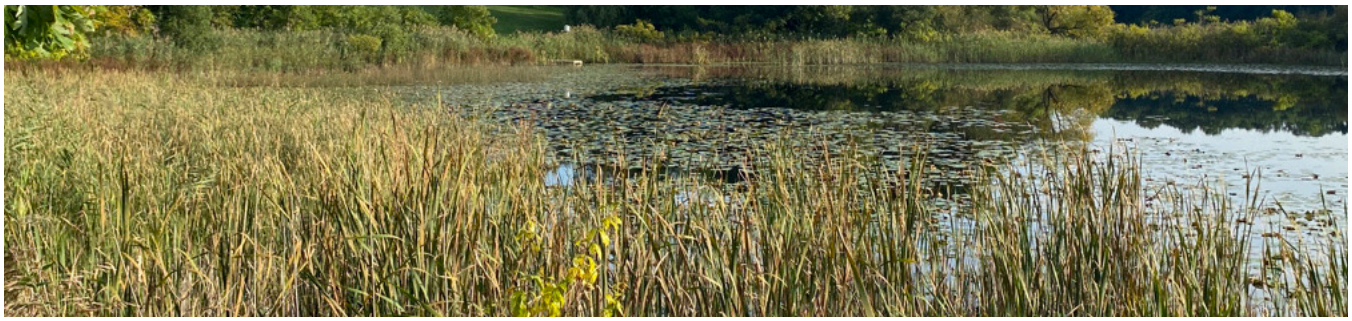
The Oakland County Cooperative Invasive Species Management Area (CISMA) is a source for education/outreach materials, technical assistance, best practices, and funding for protecting and improving natural habitat.[19] Collaboration with CISMA can help expand upon the lakes/wetlands protection and preservation efforts in White Lake Township.

GREEN INFRASTRUCTURE

Green infrastructure planning focuses on developing a connected network of natural land, open spaces, and waterways. Green infrastructure is both a network of green space and natural areas, along with man-made techniques such as rain gardens and bioswales that preserve the function of the natural ecosystem. It is a system that protects water quality, functions as a filtration and drainage network at little or no cost, and provides recreational benefits for residents.

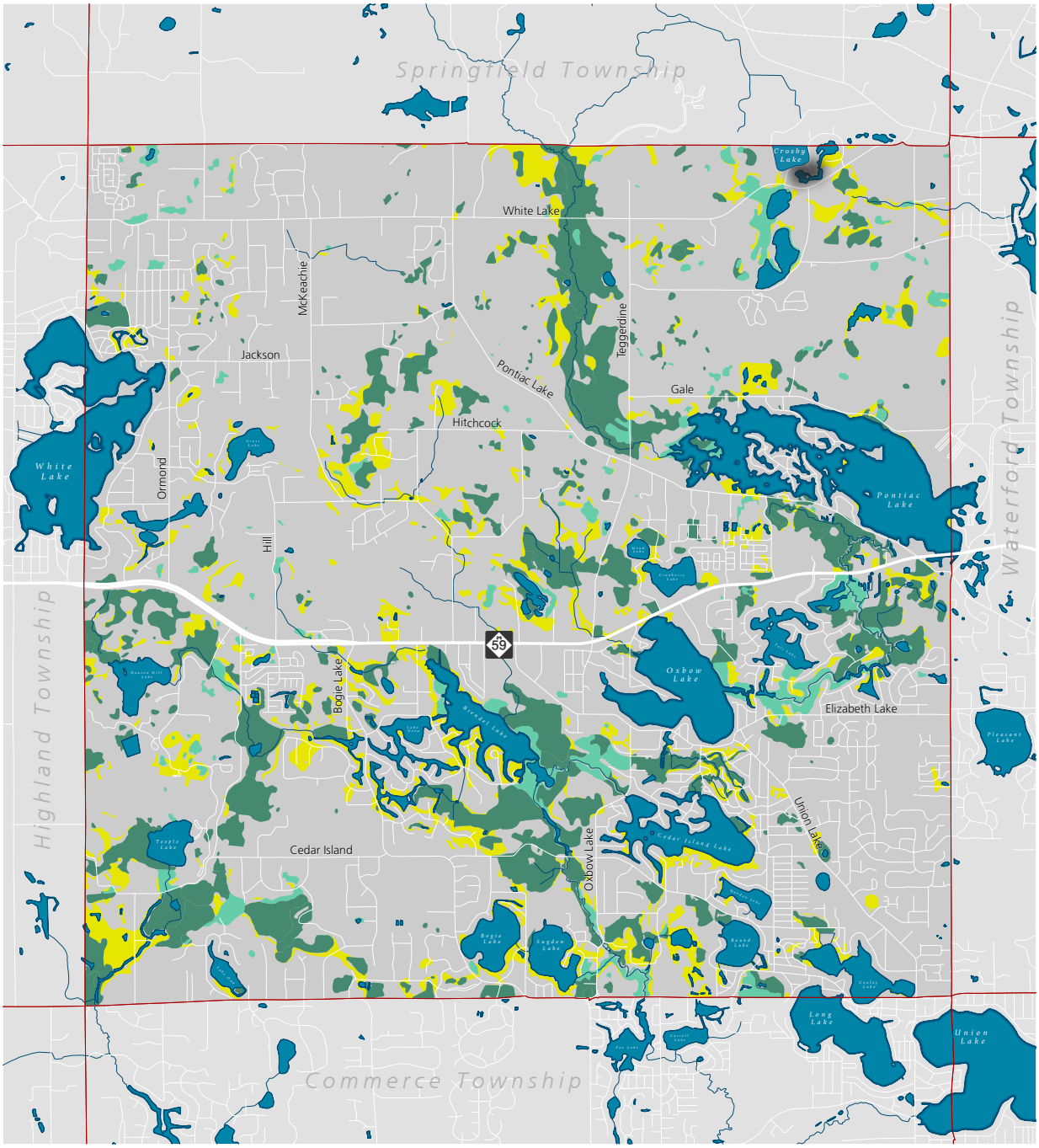
Green Infrastructure Methods

Low impact development (LID) is a broad term for a set of practices that imitate natural processes to allow stormwater to infiltrate the ground as opposed to channeling it toward water bodies. The table titled "Green Infrastructure Methods" (p. 37) shows several examples of landscaping and low impact development practices that can be encouraged in White Lake Township. The Township should encourage green infrastructure placement during the site plan review process and/or planned development process.



Bloomer Park

Map 06: Wetlands



Wetlands

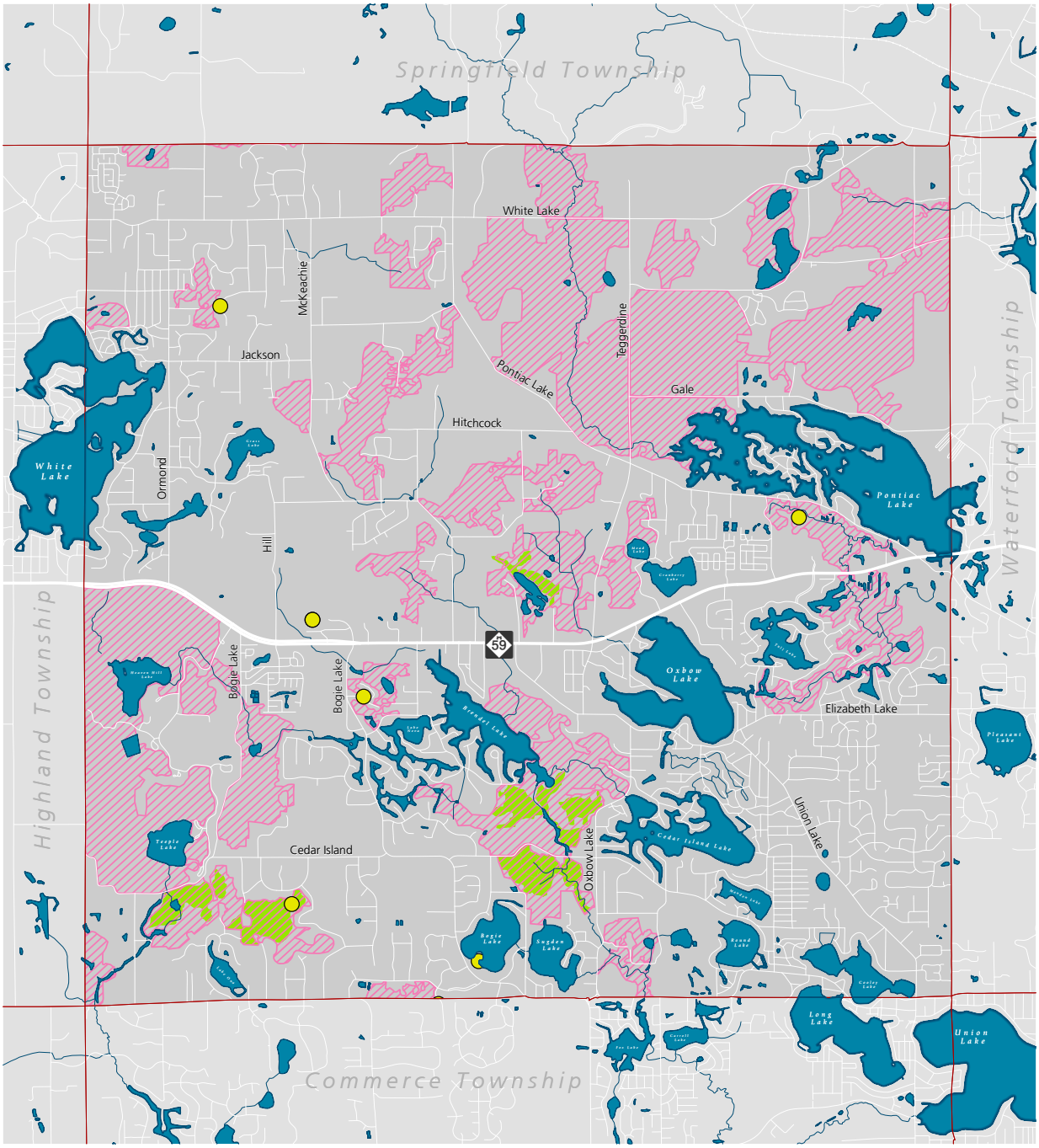
3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

- Emergent Wetland
- Forested Wetland
- Restorative Wetland

Map 07: Potential Conservation Areas



Potential Natural Areas

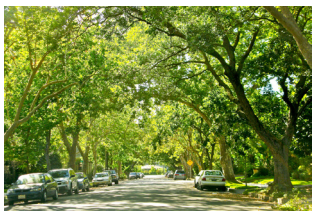
3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

- Existing Conservation Easement
- Potential Natural Area
- High Quality Habitat

Table 08: Green Infrastructure Methods

Method	Description	Example
Rainwater Harvesting	Systems that collect and store rainwater for later use.	
Rain Gardens	Shallow, vegetated gardens that collect and absorb runoff from streets, sidewalks, and roofs.	
Planter Boxes	Boxes along sidewalks, streets, or parking lots that collect and absorb rainwater; they can be designed with a notch to allow additional stormwater to flow in, as with rain gardens. These also serve as streetscaping elements.	
Bioswales	Linear and vegetated channels, typically adjacent to a road or parking lot, that slow, retain, and filter stormwater.	
Permeable Pavement	Pavement that absorbs, filters, and stores rainwater, like these pavers.	
Green Roofs	Vegetated roofs that absorb and filter rainwater.	
Tree Canopy	Trees reduce and slow stormwater flow.	

Source: United States Environmental Protection Agency

Figure 13: Natural Features & Open Space: Key Takeaways and Recommendations

Woodlands & Tree Canopy should be protected.

» Existing trees can be "credited" to a development's landscaping requirements to encourage tree preservation and must be replaced if damaged during the process.

Development around Water Features (Floodplains, Wetlands, Groundwater Recharge Areas) should be regulated.

» The Township should encourage the protection of wetlands and the installation of green infrastructure measures along the FEMA flood zones.

» The Township can designate the areas around the floodplain as conservation areas to limit development and impervious surfaces.

» The Township can also regulate lakefront development by mandating greenbelts with native vegetation as a buffer zone between the setback and the water's edge to reduce flooding impacts.

» Development should be regulated such that no potential pollutant sources, like heavy industry, are located within the wellhead protection area.

» Development that deposits, fills, dredges, removes, drains, or constructs on a wetland must receive a permit from EGLE.

Conservation Areas should be protected.

» The location of these high-quality natural lands should be considered whenever development takes place within the community.

» The Township can provide information about voluntary conservation easements to residents, especially those living in the designated areas on the map.

Green Infrastructure Measures should be promoted.

» The Township should encourage green infrastructure placement during the site plan review process and/or planned development process.

Meadow along Cedar Island Road

Sources

1 U.S. Environmental Protection Agency in White Lake Township Master Plan for Land Use 2010–2011, 2011, https://www.whitelaketwp.com/sites/default/files/fileattachments/planning/page/3681/complete_wl_mp_update_document_2012.pdf.

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4 Huron River Watershed Council, Watershed Management Planning, https://www.hrwc.org/what-we-do/programs/watershed-management-planning/.

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13 Huron River Watershed Council, Kent Lake/Upper Huron River Watershed Management Plan, 2006, https://www.hrwc.org/wp-content/uploads/KENTLAKE-WMP-v2.pdf.

14 Huron River Watershed Council, Kent Lake/Upper Huron River Watershed Management Plan, 2006, https://www.hrwc.org/wp-content/uploads/KENTLAKE-WMP-v2.pdf.

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17 Michigan Department of Environmental Quality. Wetland Permits. https://www.michigan.gov/deq/0,4561,7-135-3313_3687-10813--,00.html.

18 Oakland County Open Data Portal.

19 Oakland County CISMA, https://oaklandinvasivespecies.org/

Housing

Providing quality housing opportunities that cater to the needs and preferences of residents across demographic and income groups is vital to building thriving communities. According to the MI New Economy plan, Michigan faces an acute housing shortage—worse than the national average for both owners and renters.[1] Home construction has not returned to pre-Great Recession levels compounding the effects of a housing shortage. In Michigan, it is predicted by 2045 there will be a shortage of 150,000 units.[2] On top of that, the COVID-19 pandemic disrupted the economy, pushing the Michigan housing market into a state of precarity as labor and materials became increasingly expensive.

The undersupply of housing benefits existing homeowners and disadvantages newcomers to the market. For existing homeowners, there is increased demand and competition for their homes, which drives up the prices. Homeowners can leverage equity gained from rising home prices to purchase their next home. However, because so few new units have been built, many homeowners are facing difficulties finding new units. For newcomers to the market, skyrocketing housing prices are out of reach for moderate- and low-income earners, such as young professionals or single-income households. As a result, these households stay in their rentals longer or have to pay more for older homes that were once attainable to lower-income households. The bottleneck caused by a lack of available homes for purchase leaves more people in the rental market, and rents increase as a result of increased competition, leaving renters less opportunity to save for a down payment on a home. Many households are in less-than-ideal housing situations when it comes to finding the price, type, and location that fits their lifestyle.

In response to this housing crisis, the Michigan State Housing Development Authority's (MSHDA) Statewide Housing Plan set a calculated target of adding 75,000+ new or rehabilitated units over the next five years.[3] This target can only be realized if every community in Michigan proactively expands its housing stock and housing diversity. To this end, this section of the Plan summarizes the housing characteristics in the Township, presents community preferences, and outlines housing strategies.

REGIONAL CONTEXT

Housing supply is a regional issue as it is part of a larger ecosystem of people, land use, natural and built environments, transportation networks, and economic markets. Housing trends constantly change and evolve in response to local and regional socioeconomic shifts. Therefore, where relevant, the existing condition of housing in White Lake Township is compared to nearby Oakland County communities to guide housing goals and recommendations in this Plan.

DEMOGRAPHIC TRENDS IMPACTING HOUSING

Demographic trends influence housing; therefore, it is essential to monitor the population and the community's preferences to predict future trends in housing and strategize housing supply appropriately. The Township's local and regional demographic trends are discussed in detail in Chapter 2, titled "Demographics," but trends impacting the housing market are listed below:

- Households in White Lake Township are becoming smaller (average household size of 2.68 in 2010 to 2.6 in 2020) and as a result, the total households in the Township grew by 9% between 2010 and 2020.
- White Lake Township's population is aging. Mature households (35-54 years) continue to remain the largest age cohort (26%) while the percentage of empty nesters and seniors, with niche housing requirements, increased to

roughly 18% in 2020.

» Roughly 15% of the Township's population and almost 40% of seniors have a disability and will require support facilities including mobility assistance, accessible living facilities, and specialized healthcare services.

» The percentage of individuals in poverty has increased to 8.8% in 2020, and an estimated 28% of households fall under the ALICE threshold. Providing affordable housing and economic opportunities will be key in ensuring these households can navigate their way out of poverty.

CHARACTERISTICS OF HOUSING IN WHITE LAKE TOWNSHIP

Housing Units

The total housing units in White Lake Township increased by roughly 4% to an estimated 12,519 in 2020. Given households increased by 9% in the same period, the growth of housing units has been relatively slow, indicating a mismatch between the changing household structure and the existing housing stock in the Township. The pace of growth is comparable to the County (2.9%); however, almost all surrounding communities, except Waterford Township, witnessed a greater increase in housing units than the Township. Given the population in these communities also grew faster than the Township, the higher growth rate of housing units is expected.

Of the 12,519 housing units, 95.8% are occupied units and the remaining 4.2% are vacant; the vacancy rate dropped from the estimated 8.8% in 2010 and is lower than the County (6%). While low vacancy rates are desirable, rates as low as 4% are one indication of a housing shortage. The term vacancy includes units for sale, seasonal housing units, and migrant-worker housing. Therefore, while the unit may be "vacant," it may not be available for a household to purchase or occupy. About 175 units are vacant, seasonal, recreational, or are occasionally used.[4]

Age of Housing Stock

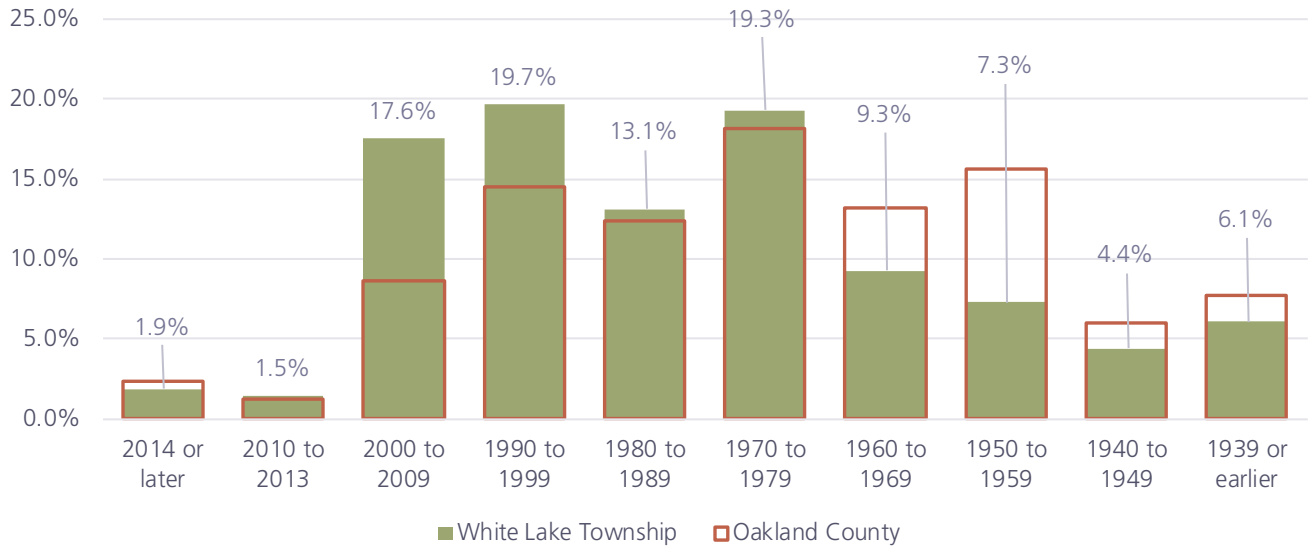
The housing stock in White Lake Township is aging. Over a quarter of the housing stock is close to 50 years old, and only 4% of units have been built in the last decade. A large proportion of existing units were built between 1990-1999 which corresponds to the population boom the Township witnessed during that period (25%). The slow rate of new builds in the Township is consistent with the trend in Oakland County and most surrounding cities and is a contributing factor to the housing shortage in the region.[5] The market is still recovering from the aftermath of the Great Recession which halted development for several years, but in many places, including White Lake Township, it has not caught up fast enough. Without an influx of new units, the average age of homes will increase. Older homes, depending on their level of maintenance or architectural charm, can either add to the Township's appeal or detract from it. When kept up, they are historic assets. On the other hand, families might find them harder to maintain and feel that they lack modern, convenient amenities.

Table 09: Total Housing Units: White Lake Township & Other Communities (2010–2020)

	2010	2020	Change
White Lake Twp	12,045	12,519	3.9%
Commerce Twp	15,292	17,096	11.8%
Highland Twp	7,677	8,048	4.8%
Lyon Twp	5,197	7,537	45.0%
Orion Twp	13,648	15,896	16.5%
Springfield Twp	5,264	5,620	6.8%
Waterford Twp	31,766	32,564	2.5%
Oakland County	526,693	542,094	2.9%

Source: U.S. Census Bureau ACS Five-Year Estimates (2010, 2020)

Figure 14: Age of Housing Stock: White Lake Township & Oakland County (2010-2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Table 10: Housing Sale Inventory, White Lake Township (May 2022-May 2023)

Housing Typology	Units Sold
Detached Single-family Residential	430
Attached Single-family Residential	55
Multi-family Residential	1
Total Residential	486
Undeveloped Parcels	30

Source: Debby DeHart, Real Estate One.

Homeownership in White Lake Township

A high percentage of owner-occupied units is generally perceived as a healthy market characteristic. In 2020, owner-occupied units accounted for 85.9% of the occupied households in White Lake Township, slightly lower than the homeownership rate in 2010 (89.5%), but higher than the County (71.2%).[6] The Township has a very low homeowner vacancy rate of 0.9%, indicative of a competitive homeownership market where demand outpaces supply.[7]

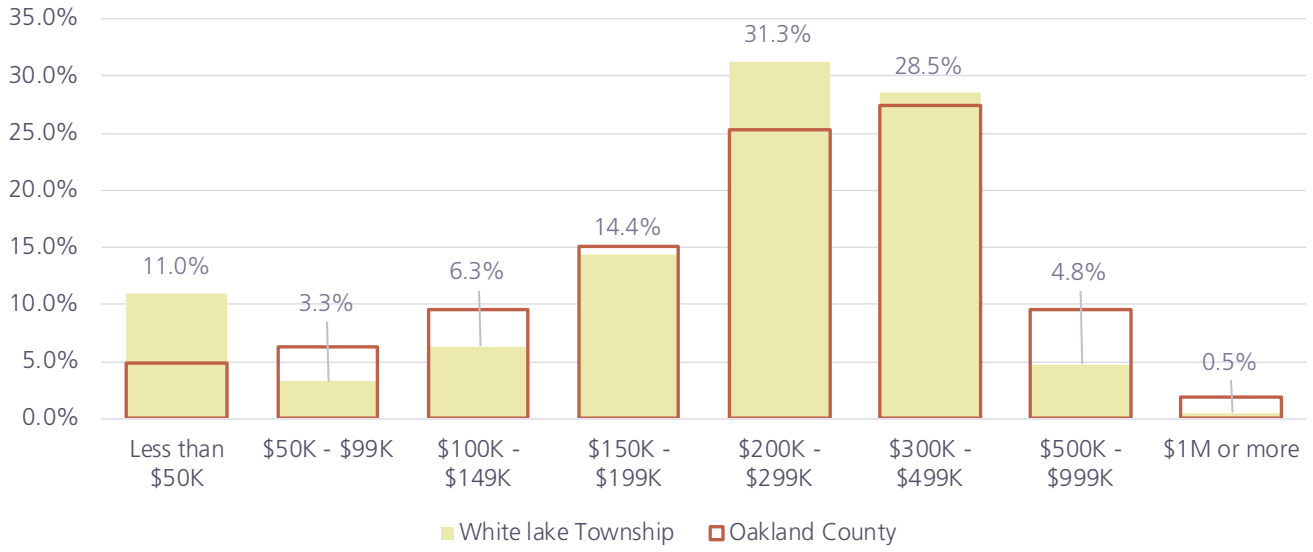
Housing Sale Inventory

The table titled "Housing Sale Inventory, White Lake Township (May 2022–May 2023)" lists data on the number of residential units sold in White Lake Township between May 2022–May 2023. Of the 486 total residential units sold in the Township, 430 were detached single-family units and 55 were attached single-family units; one multi-family unit was sold during the same period. In addition, 30 undeveloped parcels of land were sold, which may be used towards new residential developments.

Home Value

The shortage of units available for sale is likely why median home values increased to $247,200 in 2020 from $210,700 in 2010. The median home value in the Township is lower than the County ($252,800) but higher than the State of Michigan ($154,900).[8] Since demand drives home value; the higher the demand the more homes are valued. In a tight market, when a housing unit becomes available, the bidding process can inflate the home's value, resulting in people paying above-average price for the home. While this benefits existing residents because it increases the price of their homes, it

Figure 15: Housing Value (2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

makes it challenging for households attempting to enter the market.

The figure "Housing Value (2020)" illustrates the majority of homes (31.3%) in the Township are valued between $200,000-$299,999 and 28.5% are valued between $300,000-$499,999. Housing sales data indicated a total of 430 homes were sold in the Township between May 2022 and May 2023, and the average sale price was $357,089.[9] Only about 5% of homes have price points between $500K and $1M. The Township also has a relatively smaller percentage of homes in the lower price range ($50K–$150K) creating a challenge for households seeking to buy "starter homes" and enter the market. Around 11% of the homes are priced at less than $50,000. Given that 14% of vacant homes are sold but not occupied, these homes are likely blighted and uninhabitable.[10]

Housing Costs & Affordability

Homeowner costs are measured using the "Selected Monthly Owner Costs" (SMOC) metric, which includes a mortgage payment as well as insurance and other housing-related expenses. The median SMOC in White Lake Township in 2020 was estimated at $1,666, slightly lower than the County ($1,676). Among homeowners, roughly 82% live in an affordable unit and 16% live in an unaffordable unit. Given the rising poverty rates in the Township, producing affordable housing will be a key step in assisting these households to navigate their way out of financial distress.

Defining Housing Affordability

Affordable: Households spend <30% of income on housing costs.

Unaffordable: Households spend 30% - 50% of income on housing costs.

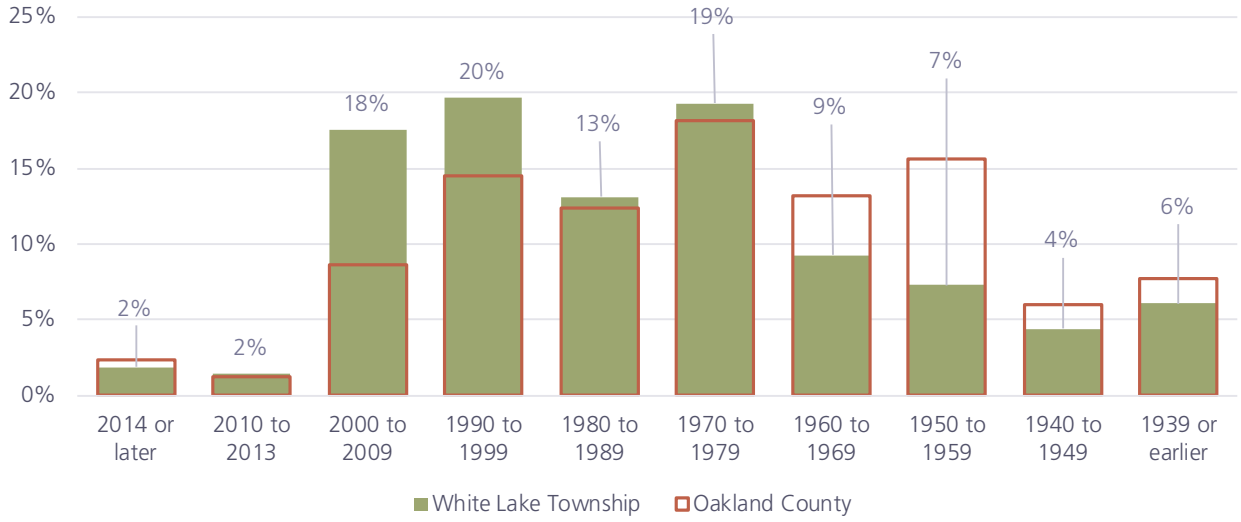
Severely Unaffordable: Households spend >50% of income on housing costs.

Source: U.S. Department of Housing and Urban Development (HUD)

Renting in White Lake Township

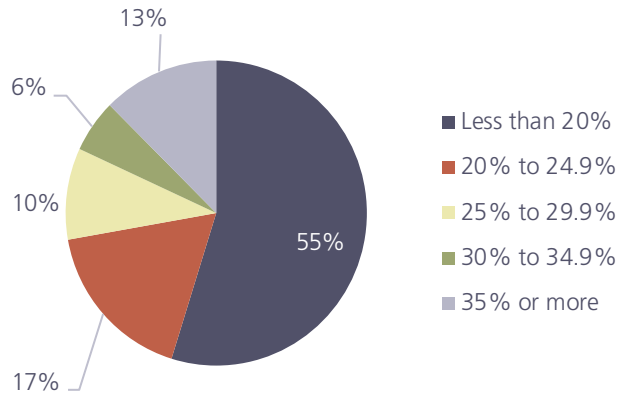
Renting is becoming an increasingly popular option among young households, empty nesters, and seniors. Considering an overall scarcity of units available for sale in White Lake Township, especially in the lower price range ($50K– $150K), home ownership is out of reach for low- and moderate-income households, and as a result, they must rent. In 2020, renter-occupied units account for 14.1% of the occupied households in White Lake Township, higher than in 2010 (10.5%), but lower than the County (28.8%).[11] The rental vacancy rate in the Township is 2.5%. The average household size of rental households is 2.05, lower than that of homeowners (2.69).

Figure 16: Age of Housing Stock: White Lake Township & Oakland County (2010–2020)



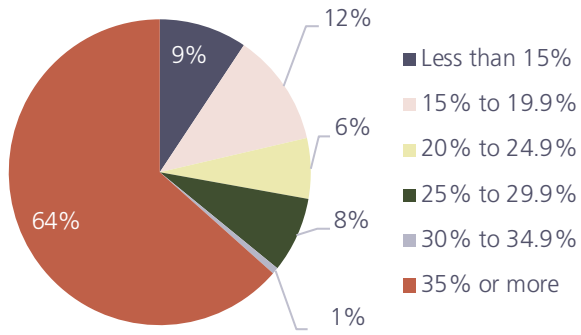
Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Figure 17: Homeowner Affordability (2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Figure 18: Renter Affordability (2020)



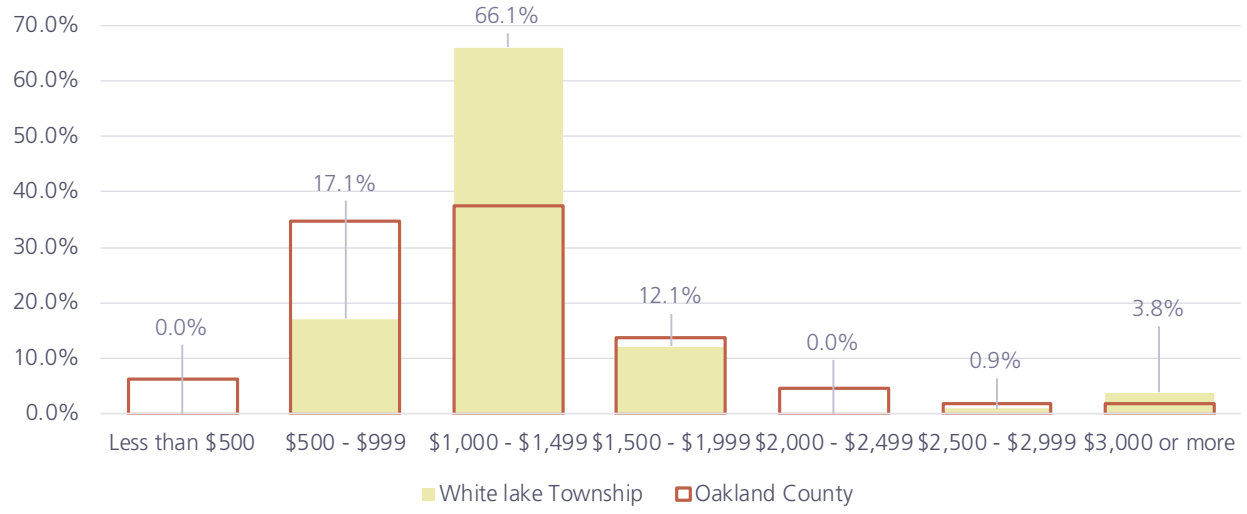
Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Gross Rent

Between 2010–2020 the median gross rent in the Township jumped to $1,192 from $884. The gross rent in the Township is slightly higher than the County ($1,100) but substantially higher than the State of Michigan ($871).[12] The figure titled "Monthly Rent (2020)" (p. 45) illustrates roughly two-thirds of the renters in the Township pay a gross rent between $1,000–$1,499 monthly. About 17% pay less than $1,000 and 12% pay gross rents between $1,500–$1,999. The County has a greater availability of units (34.6%) with rents in the $500-$999 than the Township (17.1%).

The table titled "Household Income in The Past 12 Months by Monthly Gross Rent (2020)" presents the ratio of household income by gross monthly rent. The table shows that some of the lowest rents (less than $600) in the Township are borne by households with an income between $10,000 and $49,999. However, the table also shows the highest percentage of renters (81%) paying the highest rents in the Township ($2,000 or more) are households with an income between $35,000–$49,999, suggesting many renter households may be housing cost burdened. The ratio of renter households paying the median rent range in the Township ($1,000–$1,499) is also concentrated among households earning $10,000–$34,999, reiterating that many households are paying rents considered unaffordable based on the affordability standards defined by the Department of Housing and Urban Development (HUD).

Figure 19: Monthly Rent: White Lake Township & Oakland County (2020)



Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Table 11: Household Income in the Past 12 Months by Monthly Gross Rent (2020)

	Less than $10,000	$10,000 to $19,999	$20,000 to $34,999	$35,000 to $49,999	$50,000 to $74,999	$75,000 to $99,999	$100,000 or more
$500 to $599	0%	32%	32%	36%	0%	0%	0%
$600 to $699	0%	0%	0%	37%	37%	0%	26%
$700 to $799	0%	9%	16%	0%	75%	0%	0%
$800 to $899	0%	16%	58%	5%	20%	0%	0%
$900 to $999	0%	32%	24%	8%	19%	17%	0%
$1,000 to $1,249	6%	9%	55%	2%	10%	11%	6%
$1,250 to $1,499	0%	46%	18%	2%	23%	6%	4%
$1,500 to $1,999	9%	9%	32%	0%	0%	6%	45%
$2,000 or more	0%	0%	0%	81%	10%	3%	6%
No cash rent	18%	22%	9%	22%	0%	20%	9%

Note: The table above is read horizontally, all rows add up to 100%, showing the ratio of household income by gross monthly rent.

Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Housing Costs & Affordability

As noted above, the table titled "Household Income in The Past 12 Months by Monthly Gross Rent (2020)" highlights affordability concerns among the renter households in the Township. A sizable 64% of renters live in units unaffordable for their household income, while only 36% live in affordable units. The low- and moderate-income households in White Lake Township are disproportionately disadvantaged when considering rental affordability. These renters are in a challenging situation because they are priced out of homeownership and are living in rental units and still paying unaffordable rents.

Housing Diversity

Housing diversity is an important tool to address the housing shortage and affordability in White Lake Township. The changing demographics of the Township require a variety of housing typologies at different price points to ensure housing access. Consistent with the County and regional trends, the existing housing stock in the Township is

homogeneous with 77.1% detached single-family dwelling units. Of the remaining units, 3.2% were attached single-family dwelling units, 0.6% were duplexes, 7.6% were multi-dwelling units, and 12% were mobile homes. Additionally, nearly a quarter of housing units have four or more bedrooms; with the average household sizes decreasing the demand for large-footprint homes will likely decrease in the Township.[13] However, of the 76 new builds authorized in the Township in 2022, 85% were detached single-family dwelling units, signifying recent home construction is not aligned with the shifting housing preferences of demographic trends.[14] Concentration in the Township's housing stock of predominantly one housing typology is a major factor driving up unaffordability levels in the Township. For instance, empty nesters who wish to downsize, working households with limited discretionary income, couples without children, or young adults moving out of their parent's homes, may prefer smaller but affordable units. A shortage of such options will push residents, and potential future residents, to seek desired housing outside of the Township or drive demand for those units in the Township. Furthermore, because the neighboring townships have less to offer in terms of housing diversity, it could push them out of the region.

COMMUNITY HOUSING PREFERENCES

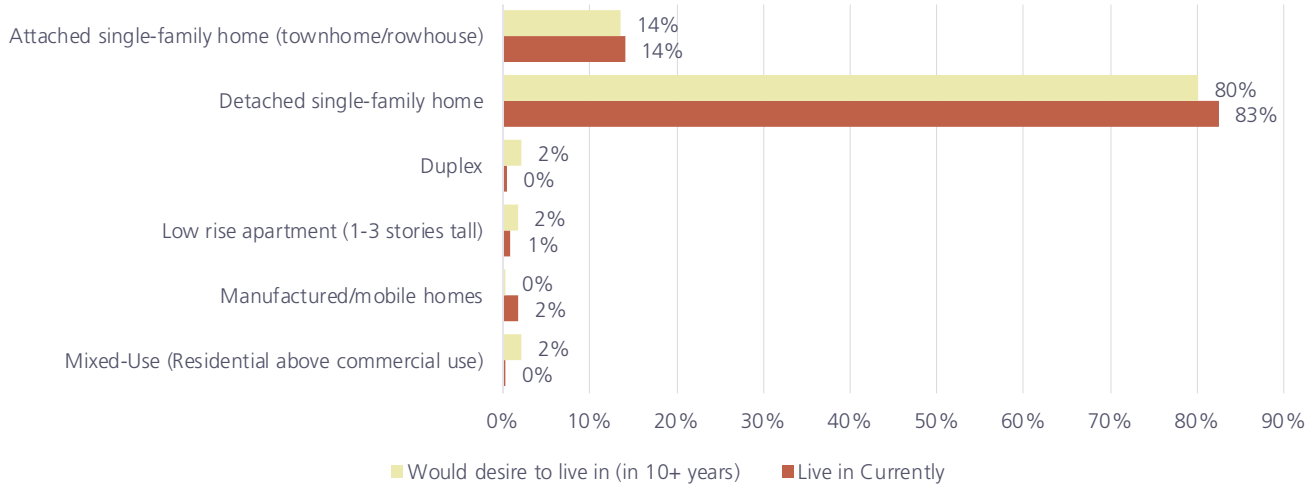
The takeaways from the responses in the housing section of the Master Plan community survey are summarized below and represent consensus on housing preferences and challenges in the Township, and are instrumental in tailoring housing solutions and recommendation to meet the needs of the White Lake Township community.

What type of housing do you LIVE IN CURRENTLY and what type would you like to LIVE IN 10 YEARS FROM NOW? (Please select all options that apply)

The majority of respondents currently live in either detached single-family homes (83%) or attached single-family homes (14%); only 3% of all respondents live in other multi-family housing units. Future preferences of respondents are also concentrated only between the two typologies of single-family homes, attached (80%) and detached (14%), indicating most respondents are not seeking diverse housing typologies in the Township. It is important to ensure housing needs are met in the community. A small percentage of respondents (6%) indicate a desire to live in multi-family housing units such as duplexes (2%), low-rise apartments (2%) and mixed uses units (2%) 10 years from now. A more detailed analysis of housing preferences by age indicated additional trends. First, of the 2% of respondents who wish to live in duplexes, over 50% are seniors (65 years and above). Second, the desire to live in low-rise apartments was most prominent for young professionals and families (25-34 years), empty nesters (55-64 years), and seniors. And third, among those who wish to live in mixed-use residential units in the future (2% of the total), 36% are young professionals and families, while the remaining vary in age from 35-seniors.

Single-family home

Figure 20: Current Housing Type and Future Preferences



Response Rate: 78.0% of Respondents

What is the size of your current housing unit, and what size of housing unit do you require to fulfill your housing needs in the future? (Please select one for each column)

Almost one half of the respondents (46%) live in mid-size homes between 1,000-2,000 square feet and over a third of respondents (38%) live in homes with an area between 2,000-3,000 square feet. About 10% live in larger homes with an area of 3,000 to 4,000 square feet or above while only 5% of respondents live in smaller units ranging between 5,00-1,000 square feet. Reviewing the future housing needs of respondents, a higher percentage of respondents indicate a desire to live in homes with an area of 1,000-2,000 square feet in the future than where they currently live. One possibility for this demand may be a lack of availability of sufficient units of 1,000-2,000 square feet in area, suggesting that the current housing needs of some respondents are not being met. Alternatively, as housing composition changes, it is likely that the future housing needs will change, creating a future demand for homes in the 1,000-2,000 square feet category. Irrespective of the reason, respondents indicate a need to increase the housing stock of homes 1,000-2,000 square feet in the Township. Similarly, respondents also indicate a demand for smaller homes, 500-1,000 square feet in the Township.

The table titled "Current Housing Size and Future Preferences by Age" (p. 48) filters the current housing size and future needs by age of the respondent. The table demonstrates that a larger percentage of seniors who currently live in larger homes will be interested in downsizing to smaller homes 500-1,000 or 1,000-2,000 square feet in the area. As the population of the Township is aging, the Township can expect the demand for small to mid-size homes to grow. However, those aged 25-34 years indicate a desire for the larger footprint (3,000-5,000 square feet) likely to house their growing families.

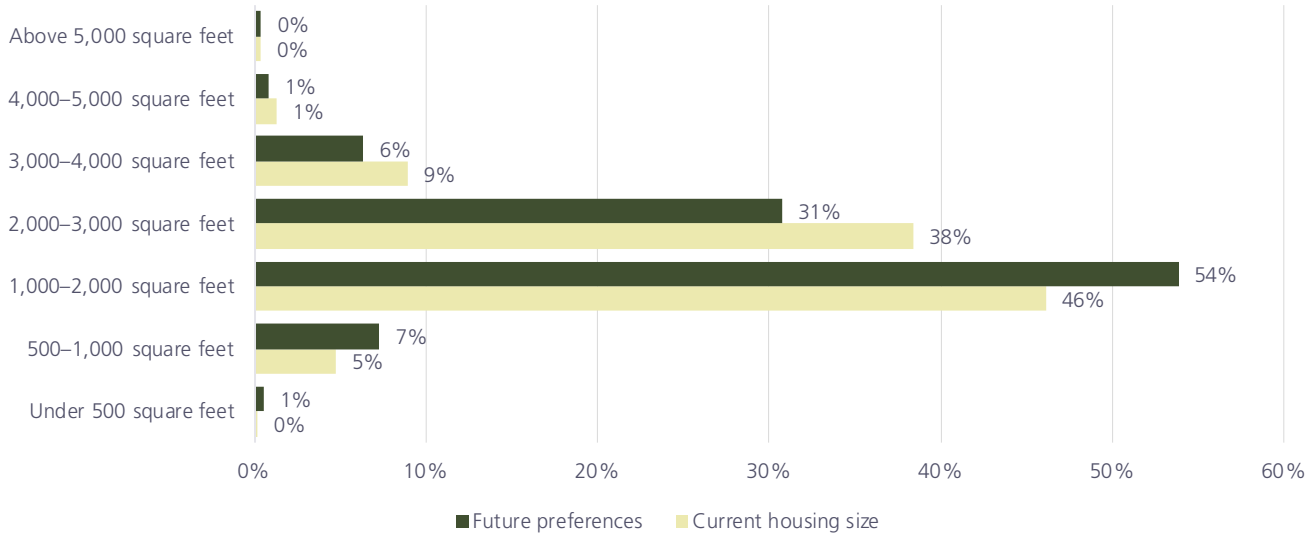
What is your housing tenure status?

About 95% of respondents are homeowners, 2% are renters, and 2% are not financially responsible for their housing costs. The majority of respondents who are not responsible for their housing costs are young adults and professionals aged 18-34 years, and the largest percentage of renters (29%) belong to the 25-34 years cohort hinting a housing affordability concern for specifically the low- and moderate-income households in the Township.

How strongly do you agree with the following statement: "With my household income, I feel the housing options in White Lake Township are financially attainable."

Respondents demonstrated varied levels of agreement on housing attainability in the Township indicating a need to diversify housing to reach the various income cohorts in the Township. While across age groups, over half the respondents are able to access housing catered to their household income, many either disagree or strongly disagreed to the above statement, suggesting they are housing-cost burdened. Those aged 18-24 years, potentially

Figure 21: Current Housing Size and Future Preferences



Response Rate: 77.9% of Respondents

Table 12: Current Housing Size and Future Preferences by Age

Size of Unit	Current Housing Size							Future Needs					
	18-24	25-34	35-44	45-54	55-64	65+		18-24	25-34	35-44	45-54	55-64	65+
Under 500 Sq.Ft.	0%	0%	0%	0%	0%	1%		0%	0%	0%	0%	1%	1%
500–1,000 Sq.Ft.	25%	9%	6%	2%	5%	1%		9%	7%	2%	5%	9%	12%
1,000–2,000 Sq.Ft.	42%	52%	42%	46%	44%	50%		73%	34%	43%	59%	59%	62%
2,000–3,000 Sq.Ft.	8%	31%	41%	39%	38%	41%		18%	43%	46%	25%	24%	23%
3,000–4,000 Sq.Ft.	25%	6%	7%	11%	11%	6%		0%	14%	9%	9%	5%	2%
4,000–5,000 Sq.Ft.	0%	1%	3%	0%	1%	1%		0%	3%	0%	1%	1%	0%
Above 5,000 Sq.Ft.	0%	0%	0%	1%	0%	0%		0%	0%	0%	1%	1%	0%

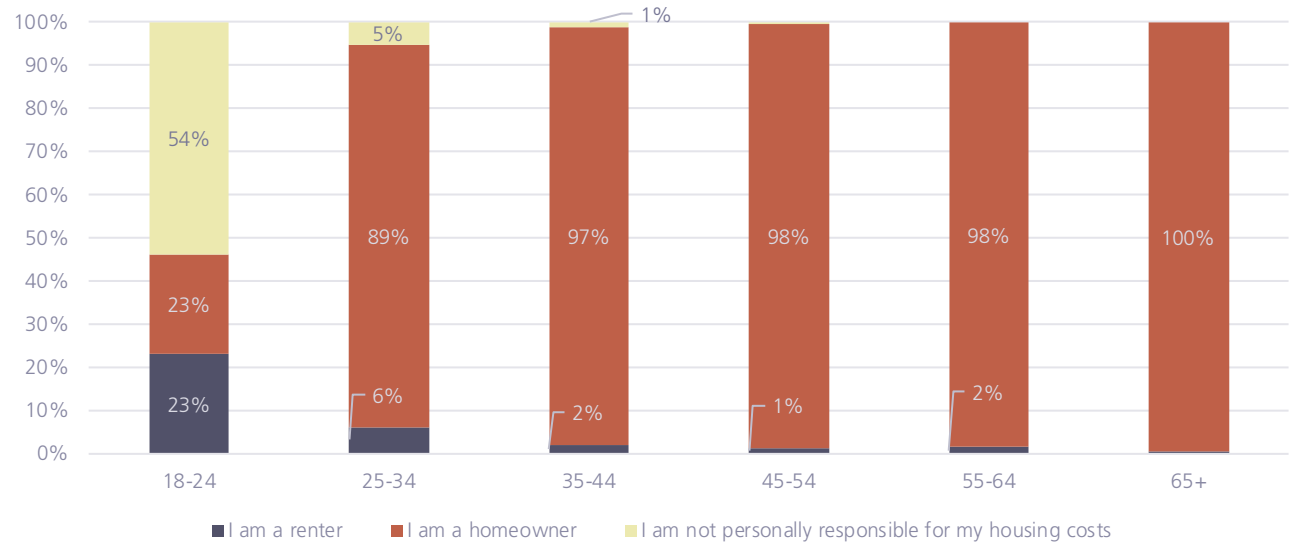
Note: The table above is read vertically, all columns add up to 100% showing the distribution of housing needs within each age cohort.

including those still in school or beginning their careers, indicated strongest disagreement, likely due to a lack of smaller starter or low- to mid-end rental units.

How much longer do you anticipate living in your current home?

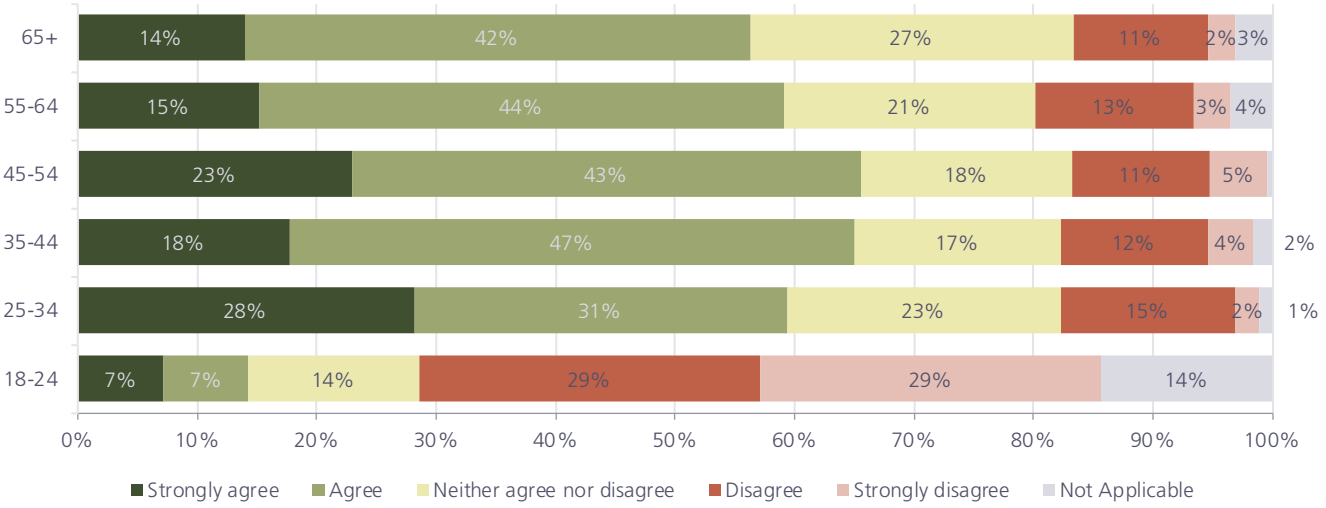
The percentage of respondents aged 25-34 years indicate varied timelines in their current homes, indicating they will move out as they transition through various stages of life. Among those aged 35-44 years, the majority (34%) anticipate living in their current homes over the next twenty years, likely homeowners who have children in a nearby school district. Preferences vary among those aged 45 years and above. This is likely due to some anticipating they will downsize after their children leave the nest or for retirement while others are already in the housing of their choice and intend to age in place.

Figure 22: Housing Tenure Status by Age of Respondents



Response Rate: 78.5% of Respondents

Figure 23: Housing Attainability by Age of Respondent



Response Rate: 77.8% of Respondents

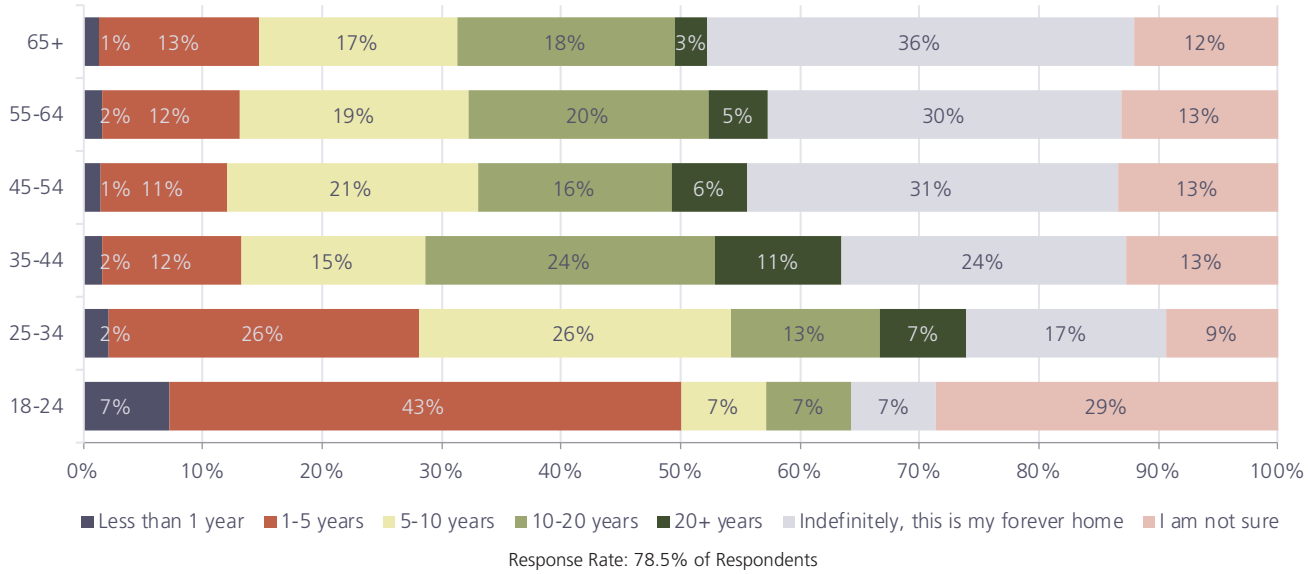
HOUSING STRATEGIES

Missing Middle

There is still a wide range of housing options between single-family dwelling units and multi-dwelling unit apartment complexes that remain unexplored in White Lake Township. In housing terms, the Township needs to expand "Missing Middle" housing, a term that refers to housing similar in size to single-family structures, but instead are either clustered or have multiple units.[15] Missing Middle housing typologies: Duplex, Triplex, Quadplex, Bungalow Courts, Multiplex, Live/Work units, weave density and diversity into the fabric of traditional single-family residential neighborhoods. Typically, when smaller units are built on reduced lot areas, they generally have lower purchasing prices and maintenance costs.

Among the different missing middle typologies, Accessory Dwelling Units (ADUs) are an effective way to diversify the existing housing stock and offer low impact increases to density. Colloquially referred to as "in-law units" or "granny flats," they are smaller units located in the rear areas of a residential parcel, subordinate to the principal structure, that can be used to house family members or to be rented to a nonfamily member. ADUs add new units compatible with the existing neighborhood composition that

Figure 24: Duration in Current Home



Response Rate: 78.5% of Respondents

are not supplied by the private housing development market. The lower costs may be passed on to the tenants to provide more affordable housing options for young adults, the elderly, or residents in transition to homeownership, all of which are important goals for the Township. Attached ADUs are currently permitted in the Township; however, limitations with septic fields and connecting to septic system limits their widespread applicability in the Township.

Build To Rent

Housing markets often tend to focus heavily on ownership, and while ownership tenure is vital for overall economic well-being, renting is an option due to housing costs and inventory shortage associated with homeownership. Additionally, demographic groups such as young adults, empty nesters, and seniors may prefer to rent due to the convenience and flexibility it offers. With this demand for rental units, developers are building to rent in Southeast Michigan, spread over an array of housing typologies, and the units can be more spacious than apartments and include shared amenities.[16] Based on existing and approved projects, there is an adequate supply of rental units to serve Township residents.

Rehabilitate Blighted Properties

As of 2020, 77 units under ownership tenure are unoccupied and are valued below $50,000.[17] These units are likely blighted and uninhabitable, and a potential threat to deteriorating the quality of the neighborhood and lowering property values. Rehabilitating or retrofitting such properties will not only funnel more units into the housing market

Figure 25: Missing Middle Housing

to address the supply issues, but will also produce units at lower prices than new builds to cater to the low- and middle-income groups pursuing homeownership. Oakland County provides federal Community Development Block Grants (CDBG) funding to communities for revitalization projects. The program strengthens neighborhoods by supporting local revitalization, home improvement and public services for senior citizens, low-income persons and families, disadvantaged youth, and disabled residents throughout most of Oakland County.[18] The map titled "CDBG Area-Wide Benefits: White Lake Township" (p. 52) denotes areas of the Township eligible for the CDBG funding from Oakland County. Detailed information can be found on Oakland County's Community & Home Improvement Division website.

Zoning Reform[19]

Zoning determines where housing will be built, what types of units are allowed, how the housing might look, and when it might be approved. As the Township's legally binding document, the language can be removed or added to allow a range of housing types. Provisions can be modified to make conversions, infill, and redevelopment possible.

Rezone for Mixed-Use/Multi-Family in Commercial Districts

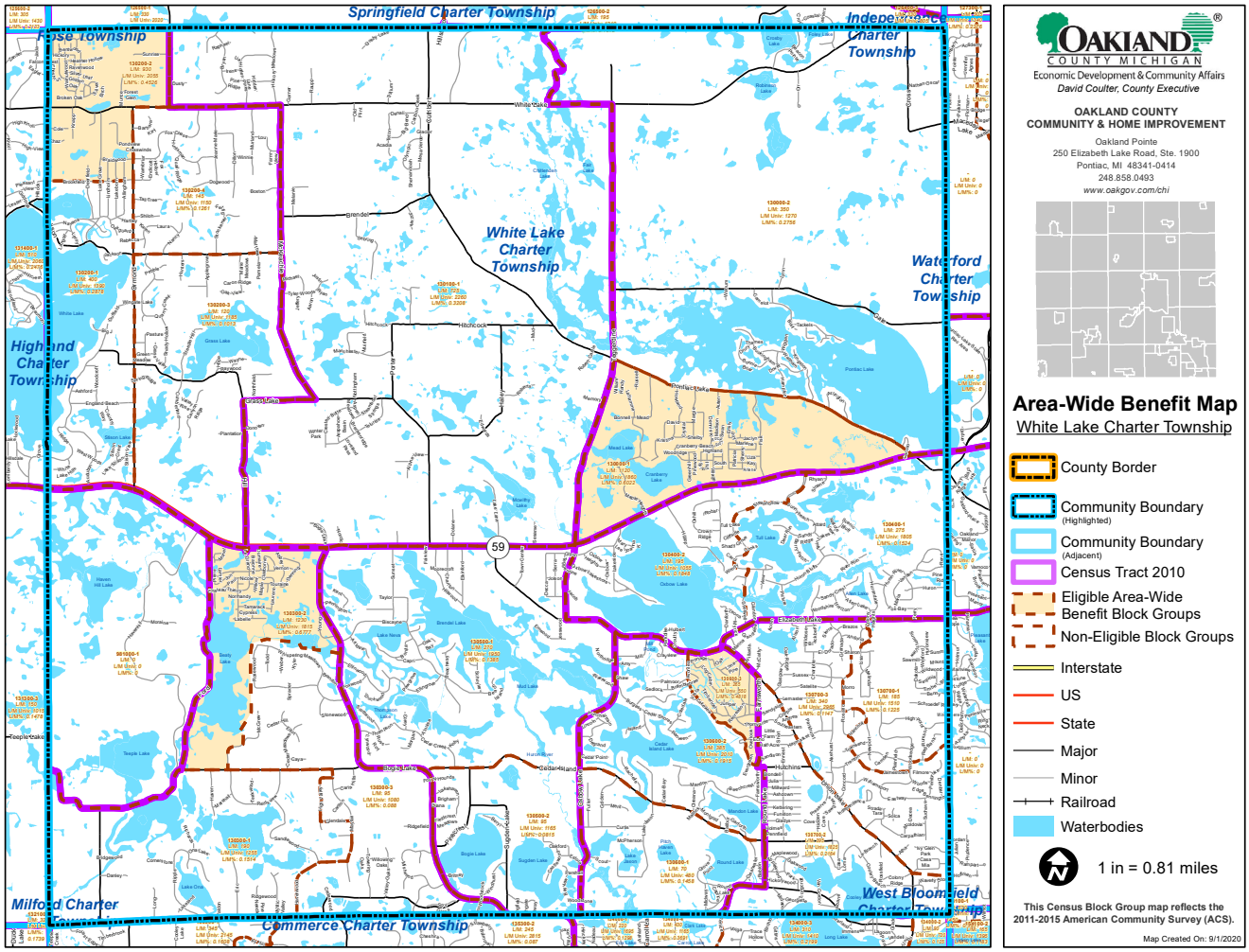
Existing commercial districts and corridors can be great locations to accommodate more housing. Zoning for mixed-use districts along commercial corridors, is one of the easiest ways to support higher-density residential uses adjacent to, but outside of, less compact neighborhoods. The majority of the M-59 corridor is zoned planned business which does not permit any residential development. There are opportunities for residential development behind many of the commercial frontages on the corridor.

Minimum Lot Width, Area, and Setback Requirements

Lot width and area requirements set the minimum standard for the size of the property. These two standards combined with setback requirements are often the primary criteria that establish whether a lot is buildable and impose restrictions on choice and cost of development. White Lake Township's lot width, area, and setbacks are well written to permit a range of residential housing sizes and styles and are well scaled to the intent of each residential zoning district.

Single-family residence

Map 08: CDBG Area-Wide Benefits: White Lake Township



Source: Oakland County's Community & Home Improvement Division

Small lot single-family

Figure 26: Key Housing Strategies

Missing Middle Housing

Missing Middle housing typologies: Duplex, Triplex, Quadplex, Bungalow Courts, Multiplex, Live/Work units, weave density and diversity into the fabric of traditional single-family residential neighborhoods.

Rehabilitate Blighted Properties

Rehabilitating or retrofitting blighted properties will not only funnel more units into the housing market to address the supply issues but will also produce units at lower prices than new builds to cater to the low- and middle-income groups pursuing homeownership.

Zoning Reform

As the Township's legally binding document, language in the Zoning Ordinance can be removed or added to allow a range of housing types.

- Rezone for Mixed-Use/Multi-Family in Commercial Districts.
- Minimum Lot Width, Area, and Setback Requirements.

Large lot single-family

Sources

1 MI New Economy, https://www.michigan.gov/mineweconomy/build-strong-communities/objectives/housing

2 Michigan Association of Planning, "Zoning Reform in Michigan: What Can You Do Now?," Spring Institute, 2022.

3 Michigan State Housing Development Authority, Michigan's Statewide Housing Plan, 2022.

4 United States Census Bureau, B25004 Vacancy Status, American Community Survey 5-Year Estimates, 2020.

5 United States Census Bureau, DP04 Selected Housing Characteristics, American Community Survey 5-Year Estimates, 2020.

6 United States Census Bureau, DP04 Selected Housing Characteristics, American Community Survey 5-Year Estimates, 2020.

7 United States Census Bureau, DP04 Selected Housing Characteristics, American Community Survey 5-Year Estimates, 2020.

8 United States Census Bureau, DP04 Selected Housing Characteristics, American Community Survey 5-Year Estimates, 2020.

9 Inventory Counts Report from Debby DeHart, www.debbydehart.com

10 United States Census Bureau, B25004 Vacancy Status, American Community Survey 5-Year Estimates, 2020.

11 United States Census Bureau, DP04 Selected Housing Characteristics, American Community Survey 5-Year Estimates, 2020.

12 United States Census Bureau, DP04 Selected Housing Characteristics, American Community Survey 5-Year Estimates, 2020.

13 United States Census Bureau, DP04 Selected Housing Characteristics, American Community Survey 5-Year Estimates, 2020.

14 Southeast Michigan Council of Governments (SEMCOG), White Lake Township Community Profiles, 2022

15 Opticos Design. Missing Middle Housing. https://missingmiddlehousing.com/

16 Alexandra Ciuntu. Built-to-Rent Homes Expected to Hit All-Time High in 2022, Fueled by Need for Space and Privacy. Rent Café, 2022. https://www.rentcafe.com/blog/rental-market/market-snapshots/built-to-rent-single-family-homes-double-in-2022/#:~:text=Built%2Dto%2Drent%20communities%20are,have%20a%20direct%2Daccess%20garage.

17 United States Census Bureau, B25004 Vacancy Status, American Community Survey 5-Year Estimates, 2020.

18 Oakland County's Community & Home Improvement Division, Community Development Block Grants, https://www.oakgov.com/nhd/grants-funding/Pages/cdbg.aspx

19 Michigan Association of Planning, Zoning Reform Toolkit, https://www.planningmi.org/assets/images/ZoningReformToolkit/MAP_ZoningReformToolkit_2022%2008%2002_Gradient.pdf

Lakefront home

Transportation & Mobility

Transportation networks are the physical links that define mobility and connectivity in a community. Roads, public transit, sidewalks, and other non-motorized paths allow residents to move between home, work, places to socialize, and other everyday destinations. Transportation infrastructure also enables regional connectivity, facilitating the exchange of products and services with other economic markets. Typically, housing, businesses, and amenities tend to concentrate along well-connected road networks, thereby establishing transportation infrastructure as a fundamental element of land use planning.

The Township's 2012 Master Plan recognized the importance of broadening transportation choices, improving pedestrian connectivity to public and commercial areas, and promoting a public transportation system to increase the mobility of the elderly and physically disabled. However, transportation and the supporting infrastructure in the Township continues to be auto-oriented. This section inventories the transportation systems in White Lake Township and identifies how existing infrastructure can be adapted to support diverse mobility options. The findings from the analyses and community input session will help guide the Township on major transportation infrastructure advancements and policy decisions.

ROAD NETWORK

White Lake Township has 231.5 miles of roads within its boundary.[1] The Township is bisected by State Highway M-59 that runs east-west through the Township. The M-59 thoroughfare continues west to connect the Township with US-23, which runs north to Flint and south to Brighton and Ann Arbor, and continues east through metro Detroit to find a terminus at Chesterfield and Harrison Townships. Interstate 75 (I-75), which runs north to Flint and south to Detroit, can be accessed about three miles northeast. Collectively, the M-59 thoroughfare and the proximity to freeway interchanges and highways offer convenient regional connectivity, making White Lake Township an accessible residential community.

Road Classification and Traffic Volumes

The National Functional Classification (NFC) is a hierarchical system developed by the Federal Highway Administration (FHWA) and used by the Michigan Department of Transportation (MDOT) to determine federal funding allocation for roads. Roads are categorized based on mobility, trip distance, speed limit, and traffic volume. The higher the road classification, the greater the funding. Roads in White Lake Township fall into one of the following classifications: Major Arterial, Minor Arterial, Major Collector, and Local Roads. The map titled "National Functional Classification" (p. 58) represents the Township's road network based the NFC system. MDOT also calculates the average daily number of vehicles that travel on roadways throughout the year, a metric termed "Average Annual Daily Traffic" or AADT. The numbers on the NFC map represent the estimated 2019 AADT counts in White Lake Township. MDOT recommends the continued use of 2019 AADT numbers since the most recent data was skewed due to the COVID-19 pandemic.

Major Arterials

The east-west connector in the Township, M-59 (locally referred to as Highland Road) and the east-southeast peripheral road, Williams Lake Road, are the two major arterial roads. M-59 continues west to merge with US-23, connecting the Township to the major cities and employment hubs in the region: Flint to the north and Ann Arbor to the south, making the western segment of M-59 the busiest road in the Township with an AADT of nearly 30,980. With an AADT of 27,920, the eastern segment of M-59 is equally busy as it offers connections to the Oakland County International Airport and Metro Detroit. Williams Lake Road is the eastern boundary

National Functional Classification

Major Arterials: Carry long-distance high-speed traffic and offer connectivity to other interstate highways. White Lake Township has 11.5 miles of major arterials.

Minor Arterials: Provide service for trips of moderate length, serve smaller geographic areas, and offer connectivity to other major arterials. White Lake Township has 18.1 miles of minor arterials.

Major Collectors: Gather and funnel traffic from local roads to the arterial network; these provide access to properties but tend to be longer in length, have lower connecting driveway densities, have higher speed limits, are spaced at greater intervals, and may have more travel lanes than minor collectors. White Lake Township has 16.4 miles of major collectors.

Local Roads: Provide access to properties. White Lake Township has 185.6 miles of local roads.

Source: Federal Highway Administration (U.S. Department of Transportation)

of the Township, which meets Cooley Lake Road to the south and, in turn, connects the Township to the "Four Towns" area with Commerce, Waterford, and West Bloomfield Townships. Williams Lake Road extends northeast to merge with Dixie Highway (M-24). A small segment of Cooley Lake Road, east of Union Lake Road, generates a high volume of traffic (AADT of 29,189) in the southeast corner of the Township, due to the connectivity it offers to the cities and employment centers south of the Township.

M-59 is under jurisdiction of MDOT, and the Township has limited control over any infrastructure decisions. Since Highland Recreation Area is accessed off M-59 and many commercial uses in the Township are concentrated along M-59, any decisions made by MDOT regarding road improvements will directly impact pedestrian safety, walkability, and the overall character along the corridor. MDOT'S Five-Year Transportation Program for 2023 to 2027 includes plans to rehabilitate M-59, or Highland Road, for the segment between Milford Road to US-24 and Pontiac Lake Road. Construction and physical improvements are planned to begin in 2026. In addition to the rehabilitations planned for this stretch, six other segments of M-59 within the bounds of Oakland County will receive repairs and be reconstructed beginning in 2027.[2]

Minor Arterials and Major Collectors

There are five minor arterial roads in White Lake Township: Elizabeth Lake Road, Union Lake Road, and Bogie Lake Road branch south from M-59/ Highland Road while Ormond Road branches north to meet another minor arterial, White Lake Road. The vehicle counts on Bogie Lake Road range from approximately 10,620 to 10,740; the volume of traffic is higher closer to the Huron Valley Schools campus. Elizabeth Lake Road and Union Lake Road are widely used (AADT of about 10,330 and 7,560, respectively) as the connectors between M-59 and the denser residential developments in the southeast quadrant of the Township. With an AADT of 9,345, White Lake Road is another major east-west connector in the Township, which runs parallel to M-59 and continues northeast to merge with Dixie Highway.

White Lake Township has several major collector roads including Teggerdine Road, Pontiac Lake Road, Oxbow Lake Road, and a segment of Cooley Lake Road. The segment of Cooley Lake Road, west of Union Lake Road, receives an AADT of 9,600, making it the busiest major collector in the Township. Teggerdine Road and Oxbow Lake Road are the primary north-south connectors in the Township with an annual daily average of about 7,700 vehicles. Pontiac Lake Road, leading to M-59, connects the northern portion of the Township to Waterford Township. The minor arterials and the major collectors are maintained by Oakland County and any infrastructure improvements along these roads require coordination with the Road Commission for Oakland County (RCOC).

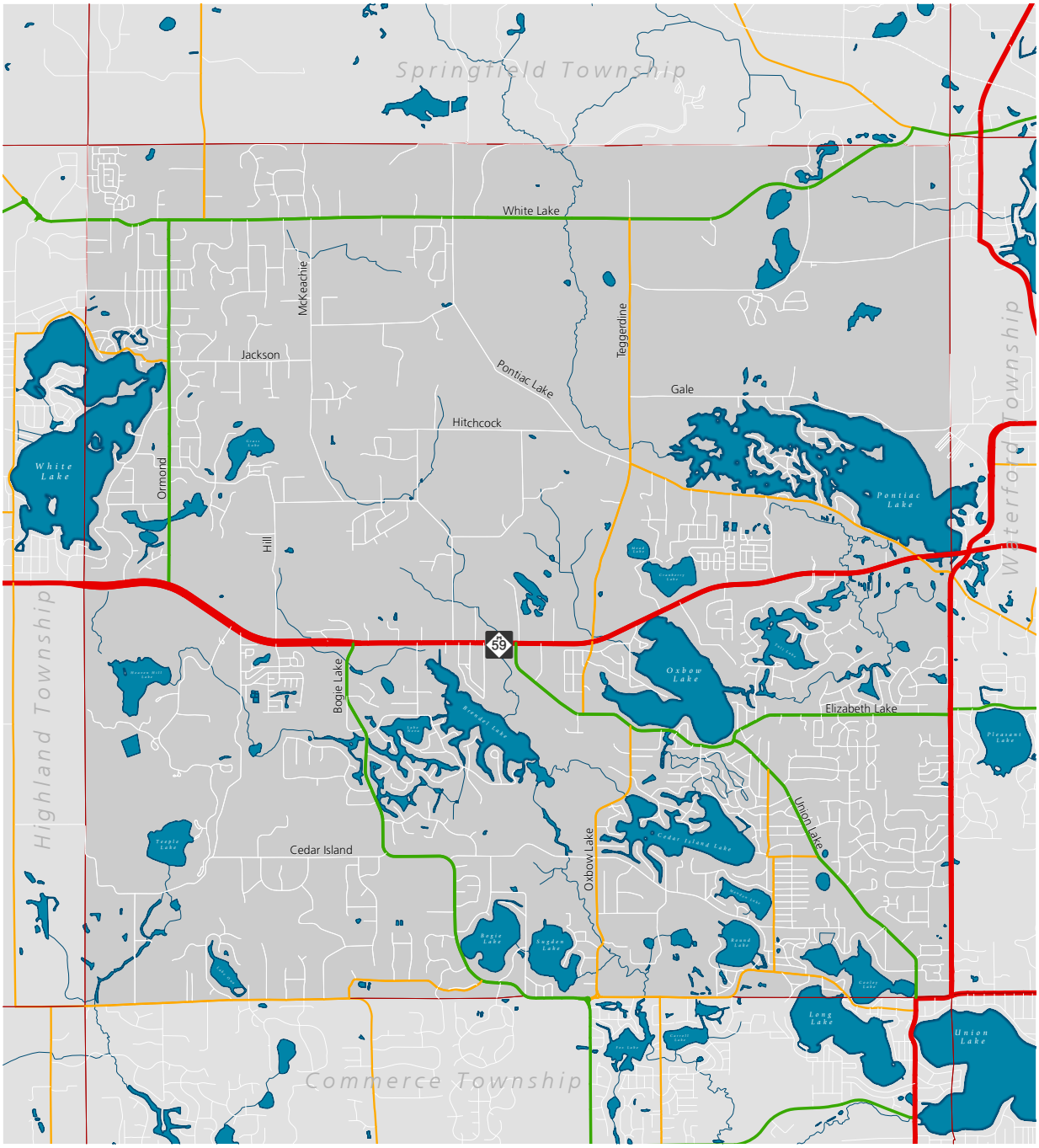
Local Roads

Local roads offer connectivity to residential neighborhoods and other public spaces in the Township. Local roads cover the largest area compared to the other roads but are not eligible for any federal funding.

Commuter Traffic

White Lake Township is primarily residential in character, with almost 96% of its residents

Map 09: National Functional Classification



National Functional Classification

3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township, MDOT

- Major Arterial
- Minor Arterial
- Major Collector
- Local Roads

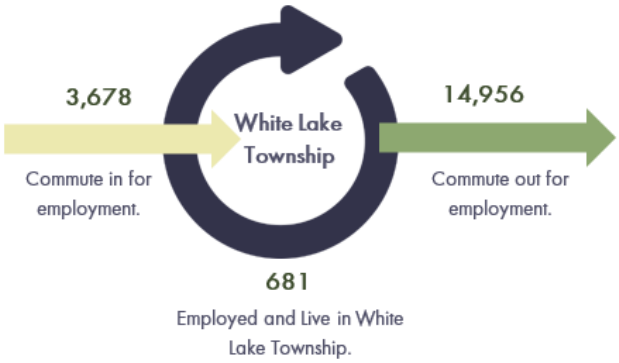
2019 Average Annual Daily Traffic (AADT)

commuting outside of the Township to their place of employment.[3] About 61% of Township residents are employed within Oakland County and 17% commute to Wayne County for employment.[4] Most residents commute either south or southeast to the employment hubs of Detroit (4.7%), Farmington Hills (4.5%), Troy (4.3%), or Southfield (4.2%).[5] All four cities can be accessed via the segment of M-59 east of Teggerdine Road, likely causing congestion along this major throughfare during peak hours in the morning and evening, which can impact the length of daily commutes and safety. Those commuting to the Township for employment also primarily access the Township via M-59 from the west, establishing this stretch of the state highway as an important corridor.[6] The segment of Cooley Lake Road west of Union Lake Road receives high traffic counts (AADT 9,600) as it contains a strip mall and offers connectivity to the cities of Farmington Hills, Novi, and Livonia, making it a bottleneck for traffic.

Road Quality

The Transportation Asset Management Council (TAMC) conducts a visual survey called the Pavement Surface Evaluation and Rating (PASER) to evaluate conditions of roads. This survey uses a scale of 1-10 to rate roads and categorize them as good, fair, or poor, as represented in the map titled "PASER Ratings 2022" (p. 60). The map depicts a vast majority of the major roads in the Township are in fair (indicated in yellow) or poor (indicated in red) condition; only a handful of road segments are in good condition (indicated in green). While Michigan's extreme weather exacerbates regular wear and tear, deteriorating road conditions can impede daily commutes and safety.

Figure 27: Commute Patterns, White Lake Township, 2019



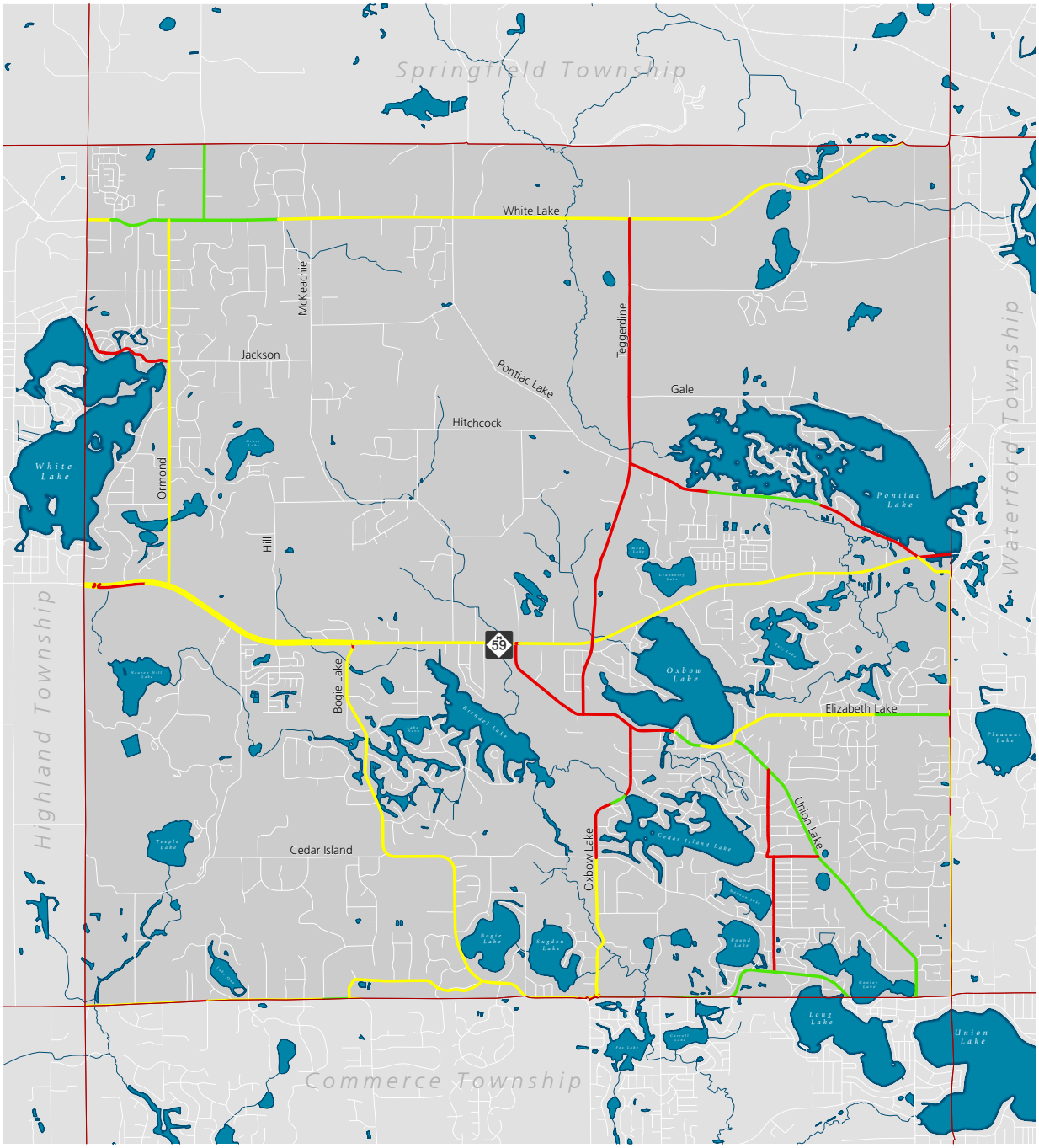
Source: OnTheMap, United States Census Bureau

The Township's major arterials, M-59 and Williams Lake Road, are in "fair" condition. Given both roads are gateways into the Township and receive high volumes of daily commuters, improving the quality of these roads is imperative. As noted in the previous section, improvements and maintenance along M-59 are managed by MDOT. In addition to the rehabilitation projects MDOT has planned for 2026 and 2027 along M-59, SEMCOG has proposed $53.8 million in pavement improvements along M-59 between Milford Road and Pontiac Lake Road in 2026 under the Transportation Improvement Program (TIP), which includes projects recommended by MDOT for state-owned transportation assets in the SEMCOG region.[7]

The quality of pavements along the minor arterial roads, Elizabeth Lake Road, Union Lake Road, Bogie Lake Road, Ormond Road, and White Lake Road, varies from good to poor; only Union Lake Road, short segments of Elizabeth Lake Road, and White Lake Road are in "good" condition. Particularly concerning is the western segment of Elizabeth Lake Road that connects with M-59. This intersection provides direct access to the residential development in the southeast portion of the Township. The RCOC completed a $2.3 million project, to address concerns regarding road quality and safety along Elizabeth Lake Road. The improvements include:[8]

- Conversion of the three-way Elizabeth Lake Road/Teggerdine Road intersection, controlled by stop signs, to a single-lane roundabout.
- Conversion of the three-way Elizabeth Lake Road/Oxbow Lake Road intersection, controlled by stop signs, to a compact roundabout.
- Repaving of roads in the vicinity of the roundabouts with asphalt.
- Installation of curbs and gutters, sidewalks, Americans with Disabilities Act (ADA)-compliant pedestrian crosswalks, and street lighting at the roundabouts.
- Improvements to storm sewers and drainage.
- Utility relocation.
- Milling and paving Elizabeth Lake Road between the roundabouts with the addition of four-foot road shoulders.

Map 10: The Pavement Surface Evaluation and Rating (PASER)



PASER Ratings 2022

3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

- Good
- Fair
- Poor

Many of the major collector roads in the Township are in "poor" condition. The quality of pavement that covers the entire stretch of road along the major north-south connectors in the Township, Teggerdine Road and Oxbow Lake Road via Elizabeth Lake Road, are in poor condition. In addition to offering north-south connectivity, Oxbow Lake Road provides access to Oxbow Elementary School, furthering the urgency to invest in infrastructure improvements along this stretch. Segments of Pontiac Lake Road leading to Teggerdine Road and M-59 are also of poor quality.

Road Safety

The existing road infrastructure in White Lake Township is impacted by the geography of the lakes as the road system is not organized into rectilinear grids, but rather large swooping stretches with disjointed intersections and connections in response to the existing lakes and wetlands. While accidents can occur at any segment of a road, 31% of Michigan's fatal crashes in 2021 occurred at intersections, emphasizing the importance of designing safe road intersections.[9] Additionally, as highlighted in the Road Quality section above, the poor quality of pavement along some of the Township's major thoroughfares further exacerbates the safety of commuters. The map titled "Crashes, 2021" (p. 62) uses 2021 crash data from the Michigan Traffic Crash Facts (MTCF) website to identify unsafe intersections and road segments in White Lake Township.

A total of 568 crashes occurred in the Township in 2021, of which a majority occurred along M-59, especially at intersections with north-south arterials or collector roads. The "Crashes, 2021" map (p. 62) shows several crashes along White Lake Road in the northern half of the Township, but the southern half witnessed a significantly higher number of crashes along Williams Lake Road, Bogie Lake Road, Elizabeth Lake Road, Union Lake Road, and Oxbow Lake Road likely due to blind spots created by curvilinear geography of roads in response to several lakes and natural features. The highest concentration of crashes occurred at the following intersections:

- M-59 and Ormond Road
- M-59 and Bogie Lake Road
- M-59 and Teggerdine Road
- M-59 and Fisk Road
- M-59 and Pontiac Lake Road

While there were no fatalities caused by crashes in 2021, the table below titled "Injury Caused by Crashes" shows of the 568 total crashes in the Township, 9.7% may have involved injuries, 8.1% may have resulted in minor injuries, and 1.6% may have caused serious injuries. Two accidents involving pedestrians were categorized as "Suspected Serious Injury" while two involving bicyclists were categorized as "Suspected Minor Injury."

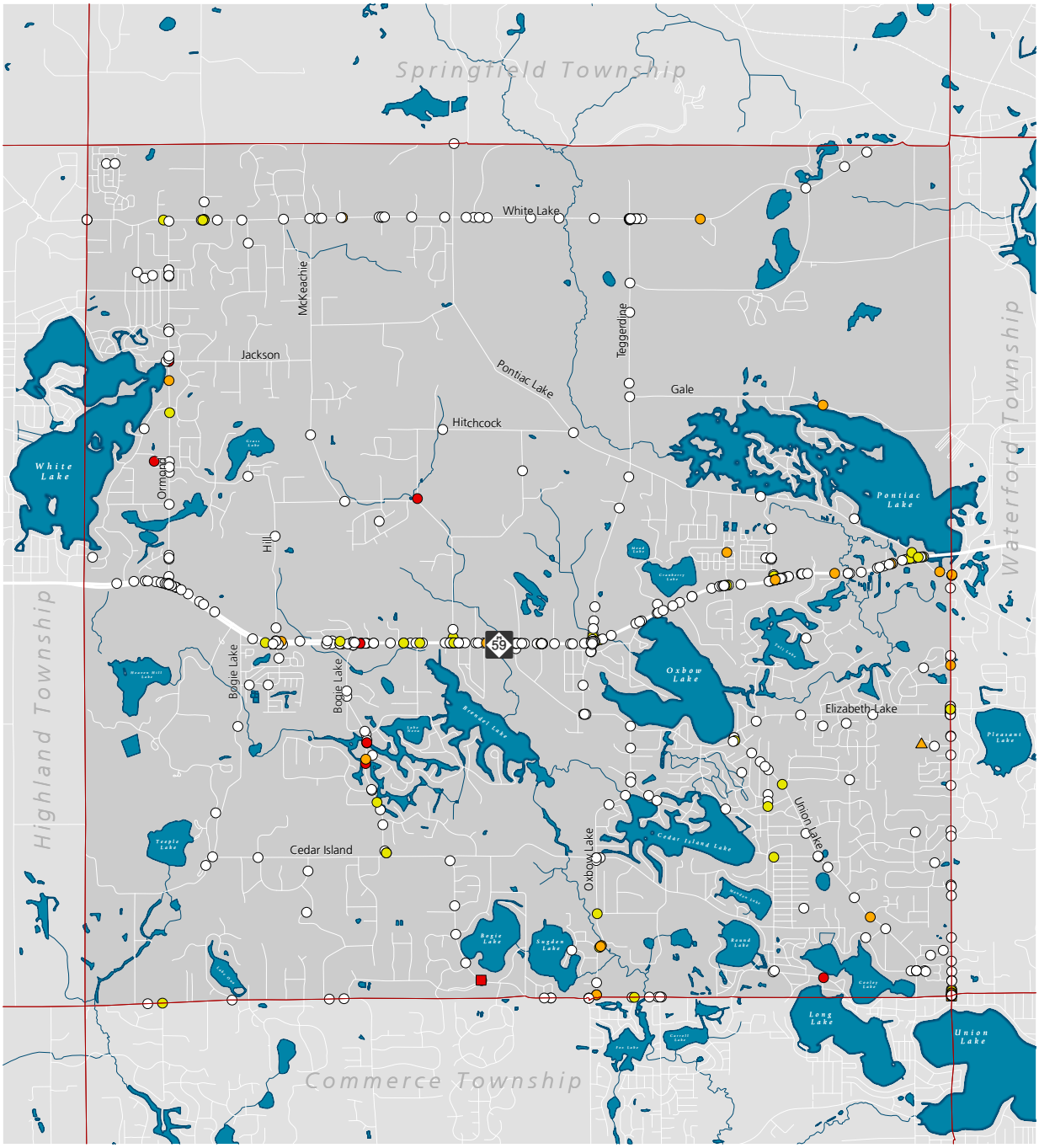
Given the volume and intensity of crashes in 2021, improving road safety measures and addressing problematic intersections should be important priorities for the Township. Proposed improvements along M-59 and between Milford Road and Pontiac Lake Road may address some safety concerns. The construction of roundabouts at the intersections of Elizabeth Lake Road and Teggerdine Road, and Elizabeth Lake Road and Oxbow Lake Road, will improve safety in the southern portion of the Township.[10]

Table 13: Injury Caused by Crashes in 2021

Injury Type	Number of Crashes	Percentage of Total
Fatal Injury	0	0.0%
No Injury	458	80.6%
Possible Injury	55	9.7%
Suspected Minor Injury	46	8.1%
Suspected Serious Injury	9	1.6%
Totals	**568**	**100%**

Source: Michigan Traffic Crash Facts

Map 11: Crashes 2021



Crashes 2021

3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township, MTCF

Type of Crash

- ▲ Pedestrian Involved
- ■ Cyclist Involved
- • No Pedestrian or Cyclist

Severity

- No Injury
- Possible Injury
- Minor Injury
- Major Injury

MULTI-MODAL TRANSPORTATION INFRASTRUCTURE AND COMPLETE STREETS

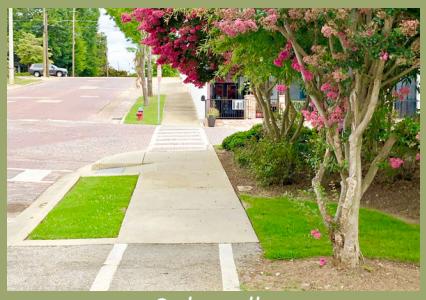
Transportation advocates have increased public awareness of how streets in the United States are overwhelmingly oriented toward automobile travel. As an alternative to single-use roads, advocates have pushed for "Complete Streets," a movement that calls for multimodal transportation by designing streets for automobiles, pedestrians, bicyclists, and public transit users of all ages and abilities. From simple additions or modifications to full-fledged infrastructure revamps, complete street elements may be scaled based on the needs and budget of individual communities.

Non-Motorized Pathways

The existing pedestrian system is as expected in an area that relies heavily on the automobile as the primary source of transportation: currently, it contains several disconnected sidewalks/pathways. Though about 91% of Township residents primarily use automobiles (cars, trucks, or vans) to commute to work, integrating and increasing non-motorized trails and pathways was recognized as a "high priority" by 32% of survey respondents.[11] To this end, the Parks and Recreation Committee developed a plan for Township-wide system of pathways; the renovation of the M-59 pathway is an essential element of this plan as it will connect future north-south pathways to residential land use in the Township. The 2024–2029 CIP shows $6 million for the renovation of the pathway along M-59, spread over three phases, as a combination of funds from the Township and partner organizations.[12] The CIP also includes $7 million worth of pathway construction along Union Lake Road and Bogie Lake Road.[13] In addition to pathways along the major thoroughfares, the Township has also planned for the development of the "ITC Corridor Four Seasons Trail" which would provide a link between Pontiac Lake State Recreation Area and Highland State Recreation Area, via the M-59 trailway.[14] This route is included in the Oakland County Greenways Plan and includes state and regional financial participation. Construction of the trailway is expected to occur over three phases. Furthermore, the Huron-Clinton

Complete Streets

Complete street elements the Township can focus on include sidewalks, bicycle lanes, safe crossings, street lighting, and street landscaping.



Sidewalks

Bicycle Routes

Safe Crossings

Street Landscaping

Street Lighting

Metroparks have begun a project to connect the five metroparks with non-motorized pathways. The initial phase of the project is complete, and two of the proposed segments under consideration are in White Lake Township.[15]

Signed Bicycle Route[16]

A signed bicycle route is a low-volume roadway designated for cyclist use, which typically connects dense residential areas to municipal facilities such as the Township Hall, library, schools, churches, retail uses, and the like. There is not a dedicated lane within the roadway for bicycle use. Rather, bicyclists share the road with vehicles and are guided to their destination by "bicycle route" signs along the shoulder.

Bicycle Lane[17]

Bicycle lanes are dedicated portions of the roadway designed, striped, and signed to accommodate bicyclists. There are several thoroughfares in White Lake Township that could be designed to accommodate bicycle lanes, including Bogie Lake Road, Elizabeth Lake Road, Teggerdine Road, Union Lake Road, Ormond Road, White Lake Road, and paved portions of Pontiac Lake Road and Fisk Road.

Shared-Use Path[18]

Shared-use paths are routes that accommodate two-way "traffic" of non-motorized and pedestrian uses within a single right-of-way separated from the roadway. Frequently, these trails are developed within an easement part of a utility corridor or within an abandoned railroad corridor. Shared-use paths can accommodate a wider spectrum of users than either the signed bicycle routes or bicycle lanes. Shared-use paths are typically wider and separated from motorized traffic, making it safer for walkers, runners, in-line skaters, and bicyclists. Often these trails are used during the winter months for cross-country skiing and snow shoeing. Therefore, the design of this trail system (width, materials, grade, etc.) is critical to accommodate all potential users. In White Lake Township, proposed pathways along M-59 and the ITC corridor are classified as shared-use paths.

The Township should continually aim to integrate trails, sidewalks, and bicycle routes that connect parks and open spaces, recreational facilities, residential neighborhoods, schools, and commercial uses to achieve improved multi-modal access and usability in the community. In addition to the complete street elements identified previously, the Township should be mindful of the following goals as it works to integrate shared-use pathways among existing roads and transportation infrastructure:

- GOAL 1: Maintain and improve existing pathway segments.
- GOAL 2: Construct new pathway segments and establish connections between existing segments.
- GOAL 3: Plan connections to Oakland County Trail System.
- GOAL 4: Non-motorized access to parks.
- GOAL 5: Non-motorized access to a future central gathering place.
- GOAL 6: Individual connectors between neighborhoods and Township parks.

The Township can also explore the adoption of a Complete Streets Ordinance, requiring all new roads or improvements to existing roads to consider the inclusion of Complete Street elements.

PUBLIC TRANSPORTATION

Access to quality public transportation at affordable rates and regular frequency enables mobility for people of all age groups and income. Oakland County coordinates with various regional transportation organizations to provide public transportation in White Lake Township and other communities across the County. In November 2022, Oakland County residents approved the Oakland County Public Transportation millage. This voter-approved 10-year, 0.95 millage is dedicated to maintaining and expanding public transit services throughout Oakland County.[19] Following are the public transportation options available to White Lake Township residents.

Suburban Mobility Authority for Regional Transportation (SMART)[20]

The Suburban Mobility Authority for Regional Transportation (SMART) is southeast Michigan's regional bus system which provides a variety of transit services in Oakland County. White Lake Township is currently not serviced by SMART; however, in 2023, SMART will endeavor to create a new fixed route

service from Auburn Hills through Pontiac that continues west through Waterford Township and a portion of White Lake Township.

Western Oakland Transportation Authority (WOTA)[21]

The Western Oakland Transportation Authority (WOTA) has been providing paratransit (dial-a-ride) transportation services since 2020 to qualifying residents of Highland Township, Walled Lake, Waterford Township, and White Lake Township. WOTA accommodates trips to work, medical appointments, shopping, banking, civic events, entertainment venues, and social activities within the driving boundary. Eligible riders include seniors over 55, adults with disabilities, and veterans, along with companion riders. In 2023, WOTA will undertake efforts to extend the hours of service, reduce the cost per stop, include low-income residents as eligible riders, purchase additional ADA-compliant minivans, and expand the geography of the service area.

Figure 28: Transportation & Mobility: Ongoing & Proposed Transportation Improvements

Major Arterials

- MDOT'S Five-Year Transportation Program for 2023 to 2027 includes plans to rehabilitate M-59, or Highland Road, for the segment that stretches between Milford Road and Pontiac Lake Road; construction and physical improvements are planned to begin in 2026.
- Six other segments of M-59 within the bounds of Oakland County will receive repairs and be reconstructed beginning in 2027.

Road Quality

- SEMCOG has proposed $53.8 million in pavement improvements along M-59 between Milford Road and Pontiac Lake Road in 2026, under the Transportation Improvement Program (TIP) which includes projects recommended by MDOT for state-owned transportation assets in the SEMCOG region.
- The RCOC completed a $2.3 million project to address concerns regarding road quality and safety along Elizabeth Lake Road.

Road Safety

- The construction of roundabouts at the intersections of Elizabeth Lake Road and Teggerdine Road and Elizabeth Lake Road and Oxbow Lake Road will improve safety in the southern portion of the Township.

Complete Streets

- In addition to the several non-motorized and multi-modal infrastructure measures, the Township can also explore the adoption of a Complete Streets Ordinance, requiring all new roads or improvements to existing roads to consider the inclusion of Complete Street elements.

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Sidewalk in commercial development

Community Facilities

A primary function of local government is to provide services and amenities like public safety, infrastructure, and recreational opportunities to its residents. In many cases, the provision and quality of these services and amenities are a draw to the municipality and may also be cited as the reason current residents chose to live in the area.

These sentiments ring true for many residents of White Lake Township. Results from the community survey indicate 56% of respondents consider the Township's recreation options to be one of White Lake Township's best characteristics. Another 39% held the same perspective about the quality of schools that serve the Township, 11% about the quality of municipal services, and 4% about access to healthcare services, all of which comprise essential municipal facilities and services that impact residents on a daily basis. On the other hand, when asked about the largest challenges to face White Lake Township within the next 10 years, 18% of respondents expressed concern about the maintenance of public infrastructure, representing the 6th most commonly held concern in the coming decade. These sentiments may be indicative of the need to service these systems in the coming years.

This chapter inventories the facilities and services available to residents of White Lake Township, including public utilities and services, municipal facilities, public safety services, parks and recreation spaces and facilities, educational services and facilities, and healthcare facilities to support medical needs.

PUBLIC UTILITIES & SERVICES

Water and Sewer

Water System

The water system includes about 55 miles of water main lines that range in size from 4 to 16 inches in diameter; 15 pressure control valves; approximately 1,000 gate valves; nearly 700 fire hydrants and hydrant valves; 2 elevated water storage tanks that each hold 1 million gallons of water; 5 water treatment plants; and 9 water supply wells. Major improvements to the Township's water system took place in 2019 and 2020 at the Twin Lakes II and Hillview well houses. While the condition of the system varies, it is primarily assessed as being in "good to excellent" condition and typically experiences moderate to heavy use on a regular basis.[1]

The Township's Department of Public Services (DPS) is managed by the DPS Director and seeks to provide safe drinking water and fire protection to all citizens of the Township. The Department has provided water to Township residents since 1980; currently, more than 2,100 water accounts are in use.[2] The Department offers numerous services that include, but are not limited to, the following:[3]

- Repairing and maintaining water mains and related structures, such as towers, pumps, treatment facilities, fire hydrants, water shut-off valves, and generators.
- Flushing fire hydrants in the Spring and Fall.
- Replacing water meters and updating them to work in an automated billing system.
- Marking underground water utility locations.
- Managing subdivision irrigation meters.
- Investigating water service line leaks.
- Answering customer inquiries regarding rusty or cloudy water, low water pressure, water location, billing, and fees.
- Complying with public health standards and guidance.

Sanitary Sewer System

The sanitary sewer system serves approximately 4,500 residents. The sewer mains of this system were primarily constructed in 1999 with additional

improvements and extensions taking place later, including the most recent update in 2012. The Sanitary Sewer System contains approximately 20 miles of gravity sewer mains, 22 miles of pressured mains, and 10 pumping stations. The wastewater flow of the Township is discharged into Commerce Township's collection system and conveyed to the Commerce Township Wastewater Treatment Plant for treatment. Currently, the Sanitary Sewer System is in "good to excellent" condition and experiences light to moderate use on a regular basis.[4]

The Township's sanitary sewer system is managed by the DPS. This Department holds numerous responsibilities that advance its mission to provide quality and efficient services to all users while simultaneously protecting and enhancing the Huron and Clinton River Watersheds. The Department's responsibilities include, but are not limited to, the following:[5]

- Managing and sharing storm and sanitary sewer locations and easement information.
- Continually developing, maintaining, and reviewing the Sanitary Sewer Master Plan.
- Calculating and sharing sewer connection, extension, and capacity estimates.
- Developing Special Assessment Districts (SADs) for sewer and water systems.
- Performing program, project, and asset management, design assistance, and systemic fiscal responsibility.
- Overseeing invasive species management programs, including the West Nile Virus (Mosquito) Control Program.
- Hosting public education and outreach efforts.
- Assessing the quality of surface and groundwater.

In the event of an emergency, the Department of Public Services provides around-the-clock maintenance of the Township's sewer system through an agreement with the Oakland County Water Resources Commissioner's Office.

White Lake Township utilizes two types of infrastructure to transport wastewater through the municipal pipe system to appropriate treatment facilities: the conventional gravity sewer system and the pressure sewer system. Gravitational methods of wastewater transport use underground, sloping pipe systems that enable gravitational movement toward treatment facilities while pressure sewers break down waste in a pumping station before transporting it through smaller, airtight pipes toward treatment centers.[6] Though pressure sewers require energy to break down wastewater, the construction of pressure system pipelines is less intensive and can be placed closer to the ground level. Because gravity sewer systems are reliant on sloping pipelines, their placement is often much deeper underground.

The map titled "Sanitary Sewer Master Plan" (p. 70) illustrates upcoming plans to maintain, adjust, and expand the Township's sewer system. The current pressure system primarily runs east-west through the center of the Township and around Pontiac, Oxbow, Bogie, and Sugden Lakes. Plans for the pressure system's expansion would extend pressure mains and sanitary pressure structures to the land surrounding Cedar Island Lake, Brendel Lake, and Grass Lake to cover more of the Township's southern and northwest areas. The Township's existing gravity system covers less area than the pressure system. Notably further from the Township's bodies of water than the pressure systems, expansion plans for the gravity system would cover much of White Lake Township's southeast corner and also provide greater connection to the northwest area with additional gravity main lines and sanitary structures that follow Highland Road and Hill Road. Plans for expansion of the system should be carefully considered and done in accordance with the Future Land Use Plan. Water and sewer systems allow for higher-density development and can be used as a tool to control and direct growth and density. Areas designated as higher density on the Future Land Use Plan should be prioritized for water and sewer expansion (if they are not already served). Areas designated as low density on the Future Land Use plan should not be candidates for the expansion of the system.

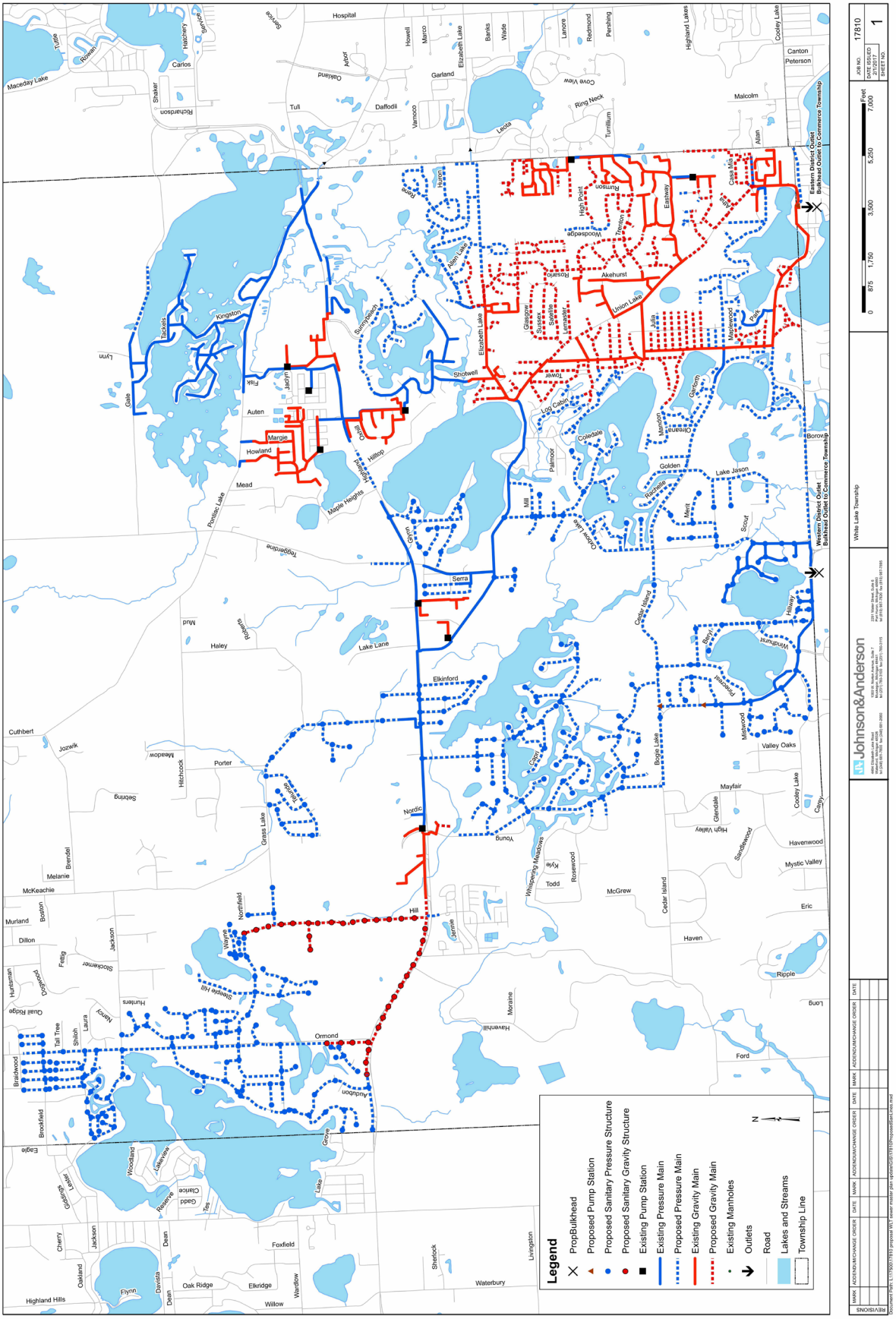
Electric and Gas Utilities

Electricity in White Lake Township is provided by DTE, while natural gas is provided by Consumers Energy. A transmission line passes through White Lake Township, and there is a gas/oil well located in the western-central portion of the Township.[7]

Broadband and Cell Service

Residents of White Lake Township can access home internet services through numerous providers.

Map 12: Sanitary Sewer Master Plan



Source: White Lake Township Community Development Department

Though T-Mobile 5G Home and Xfinity Cable are the most common, Frontier, Mercury Broadband, HughesNet, and Viasat round out the options available to Township residents, with download speeds that range from 25 Mbps to 120 Mbps. Cellular internet service is offered through Verizon, AT&T, Xfinity Mobile, T-Mobile, Mint Mobile, and Visible. AT&T provides 5G connection while the other five providers offer 4G LTE.[8]

In 2022, Oakland County and the Southeast Michigan Council of Governments (SEMCOG) helped secure funding for a project enacted by Connected Michigan to assess and better understand uneven internet access and coverage as it pertains to rural communities in Oakland, Macomb, and Wayne counties. This project ultimately intends to increase broadband access based on findings uncovered through various phases of the study, including a survey distributed to update coverage maps for the state. With evidence backed by data, Connected Michigan has plans to use their findings to apply for federal funding to improve broadband access by investing in infrastructure that benefits homes, businesses, and public spaces alike.[9]

Road Maintenance

In White Lake Township, road maintenance responsibilities are split between the Road Commission for Oakland County (RCOC) and the Michigan Department of Transportation (MDOT). A road's classification determines which entity is responsible for maintenance and improvements; for example, M-59 falls under the jurisdiction of MDOT because it is a state highway and classified as one of the Township's major arterials.

MUNICIPAL FACILITIES

White Lake Township Hall

White Lake Township Hall was built in 1949 and received its last major improvement in 1996. The Hall houses the offices and operations of the Supervisor, Clerk, and Treasurer, all elected officials of the Township. It also houses the offices of the Assessing, Building, and Planning departments for the Township. The Hall has been assessed as being in "fair" condition, and it is used heavily by both employees and community members as the site of numerous meetings.[10] All board and commission meetings are held in the Township Annex.

In 2020, the White Lake Township Board of Trustees passed a motion to move forward with plans to construct a new Township Civic Center that will include a new township hall and public safety building for the Township's police station and Fire Station #1.[11] Informed by resident input, the Board envisions this new construction to creatively incorporate and connect municipal, recreational, and commercial uses in one place. The Township's purchase of the 57-acre former Brendel Lake Campground will be incorporated into the Civic Center's creation as the land is developed into Stanley Park. The park will include an expanded trail system, pavilion for community events, picnic areas, and a variety of other amenities to be enjoyed throughout the year.[12] The Township's 2024-2029 Capital Improvement Plan includes plans to construct a new Township Civic Center in lieu of conducting renovations to the existing Township Hall. Construction will be financed through grant funds, the Improvement Revolving Fund, and the issuance of bonds to complete the project.

PUBLIC SAFETY

Police

The White Lake Township Police Department provides police services to the Township. In addition to responding to calls, the Department offers community resources and services to the Township to bolster civic responsibility, involvement, and safety. These community-based services include the following:

- **Neurodiverse Citizen Program:** This program provides an opportunity for the Township's Police Department to connect and interact with neurodiverse citizens on an individualized, appropriate, and helpful basis. Residents have the opportunity to provide voluntary information to the Department about special circumstances and the best way to approach neurodiverse individuals when responders are notified of a situation. This information and guidance are used to assess unique circumstances from a mental health perspective with the individual's best interests in mind.[13]
- **Senior Welfare Contact Program:** This program was implemented with the intent to reduce the criminal victimization of the elderly by creating channels of communication between senior citizens and the Township's Police Department. Individuals enrolled in this

program will be contacted by a representative from the Department on a monthly basis to address concerns or problems within the community, generally check on their well-being, and connect them to senior services available at the local and national levels.[14]

» **T.E.A.M. (Teaching, Educating, and Mentoring):** In 2018, the T.E.A.M. curriculum replaced DARE and is taught to all 5th and 7th grade students in the Township over the course of 10 weeks. Topics include vaping, alcohol, drugs, gun safety, school violence, bullying, the court system, and internet safety. Additionally, T.E.A.M. program officials coordinate with the White Lake Police Foundation to offer events to participating students, including an annual golf outing, Youth Police Academy, a 5k Run event, and more.[15]

» **Community Emergency Response Team (CERT):** The program educates volunteers about disaster preparedness through training sessions focused on basic disaster response skills in the event of fires, small-scale search and rescue, team organization, and medical operations. To complete the program, CERT volunteers must complete seven core training classes.[16]

» **Citizens Academy:** The Citizens Academy is a 30-hour block of instruction designed to give the public a knowledge of the Police Department, Fire Department and Township personnel and policies. It consists of a series of classes, held once each week for two to three hours. The instruction is comprehensive, covering a different area of the Police Department, Fire Department and Township each week. Officers, Firefighters, and Township Board members assigned to that particular division conduct each instructional block.[17]

Fire Department

The White Lake Township Fire Department (WLTFD) seeks to protect life and property through fire rescue and emergency medical services. Since its founding in 1948, the Department has transitioned from a volunteer department to a department of career and part-time firefighters. White Lake Township is covered 24 hours a day, 7 days a week by career fire department personnel with emergency assistance from part-time staff members as needed.[18] In addition to fire suppression and rescue needs, the WLTFD may also respond to the following: utility problems (including downed or arching power lines and natural gas leaks), smoke and odor investigations, motor vehicle accidents, medical emergencies, mutual aid, and citizen assists.

Beyond its primary responsibilities, the White Lake Township Fire Department stays involved with the community through numerous events and public education opportunities. The Citizens Academy and Youth Fire Academy are both intended to provide participants with hands-on experience by exposing them to some elements of the Department's responsibilities and work. The Citizens Academy offers one class a week over the course of 11 weeks and is open to any individual over the age of 21 who works or lives in the Township. The Youth Fire Academy is a week-long program that takes place in the summer months and is open to 7th and 8th-grade students. In addition to each academy experience, the Fire Department educates the public with classes on CPR and basic first aid and through appointments with families to ensure their car seat setup is proper and safe.

Emergency Medical Services

Star EMS provides emergency and non-emergency services to communities throughout Oakland County, including White Lake Township. The dispatch center is staffed 24 hours a day with Emergency Medical Dispatchers who have been trained to give first aid assistance to each 911 caller and, when necessary, to provide a prompt ambulance response to emergencies requiring medical assistance and transportation. Star EMS also provides trusted non-emergency ambulance services to transport individuals to area hospitals, extended care facilities, nursing homes, dialysis clinics, doctor offices, and private residences.[19]

PARKS & RECREATION

Parks, recreation spaces, nature preserves, and subsequent programming opportunities are important to provide in White Lake Township. In addition to the six parks managed and operated by the Township, recreation facilities are located on school properties, properties managed by the State, Metropark system, Oakland County, and private properties with activities like skiing and golf.[20]

The park and recreation facilities under the purview of the Township include a wide variety of offerings to ensure patrons of all ages and abilities can participate in recreational opportunities. In White Lake Township,

these facilities include neighborhood parks that offer play areas for children near their homes with fields that fulfill the needs of sports teams for both children and adults. Community-wide parks provide a destination for the broader community by offering a variety of activities and facilities, including trails, sports fields, and playground equipment.[21] In White Lake Township, recreation planning is intended to be participatory and to elicit insights from a large portion of the Township's population. The Parks and Recreation Committee, Planning Commission, and Township Board are collectively responsible for planning through the master planning and parks and recreation planning processes. As the legislative body, the Township Board retains the utmost authority for recreation planning and budgeting.[22] The White Lake Township 2023-2027 Parks & Recreation Plan can be accessed on the Township's website.

EDUCATION

Schools

Within the boundaries of White Lake Township, students are served by one of five school districts:

- Clarkston Community Schools.
- Holly Area Schools.
- Huron Valley Schools.
- Walled Lake Community School District.
- Waterford Community Schools.

St. Patrick, a parochial school, is also located in the Township and serves students in Pre-K through 8th grade. Each of the Township's districts and schools boast opportunities for early childhood learning prior to beginning elementary school as well as numerous programs and facilities dedicated to enrichment, recreation, and extracurricular activities.

Museums and Libraries

Museum

The White Lake Historical Society provides an outlet for Township residents to participate in a mutual appreciation of White Lake's history. The Society seeks to "preserve, advance, and disseminate" information about the Township's history through the collection, arrangement, preservation, and restoration of numerous historic materials, including physical sites, as well as various written documents.

The White Lake Historical Society operates a museum to further its mission and educate visitors of all ages. The museum consists of the 1855 Kelley-Fisk Farm state historic site, the Greek Revival farmhouse and outbuildings, including barn, pig, and hen houses, two corn cribs, a garage, and a privy.[23] The site also includes the 1876 Thompson One-Room School which was dismantled in 1995, moved from its original location on the Thompson Farm in 2004 and rebuilt.[24] Currently, the museum is available for visitation during special events or by appointment.

The White Lake Library

Since its establishment in 1975, the White Lake Library has had four different locations. First in the White Lake Community Hall, second Brooks Elementary, third to a building on Highland Road, and fourth, as of 2019, to a 28,000-square foot facility on Elizabeth Lake Road.[25] The demand for additional space corresponded with an increase in the Township's population and, along with voter approval of a new space, speaks to the importance of the Library as a community asset for both long-term residents and newcomers to the community. In 2022 there were a total of 47,608 visits to the library. While the Library's 87,618 items in its collection are certainly a point of attraction for visitors, it also offers a robust variety of online resources: eBooks; audiobooks; special collections; seeds that are free to plant and grow; numerous programs for kids, teens, and adults; and various events throughout the year. Program offerings range from musical events, movie nights, reading circles, arts and craft opportunities, book clubs, and yoga.

The White Lake Library is primarily funded through Township property taxes. In August 2022, Township voters approved a renewed millage rate of 0.5 mill to support library operations for the next 8 years.[26] The Library's non-property tax revenue comes from state aid, penal fines, donations, and interest accrued from investments.

HEALTHCARE & MEDICAL RESOURCES

Healthcare Services

A range of healthcare services through numerous facilities are located within the boundaries of the Township. White Lake Family Medicine provides services for several separate areas of focus: family

medicine, including pediatric services for infants, toddlers, children, and teens; urgent care; addiction treatment; behavioral and mental health treatments and services; COVID-19 testing; allergy testing; medical weight loss and nutritional services; sports physicals; personalized treatment for substance abuse; and women's health services.[27]

For individuals who seek and would benefit from assisted living facilities, the Neighborhoods of White Lake, Independence Village, and New Hope are located within the Township.

Springfield Urgent Care provides flexibility in meeting the healthcare needs of White Lake residents of all ages. Open from 9am to 9pm every day of the week, including weekends, Springfield Urgent Care bridges the gap between primary physician care and emergency room treatment by offering services that fulfill urgent, non-emergency medical needs.[28]

Hospitals

While there is not a hospital located within the boundaries of White Lake Township, there are seven hospitals located within 15 miles. Of these seven hospitals, the Detroit Medical Center Huron Valley-Sinai Hospital is less than five miles from White Lake Township.[29]

Figure 29: Community Facilities: Key Takeaways

There are several projects underway in White Lake Township.

- The Civic Center project, which includes the new Township Hall and Public Safety Building, has been in the works for several years and will be the result of many visionary planning efforts.
- The Township has been working on the future vision of sewer and water infrastructure and where it should be developed in the future.
- Phase 1 development of Stanley Park is nearing completion.

There are a host of services and facilities available to Township residents including:

- Water and sanitary sewer infrastructure.
- Electric and gas utilities.
- Broadband and cell services.
- Road maintenance.
- Public safety (police, fire, emergency medical services).
- Parks and recreation facilities.
- Public schools and healthcare facilities.

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Economic Development

REGIONAL CONTEXT

Economies are a web of relationships that span local, national, and global geographies. While municipalities have influence over economic development, they are beholden to laws, policies, and trends outside of their control that can have a negative or positive impact on local success. Due to its dependence on a larger system, economic development strategies are best conceived of and implemented with partners to strengthen the network and opportunities in which they operate.

Southeast Michigan is comprised of seven counties, including Oakland County. The Southeast Michigan Council of Governments, or SEMCOG, created a Comprehensive Economic Development Strategy for the region to reach economic success through strategies that emphasize collaboration, current conditions, and opportunities for growth and development.[1] By focusing on the three pillars of economic development (place, business, and talent), SEMCOG and the region endeavor to meet a vision of economic prosperity by ensuring communities have access to the following:

- Unique places that offer various housing choices for a large and diverse population.
- An educated and trained workforce that supports a multi-sector economy and provides opportunities for all.
- Healthy and clean lakes, streams, and air, as well as connected systems of trails, parks, and natural areas that support recreational and cultural amenities.
- Safe, efficient, and coordinated infrastructure systems that embrace advances in technology and focus on access for all.
- Effective local government and engaged citizenry.

In local government, economic development is correlated to developing land to accommodate its "highest and best use." When land is used according to the analysis conducted in this Master Plan, the region's need for housing, commercial, recreational, or industrial uses can be optimized for job creation, housing that is affordable for the workforce, or creating tourist destinations. This section will explore the region's major employment sectors, partnerships, and opportunities for development/redevelopment.

EMPLOYMENT INVENTORY

White Lake Township's rate of labor participation is reflective of employment patterns. Of the Township's population aged 16 years and older, 64.7% participate in the labor force. While Oakland County's rate of labor force participation is slightly higher at 66.2%, White Lake exceeds workforce participation not only in Michigan but the United States as well. As seen in the table (p.77) titled "Labor Force Participation (2020)," White Lake Township has experienced a lower unemployment rate than Oakland County, State of Michigan, and the United States; conversely, the Township has the highest percentage of households collecting social security income (39.3%) compared to other scales of observation. White Lake Township also has the highest rate of self-employment when compared to Oakland County and the State.

For residents of White Like that are employed, the U.S. Census records the sectors of employment that residents participate in, regardless of where Township residents go to work. With the rise of remote work options, it is possible for residents of White Lake to work in sectors headquartered outside of the region; it is also possible for residents of White Lake to commute to places of work located outside of the Township or County on a hybrid or daily basis.

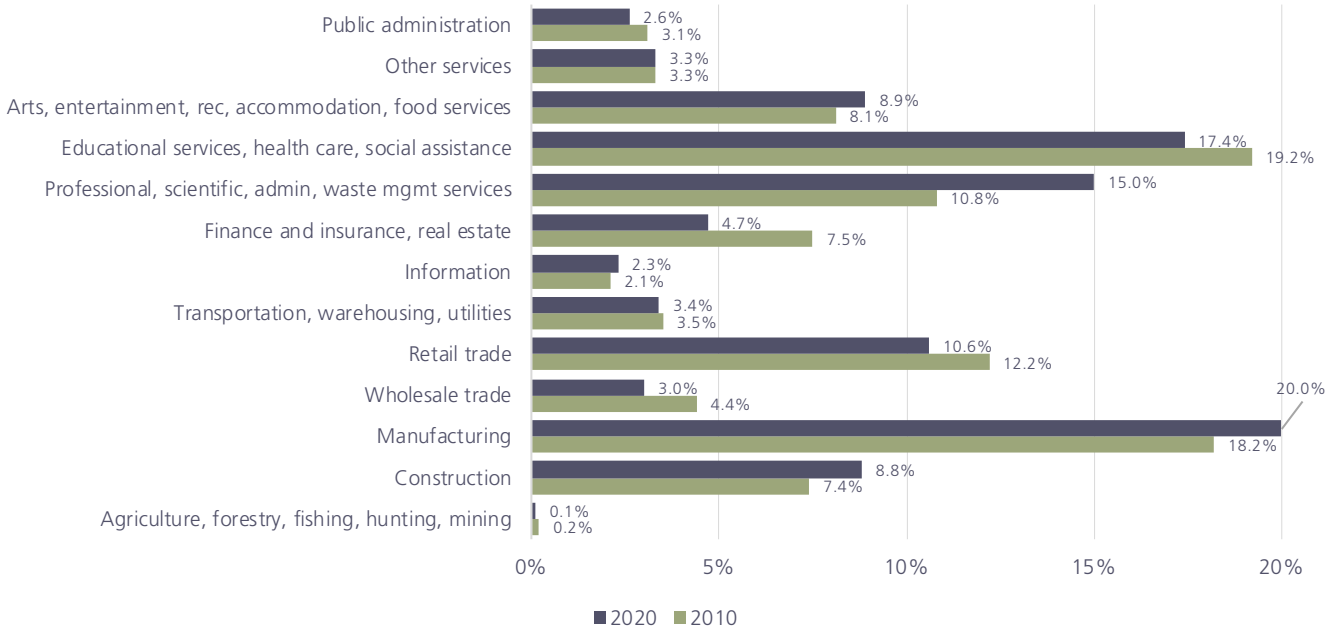
The most prominent sectors of employment for White Lake residents in 2020 (not necessarily

Table 14: Labor Force Participation (2020)

	White Lake Township	Oakland County	Michigan	United States
Labor Force Participation	64.7%	66.2%	61.5%	63.4%
Self-Employment Rate	5.6%	4.8%	5.0%	5.9%
Social Security Income	39.3%	30.9%	34.9%	31.4%
Unemployment Rate	4.6%	4.7%	6.0%	5.4%

Source: U.S. Census Bureau ACS Five-Year Estimates (2020)

Figure 30: Industry Employment Over Time (2010-2020)



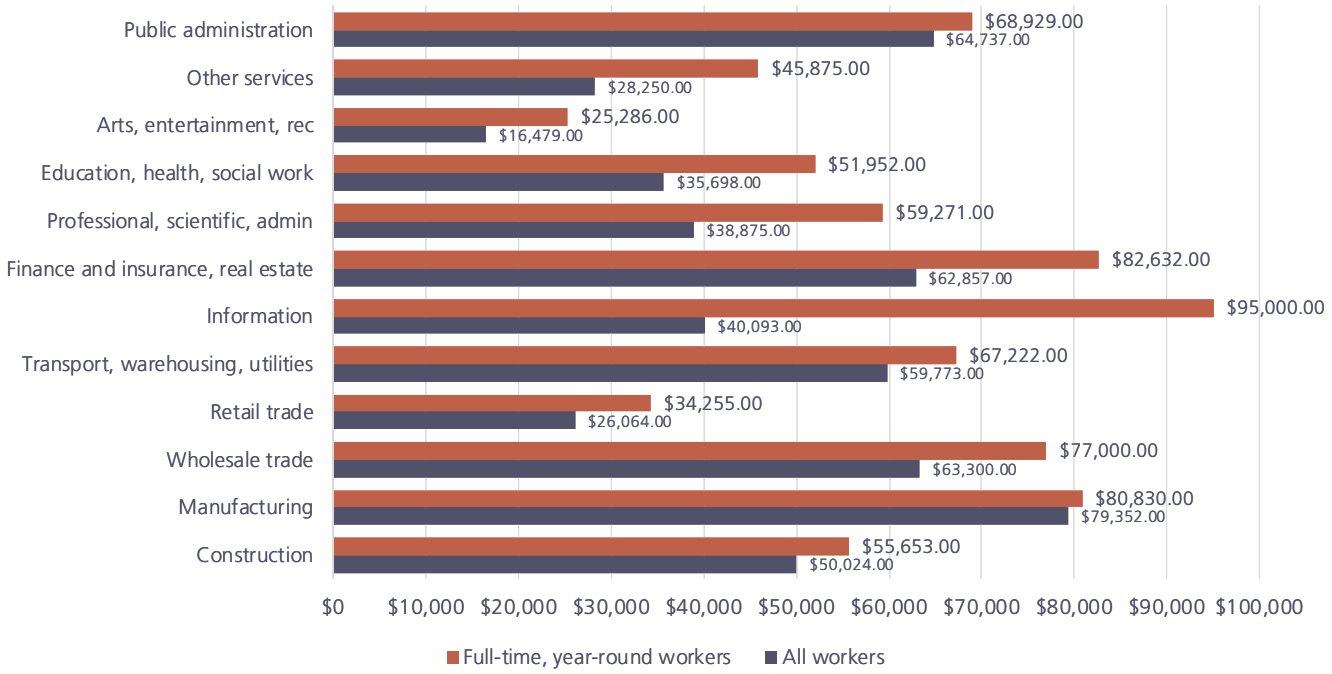
Source: U.S. Census Bureau ACS Five-Year Estimates (2010, 2020)

located within the Township) include: manufacturing (20%); educational services, health care, and social assistance (17.4%); and professional, scientific, administrative, and waste management services (15%). These sectors represent a little over half of all employers for residents of the Township. From 2010 to 2020, these three sectors have largely maintained the same prominence within White Lake Township. In 2010, retail trade included 12.2% of all White Lake workers, surpassing past levels of employment for those working in professional, scientific, administrative, and waste management services which was 10.8% that year. In 2020, workforce participation in retail services dropped slightly to 10.6% of the Township's working population, representing the fourth most prominent sector of employment.

Median annual earnings vary across industries of employment, especially when distinguishing between all workers, whether seasonal part-time or year-round full-time participation in the workforce. In 2020, the median annual income for all workers in the Township was $42,948, nearly $20,000 less than the median income of full-time workers who are employed on a year-round basis and earn an average of $60,794 annually.

Median incomes in the manufacturing sector did not vary greatly between different types of employment, likely indicating most employees in the industry work on a full-time basis. Additionally, manufacturing income is approximately $80,000 annually, the highest for all workers and the third greatest for full-time, year-round workers, which bodes well for the Township as the greatest portion of residents

Figure 31: Median Annual Earnings by Industry (2020)



Source: United States Census Bureau ACS 5-Year Estimates (2020)

are employed in this sector. The two other most prevalent sectors of employment have median annual incomes notably less than manufacturing. Full-time, year-round employees of: educational services, health care, and social assistance; and professional, scientific, administrative, and waste management services earn $51,952 and $59,271, respectively.

SECTOR ANALYSIS

Products often go through multiple stages of manufacturing, processing, distribution, and sales before they get to the consumer. All of these stages are important economic links and form the broader economy. IMPLAN, an input-output economic modeling tool, was used to illustrate interdependence between industries and sectors in White Lake Township. IMPLAN data is sourced from various governmental agencies including the Bureau of Economic Analysis, Census Bureau, and Internal Revenue Service. IMPLAN models upstream economic activity, or the activities and labor that take place on the supply side of production. This includes the resources, supply, and manufacturing of goods and services. IMPLAN does not model sales, use, and disposal activity, also known as downstream economic activity. IMPLAN models several elements of economic output, including labor income, intermediate output, and value added. The elements discussed in this section are described below.

- "Value Added" represents the contribution to the gross domestic product.
- "Total Economic Output" is the combined value of labor income, value added, and intermediate outputs.

While nearly 96% of Township residents commute to places of employment located outside of White Lake and these patterns of commuter and employment can render the Township a "bedroom community", the following analyses will investigate employment opportunities within the Township. Prominent economic trends and the Township's more prevalent industries impact the experience of living in and being a patron of businesses across the Township. Later analyses will focus on the economic impacts of COVID-19, which are place-based and felt by all residents of the Township, regardless of their place of employment.

Of the 546 industries modeled by IMPLAN, 181 are active in White Lake Township. By looking at each industry's change in economic output, amount of economic output, and concentration in the

Table 15: Economic Base

Industry Categorization	Description	Location Quotient	2018-2019 Economic Output
Growth Industry	Industries that have a strong presence in the region and are expanding.	LQ >1	Positive Change
Emerging Industry	Industries that are expanding but have yet to establish a strong presence.	LQ < 1	Positive Change
Mature Industry	Industries that have been a specialty for the region but are declining.	LQ > 1	Negative Change
Declining Industry	Industries with a small presence and declining economic activity.	LQ < 1	Negative Change

Source: IMPLAN, 2019

Township between 2018 and 2019, the industries are each categorized as mature, growing, emerging, or declining. These categorizations are determined by the industry's location quotient, a statistical metric that measures a region's industrial specialization compared to a larger geography, typically the state or nation. Location quotients (or LQs) greater than one indicate that industry contributes to a greater share of that community's economic activity. The table titled "Economic Base" shows how industries are categorized based on their location quotient and change in economic output.

The table titled "Growth and Decline Spectrum" (p. 80) provides an overview of the Township's economy based on trends in industry presence and growth. In White Lake, negative economic changes have slightly exceeded positive gains. While the employment and total economic output of declining industries have the smallest presence of any of the four economic base categorizations, the Township's mature industries have the highest amount of economic output and employ the greatest number of workers. These trends indicate declining industries are likely to continue to diminish, but the prevalence of mature industries reduces the likelihood they will lose their stronghold in the Township. It is worth noting mature industries can easily become categorized as growth industries if and/or when their economic output increases over the course of observed years. Despite the presence of declining industries, emerging and growth industries illustrate economic promise; the greatest number of Township industries are categorized as emerging, and growth industries rival mature industries in the number of workers that are employed in the sector.

Industry Categorization

Declining: industries that have a small presence and declining economic activity; negative change.

Emerging: industries that are expanding but have yet to establish a strong presence; trending towards positive change.

Growth: industries with a strong regional presence that are expanding; positive change.

Mature: industries that have been a specialty for the region but are now declining; trending towards negative change.

Source: IMPLAN

- 49.0% of workers in White Lake Township are employed in growth or emerging industries.
- Growth and emerging industries produce about 45.6% of the Township's total economic output while mature industries alone produce 42.9% of all economic output.
- 51.4% of all businesses saw a positive change in economic output between 2018 and 2019.

Regardless of an industry's classification as growth, emerging, mature, or declining, economic contributions take place at all stages of development. The table titled "Top Industry Trends" compiles the top five industries under each stage based on their

Table 16: Growth and Decline Spectrum

Stage	Industry Count	Economic Output, 2019		Employment, 2019	
	Number	Dollars	Percent of Total	Count	Percent of Total
Declining	63	$95,492,419.08	11.50%	692	11.31%
Emerging	74	$158,237,389.13	19.06%	863	14.11%
Growth	19	$220,425,192.58	26.55%	2,122	34.86%
Mature	25	$356,035,977.88	42.89%	2,441	39.90%
Total	**181**	**$830,190,978.67**	**100%**	**6,118**	**100%**

Source: IMPLAN, 2019

Table 17: Top Industry Trends

Top Industries	Growth Industries	Emerging Industries	Mature Industries	Declining Industries
#1	Retail – building material and garden equipment and supplies store $57.73 M	Other real estate $36.36 M	Tenant-occupied housing $130.66 M	Insurance agencies, brokerages, and related activities $15.51 M
#2	Construction of other new residential structures $29.38 M	Monetary authorities and depository credit intermediation $17.08 M	Retail – general merchandise stores $61.67 M	Full-service restaurants $12.91 M
#3	Retail – motor vehicle and parts dealers $22.98 M	Insurance carriers (except direct life) $14.68 M	Limited-service restaurants $29.63 M	Legal services $9.89 M
#4	Retail – food and beverage stores $16.65 M	Architectural, engineering, and related services $12.12 M	Construction of new single-family residential structures $29.51 M	Wholesale – motor vehicle and motor vehicle parts and supplies $6.30 M
#5	Nursing and community care facilities $14.75 M	Retail – non-store retailers $10.66 M	Drilling oil and gas wells $13.31 M	Religious organizations $6.18 M

Source: IMPLAN, 2019

economic output for 2019. The Township's highest producing growth industries follow themes of various retail spaces, construction and building, and nursing and community care. As is expected from the preliminary base sector analysis, the top five mature industries exhibit high totals of economic activity. As these areas are regional specialties that have exhibited evidence of decline between 2018 and 2019, investing in these industries may increase the likelihood they will observe economic growth in the present and shift to the growth categorization.

The emerging industries with the highest economic outputs echo trends present across Oakland County and complement the Township's most profitable

growth and mature industries. Other real estate and architectural, engineering, and related services are both necessary for construction and development services as well as housing and residences at large. Investing in this area is likely to benefit growth, emerging, and mature industries alike and further bolster economic growth and regional specialization for each.

LARGEST SECTORS

This section analyzes industries by their regional advantage, economic output, and number of employees to inventory the Township's strengths and areas for improvement.

Regional Advantage

A base sector analysis was performed to identify industries in White Lake Township that are the largest exporters of goods and services as well as the industries that typically import goods and services. Exporting industries are important to identify because they inform the base of a municipality's economy. Exporting sectors draw money into the region across a broad geographical area, indicating which industries provide a competitive advantage for the region. The location quotient is used to pinpoint the Township's major exporters in comparison to the presence of each industry in a broader geographic setting; location quotients greater than one indicate the presence of an exporting industry. The greater the location quotient, the more that industry exports and/or specializes in goods and services compared to a broader, national context.

As shown in the table titled "Top Five Export Industries in White Lake Township (2019)," manufacturing, drilling, and mining industries are a specialty for the Township. White Lake Township's top 20 export industries predominantly reflect sectors that serve permanent residents with a focus on residential construction, housing, general retail, recreation and amusement, and a variety of child and healthcare services. Further, the Township's top 20 export industries account for about 47% of its total economic activity, indicating these regional specialties are making productive contributions to the entire economy. Of the top five export industries, three exhibited positive growth between 2018 and 2019. The two mature industries of "drilling oil and gas wells" and "jewelry and silverware manufacturing" exhibited declines of 31% and 8%, respectively, between both years.

Biggest Employers

The biggest employers in White Lake Township are determined by the number of employees in each industry. In 2019, four of the Township's five most prominent sectors of employment were categorized as mature industries. These industries also broadly fell into two primary categories: retail/restaurant service or housing/housing construction. The table titled "Top Five Employers in White Lake Township (2019)" details the most prevalent employers of the Township. These employers comprise 36.1% of the Township's total employment.

In 2019, the average employee compensation for all of the top five industries by employment was less than

Table 18: Top Five Export Industries in White Lake Township (2019)

Export Industry	Location Quotient	Total Economic Output (millions)	Employment	Stage
Concrete pipe manufacturing	45.59	$6.51 M	18	Growth
Drilling oil and gas wells	41.59	$13.31 M	61	Mature
Jewelry and silverware manufacturing	12.24	$4.71 M	22	Mature
Iron ore mining	8.01	$3.71 M	17	Growth
Retail-building material and garden equipment and supplies stores	7.05	$57.73 M	433	Growth

Source: IMPLAN, 2019

Table 19: Top Five Employers in White Lake Township (2019)

Industry	Employment	Economic Output (millions)	Average Employee Compensation	Stage
Retail-general merchandise stores	784	$61.67 M	$33,412.89	Mature
Retail-building material and garden equipment and supplies stores	433	$57.73 M	$52,252.49	Growth
Limited-service restaurants	405	$29.63 M	$21,248.69	Mature
Tenant-occupied housing	355	$130.66 M	$59,133.77	Mature
Construction of new single-family residential structures	229	$29.51 M	$75,706.81	Mature

Source: IMPLAN, 2019

the Township's average annual income ($85,384) for the same year. Beyond the Township's average annual income, the Asset Limited, Income Constrained, and Employed (ALICE) suggested survival and stability budgets provide greater context for whether these compensation figures are appropriate for employees in these sectors. A "survival budget" accounts for all necessary expenditures related to housing, food, transportation, childcare, etc. A "stability budget" estimates expenditures in these same essential categories while also incorporating a savings category and accounting for higher costs that contribute to greater financial stability over time.

Three of the Township's five largest employers provide average employee compensation that fulfills suggested survival budgets for single- and two-adult households. However, only one industry meets the survival budget threshold for a family of four. The stability budget suggestions are further out of reach as three industries are near or surpass the budget for a single adult, and only one industry offers stability for a household of two adults. Limited-service restaurant employee compensation does not satisfy any suggested budgeting parameters; while a greater portion of employees in this industry may be employed on a seasonal and/or part-time basis, compensation in this industry is not sufficient to support even a single adult. Moreover, positions with predominantly part-time or seasonal employers are unlikely to include benefits, putting employees in a precarious situation should they have an accident and are not covered by an employer's insurance plan.

Greatest Economic Output

The table titled "Top Five Largest Industries in White Lake Township by Economic Output (2019)" highlights the five industries that had the largest economic output in 2019. Tenant-occupied housing had the highest economic output in the Township, totaling over $130 million. Notably, both retail-based industries, tenant-occupied housing, and limited-service restaurants also made up four of the Township's top five employers, illustrating the relationship between the prevalence of each industry in terms of employment and total output. The output of tenant-occupied housing and other real estate (which include leasing, appraisal services, and financing) contribute to the strength of the

Table 20: ALICE Budget

	Single Adult	Two Adults	Two Adults, Two Children
ALICE Survival Budget	$31,344	$45,588	$66,252
ALICE Stability Budget	$54,792	$76,836	$133,872

Source: ALICE United, 2021

Table 21: Top Five Largest Industries in White Lake Township by Economic Output (2019)

Industry	Total Economic Output (millions)	Intermediate Outputs (millions)	Value Added (millions)	Labor Income (millions)	Employment
Tenant-occupied housing	$130.66M	$15.91M	$114.75M	$15.21M	355
Retail – general merchandise stores	$61.67M	$23.01M	$38.66M	$26.08M	784
Retail – building material and garden equipment and supplies stores	$57.73M	$16.30M	$41.43M	$22.91M	433
Other real estate	$36.36M	$18.51M	$17.85M	$7.27M	158
Limited-service restaurants	$29.63M	$16.58M	$13.05M	$8.64M	405

Source: IMPLAN, 2019

housing and real estate industry in Oakland County as a whole. One third of Michigan's total economic output from the real estate industry originates from Oakland County.

COVID IMPACTS

While White Lake Township has shown signs of bouncing back from the economic impacts of COVID-19, the pandemic has had a lasting effect on the Township's overall economy. Using a similar economic base analysis for the years 2019 and 2021, the IMPLAN model helps explain the recovery process for the Township's industries in comparison to industry activity across all of Michigan. In 2021, the Township's economic output was about $22 million dollars less than its output prior to the pandemic ($808,486,039.84 in 2021 vs. $830,190,978.67 in 2019).

The table titled "COVID Impacts" (p. 83) details the distribution of industry growth between 2019 and 2021, stating how industries have grown or declined over this period of time and to what extent these changes have taken place in comparison to

Table 22: COVID Impacts

Industry Status	Description	No. of Industries	% of Total	Example Sector
Decline and Underperform	Industry declined after COVID to a greater extent than it did across Michigan	73	40%	Broadwoven fabric mills; concrete pipe manufacturing; household laundry equipment manufacturing; lawn and garden equipment manufacturing.
Decline but Outperform	Industry declined after COVID but to a lesser extent than it did across Michigan	11	6%	Air transportation; computer related services, including facilities management; metal mining services; paperboard mills.
Increase and Outperform	Industry increased after COVID to a greater extent than it did across Michigan	61	34%	Local government passenger transit; maintenance and repair construction of nonresidential structures; retail-nonstore retailers; wholesale-grocery and related product wholesalers.
Increase but Underperform	Industry increased after COVID but to a lesser extent than it did across Michigan	36	20%	Environmental and other technical consulting services; home health care services; iron ore mining; retail-gasoline stores.

Source: IMPLAN, 2019

Michigan. A total of 97 industries of the Township increased their economic activity over these two years, exceeding the number of industries that exhibited an economic decrease in activity (84 industries). However, the greatest portion of industries (40%) fall in the category of "decline and underperform," meaning the economic activity of these industries in White Lake declined over these two years and to a greater extent than they did across the rest of the State. The second most prominent category of industries are those in the category of "increase and outperform," meaning economic activity for 34% of the Township's businesses increased between 2019 and 2021 to a greater extent than the State.

DEVELOPMENT OPPORTUNITIES

Analysis of the Township's economic position, prominent industries, employment patterns, and barriers to growth can be considered alongside community engagement results to determine the "highest and best" use of available land. Determining the highest and best use of parcels prime for development or redevelopment matches these spaces with the land uses and businesses in highest demand within the community. However, due to the size, shape, and surroundings of each parcel, sites may not be suitable for the most requested types of uses.

Community Insights

The White Lake Township community survey assessed resident perceptions of the local economy, including their preferences regarding commercial developments and how their economic needs fit in with other Township goals and priorities such as the preservation of natural and open spaces. It is worth emphasizing "undesirable commercial development" ranked fourth out of 11 options for respondents to identify the top three challenges facing the Township over the next decade. To address the prospect of appropriate commercial development, respondents overwhelmingly supported approaching commercial development through the revitalization of former commercial buildings that have become vacant and/or retrofitting strip malls to support new commercial activities. The preference for these approaches aligns with respondent concerns about the potential loss of open and/or natural spaces as new commercial areas are developed. Furthermore, revitalizing vacant spaces presents the opportunity to utilize existing sites instead of developing new ones. Increased traffic was also a prominent concern in the discussion of additional commercial development.

When asked about the types of retail establishments respondents would like to see in the Township, food and beverage stores and restaurant and drinking establishments received the greatest support as uses respondents would patronize on a daily or weekly basis. Respondents specifically expressed support for the Township's development of additional restaurants and bars, farm-to-table eating establishments, family-friendly restaurants, cafes, and breweries, with each eating and drinking option receiving support from 50% or more of all survey takers.

Redevelopment Sites

On August 17, 2023 the Planning Commission hosted a workshop to gather public input on five sites of possible redevelopment. The workshop was held between 5 p.m. and 7 p.m. in the Township Annex, and approximately 100 members of the public attended.

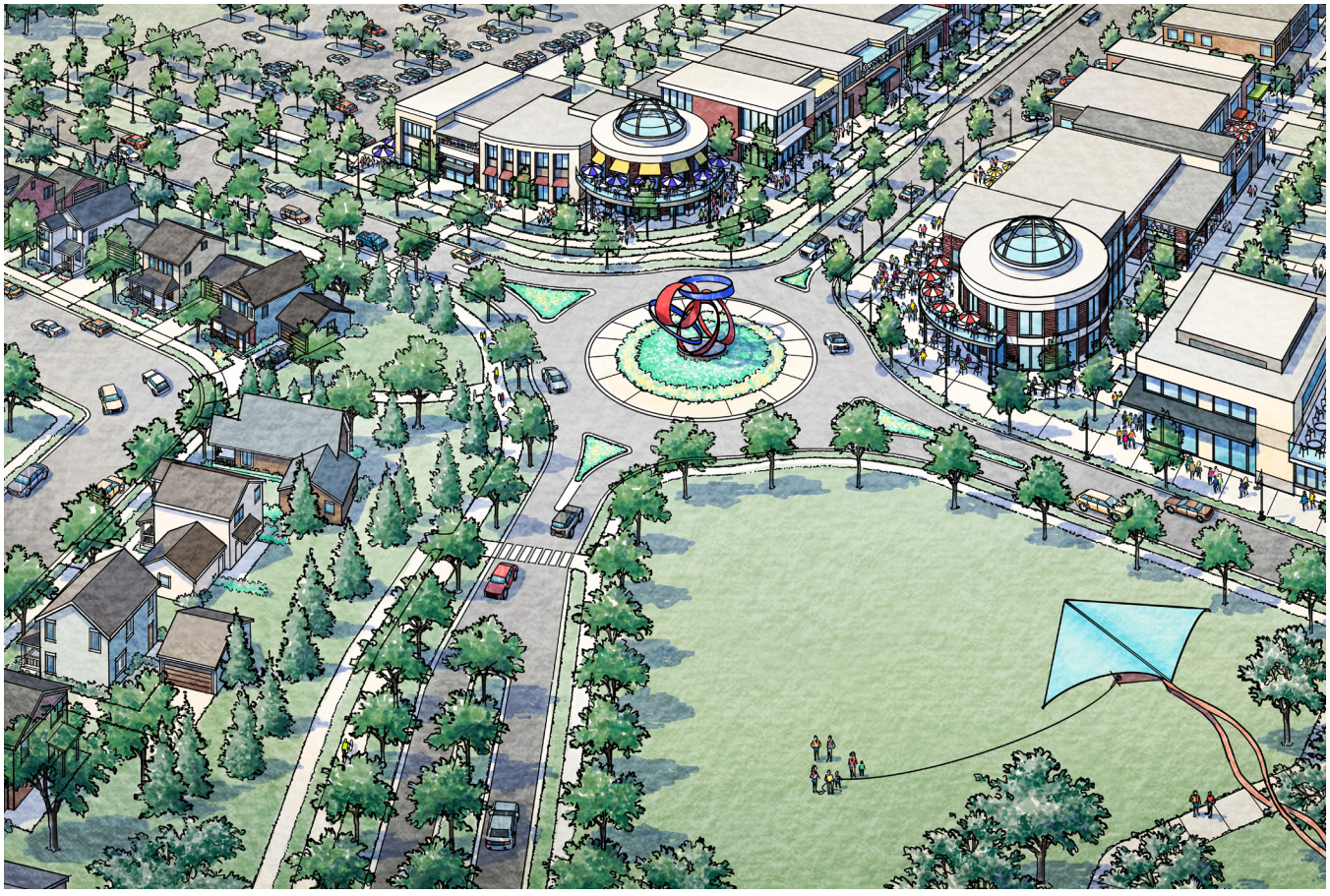
The central aim of the workshop was to begin a conversation among residents about the potential of five sites selected for consideration by the Planning Commission. Though some sites identified for this workshop are currently vacant, two sites were part of the Township's Master Plan update in 2012. Concepts for future development and use at both sites were developed during the last planning process, and both concepts were presented again during the workshop. The other three sites provided blank slates for residents to share their ideas based on the site surroundings as well as general desires for development in the area. The full results from the workshop can be found in the appendix. The Planning Commission picked three of the sites as prime redevelopment opportunities for evaluation in this Master Plan.

PONTIAC LAKE GATEWAY		
Purpose	The redevelopment concept envisions the area as a key and welcoming gateway into the community. At the northern intersection of Pontiac Lake Road and Highland Road/M-59 is a two-story mixed-use concept with frontage along the roads and the lake, with parking located in the middle. The mixed-use concept includes restaurants, retail, and residential on the second floor. This area is intended to be walkable and integrated into the shoreline of Pontiac Lake. People can access this area via foot, bike, car, or boat. Boaters can dock along the boardwalk and walk to restaurants or shops. Along Highland Road/M-59 is traditional commercial development but an emphasis is placed on fronting buildings on M-59 and locating parking in the rear. There are limited curb cuts and the properties are served by access roads at the rear. At the western edge of the gateway is a cluster of townhomes. The southern end of the gateway is maintained as undeveloped open space.	
Regulated Uses	**Non-Residential** » Low-scale local retail along M-59 » Restaurants, local dining with no drive-thru's » Office and professional services » Boat docks, no launches	**Residential / Open Space** » Townhomes, Owner Occupied » Upper Story Residential » Lakefront Open Space
Built Form	**Building Height:** Residential - No more than two stories, or 30 feet above grade. Mixed-use buildings no more than three stories, or 42 feet above grade. **Parking:** In the rear of the buildings; minimal ingress-egress on M-59 **Road Frontage:** Setbacks from ROW is 25 feet to allow for a landscape zone with street trees and an 8' to 10' pedestrian sidewalk. **Exterior Building Materials:** Primarily high-quality, durable, low-maintenance material, such as masonry, stone, brick, glass, or equivalent materials. All buildings should be completed on all sides with acceptable finishing materials. Materials such as vinyl, aluminum, and other metal siding should be avoided. Metal and portable buildings should be prohibited. **Design:** Architectural design should be consistent with pedestrian-oriented development with a minimum of 10-foot-wide sidewalks to allow for outdoor dining and seating.	

Figure 32: Conceptual Rendering – Pontiac Lake Gateway

LAKES TOWN CENTER		
Purpose	Small scale mixed-use development that provides a transition between the regional shopping center east of Elizabeth Lake Road and the single-family development to the west along Elkinford Drive. Retail uses would be internalized within the development surrounded by single family residential.	
Regulated Uses	**Non-Residential** » Assisted Living Facilities » Local/Regional Retail; small scale » Child and Family Care Facilities » Independent and Congregate Care Facilities	**Residential / Open Space** » Single Family - Detached and Attached » Upper Story Residential » Duplexes » Home Occupations
Built Form	**Building Height:** Residential -No more than two and one-half stories, or 35 feet above grade. Mixed-use Buildings - three stories, or 42 feet above grade. **Road Frontage:** Setback along Highland Road would be 40 feet with no ingress/egress. Ingress/egress would be from Elizabeth Lake Road. **Building Type:** Small scale, retail and restaurant clustered in a walkable Village concept that allows for outdoor dining, events, and possible farmers market. Traditional single family neighborhoods would surround the retail. Upper story residential would be encouraged.	

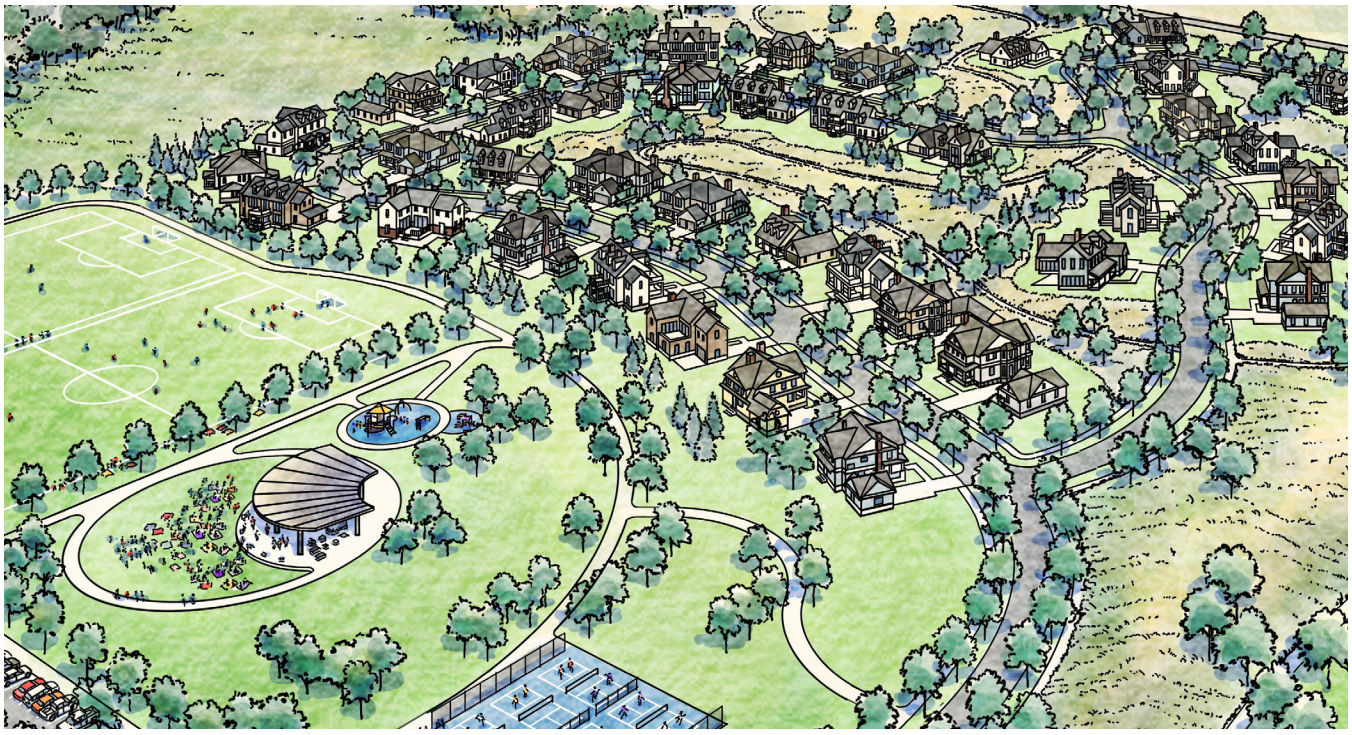
Figure 33: Conceptual Rendering – Lakes Town Center



CEDAR ISLAND ROAD AND BOGIE LAKE ROAD

Purpose	This redevelopment site is located in the southern part of the Township and is in close proximity to three primary/secondary schools (Lakewood Elementary School, White Lake Middle School, and Lakeland High School) as well as the Brentwood Golf Club and Banquet Center. This site's location on Bogie Lake Road provides a direct connection to M-59, making it accessible from across the Township. The redevelopment concept envisions this area as a community anchor in the southwest section of the Township. The main entrance to the site is along Cedar Island Road, near the intersection of Bogie Lake Road. Development would include single-family detached and attached dwellings with adequate area reserved for outdoor recreation for both active and passive activities.	
Regulated Uses	Non-Residential » Local Business with no drive-thru's focused only on the southeast corner	Residential / Open Space » Single Family; Attached and Detached » Active and Passive Recreation Areas » Home Occupations
Built Form	**Building Height:** No more than two and one-half stories, or 35 feet above grade. **Road Frontage:** Setbacks from Bogie Lake Road would be ROW is 35 feet to allow for a landscape zone with street trees and a shared pathway. The setback line for residential single-family homes would be 35 feet from the ROW. Access points on Bogie Lake Road and Cedar Island Road would serve an internalized street network, in order to reduce traffic. **Building Type:** Traditional single family neighborhoods. Residential densities along Bogie Lake Road would be one dwelling per acre. Internal residential development could be higher if developed adjacent to the recreation open space.	

Figure 34: Conceptual Rendering – Cedar Island and Bogie Lake Roads



Placemaking

Building a sense of place starts with defining borders, a core, hubs of activity, and landmarks in the public realm so that passers-by understand where the district begins and ends. Place, by definition, should be distinct enough for people to immediately distinguish it from other neighborhoods or districts.

Placemaking's main charge is to create desirable places with a focus on physical improvements. As so much of the economy is impacted by activity that takes place outside of the Township, the focus on investing in beauty through landscaping, amenities, art, and events helps to create a distinguishable place that entices residents and tourists to visit. Public investment signals to developers the Township is ready and willing to support business establishments, simultaneously setting the tone for how they should fit in the community. It takes the coordination of public and private dollars to create a place that people want to be. Placemaking's connection to economic development is straightforward. One study found that people are 50% more likely to spend time in spaces with creative placemaking.[2] Related to this, people will also be more likely to recommend this place and spend more money there.

Within White Lake Township, the majority of placemaking efforts prioritize natural features, parks, and recreational spaces as a testament to the Township's commitment to natural space preservation.

Stanley Park

Located on Elizabeth Lake Road just southeast of the Civic Center, Stanley Park provides beach access to Brendel Lake as well as a system of trails. Stanley

Table 23: Proposed Corridor Improvement Authority Projects

Project	Description	Timeline
Branding	A branding process creates a distinct identity to be established for the district and the Township. The CIA will promote the area as a community center and area of regional appeal and business attraction. Branding the district will also set the themes of other visual improvements, gateway signage, marketing, and wayfinding.	2024 – 2025
Entryway and wayfinding signage	Include wayfinding that would direct visitors within the district to the Town Center, Gateway District, parks, community buildings, and other points of interest.	2027 – 2029
Streetscape improvements	Includes enhancements to the streetscaping, landscaping, public art, seasonal displays, and other design elements. Provide a visual connection between M-59 and other corridors.	2030 – 2032
Pathway extensions and improvements	Improve non-motorized transportation throughout the district. Connect M-59 with residential, commercial, and recreational areas. Complete the Township Triangle Trail to connect the Town Center and Library to M-59 and Teggerdine Road.	2028 – 2035
Traffic safety improvements	Build intersection capacity and additional safety improvements throughout the district. Add safe pedestrian and non-motorized crossings.	2025 – 2035
Enhanced transit stops and transit-oriented development	In conjunction with the expansion of WOTA along M-59, enhance transit stops with cover and seating. Promote transit-oriented development.	2028 – 2035
Sewer extensions	Expand sanitary sewer to underserved and unserved areas of the district.	2028 – 2034
Water extension/system improvements	Expand water service to underserved and unserved areas of the district.	2028 – 2034
Property/easement acquisition	Potentially acquire property through fee simple or by easement.	2025 – 2035

Source: White Lake Township Corridor Improvement Authority Development Plan and Tax Increment Financing Plan

Park and its placemaking efforts are unique in that the Township's 5-Year Recreation Plan for 2023-2027 focused on redevelopment plans for the park to improve facilities while also maintaining and preserving its natural features.

Corridor Improvement Authority

The White Lake Township Corridor Improvement Authority (CIA) aims to promote private development and redevelopment, highlighting the Township's position as a "Four Seasons Playground" and offering world-class recreational opportunities for residents and visitors alike. The Authority's focus is on the Highland Road corridor with the intention to promote the area's natural amenities, non-motorized connectivity, and nodes of retail, dining, entertainment, and lodging to round out the corridor experience.

In 2023, the CIA recommended the Township Board adopt a development plan and tax increment financing (TIF) plan. The plan outlines a TIF funding mechanism which captures increases in tax revenue from properties in the CIA which are not taxed at a higher rate; the TIF diverts a portion of future revenues to the CIA. Between 2024 and 2043, the TIF is estimated to capture $12,273,133.

For CIA programs and projects, redevelopment encompasses the physical, economic, and social elements of place. Projects the CIA has proposed include branding and marketing efforts, wayfinding signage, streetscape improvements (including beautification efforts and area branding), along with various improvements to traffic flow, non-motorized connections, and transit-oriented development.[3]

Brownfield Redevelopment Resources[4]

Redevelopment and revitalization, and, in many cases, the implementation of these projects would involve brownfield protocols. White Lake Township does not have their own Brownfield Redevelopment Authority (BRA) but can partner with Oakland County through the Oakland County Brownfield Redevelopment Authority (OCBRA). The OCBRA can assist and coordinate with the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) along with the Michigan Economic Development Corporation (MEDC), as needed, in an effort to prepare designated brownfields for redevelopment.

Future Study Areas

There are a few areas within the Township that could warrant future planning studies for potential development. The two most prominent of these areas include 1) the intersection of Elizabeth Lake Road and Union Lake Road, and 2) the area at Cooley Lake Road and Round Lake Road. Each of these areas has opportunity for improvement and might take advantage of several of the available economic development partnerships and resources.

ECONOMIC DEVELOPMENT PARTNERSHIPS

As forces both inside and outside of White Lake play a role in the Township's overall economic health, the Township itself is not solely responsible for its continued development and economic prosperity. As part of a network, White Lake will have to cooperate with agencies and organizations that have a larger scope of operation and connections to resources such as funding, expertise, talent, and program management. Economic partnerships could include cross promotion, regularly scheduled meetings, joint projects, and other opportunities for mutual support as needed. Below is an inventory of local and regional partners to support the Township's economic development.

Commercial Development

Table 24: Economic Development Partners

Project	Description
Advantage Oakland	Oakland County's economic development department, connecting jurisdictions across the County to resources to support businesses with capital acquisition, workforce development, entrepreneurial endeavors, and more.[5]
Community Foundation for Southeast Michigan-New Economy Initiative	The New Economy Initiative is a special project of the Community Foundation for Southeast Michigan committed to regional economic development to encourage further investment. The initiative focuses on supporting service providers by providing technical assistance through business planning, providing capital to new and growing businesses, and connecting businesses to each other and their community.[6]
Oakland Chamber Network	Oakland Chamber Network seeks to cultivate a collaborative business environment across the region where member chambers can access resources that support each individual chamber's mission.
Lakes Area Chamber of Commerce	The regional chamber for western Oakland County that serves the communities of Commerce, Walled Lake, Waterford, White Lake, Wixom, Wolverine Lake, and the Union Lake Business District has been serving them since 1950. With approximately 400 members, the Chamber represents a diversified group of businesses, drives economic progress, and facilitates valuable connections through networking and other initiatives.[7]
Southeast Michigan Council of Governments	The Southeast Michigan Council of Governments (SEMCOG) supports local planning by providing technical services, data analysis, and intergovernmental resources. SEMCOG's technical assistance in the region's economic development covers many facets, including a recently published report titled Increasing Shared Prosperity for a Resilient Economy (semcog.org).

Figure 35: Economic Development: Key Takeaways

In 2020, 20% of all White Lake Township residents worked in manufacturing industries. Manufacturing and educational services, health care, and social assistance industries have been the most common employers for Township residents from 2010 to 2020 – 37.4% of all Township residents were employed in either sector in both 2010 and 2020.

In 2019, the Township's "mature" industries (regional specialties with decreasing economic output) dominated White Lake's economic output and portion of workers employed. On the other hand, "growth" industries (regional specialties with increasing economic output) have the second greatest presence in the Township.

Retail, real estate, construction, housing, and service restaurants are among the Township's most prominent industries in terms of exports, economic output, and employment.

Though the Township's economic output in 2021 was about $22 million less than outputs before the COVID-19 pandemic in 2019, trends of economic recovery across the Township are promising as 54% of all industries have increased their economic output since the pandemic began; however, 74% of all industries are underperforming economically in comparison to industry trends across the State, regardless of whether they have experienced financial growth or decline.

Sources

1 SEMCOG, Increasing Shared Prosperity for a Resilient Economy, https://maps.semcog.org/sharedprosperity/.

2 Real Estate News, New Research Reveals the Impact of Creative Placemaking, 2016, https://storeys.com/new-research-reveals-the-impact-of-creative-placemaking/.

3 White Lake Township Corridor Improvement Authority Board, Agenda, https://mccmeetings.blob.core.usgovcloudapi.net/whitelakmi-pubu/MEET-Packet-197320c748a24e679194674cc23a15f8.pdf

4 Oakland County, Brownfield Program, https://www.oakgov.com/community/community-development/brownfield-initiative.

5 Oakland County, Business Development, https://www.oakgov.com/business/business-development.

6 Community Foundation for Southeast Michigan, New Economy Initiative, https://cfsem.org/initiative/new-economy-initiative/.

7 Lakes Area Chamber of Commerce, https://lakesareachamber.com/ .

Agri-business

Land Use

Land use is a foundational piece of community planning as the land area of any community is fixed in size, planning and designating zones of land for predetermined uses is imperative to ensuring all community needs and desires are met. The identity of a community is also often tied to its land use patterns. White Lake Township is unique in offering a mix of rural and suburban lifestyles as demonstrated through land use patterns. On one hand, the Township carries forward its rich agrarian history through a combination of agricultural and rural residential land uses. But, on the other hand, regional population growth and the Township's proximity to several urbanized municipalities in the metro Detroit area attract denser residential and commercial land uses. Ensuring development does not infringe on the Township's abundant natural resources and recreational land uses is a priority for the community. This chapter inventories existing land use patterns in the Township to identify areas for preservation and areas suitable for development. This chapter combined with community input lays the foundation for establishing a robust future land use strategy in White Lake Township.

EXISTING LAND USE

White Lake Township's current pattern of land use is represented in the map (p. 93) titled "Existing Land Use." Land use in the Township has been determined, to a large degree, by the M-59 thoroughfare which runs east to west and divides the Township in half. The northern half of the Township exhibits a rural setting with agricultural and large-lot-residential land uses, whereas denser residential land uses (that range from single-family dwellings on smaller lots to multiple-family dwellings) are the dominant land use in the southern half. Barring a few parcels, almost all commercial development in the Township is concentrated along M-59. Additionally, land reserved for recreation or conservation purposes account for a large percentage of the Township, through the Pontiac Lake State Recreation Area in the northeast, and Highland State Recreation Area in the southwest quadrants of the Township. Utilizing data from Oakland County, land parcels in White Lake Township are divided into the following categories:

- Agricultural.
- Commercial/Office.
- Industrial.
- Public/Institutional.
- Recreation/Conservation.
- Residential.
- Transportation/Utility/Communication.
- Vacant.

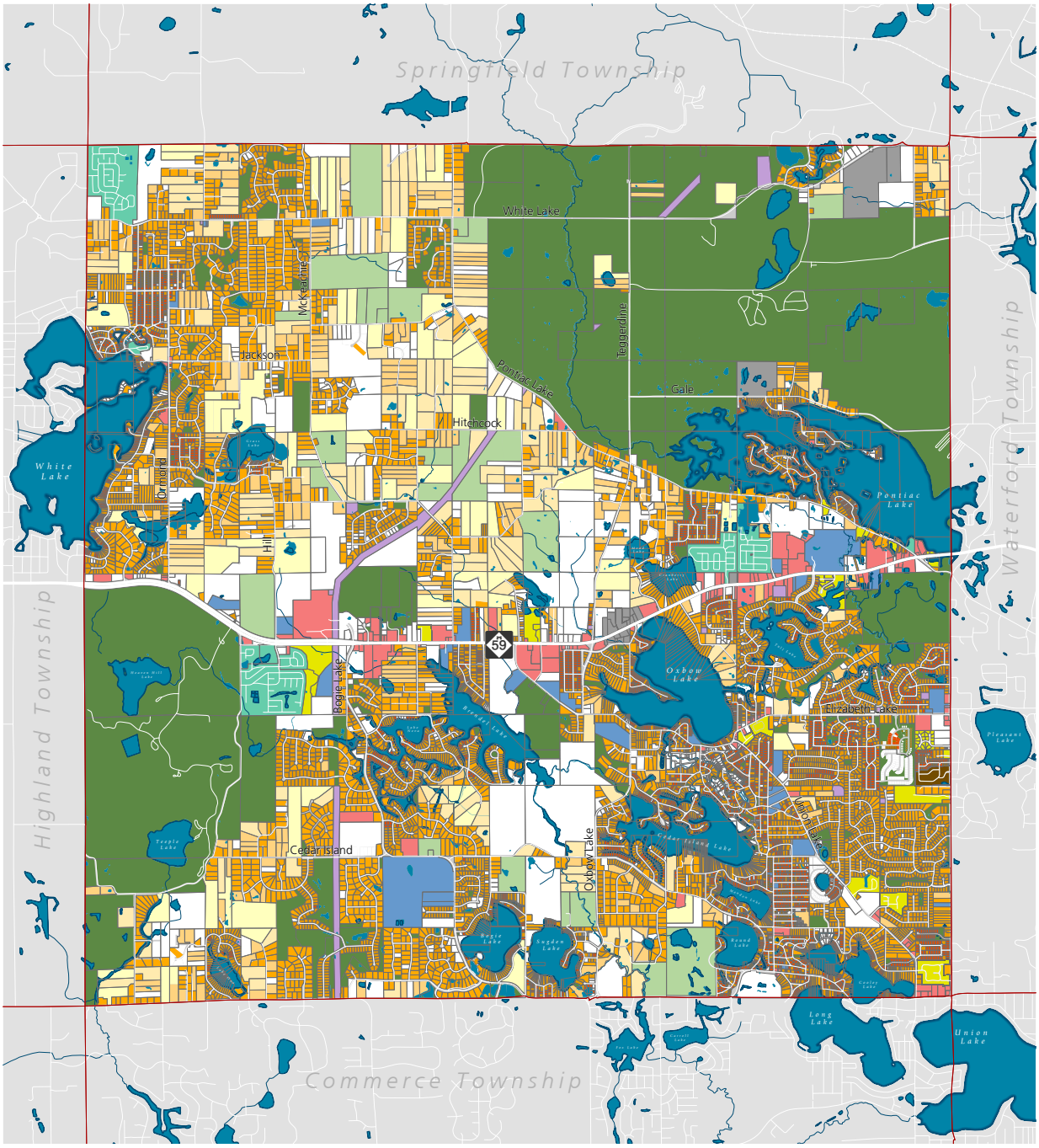
The table titled "Existing Land Use" (p. 94) charts the acreage and the total percentage of the Township area under each land use classification.

Residential Land Use

Residential use is the largest land use category in White Lake Township and accounts for roughly 8,990 acres, or 46.3% of the Township area. Lot sizes and density vary throughout the Township; rural residential uses with larger lots (2.5 acres and above) are predominant north of M-59 while denser residential development with smaller lots (less than 2.5 acres) and multifamily units are common south of M-59. Due to the geography around the lakes, land use around the lakes tends to be concentrated with smaller lots as shown in the map (p. 93) titled "Existing Land Use."

Land use along the boundaries, especially in the southeast quadrant bordering Waterford Township and Commerce Township, exhibits intense residential development. It is likely the connectivity

Map 13: Existing Land Use



Existing Land Use, 2020

3,000 Feet

Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

- Agriculture
- Recreation/Conservation
- Public/Institutional
- Transportation/Utility
- Commercial/Office
- Industrial
- Multiple-Family Residential
- Mobile Home Park
- Vacant

Single-Family Residential

- >10 acres
- 5 - 10 acres
- 2.5 - 5 acres
- 1 - 2.5 acres
- 14,000 - 43,559 sq. ft.
- 8,000 - 13,999 sq. ft.
- <8,000 sq. ft.
- Multiple units per parcel

Table 25: Existing Land Use

Existing Land Use	Number of Acres	Percentage of Total
Residential	**8,989.9**	**46.3%**
Single Family, 14,000 to 43,559 Sq.Ft.	2,365.1	12.2%
Single Family, 1 to 2.5 Acres	2,137.8	11.0%
Single Family, 5 to 10 acres	1,197.8	6.2%
Single Family, 2.5 to 5 acres	984.3	5.1%
Single Family, greater than 10 acres	962.7	4.9%
Single Family, 8,000 to 13,999 Sq.Ft.	657.7	3.4%
Mobile Home Park	338.9	1.7%
Multiple Family	185.2	1.0%
Single Family, less than 8,000 Sq.Ft.	143.1	0.7%
Single Family, more than 1 unit / parcel	17.3	0.1%
Recreation/Conservation	**6,131.5**	**31.5%**
Vacant	**2,455.7**	**12.6%**
Agricultural	**791.4**	**4.1%**
Commercial/Office	**392.8**	**2.0%**
Public/Institutional	**366.3**	**1.9%**
Industrial	**165.0**	**0.8%**
Transportation/Utility/Communication	**157.4**	**0.8%**
Total	**19,450.0**	**100%**

Source: Oakland County

offered via M-59 to the other major cities and employment centers in the metro Detroit area, as well as regional trends of population growth from the rapidly urbanizing municipalities of Waterford and Commerce Townships, increase the demand for development in the southeast quadrant of the Township. As urbanizing municipalities begin to encounter unmet demand for housing, utilities, services, and so on, the tendency to seek residence in nearby localities (and accept longer commutes) increases. Managing development in tandem with available (and future) infrastructure will be crucial to ensure sustainable growth in this part of the Township. The majority of larger residential parcels in the Township are concentrated in the center, north of M-59, shielded from development pressure from the neighboring municipalities. Given these parcels are in proximity to agrarian uses, and roughly 45% of survey respondents indicated a rural atmosphere with plenty of open space was the main characteristic that attracted them to move to their current area of residence, preserving the existing lot sizes and density will be a priority for the Township. Future residential development in the Township should be targeted in select areas of the Township with access to water and sewer infrastructure, preferably south of M-59, while development north of M-59 should be strictly regulated to preserve agricultural land and the rural character of the Township.

Recreation/Conservation Land Use

Parcels under the recreation/conservation land use account for 6,131.5 acres, or 31.5% of the Township area. Most of the land under this classification is within the Pontiac Lake State Recreation Area in the northeast and Highland State Recreation Area in the southwest quadrant of the Township. Other areas under this classification include areas like Indian Springs Metropark, which is included in the metropark system and operated by the Huron-Clinton Metropolitan Authority. Additionally,

White Lake Oaks Golf Course occupies a small area immediately south of M-59 and also falls under this classification. Other parcels in this land use classification are scattered around the Township, including neighborhood parks and open spaces. The southeast quadrant of the Township which has the highest density of residential development in the Township contains a lower percentage of recreation/conservation land use compared to other areas of the Township. While residents in this area can access other recreation facilities in the Township, encouraging development of neighborhood parks amidst dense residential areas will be critical to ensuring the community's recreation and open space needs are met, further ensuring access to such facilities while protecting existing lakes and natural features.

As the Township plans for and begins to develop additional parks and outdoor recreational spaces, designing the space to incorporate green infrastructure features provides an opportunity to address the infrastructural needs of White Lake alongside recreational outlets. Promoting minimal development to any extent possible can ensure both access to, and preservation of, natural resources. Green infrastructure, such as rain gardens and bioswales, can further mitigate the impacts of any paved surfaces on stormwater by slowing, cleaning, and cooling it before entering green spaces or preservation areas. Recreation- and conservation-oriented land uses are themselves considered green infrastructure that can justify the highest and best use of land in such a way that it is enjoyed, yet largely undisturbed, by residents and visitors.[1]

Agricultural Land Use

The identity of White Lake Township is influenced by its agricultural history and its rural character. However, only about 790 acres or 4.1% of the Township's total land area is currently used for agriculture. Almost all agricultural land is located in the central parts of the Township, with the majority situated north of M-59. Only a few parcels of agricultural land are located in the southeast quadrant of the Township. Since 2009, agricultural land in the Township has increased from 2.9% to 4.1% of the total Township area.[2]

Though agricultural land use in the Township has increased, protecting existing farmland from development is crucial. Agricultural land is primarily protected through zoning. In addition to the "Agricultural" zoning district, many parcels in the Township fall under the "Suburban Farm" district which allows for a combination of specific agrarian and residential uses of land. [3,4] While this may prove effective to encourage agrarian uses and preserve the rural character of the Township with large lot sizes, it limits the area available for smaller single-family homes, duplexes, and other such housing typologies. This leads to pressure for increasing residential development, and, subsequently, risks eventual infringement of farmland. One potential strategy to balance farmland preservation and the increasing demand for residential development is to continue to strictly regulate uses in the Agricultural and Suburban Farm districts. By focusing residential development to existing residential areas and adjacent vacant land it alleviates development pressure on suburban and farmland. Essentially, the strategy encourages higher density development in a smaller area rather than lower density development over a broad area. Another strategy for preserving farmland is the Farmland and Open Space Preservation Program (PA 116), a voluntary agreement between a landowner and the State of Michigan in which the landowners receive tax benefits and exemptions in exchange for preserving their land for agriculture or open space.[5]

Commercial/Office Land Use

Commercial land uses in White Lake Township are concentrated in the center of the Township along the M-59 thoroughfare. Some commercial parcels in the Township are scattered between residential land uses south of M-59, and a few are situated in the southeast corner adjoining Commerce and Waterford Townships. While restricting commercial development to the Township's major thoroughfare helps retain the rural and residential character of the Township, residents are likely dependent on the automobile to go to work, run errands, or visit businesses. Although the Township can regulate larger commercial/office uses and big-box stores along M-59, residents may benefit from additional neighborhood-scale stores such as small grocers or produce stores, especially in the denser residential neighborhoods in the southeast quadrant of the Township. Creating commercial pockets/nodes also encourages foot traffic for local businesses and reclaims the streets from catering solely to automobiles.

Public/Institutional Land Use

Parcels under the public/institutional land use classification typically serve public interest by

permitting uses such as schools, religious buildings, institutional buildings, Township offices, and so on. This land use accounts for roughly 366 acres or 2% of the Township area, and these parcels are usually exempt from property taxation. Most of this land use is situated south of M-59 including the Huron Valley Schools campus, Dublin Elementary School, and Houghton Elementary School properties.

Industrial Land Use

Industrial land is predominately used for manufacturing or processing materials or articles and includes accessory uses such as storage areas and warehousing. Only 165 acres amounting to 0.8% of the total Township area fall under the industrial land use classification. Some industrial parcels are located north of M-59 and east of Teggerdine Road, mostly comprised of automobile services and related uses. Two larger parcels are located in the northeast corner of the Township. An important consideration for industrial land use is the proximity to natural features; given most industrial parcels are located near lakes or recreation/conservation land, it is crucial to implement stringent development standards through the zoning ordinance to ensure adequate setbacks and buffers are provided from natural features.

Transportation/Utility/Communication Land Use

Areas predominately used for vehicular transportation, public utilities, or establishing communication towers and other related public infrastructure fall under this land use category and account for 150 acres and 0.8% of the total Township area.

Vacant

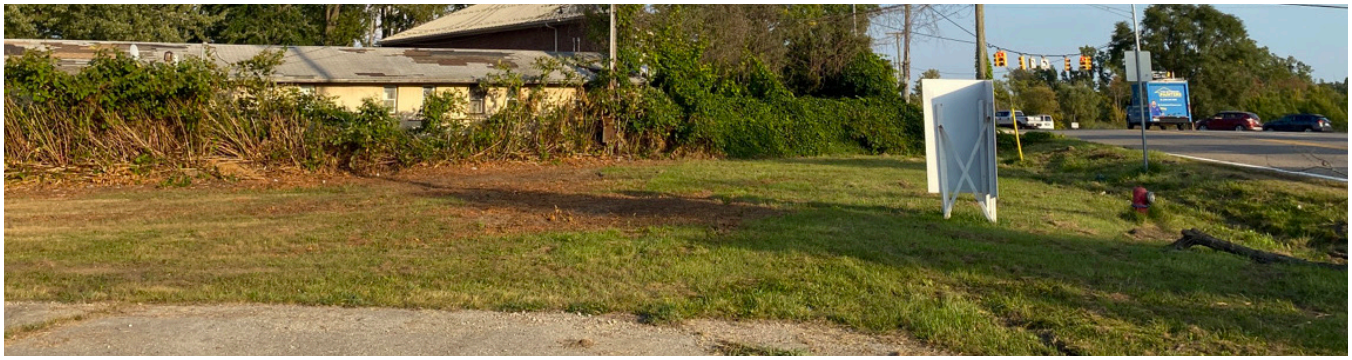
Vacant parcels are unimproved areas that do not have a specific land use classification. Roughly 2,456 acres, or 12.6% of the Township area is vacant. While vacant parcels are distributed across White Lake, most are found in the central and western portions of the Township, often adjacent to residential uses. These parcels offer the opportunity to expand land uses to cater to the needs of the community. While vacant land areas may not have a committed use, their presence may contribute to the agrarian nature of the Township. However, unlike the land designated for Agricultural or Suburban Farm uses, these areas may provide an avenue to meet the increasing demand for housing and subsequent residential uses to prevent the conversion of traditionally agricultural uses. As shown in the table titled "Zoning of Vacant Land" (p. 97), the majority of the land classified as vacant is zoned agriculture (Agricultural or Suburban Farm). Following agriculture, land zoned for residential accounts for roughly 22% of all vacant land. Finally, commercially zoned vacant land accounts for roughly 18% all of vacant land in the Township. Industrially zoned vacant land is less than 1% of the total vacant land.

Agricultural land

Table 26: Zoning of Vacant Land, 2023

Zoning	Percent of Vacant Land
Agriculture	**59.60%**
AG: Agricultural	36.39%
SF: Suburban Farm	23.21%
Residential	**21.75%**
R1-A: Single Family	4.99%
R1-B: Single Family	0.96%
R1-C: Single Family	5.75%
R1-D: Single Family	6.31%
RM-1: Attached Single Family	1.03%
RM-2: Multiple Family	2.71%
Commercial	**17.75%**
LB: Local Business	1.49%
GB: General Business	3.01%
NBO: Neighborhood Office	0.17%
ROP: Research Office Park	0.11%
PD: Planned Development	9.79%
PB: Planned Business	3.18%
Industrial	**0.77%**
LM: Light Manufacturing	0.77%

Source: Oakland County & White Lake Township



Vacant land

Figure 36: Key Land Use Strategies

Residential Land Use

» Preserving the existing lot sizes and density will be a priority for the Township.

» Future residential development should be targeted in select areas of the Township with access to water and sewer infrastructure, preferably south of M-59, while development north of M-59 should be strictly regulated to preserve agricultural land and the rural character of the Township.

Recreation/Conservation Land Use

» Encouraging development of neighborhood parks amidst dense residential areas will be critical to ensuring the community's recreation and open space needs are met.

Agricultural Land Use

» The Township should continue to strictly regulate uses in the Agricultural and Suburban Farm districts.

» Another strategy for preserving farmland is the Farmland and Open Space Preservation Program (PA 116), a voluntary agreement between a landowner and the State of Michigan in which the landowners receive tax benefits and exemptions in exchange for preserving their land for agriculture or open space.

Industrial Land Use

» It is crucial to implement stringent development standards for industrial land through the zoning ordinance to ensure adequate setbacks and buffers are provided from natural features.

Sources

1 SEMCOG, Green Infrastructure Vision for Southeast Michigan, 2014, https://www.semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=GreenInfrastructureVisionForSoutheastMichiganMarch2014.pdf.

2 White Lake Township, White Lake Township Master Plan for Land Use 2010–2011, 2011, https://www.whitelaketwp.com/sites/default/files/fileattachments/planning/page/3681/complete_wl_mp_update_document_2012.pdf.

3 White Lake Township Zoning Map, https://www.whitelaketwp.com/sites/default/files/fileattachments/planning/page/23353/wlt_zoning_map_update_20221010_updated_again_5.4.2023.pdf.

4 White Lake Township Zoning Ordinance, https://www.whitelaketwp.com/sites/default/files/fileattachments/planning/page/2311/2022_01_27_white_lake_clearzoning_ordinance_security_on.pdf.

5 "Farmland Preservation", Michigan Department of Agriculture and Rural Development, https://www.michigan.gov/mdard/0,4610,7-125-1599_2558---,00.html.

Commercial development

Goals & Implementation

Good planning uses data and community preferences to shape a preferred course of action. In this section, findings from previous chapters of the Master Plan and community engagements are used to build an Action Plan of strategies. This Action Plan is intended to advance White Lake Township towards its goals by providing guidance for future planning efforts.

The following vision from the 2012 Master Plan was shared through the community survey at the start of the master planning process:

"Strive for a sustainable White Lake Township that balances the community's economic, environmental, and social needs. Promote the identity of White Lake Township as a small country town with big city amenities by protecting and preserving natural features, encouraging redevelopment of obsolete properties, and directing growth and development to a central community core."

When asked if this vision still aligned with their vision of White Lake, 77% of respondents stated it did. The 2012 vision is carried forward with this Master Plan. In addition to the 2012 vision, the following 10 goals were identified and shared through the community survey at the start of the master planning process. The survey asked respondents to select their top three goals, the results are detailed in the table titled "Goal Survey Results."

Based on community feedback, the goals were revised to the following:

Table 27: Goal Survey Results

Goal	All Survey Respondents	White Lake Residents
Preserve and protect natural features including wetlands, floodplains, lakes, woodlands, and other natural features.	69%	69%
Maintain the small-town rural character of existing single family residential areas.	49%	49%
Provide adequate infrastructure that preserves and protects White Lake Township's natural features.	46%	46%
Address the community's needs for efficient and safe multi-modal access (walking, biking, auto).	31%	32%
Enhance the quality of life and make the community more appealing by providing a variety of recreational facilities.	26%	26%
Provide goods and services that meet the current and future needs of Township residents.	22%	22%
Address the community's needs for sewer and water systems.	20%	20%
Provide efficient public services that adequately and safely support the existing and future population of White Lake Township.	17%	17%
Encourage high tech, research, and light industrial developments to improve the tax base and provide job opportunities.	7%	7%
Provide a variety of housing opportunities.	3%	3%

A. Invest in infrastructure and implement appropriate regulations and policy measures to preserve and protect natural features, including wetlands, floodplains, lakes, woodlands, and other natural features.

B. Enhance the quality of life and make the community more appealing by providing a variety of recreational facilities.

C. Maintain the small-town rural character of existing single-family residential areas while pursuing opportunities to meet the Township's housing needs.

D. Address the community's needs for efficient and safe multi-modal transportation (walking, biking, automobile, etc).

E. Support businesses providing goods and services, and implement infrastructural upgrades to meet current and future needs of Township residents.

F. Improve the Township's tax base and provide job opportunities by encouraging beneficial development/redevelopment projects.

Table 28: Action Plan

Action Item	Applicable Goal(s)	Timeframe
Retain residents between the ages of 25 and 34 by responding to demand for more housing units, including affordable housing options.	C, E	Medium term
Support an increasing senior population by assessing and responding to the demand for additional assisted living facilities, nursing homes, and appropriate healthcare facilities.	C, E	Medium term
Accommodate the needs of the Township's disabled population by enforcing ADA compliant design.	E	Ongoing
Recognize the economic hardship that faces households earning below the ALICE threshold by encouraging affordable housing and economic opportunities.	E, F	Short term
Encourage protection of wetlands and installation of green infrastructure along FEMA zones to mitigate harm caused by flooding.	A	Short term
Designate areas around floodplain as conservation areas to limit development and impervious surfaces.	A, B	Short term
Regulate lakefront development by mandating greenbelts with native vegetation in a buffer zone between the setback and the water's edge to reduce flooding impacts.	A	Medium term
Provide information about voluntary conservation easements to residents, especially those living in environmentally-sensitive areas.	A	Short term
Encourage green infrastructure placement during the site plan review process and/or planned development process.	A	Ongoing
Preserve natural and open spaces by pursuing commercial development in vacant buildings and/or retrofitting strip malls to support new commercial activities.	A, B	Medium term
Increase housing supply to meet demand for residences in the Township.	C	Medium term
Ensure aging housing stock receives appropriate maintenance and renovation to promote its habitability to the greatest extent and to avoid deterioration and demolition.	C, E	Medium term

Action Item	Applicable Goal(s)	Timeframe
Address increasing housing costs and the limited availability of starter homes valued between $150k and $250k by increasing the Township's supply of housing to match the demand.	C	Medium term
Accommodate future community housing preferences by matching the size and types of housing construction to needs. For example, while single-family homes remain the most prominent preference for Township residents, support attached single-family structures (such as duplexes).	C	Short term
Pursue CDBG funds to support the revitalization of housing units that are deteriorating and/or uninhabitable in order to put them back into the housing market.	C, E	Ongoing
Rezone commercial districts and corridors to allow for mixed-use developments.	C, F	Ongoing
Support commercial development by revitalizing buildings that have become vacant and/or retrofitting strip malls to support new commercial activities.	F	Medium term
Ensure redevelopment plans align with community-guided ideas at Pontiac Lake Gateway, Cedar Island and Bogie Lake Roads, and around Lakes Town Center.	F	Long term
Support efforts of the Corridor Improvement Authority to promote a sense of place, connectivity, and various activities in commercial corridors across the Township.	E, F	Ongoing
Implement traffic calming techniques along Cooley Lake Road and M-59 (east of Teggerdine Road) to ease commuter congestion en route to outside communities.	D	Ongoing
Address the volume of crashes that take place at intersections along M-59 by improving road safety measures and implementing biking and pedestrian infrastructure.	D	Ongoing
Educate and share information with Township residents about implementation plans for non-motorized infrastructure that includes a signed bicycle route, bicycle lanes, and shared-use paths.	D	Ongoing
Educate and share information with Township residents about public transportation options, including upcoming changes in operation.	D, E	Ongoing

FUTURE LAND USE

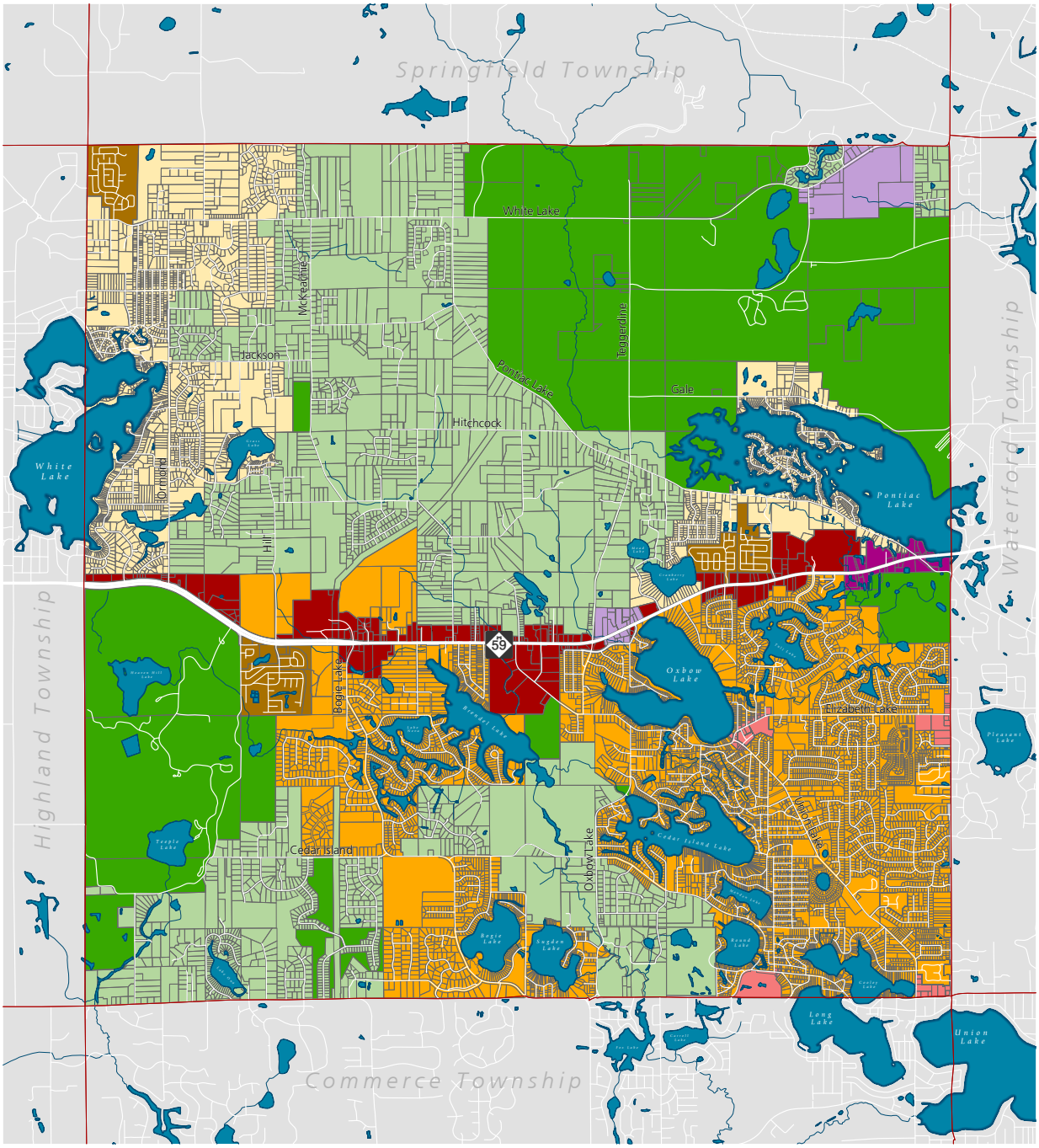
The Future Land Use Map (FLUM) (p. 104) identifies preferred future land uses in the Township. It is a general framework, a land-use visualization of intended future uses, that guide land use and policy decisions within the Township over the next 10-20 years. It should drive changes to the Zoning Ordinance and inform development review decisions. In the FLUM, preferred locations for future development types are displayed, allowing the community to identify where certain land uses should expand or contract without committing to it by law.

Table 29: Future Land Use and Zoning

Future Land Use	Description	Examples of Use*	Residential Density (DU/ Acre)	Corresponding Zoning District(s)
Recreation/ Open Space	Large recreation spaces including the Highland State Recreation Area, White Lakes Oaks Golf Course, Pontiac Lake State Recreation Area, and Township parks.	Parks, golf courses, ski resorts, conservation areas	N/A	ROS
Agriculture/ Rural Residential	Maintains agricultural land and rural living through large lots and limited residential development. Subdivision residential development is discouraged.	Large-lot single family, agriculture, farm-stands, cider mills	0.2	AG, SF
Suburban Residential	Provides large lot, low density residences with open space preservation in residential subdivisions. Residential lots tend to be smaller than those in the Agriculture/ Rural Residential future land use classification.	Large-lot single family, parks, churches, public facilities or institutions (e.g., schools)	0.5 – 3.0	R1-A, R1-B
Neighborhood Residential	Maintains existing neighborhoods and provides for denser residential development in places where there is infrastructure to support the density and ensuring density is within context of the surrounding neighborhood.	Small-lot single family, duplexes, multi-family, parks, convalescent or nursing homes	2.0 – 8.0	R1-C, R1-D, RM-1, RM-2, PD
Manufactured Residential	Includes existing manufactured housing developments.	Manufactured housing	3.0 – 6.0	MHP
Neighborhood Commercial	Provides neighborhood scale commercial establishments that have daily goods and services for residents. Creates centers of neighborhood life, encouraging a mix of compatible retail, service, office, and residential uses in a walkable environment.	Professional services/office, personal care, restaurants, mixed-use	6.0 – 10.0; varies based on development	LB, RB, NB-O, NMU
Commercial Corridor	Provides regional goods and services to residents and non-residents. Includes large box stores and drive thrus.	Large grocery, outlet, mixed-use, restaurants	Varies based on development	PB, GB, LB, PD, TC, NMU
Pontiac Lake Gateway	Creates a welcoming gateway offering a mix of local and regional goods and services. Uniform development and design standards create a defined sense of place.	Professional services, multi-family, personal care, restaurants, entertainment	Varies based on development	PG, GB, RM-1, RM-2
Production/ Technology	Serves community's need for research facilities and light industrial opportunities.	Light manufacturing	N/A	LM, ROP

* Not an exhaustive list of uses.

Map 14: Future Land Use Map



Future Land Use Framework

3,000 Feet
Beckett & Raeder, Inc.

Sources: Michigan Open Data Portal, Oakland County, White Lake Township

- Recreation / Open Space
- Agriculture / Rural Residential
- Suburban Residential
- Neighborhood Residential
- Manufactured Residential
- Neighborhood Commercial
- Commercial Corridor
- Pontiac Lake Gateway
- Production / Technology

Agri-business

Appendix

Appendix A: Survey Results Summary

Appendix B: Redevelopment Workshop Summary

Appendix C: Master Plan Open House Results

SURVEY RESULTS SUMMARY

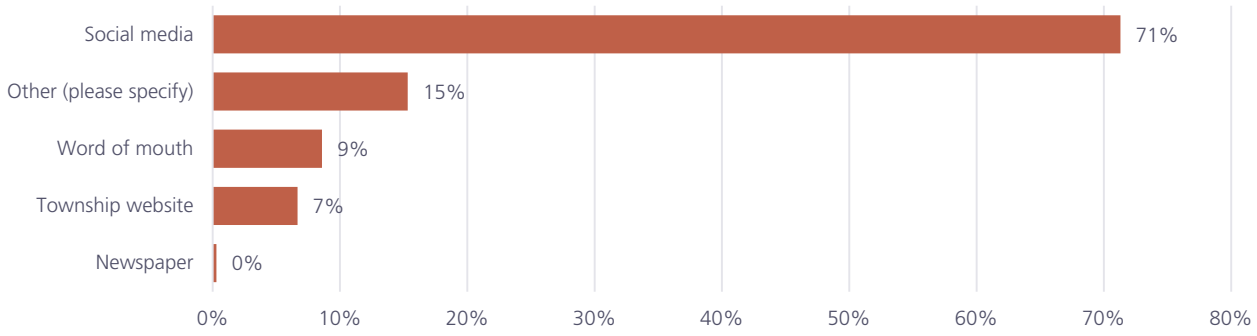
The White Lake Township Master Plan Survey was designed to garner the community's vision for the future of the Township and gauge current perspectives and future preferences and priorities regarding the quality of life, housing, local economy, recreation, and natural features. The survey was hosted on an online platform–SurveyMonkey–and extensively promoted through postcards and flyers, social media platforms, local newspapers, newsletters, email, a poster at the White Lake Township Hall, and the Township's website. Paper copies of the survey were available at the Township Hall for those who could not access the online platform. A total of 1,411 people participated in the survey between February and March 2023 with a completion rate of 70%.

INTRODUCTORY QUESTIONS

Question 1. How did you hear about the survey? (Please select all options that apply)

Social media was the most common way the survey reached people; about 71% respondents indicated they heard about the survey on social media. Word of mouth and the Township website reached 9% and 7% of the respondents respectively. The remaining 15% of respondents heard about the survey through other mediums including email, neighborhood / subdivision newsletters, and Homeowners Associations (HOAs).

Survey Outreach

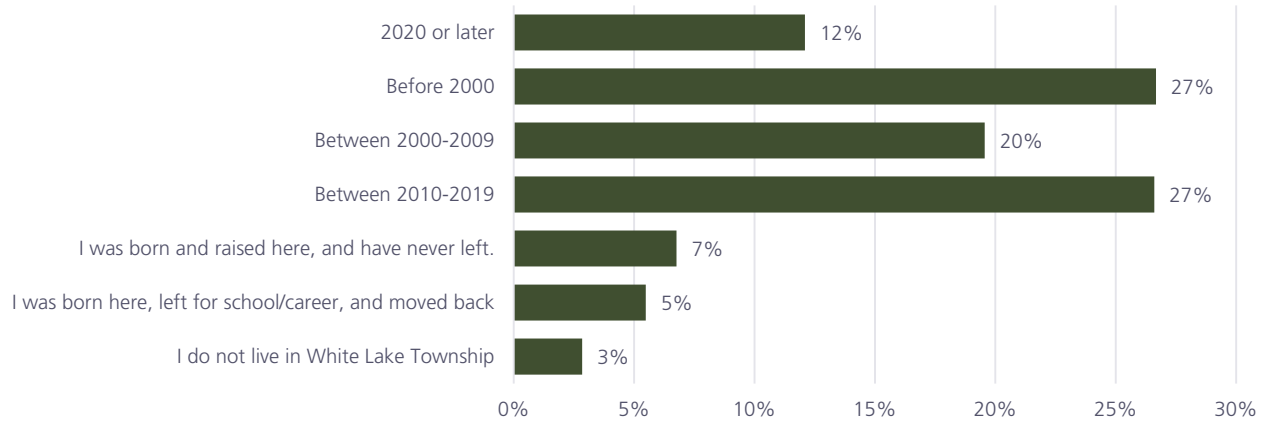


[Response Rate: 99.0% of Respondents]

Question 2. What year did you move to White Lake Township?

Respondents lived in the Township over a range of years, indicating the survey captured preferences of both recent and long-term residents. Roughly a third of respondents (34%) have lived in the Township for over 20 years and 5% of residents were born in the Township and returned after pursuing higher education / a career. About 20% of survey takers moved to the Township between 2000–2009, 27% between 2010–2019, and more recently 12% moved to the Township in or after 2020. The remaining 3% of respondents were not Township residents.

Year Respondents Moved to the Township



[Response Rate: 99.6% of Respondents; percentages may not add up to 100% due to rounding errors]

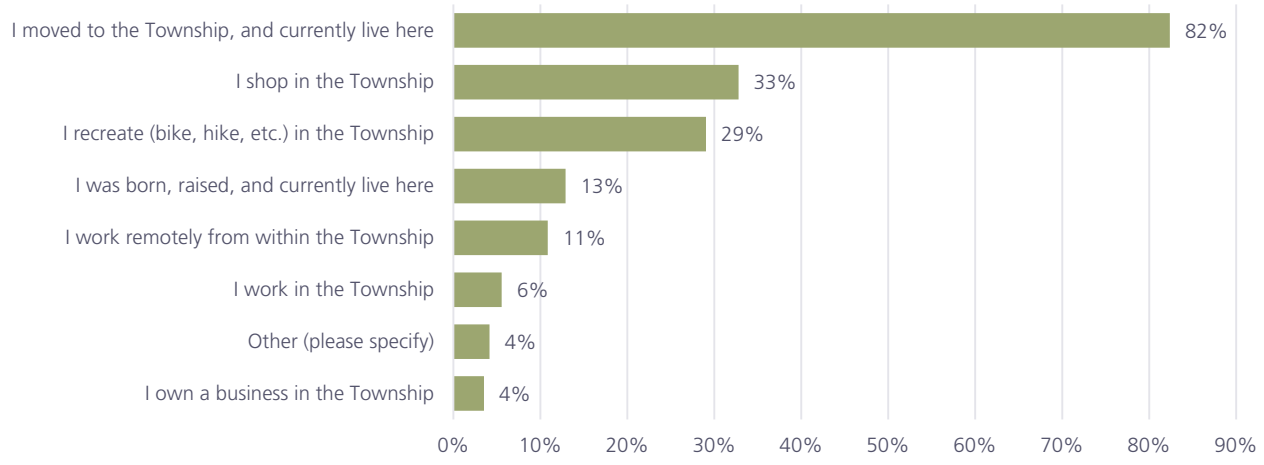
QUALITY OF LIFE

The responses in this section help comprehend the community's perception regarding the quality of life in the Township and identify aspects of the Township they believe need to be improved.

Question 3. What is your connection to White Lake Township? (Please select all options that apply)

A vast majority of respondents (82%) were residents who moved into the Township, while 13% were residents who were born and raised in the Township. Around one-third of respondents (33%) shopped in the Township and nearly 30% used recreational opportunities in the Township such as biking / hiking. In regard to employment, 11% worked remotely within the Township, 6% worked in the Township, and 4% of respondents were local business owners. Among the remaining 4% who chose the "other" option, respondents commonly owned seasonal lakeside properties, had children attending the local schools, or had family in the Township.

Respondents' Connection to the Township



[Response Rate: 86.9% of Respondents]

Question 4. In one word or phrase, what is a defining characteristic of White Lake Township?

The most common words used to describe White Lake Township were "Beautiful", "Community", "Friendly", "Home", "Lake", "Nature", "Peaceful", and "Rural".

Defining Characteristics of the Township

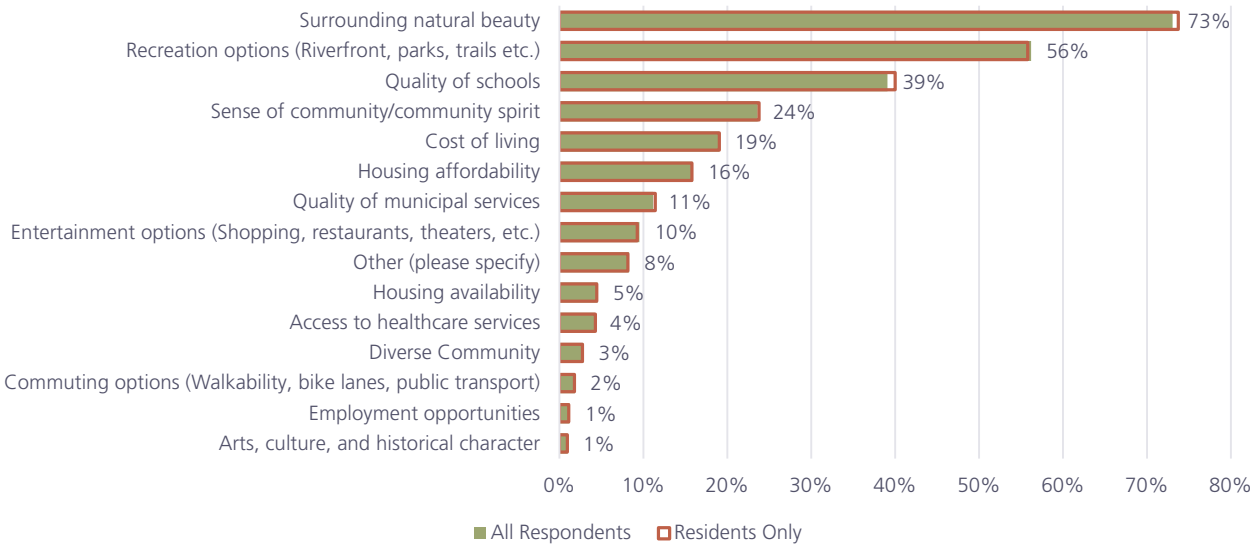
[Response Rate: 64.4% of Respondents]

Question 5. What are the THREE best characteristics of the Township? (Please select at most three options)

True to the Township's motto as the "Four Seasons Playground," a majority of respondents (73%) indicated surrounding natural beauty was the best characteristic of the Township. Recreation options and quality of schools were identified as the second and third best characteristics by 56% and 39% of respondents, respectively.

To understand what residents' valued most in the Township, the responses to this question were filtered based on respondents who selected either "I moved to the Township, and currently live here" or "I was born, raised, and currently live here" as a response to their connection to the Township in question 3. Among those who responded to this question (87% of total respondents), 95% identified as residents. Residents also identified surrounding natural beauty (74%), recreation options (56%), and quality of schools (40%) as the best characteristics of the Township. Commuting options (2%), employment opportunities (1%), and arts, culture, and historic character (1%) were the characteristics rated the lowest by all respondents and residents alike.

Best characteristics of the Township

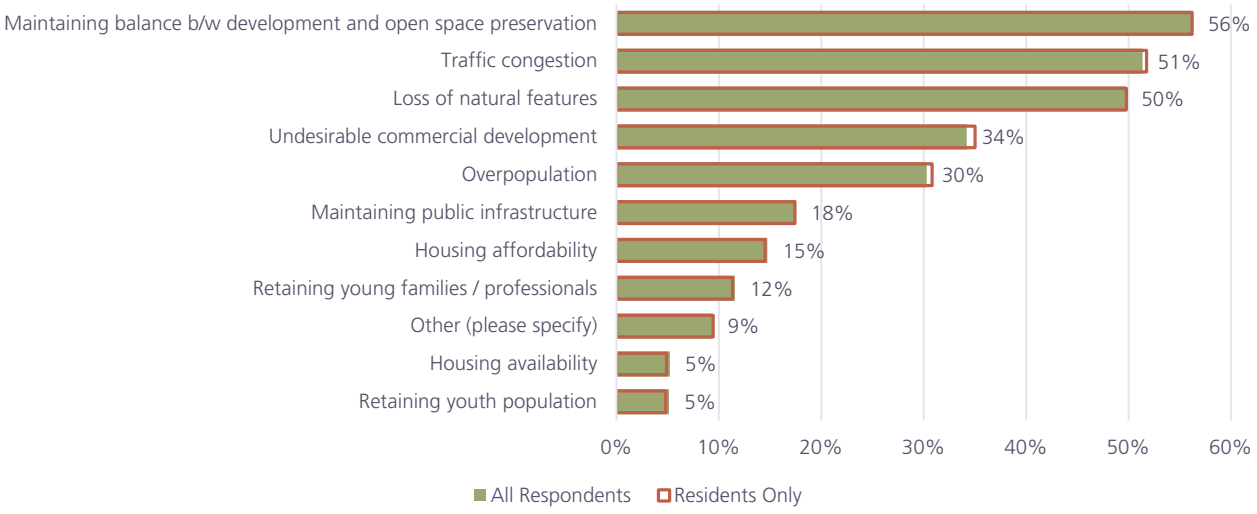


[Response Rate: 87.0% of Respondents, % labels above are all respondents]

Question 6. What are the THREE biggest challenges the Township faces over the next 10 years? (Please select at most three options)

The coexistence of both rural and urban characteristics may be a challenge in White Lake Township. Therefore, over half of all respondents (56%) indicated maintaining a balance between development and open space preservation would be the biggest challenge for the Township over the next 10 years. Traffic congestion and loss of natural features were other major challenges identified by roughly half of the respondents.

Biggest challenges the Township faces over the next 10 years.



[Response Rate: 87.0% of Respondents, % labels above are all respondents]

Filtering responses, residents also identified maintaining a balance between development and open space preservation (56%), traffic congestion (52%), and loss of natural features (50%) as the three biggest challenges for the Township over the next decade. Some other common challenges identified by 9% of respondents included poor quality of roads and public infrastructure, lack of pedestrian connectivity and bike lanes, and lack of destinations / downtown.

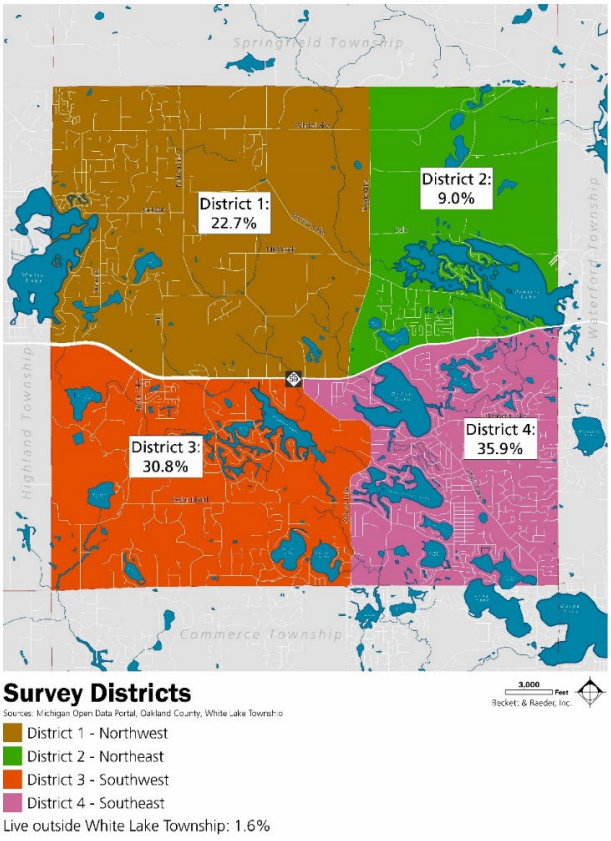
HOUSING

The responses in this section of the questionnaire help perceive the respondents' current and future preferences and needs regarding housing and residential land use in the Township.

Question 7. Which area of the Township do you live in? (Please use the map below as a reference or use this link to lookup your address)

Most of the respondents (35.9%) lived in District 4, followed by 30.8% who lived in District 3; combined, two-thirds of respondents live south of M-59. Roughly 22% of respondents live in District 1, 9% live in District 2, and the remaining 1.6% were not Township residents. Roughly 22% of respondents did not answer this question. In subsequent questions, where this question was used as a filter to categorize responses by district, it is important to acknowledge the lower response rate to this question may skew the analysis.

Percentage of Respondents by Survey District

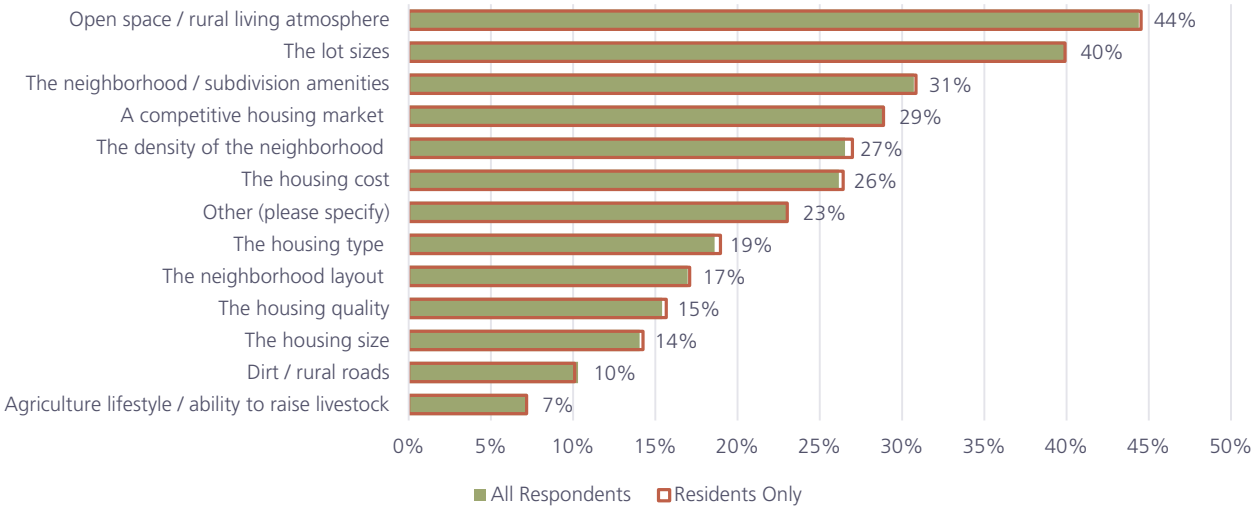


[Response Rate: 78.2% of Respondents, % labels above are all respondents]

Question 8. What characteristics of the area that you live in attracted you to move there? (Please select all options that apply)

Most respondents (44%) indicated a rural atmosphere with plenty of open space was the main characteristic that attracted them to move to their current area of residence. Many (40%) also noted the lot sizes as a reason and almost a third of respondents (31%) valued the amenities such as parks and common spaces in their neighborhood / subdivisions. When residents noted the rural aesthetic as a valuable characteristic, it appears to be limited to the open space that accompanies rural residential land use; the rural roads or the agriculture lifestyle were not aspects of the rural character respondents found attractive. Among some other responses, a vast majority of respondents also noted the lakes and access to the lakes as important characteristics of their neighborhood.

Characteristics that Attracted Respondents to their Area of Residence



[Response Rate: 77.7% of Respondents, % labels above are all respondents]

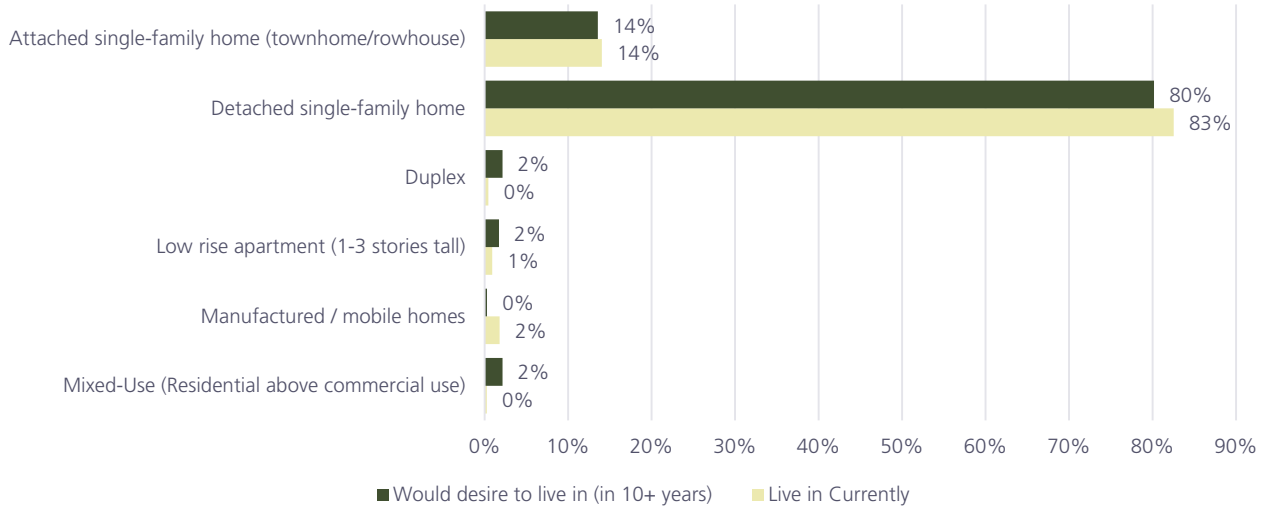
Question 9. What type of housing do you LIVE IN CURRENTLY and what type would you like to LIVE IN 10 YEARS FROM NOW? (Please select all options that apply)

The majority of respondents currently lived in either detached single-family homes (83%) or attached single-family homes house (14%); only 3% of all respondents lived in other multi-family housing units. Future preferences of respondents were also concentrated only between the two typologies of single-family homes, attached (80%) and detached (14%), indicating most respondents were not seeking different housing typologies in the Township. A small percentage of respondents (6%) indicate a desire to live in duplexes (2%), and other multi-family housing units such as low-rise apartments (2%) and mixed uses units (2%) ten years from now. A more detailed analysis of housing preferences by age, indicated the following:

- Of the 2% respondents who wish to live in duplexes, over 50% seniors (65 years and above)
- Young professionals and families (25-34 years), empty nesters (55-64 years), and seniors indicated a desire to live in low-rise apartments.

» Among those who wish to live in mixed use residential units in the future (2% of the total), 36% are young professionals and families, while the remaining vary in age from 35-year-olds to seniors.

Current Housing Type and Future Preferences

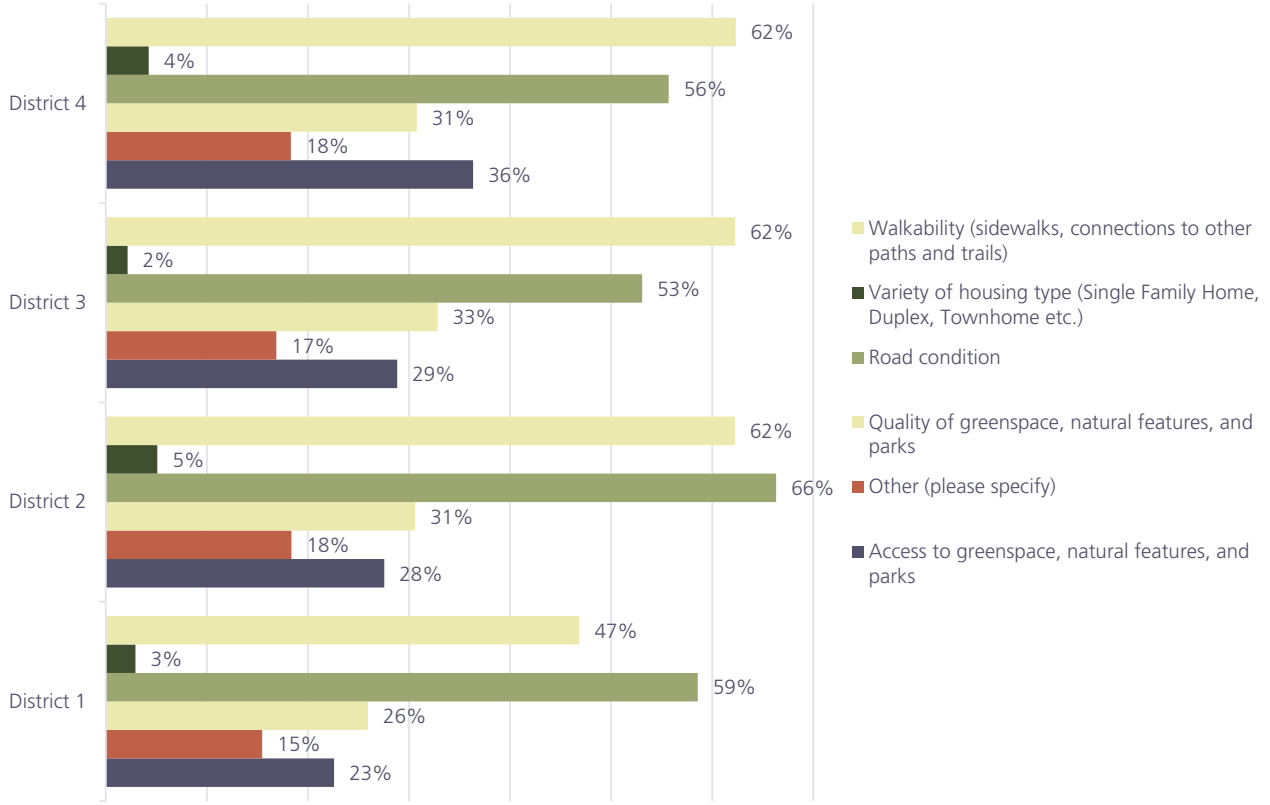


[Response Rate: 78.0% of Respondents]

Question 10. What are the characteristics of the area that you live in that could be used for improvement? (Please select all options that apply)

Walkability–the quality of sidewalks, connectivity of sidewalks and trails–was identified by roughly 60% of respondents from all four districts as a major characteristic that needs to be improved. Following walkability, over one half of respondents in Districts 1, 3, and 4, and two-thirds (66%) in District 2, noted roads required improvements. Respondents from Districts 1, 2, and 3 rated improvements related to the **quality** of greenspace, natural features, and parks slightly higher than **access** to greenspace, natural features, and parks. Conversely, in District 4, respondents rated access higher than quality. About 5% and 4% of respondents in Districts 2 and 4 suggested improving housing diversity. Among the various "other" responses, some common characteristics included improving/expanding sewer and water infrastructure, reducing traffic congestion, and increasing restaurants/destinations.

Improvement Priorities by District



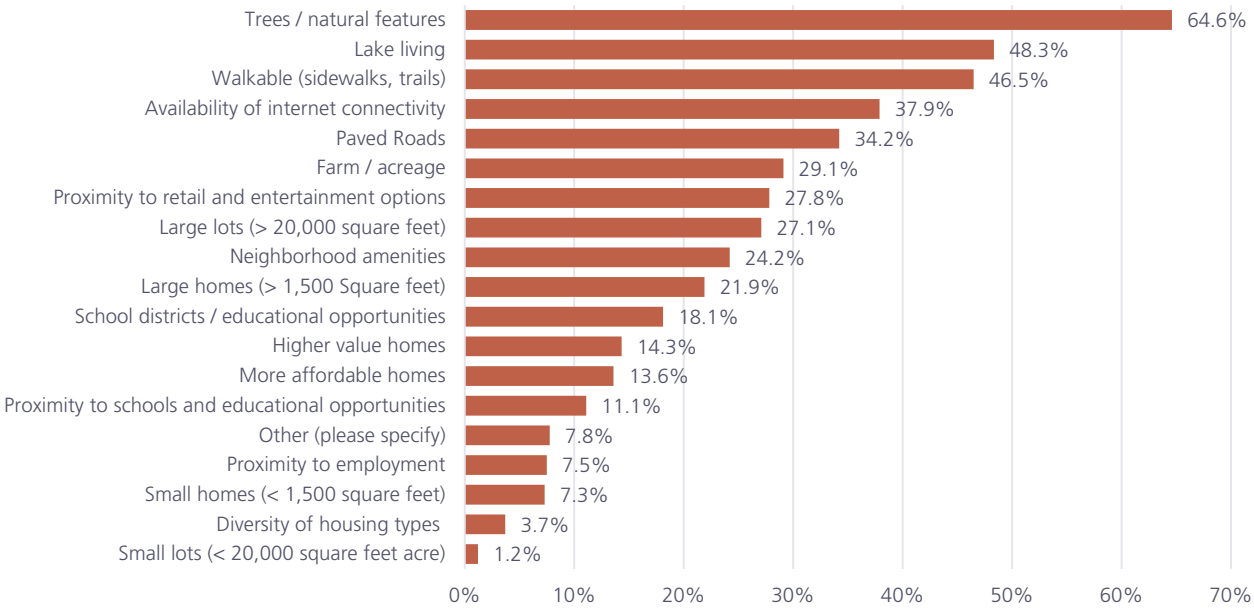
[Response Rate: 75.1% of Respondents, % labels above are all respondents]

Question 11. What are the characteristics of an area you would like to live in, in the future? (Please select all options that apply)

Overall, respondents chose trees and natural features (65%), lake living (48%), and walkability (46%) as the top three characteristics of an area they would like to live in, in the future.

Filtering responses by age of respondents, the top three priorities for all cohorts aged 25 years and above mirrored that of the entire group, in the same order. Young adults (18-24 years) also identified trees and natural features (86%) as the top characteristic of an area they would live in the future; however, deviating from the rest of the cohorts, they preferred an area with affordable homes (71%) and availability of internet connectivity (64%) over other characteristics.

Characteristics of an Area Respondents' Would Live in, in the Future.

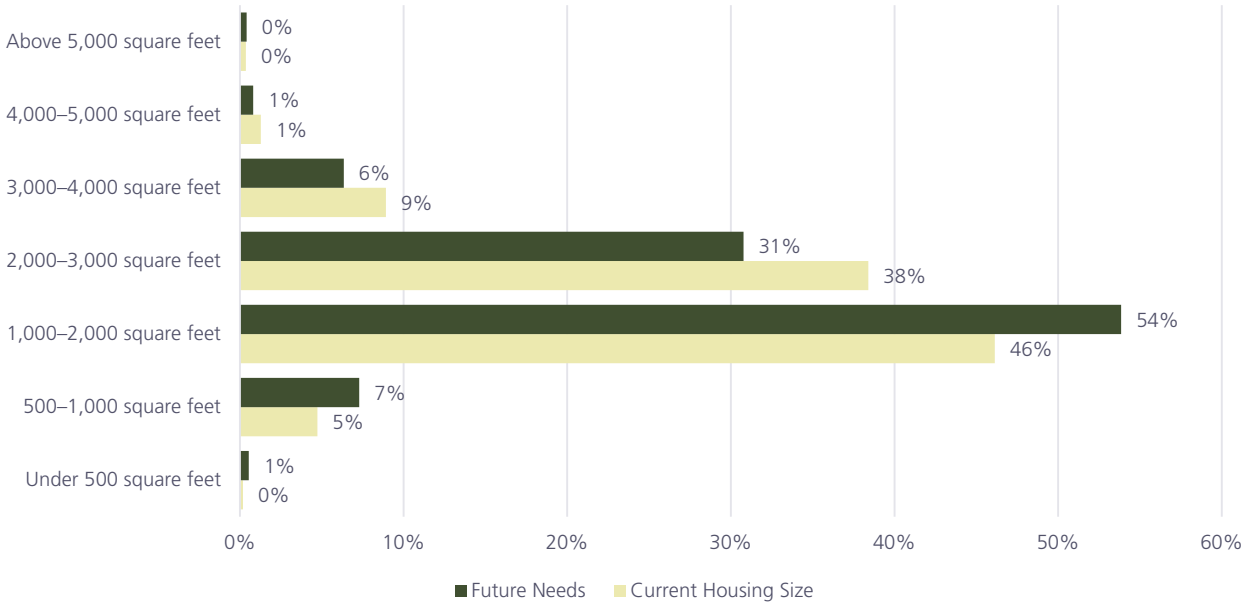


[Response Rate: 76.7% of Respondents]

Question 12. What is the size of your current housing unit, and what size of housing unit do you require to fulfill your housing needs in the future? (Please select one for each column)

Almost one-half of the respondents (46%) lived in homes between 1,000–2,000 square feet and over a third of respondents (38%) lived in homes with an area between 2,000–3,000 square feet. About 10% lived in larger homes with an area of 3,000 to 4,000 square feet or above while only 5% of respondents lived in units 500-1,000 square feet in size. Reviewing the future housing needs of respondents, a higher percentage of respondents indicate a desire to live in homes with an area of 1,000–2,000 square feet in the future than those housed presently. One possibility for this demand may be a lack of units 1,000–2,000 square feet in area, suggesting the current housing needs of some respondents were not being met. Alternatively, as housing composition changes, it is likely the future housing needs will change, creating a future demand for homes in the 1,000–2,000 square feet category. Irrespective of the reason, respondents indicated a need to increase the housing stock of homes 1,000–2,000 square feet in the Township. Similarly, respondents also indicated a demand for smaller homes, 500-1,000 square feet in the Township.

Current Housing Size and Future Preferences



[Response Rate: 77.9% of Respondents]

The table titled "Current Housing Size and Future Preferences by Age" filtered the current housing size and future needs by age of the respondent. The table demonstrates a larger percentage of seniors who currently lived in larger homes will be interested in downsizing to smaller homes 500-1,000 or 1,000–2,000 square feet in the area. As the population of the Township ages, the Township can expect the demand for small to mid-size homes to grow. Those aged 25-34 years indicated a desire for the larger format of homes (3,000–5,000) likely a future need to house growing families.

Current Housing Size and Future Preferences by Age

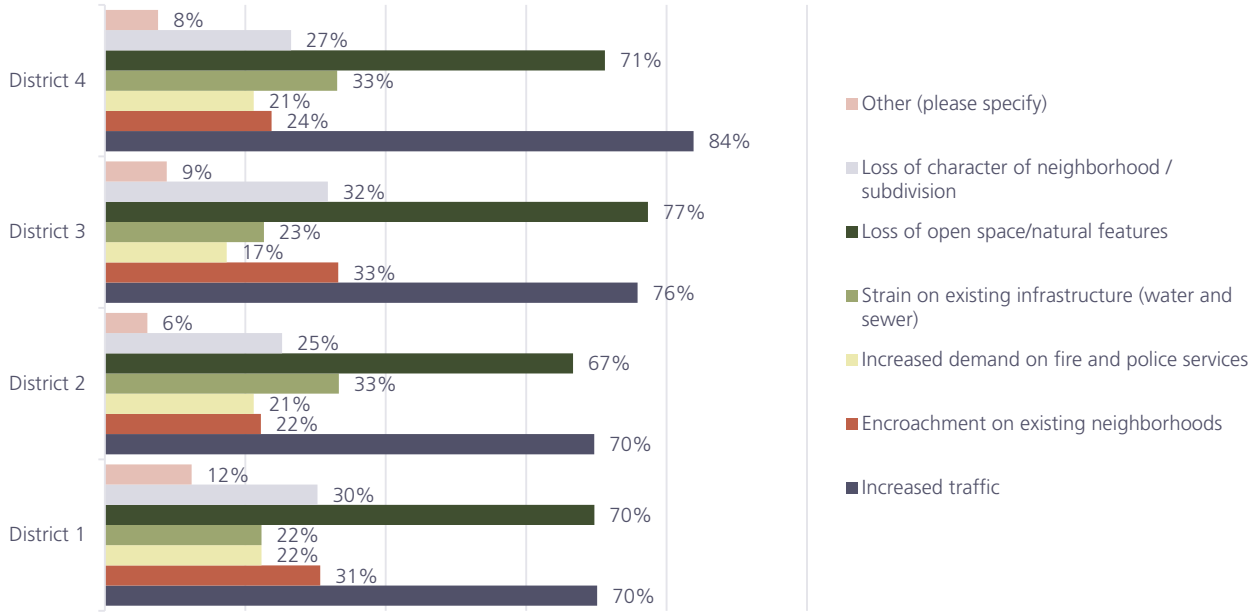
Size of Unit	Current Housing Size							Future Needs					
	18-24	25-34	35-44	45-54	55-64	65+		18-24	25-34	35-44	45-54	55-64	65+
Under 500 Sq.Ft.	0%	0%	0%	0%	0%	1%		0%	0%	0%	0%	1%	1%
500–1,000 Sq.Ft.	25%	9%	6%	2%	5%	1%		9%	7%	2%	5%	9%	12%
1,000–2,000 Sq.Ft.	42%	52%	42%	46%	44%	50%		73%	34%	43%	59%	59%	62%
2,000–3,000 Sq.Ft.	8%	31%	41%	39%	38%	41%		18%	43%	46%	25%	24%	23%
3,000–4,000 Sq.Ft.	25%	6%	7%	11%	11%	6%		0%	14%	9%	9%	5%	2%
4,000–5,000 Sq.Ft.	0%	1%	3%	0%	1%	1%		0%	3%	0%	1%	1%	0%
Above 5,000 Sq.Ft.	0%	0%	0%	1%	0%	0%		0%	0%	0%	1%	1%	0%

Note: The table above is read vertically, all columns add up to 100% showing the distribution of housing needs within each age cohort.

Question 13. What are your top THREE biggest concerns about increased residential development in the Township? (Please select at most three options)

Traffic congestion as a result of increased residential development was the biggest overall concern for over 70% of respondents from all districts. Almost 70% of respondents were also concerned about the loss of open space and natural features resulting from increasing residential development in the Township, but those from District 3 rated this as their biggest concern.

Concerns about Increased Residential Development by District



[Response Rate: 78.5% of Respondents]

Respondents from Districts 1 and 3 rated the encroachment on existing neighborhoods as the third biggest concern while those from Districts 2 and 4 expressed concerns about the loss of the character of their neighborhood / subdivision due to new development.

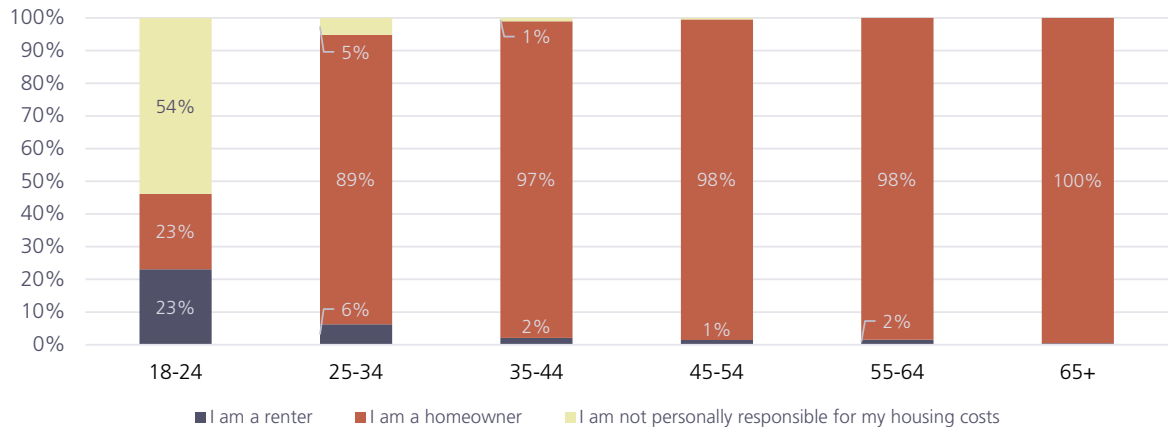
Question 14. Of the two options below, which is your preferred approach to directing new residential development?

Of the 73.8% who responded to this question, a majority of respondents (57%) supported low density development anywhere in the Township with minimal loss of open space and natural features; the remaining 43% support slightly higher density development south of M-59 while prioritizing preservation of open space and natural features north of M-59.

Question 15. What is your housing tenure status?

About 95% of respondents were homeowners, 2% were renters, and 2% were not financially responsible for their housing costs. The majority of respondents who were not responsible for their housing costs were young adults and professionals aged 18–34 years, and the largest percentage of renters (29%) also belong to the 25–34 years cohort.

Housing Tenure Status by Age of Respondents

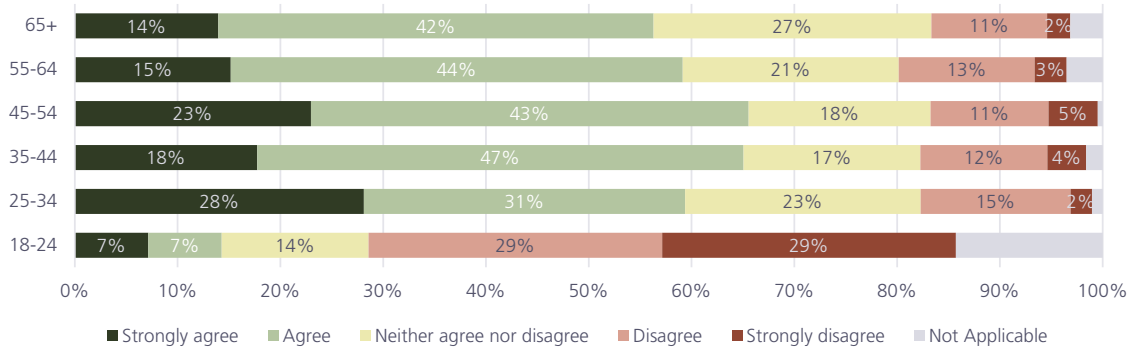


[Response Rate: 78.5% of Respondents]

Question 16. How strongly do you agree with the following statement "With my household income, I feel the housing options in White Lake Township are financially attainable."?

Respondents demonstrated varied levels of agreement on housing attainability in the Township indicating a need to diversify housing to reach the various income cohorts in the Township. While across age groups, over half the respondents were able to access housing catered to their housing income, a minority either disagreed or strongly disagreed to the above statement. Those aged 18–24 years, potentially including those still in school or beginning their careers, indicated strongest disagreement.

Housing Attainability by Age of Respondents

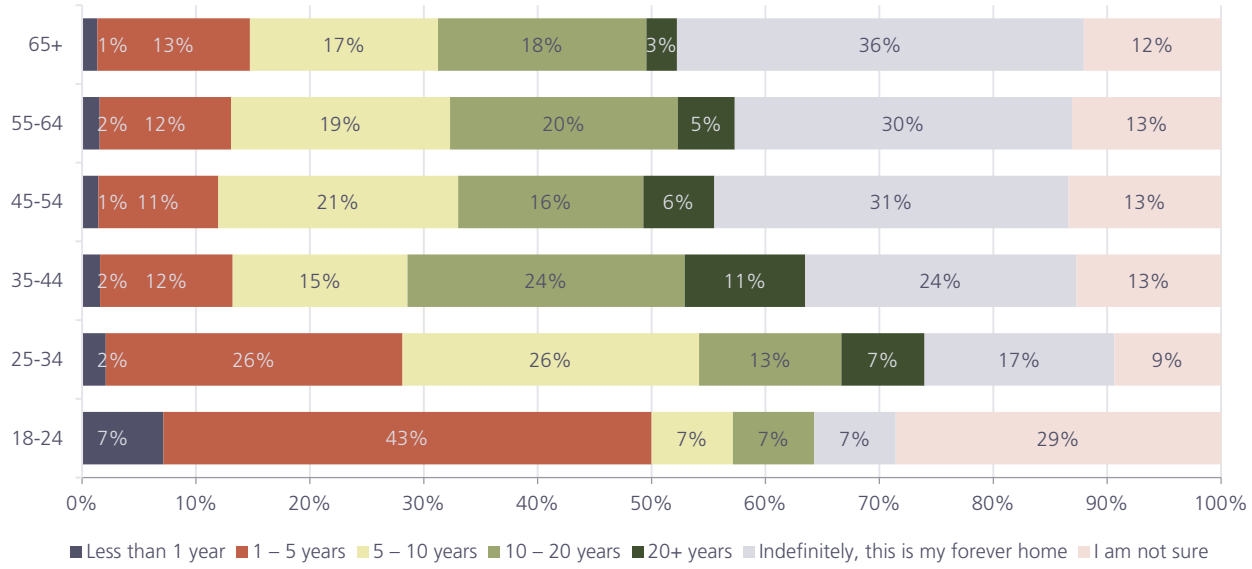


[Response Rate: 77.8% of Respondents]

Question 17. How much longer do you anticipate living in your current home?

The percentage of respondents aged 25–34 years indicated varied intentions of residing in their current homes, suggesting they would move as they transitioned through various stages of life. Among those aged 35–44 years, the majority (34%) anticipated living in their current homes over the next twenty years, likely homeowners with children in school. Preferences varied among those aged 45 years and above.

Duration in Current Home



[Response Rate: 78.5% of Respondents; percentages may not add up to 100% due to rounding errors]

FUTURE HOUSING PLANS

Question 18. Why are you planning on moving?

Responses varied depending on the age and income level of respondents as identified in the prior questions. Younger renters were interested in pursuing homeownership; middle-aged respondents planned to move to accommodate growing families; and most empty nesters and seniors planned to downsize from their current homes into smaller homes that were easier to maintain both, financially and physically.

LOCAL ECONOMY

The responses in this section of the questionnaire help perceive the respondents' current and future preferences and needs concerning the local economy and commercial land use in the Township.

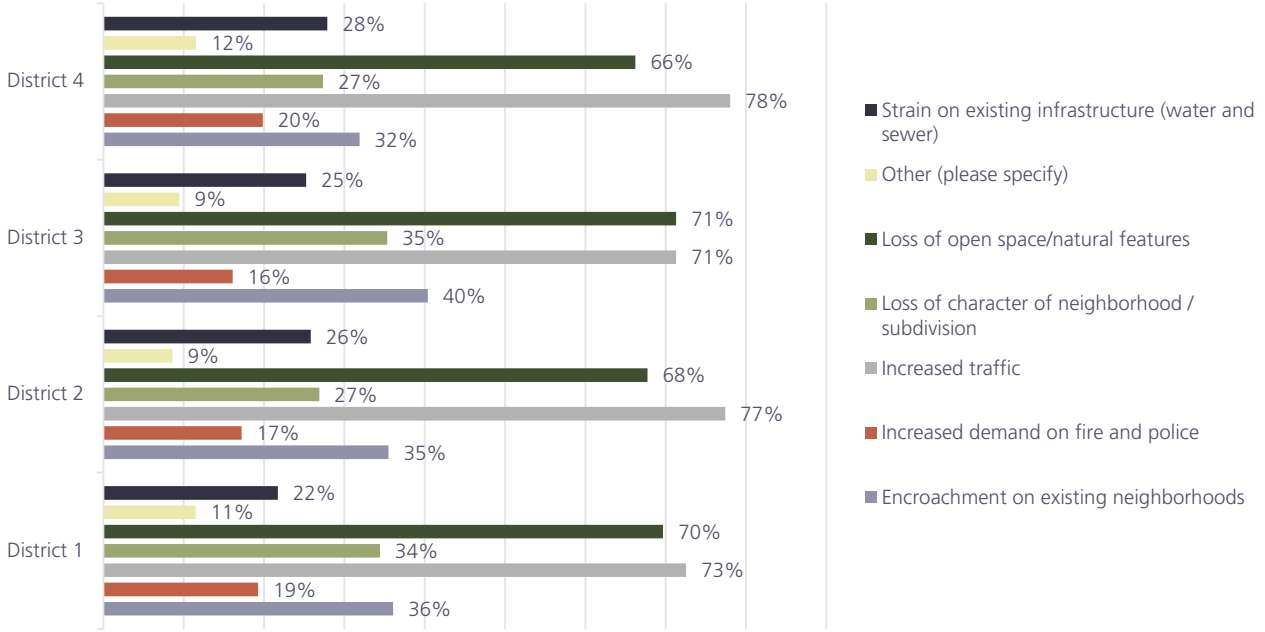
Question 19. Of the two options below, which is your preferred approach to directing new commercial development?

Of the 72.7% who responded to this question, 92% favored reuse of former commercial buildings now vacant or retrofitting of strip malls both of which will preserve existing open space and natural features; only 8% of respondents favored encouraging new low-density development along M-59 on vacant undeveloped land even with minimal threat to open space and natural features.

Question 20. What are your top THREE biggest concerns about increased commercial development in the Township? (Please select at most three options)

Increased traffic as a result of increased commercial development was the biggest overall concern for roughly 75% of respondents from all districts. Approximately 70% of respondents from all districts were also concerned about the loss of open space and natural features resulting from increasing commercial development in the Township. Around a third of respondents from all four districts showed consensus that encroachment on existing neighborhoods was the third biggest concern.

Concerns about Increased Commercial Development by District

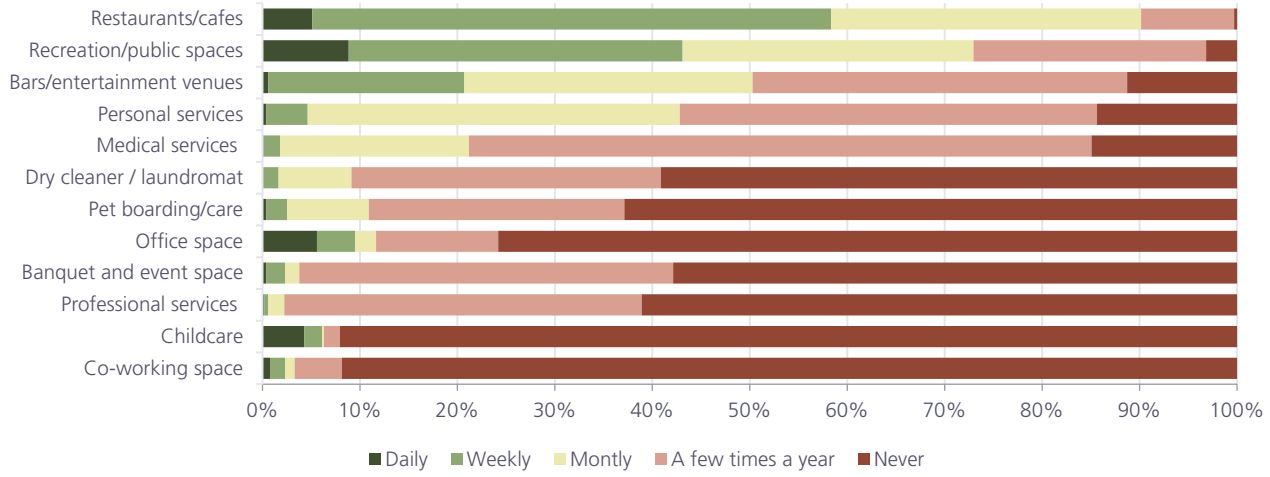


[Response Rate: 74.1% of Respondents]

Question 21. How often do you frequent the following types of businesses/locations on average?

The majority of daily visits to businesses or locations by respondents included recreation spaces (9%), followed by office spaces (6%), restaurants or café (5%), and childcare (4%). On a weekly basis, respondents frequented restaurants and cafes (53%), recreation and public spaces (34%), and bars and entertainment venues (20%). Many respondents visited bars and entertainment venues (30%) and personal services such as saloons and spas (38%), in addition to restaurants and recreation facilities monthly. Overall, coworking spaces (92%) and childcare (92%) were least visited locations overall.

Visits to Businesses / Locations

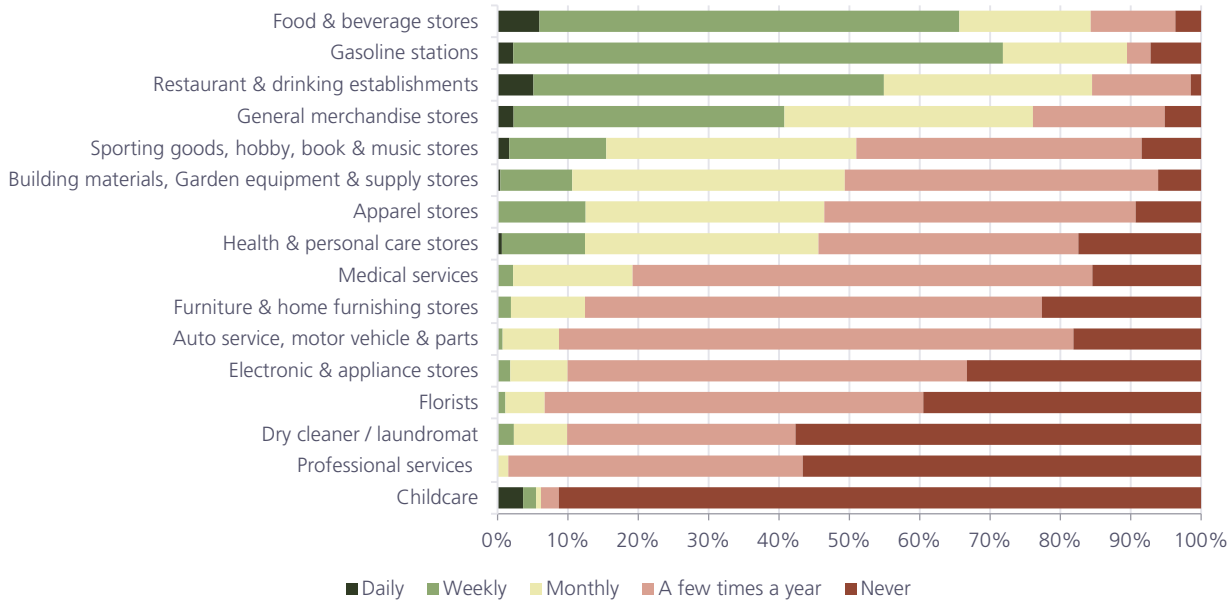


[Response Rate: 73.9% of Respondents]

Question 22. What type of retail would you like to see in the Township and how often would you frequent each storefront on average?

Many respondents indicated a high demand to frequent gasoline stations (70%), food and beverage stores (60%), restaurants and drinking establishments (50%), and general merchandise stores (38%) on a weekly basis. Respondents also showed interest in visiting apparel stores (34%), building materials and garden equipment stores (39%), and health and personal care stores (33%) every month. Close to three-quarters (73%) indicated a demand for automotive service establishments and 65% would visit furniture and home furnishing stores and medical services a few times a year. Many respondents expressed a lack of interest / need for childcare and professional services space in the Township.

Visits to Retail Establishments

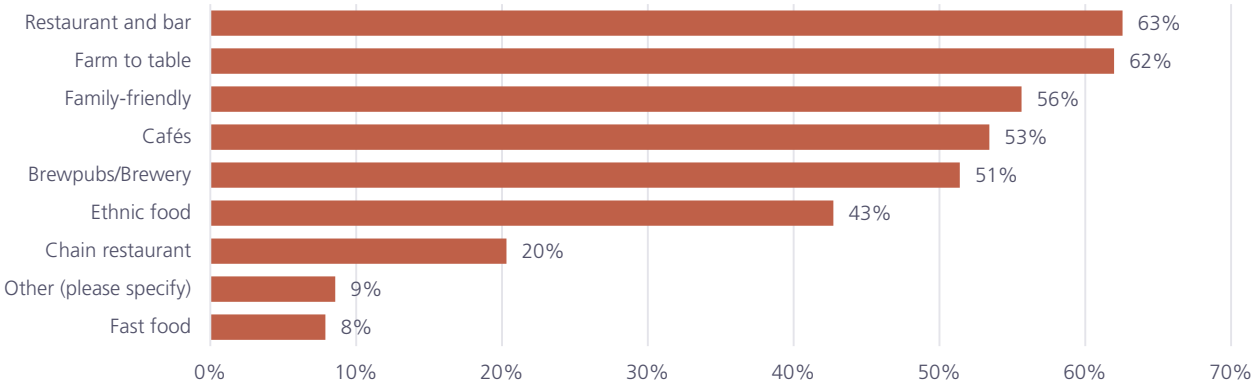


[Response Rate: 73.1% of Respondents]

Question 23. What type of eating and drinking establishments would you like to see in the Township? (Please select all options that apply)

A majority of respondents (63%) reiterated a strong desire to see more restaurants and bars in the Township. Considering the past or present ties many respondents had/have with farming and agriculture in the Township, and parts of the Township continues to preserve farmlands, many respondents expressed interest in supporting farm to table establishments. Roughly half the respondents also wish to encourage family-friendly eating and drinking establishments (56%), cafes (53%), and breweries (51%). Survey takers were least interested in encouraging fast-food or chain restaurants in the Township.

Eating and Drinking Establishments Preferences

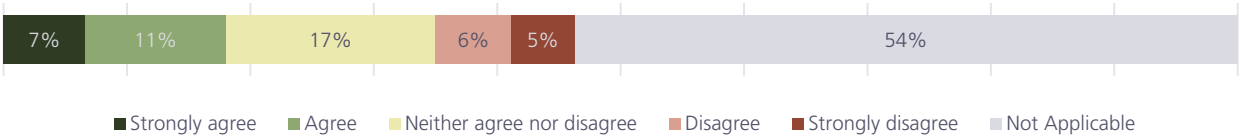


[Response Rate: 73.6% of Respondents]

Question 24. To what extent do you agree with the following statement, "I would like to start or expand a business in the Township, but I'm unaware of resources that could help me do that."

Only one-half of respondents were interested to start or expand a business the Township; 17% either strongly agree or agreed they were aware of resources to help establish/expand businesses; another 17% were neutral; while 11% were unaware of the resources.

Business Resources Outreach Satisfaction Scale



[Response Rate: 73.5% of Respondents]

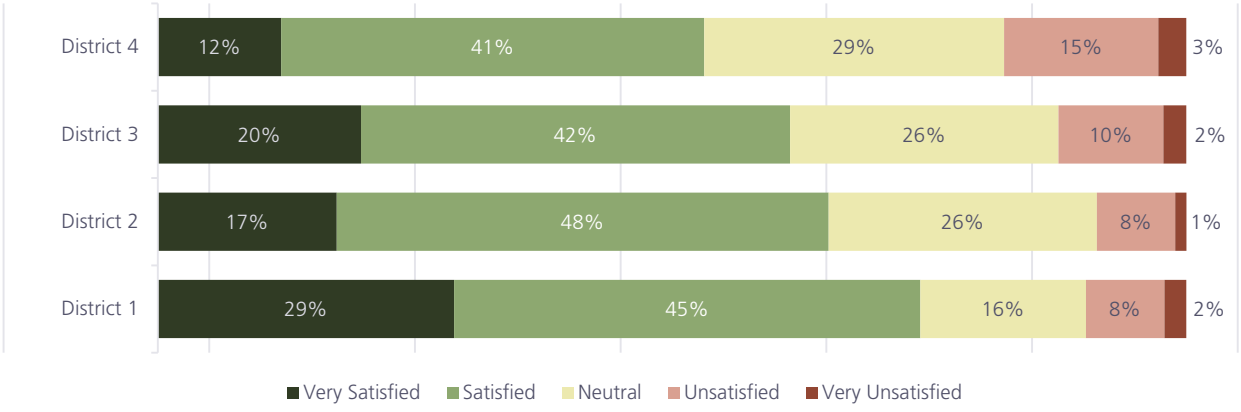
RECREATION

The responses in this section of the questionnaire help perceive the respondents' perception of recreational opportunities in the Township.

Question 25. How satisfied are you with the parks and other recreation offerings in the Township?

As the "Four Seasons Playground," a majority of respondents in all four districts were either very satisfied or satisfied with the parks and recreational opportunities offered in the Township. Many respondents reported a neutral perception, while respondents from Districts 3 and 4 indicated the highest level of dissatisfaction. As noted in Question 7, given only 78% of respondents noted their survey district, a district-wise analysis may slightly skew the results.

Satisfaction with Parks and Recreation Offerings



[Response Rate: 73.5% of Respondents]

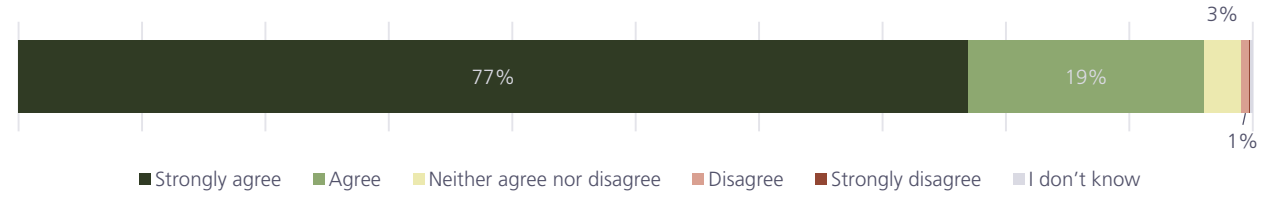
NATURAL FEATURES

The responses in this section of the questionnaire help comprehend the importance of natural features to the survey respondents.

Question 26. To what extent do you agree with the following statement: "Natural features are an asset to White Lake Township."?

Throughout the survey, most of the respondents demonstrated a strong motivation to preserve the open space and natural features in the Township; consistently, 77% "strongly agree" and 19% "agree" natural features were an asset to White Lake Township.

Level of Agreement that Natural Features are Assets to the Township

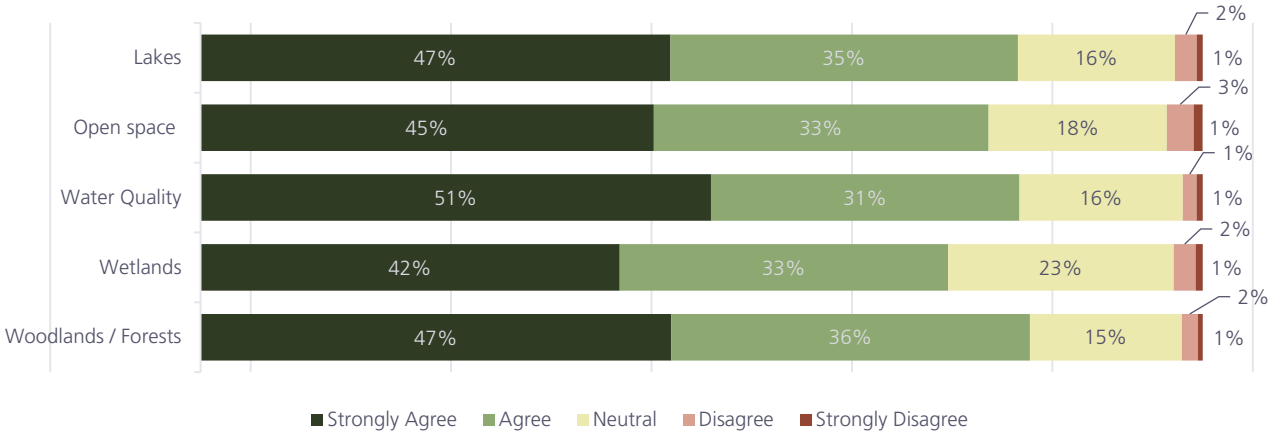


[Response Rate: 71.7% of Respondents]

Question 27. To what degree do you agree with the following statement: "The Township's natural features (listed below) could be better protected/preserved."?

Roughly 80 of respondents indicated the Township's natural features including lakes, open space, water quality, wetlands, and forests can be better preserved/protected. A majority (82%) of respondents indicated the water quality in the Township could be better preserved.

Level of Agreement that Natural Features are Assets to the Township



[Response Rate: 71.8% of Respondents; percentages may not add up to 100% due to rounding errors]

VISION FOR WHITE LAKE TOWNSHIP

This section uses community input to establish a vision for White Lake Township which is subsequently used to determine the priorities and goals in the implementation section of the Master Plan.

Question 28. Please select your top THREE goals for the future of White Lake Township. (Please select at most three options)

The majority of all respondents and residents alike (69%) identified preserving and protecting natural features as the top goal for the future of the Township. Subsequently, respondents ranked maintaining the small-town rural character of residential areas (49%) and providing adequate infrastructure while protecting natural features (46%) as the second and third priority goal; the preferences of residents align with that of all respondents.

Rating of Goals

Goals	All Respondents	Residents Only
Preserve and protect natural features including wetlands, floodplains, lakes, woodlands, and other natural features	69%	69%
Maintain the small-town rural character of existing single family residential areas	49%	49%
Provide adequate infrastructure that preserves and protects White Lake Township's natural features	46%	46%
Address the community's needs for efficient and safe multi-modal access (walking, biking, auto)	31%	32%
Enhance the quality of life and make the community more appealing by providing a variety of recreational facilities	26%	26%
Provide goods and services that meet the current and future needs of Township residents	22%	22%
Address the community's needs for sewer and water systems	20%	20%
Provide efficient public services that adequately and safely support the existing and future population of White Lake Township	17%	17%
Encourage high tech, research, and light industrial developments to improve the tax base and provide job opportunities	7%	7%
Provide a variety of housing opportunities	3%	3%

[Response Rate: 71.7% of Respondents]

Question 29. The 2012 Master Plan specified the following vision for White Lake Township: "Strive for a sustainable White Lake Township that balances the community's economic, environmental, and social needs. Promote the identity of White Lake Township as a small country town with big city amenities by protecting and preserving natural features, encouraging redevelopment of obsolete properties, and directing growth and development to a central community core." Does this vision align with your view of White Lake Township?

Majority of respondents (77%) either strongly agreed or agreed the vision statement of the 2012 Master Plan aligned with their view of White Lake Township; and 14% neither agree nor disagree. Roughly 10% of the respondents disagreed or strongly disagreed with the specified vision statement. Filtering responses by residents, no difference was observed between responses of residents compared to that of all respondents.

Question 30. If you were neutral or disagreed with the 2012 statement, what is your vision for White Lake Township?

Some common themes identified by respondents as their vision for the Township included:

- "Big city" amenities are not appropriate for the Township.
- Preserve and protect natural features.
- Protect the lakes and preserve water quality.
- Maintain small-town / rural character.
- Create walkable neighborhoods with pedestrian amenities.
- Maintain quality of roads and infrastructure
- Develop recreation programming for all ages.
- Control development / growth
- Add restaurants and destinations.
- Address blighted properties.
- Create a community!

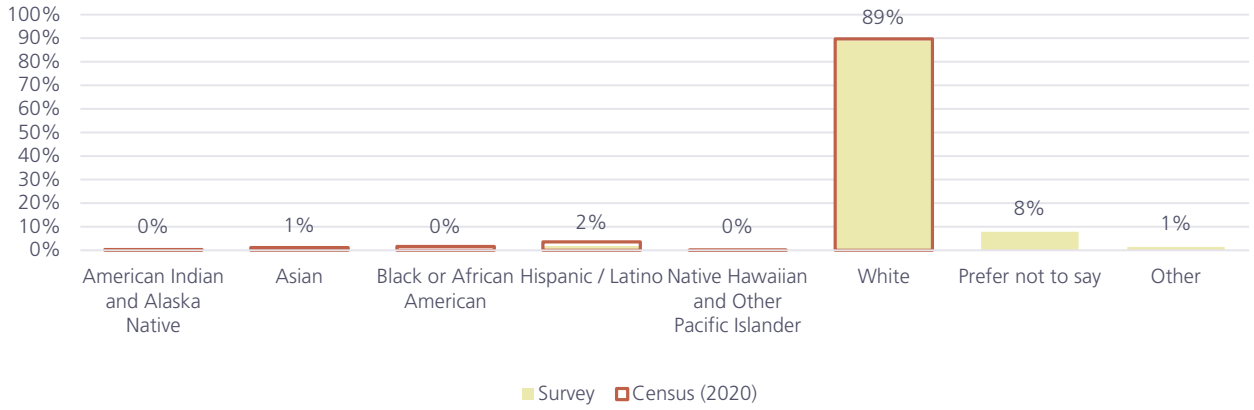
DEMOGRAPHICS

The following demographic questions in the survey were optional and included solely with the intent of ensuring the survey was representative of the community.

Question 31. How would you identify yourself? (Please select all options that apply)

The majority of respondents (89%) identified as White; given 90% of the Township population identified as White in the 2020 Census, the survey was fairly racially representative of the population.

Racial / Ethnic Identity of Respondents

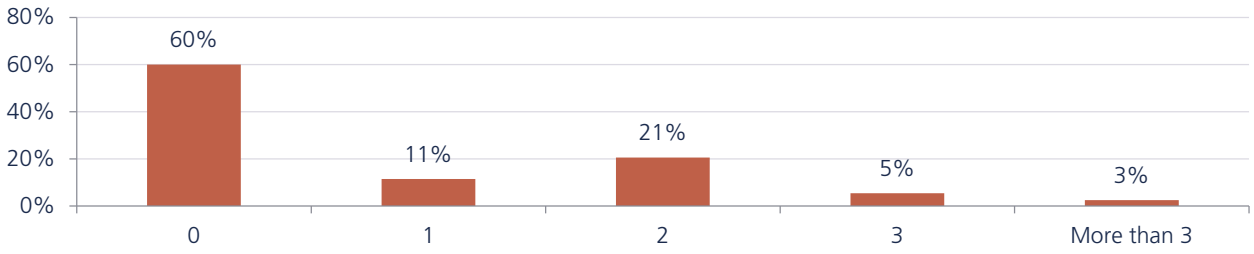


[Response Rate: 70.2% of Respondents; percentages may not add up to 100% due to rounding errors]

Question 32. How many members of your household are under the age of 18?

The majority of respondents (60%) had no members under the age of 18 years in their household and the remaining 40% had at least one member under the age of 18 years. The 2020 American Community Survey, indicated 30% of White Lake Township's population had at least one member under 18 years of age in a household, indicating respondents with children were slightly overrepresented in the survey.

Number of Household Members Under 18 Years

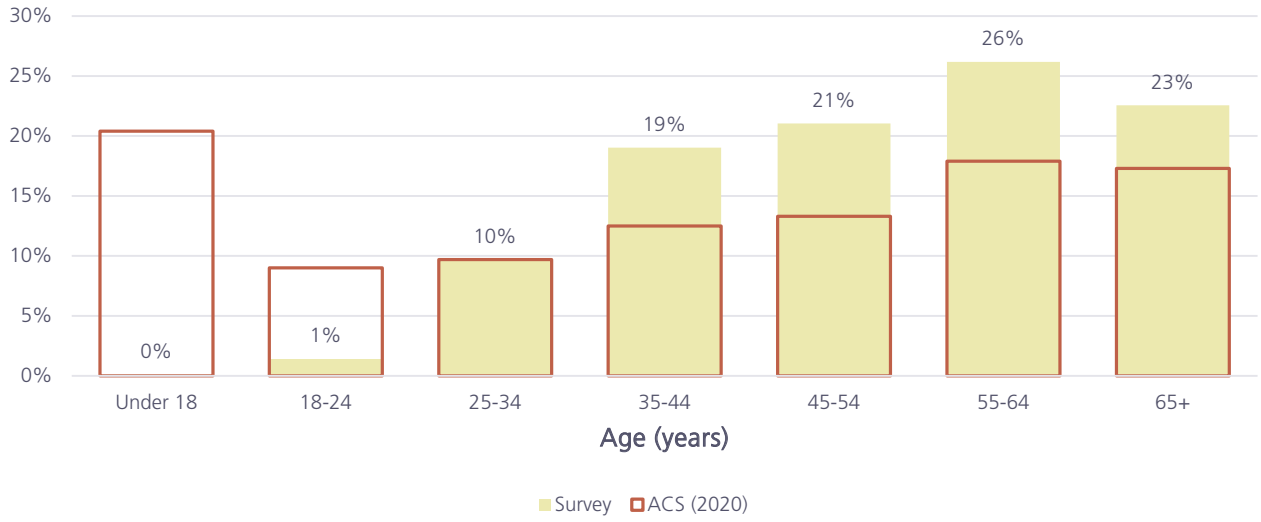


[Response Rate: 70.6% of Respondents]

Question 33. What age group do you fall into?

Respondents from all age cohorts were represented in the survey, except those under 18 years. Given children and youth were not the target audience for this survey, the under representation is expected. Comparing the age of respondents to the 2020 American Community Survey estimates, young adults 18-24 years were underrepresented while all other cohorts were overrepresented.

Age of Respondents



[Response Rate: 70.4% of Respondents]

REDEVELOPMENT WORKSHOP RESULTS

INTRODUCTION

On August 17, 2023 the Planning Commission hosted a workshop to gather public input on five sites of possible redevelopment. The workshop was held between 5pm and 7pm in the Township Annex, and approximately 100 members of the public attended.

The central aim of the workshop was to begin a conversation among residents about the future potential at five sites selected for consideration by the Planning Commission. Though some sites identified for this workshop are currently vacant, two sites were a part of the Township's Master Plan update in 2012. Concepts for future development and use at both sites were developed during the last planning process, and both concepts were presented again during the workshop. The other three sites provided blank slates for residents to share their ideas based on the site surroundings as well as general desires for development in the area.

Results from the workshop provide a framework for future plans of redevelopment as they come to fruition. By providing the opportunity for residents to identify uses they would support at each site and to share feedback, suggestions, and concerns, all five sites are currently accompanied by a vision of use and development that will be the basis of any changes. This report details the results of community input provided for all five sites, analysis of trends, and preliminary recommendations for a more complete development concept to be explored in the future.

REDEVELOPMENT SITES

The redevelopment workshop asked attendees to share their perspectives on five potential sites of redevelopment. These sites fell into one of two categories described below, and attendees engaged with each redevelopment site based on the category.

Existing Redevelopment Concepts

The following two concepts were developed during the 2012 update to the Master Plan. At the workshop, attendees used sticky dots to indicate whether they supported the existing concept rendering. Attendees were also asked to write thoughts and suggestions on sticky notes to identify the specific components of the concept they supported as well as other components they felt were missing or were not appropriate for the site.

- Pontiac Lake Gateway Concept Plan
- Elizabeth Lake Road and Union Lake Road Concept Plan

New Uses and Redevelopments

The following three sites represent vacant tracts of land that present the opportunity to be developed in ways that accommodate specific needs and desires as identified by the Township. These three sites were strategically chosen from across the southern half of the Township to ensure the predominantly agricultural uses north of M-59 are preserved. At the workshop, each site was accompanied by six to eight potential use options that attendees were asked to indicate their support of with sticky dots.

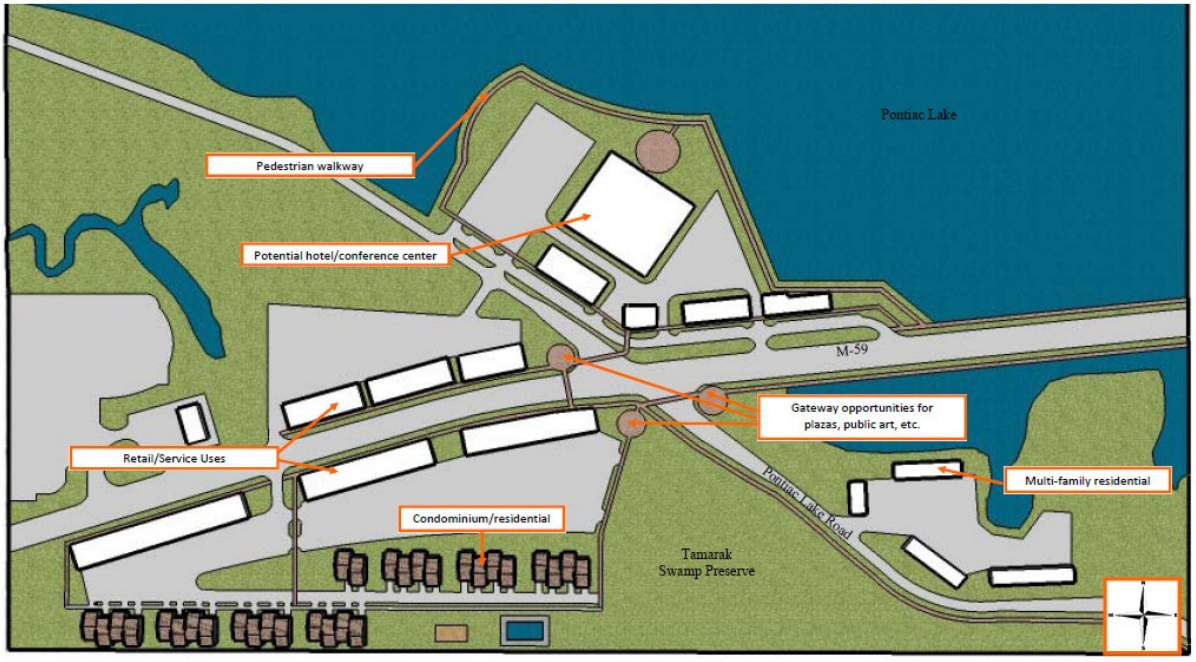
- Round Lake Road and Cedar Island Road
- Cedar Island Road and Bogie Lake Road
- Civic Center/Lakes Town Center (M-59 and Elizabeth Lake Road)

WORKSHOP RESULTS

Pontiac Lake Gateway Concept Plan

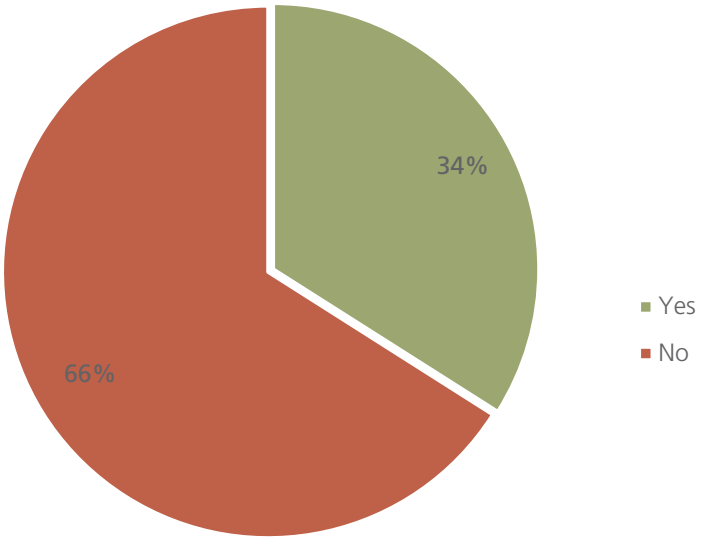
The Pontiac Lake Gateway concept plan was developed during the 2012 update to the Master Plan. Pontiac Lake Gateway offers an opportunity to showcase White Lake Township at its only major entry from the east by enhancing lake views, removing blighted structures, and improving connectivity for pedestrians. The 2012 concept proposed retail and service uses, multi-family residential, plazas and spaces for public art, a hotel and/or conference center, and a pedestrian walkway.

Pontiac Lake Gateway Concept Plan



When asked to indicate whether the current redevelopment concept aligned with their vision, about two thirds of workshop attendees shared it did not (as seen in Figure 1):

Figure 1: "Does the Pontiac Lake Gateway concept plan align with your view of the future of this site?"



Comments, suggestions, and concerns about this concept were provided by attendees on sticky notes and are summarized below. While just 6% of all comments suggested this concept should be rethought in its entirety, all other suggestions coalesce around a few themes that should be the focus of any revisions to the existing concept to align with the vision of the community.

- **Support for the concept** as a way to utilize the lake setting, create a community space, and remove deteriorating structures.
- **Support for the pedestrian walkway**. Respondents shared they would support a biking/walking path around Pontiac Lake.
- **Support for the development of restaurant/bars along the waterfront**. Attendees specified they would like to see a nice, affordable restaurant in the area and also suggested the area provide boat docks.
- **Opposition to multi-family residences**. This was the most common takeaway from the concept with about 37% of all comments sharing this sentiment.
- **Opposition to the hotel and conference center**. While there is evidence of some support for this development, attendees expressed they would prefer uses specific to the wellbeing and use of permanent residents rather than visitors.
- **Some opposition to retail**. While some responses expressed their support for retail and shopping as a compliment to restaurants, bars, and other dining areas, others shared concerns about M-59 traffic as a challenge to utilizing these retail spaces, as well as a preference to keep the Township's retail in the M-59 and Elizabeth Lake Road area.

Results

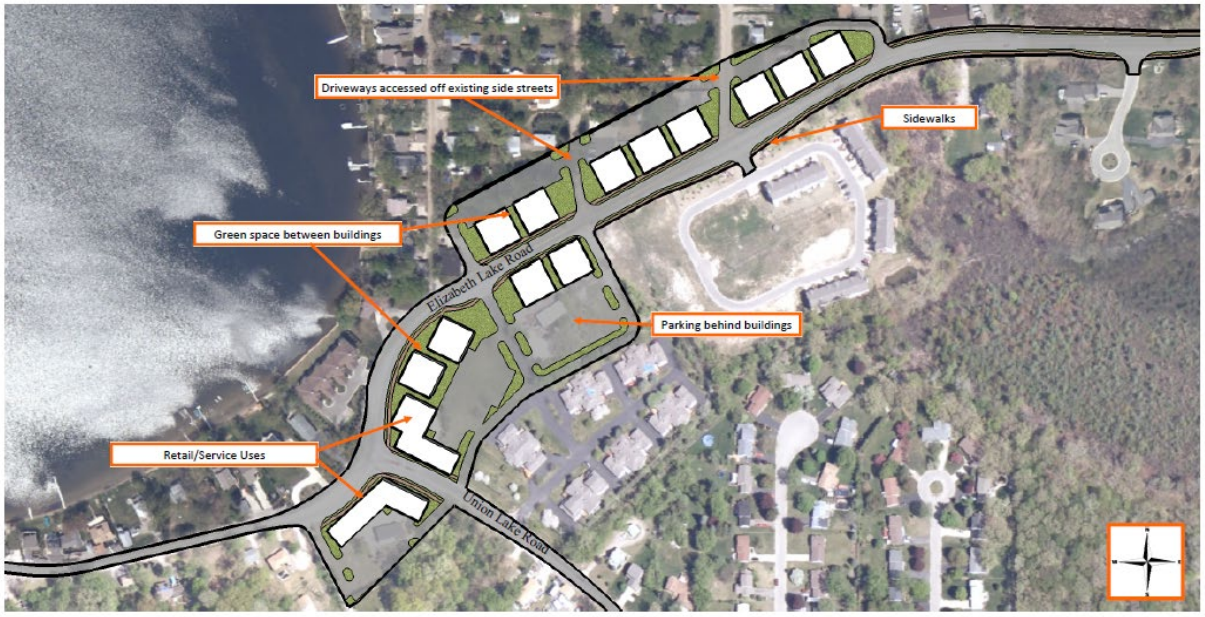
The Township should consider revising this concept in the following ways:

- Prioritize the development of restaurants over the hotel and conference center.
- Incorporate residential uses through mixed-use developments. While the proposed multi-family residential structures may not be the best fit for the site, there may be an opportunity to provide some residential units alongside retail with mixed-use development.

Elizabeth Lake Road and Union Lake Road Concept Plan

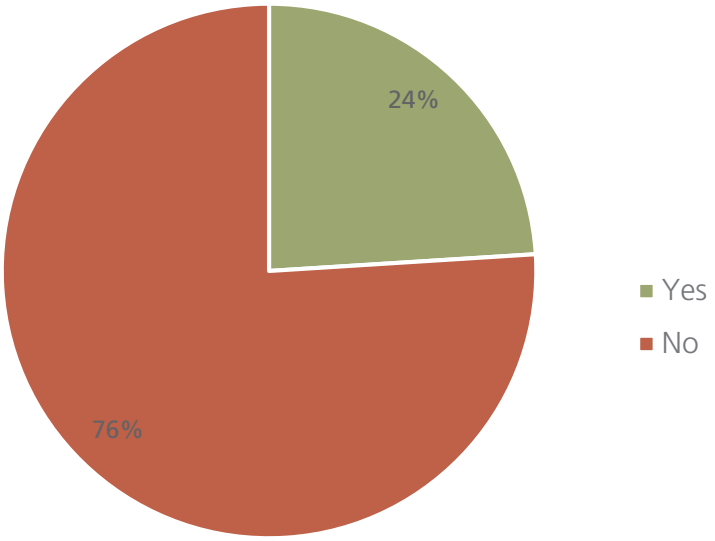
The Elizabeth Lake Road and Union Lake Road concept plan was developed during the 2012 update to the Master Plan. The site would benefit from investment to rehabilitate existing buildings or facilitate new construction. Additionally, the existing residential uses would likely support neighborhood retail. Other benefits of revitalization include the removal of blighted buildings, an improved appearance, uses that align with the largely residential character of the area, improved views of Oxbow Lake, and the opportunity to link the commercial area with nearby residential neighborhoods. The 2012 concept proposed retail and services uses connected by sidewalks that incorporate green spaces between buildings.

Elizabeth Lake Road and Union Lake Road Concept Plan



When asked to indicate whether the current redevelopment concept aligned with their vision, just over three fourths of workshop attendees shared that it did not (as seen in Figure 2 below):

Figure 2: "Does the Elizabeth Lake Road/Union Lake Road concept plan align with your view of the future of this site?"



Comments, suggestions, and concerns about this concept were provided by attendees on sticky notes and are summarized below.

- **Support for walkable design and incorporation of green spaces**. This concept plan was praised for the way it prioritized walkability, sidewalks, and green spaces in a retail-oriented area. Some suggestions included adding more sidewalks and ensuring green spaces comprise a large portion of the site.
- **Support for mixed-use developments and uses that complement adjacent neighborhoods**. Though new residential developments are not currently proposed for this redevelopment concept, some attendees suggested incorporating residences among retail sites through mixed-use buildings.
- **Concerns about locating retail uses in this area of the Township.** Some attendees shared current levels of traffic from surrounding neighborhoods may pose a challenge to successfully locating retail in this area. The residential nature of the site also poses a challenge to getting residents from other parts of the Township to the district.
- **Opposition to developing this site**. About 30% of all comments did not support the development of this site and instead favored keeping and maintaining it as green space.

Results

Revisions to this concept plan should center around scaling back the extent of proposed retail-oriented development. Proposed retail may support the needs of surrounding residents and can be catered to neighborhood-specific uses. Additionally, the greatest, most favorable assets of this site present an opportunity for adjusted development to expand green spaces and promote walkability as primary attractors to the area rather than secondary features.

Round Lake Road and Cedar Island Road

This redevelopment site is in the southeastern part of the Township. The surrounding area is primarily residential; apart from a few service agencies, there is no immediate access to any commercial area.

Redevelopment Site: Round Lake Rd

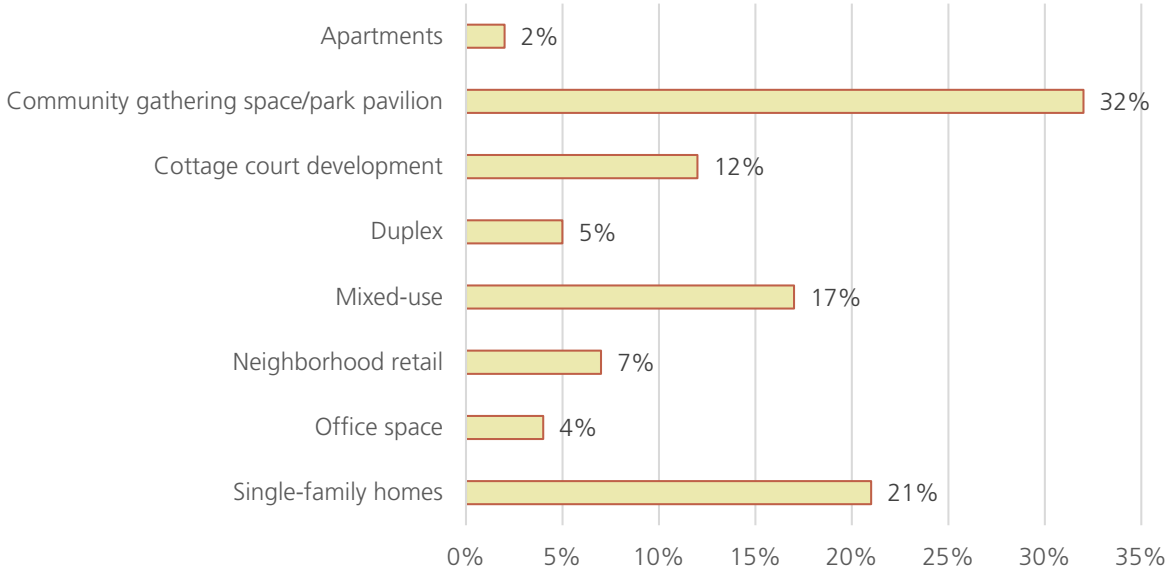
Sources: Michigan Open Data Portal, Oakland County, White Lake Township

60 Feet

Beckett & Raeder, Inc.

During the redevelopment workshop, attendees were asked to indicate which uses they would support should this site become developed. These thoughts are compiled in Figure 3.

Figure 3: Favorable Uses for Round Lake Road & Cedar Island Road



Along with indicating the uses they would support at this site, a few attendees also left comments to provide context to their responses. Some comments expressed a general need for more affordable housing in the Township; others shared retail uses would not fit and contribute to traffic congestion because of the residential nature of the area; and others shared a preference to keep the Township's green areas to avoid overdevelopment.

Results

The most common preferences for this site's redevelopment present an opportunity to develop additional dwellings compatible with an outdoor community gathering space or pavilion, the option that received the most support. A cottage court development naturally lends itself to community gathering spaces as the front and/or back yards of the development are typically shared, naturally creating community space. Mixed-use developments have the opportunity to incorporate much needed commercial uses in support of the largely residential character that currently exists in the area, while also providing additional residential units.

Cedar Island Road and Bogie Lake Road

This redevelopment site is located in the southern part of the Township and is in close proximity to three primary/secondary schools (Lakewood Elementary School, White Lake Middle School, and Lakeland High School) as well as the Brentwood Golf Club and Banquet Center. This site's location on Bogie Lake Road provides a direct connection to M-59, making it largely accessible from across the Township.

Redevelopment Site: Cedar Island Rd

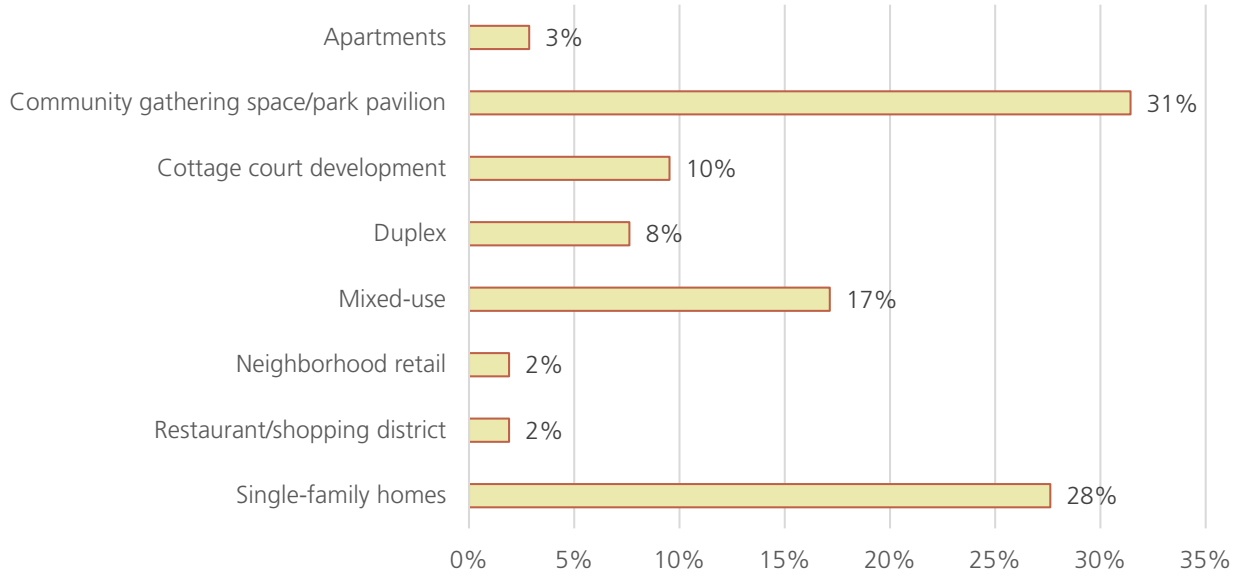
Sources: Michigan Open Data Portal, Oakland County, White Lake Township

160 Feet

Beckett & Raeder, Inc.

During the redevelopment workshop, attendees were asked to indicate which uses they would support should this site become developed. These ideas are compiled in Figure 4.

Figure 4: Favorable Uses for Cedar Island Road & Bogie Lake Road



Along with indicating the uses they would support at this site, a few attendees also left comments to provide context to their responses or to offer additional suggestions. The most common sentiment from these insights was a hesitancy to develop this site at all. These commenters shared their affinity for existing green space, concerns about school-based traffic and the general danger of roads in the area, and general opposition to development. Soccer fields were proposed as a potential use which received the second most support from commenters.

Results

The two most common responses that support the development of single-family homes and a community gathering space/pavilion complement each other and provide a feasible vision for development that aligns with the area's current landscape of schools and neighborhoods. Developing homes near the schools presents a wise pattern of development that enables much needed access for families with school aged children. This, alongside a formal community space, park, and/or outdoor pavilion, presents an opportunity for utilization by a wide range of users, such as students, families, and nearby residents. While less aligned with the two most popular choices, the support for mixed-used development in this area also provides a complementary use to nearby schools as the activity in the area is likely to support new businesses.

Civic Center/Lakes Town Center (M-59 and Elizabeth Lake Road)

This redevelopment site is located in the center of the Township at the southwest corner of Highland Road (M-59) and Elizabeth Lake Road, which contributes to its accessibility from across White Lake. The lot is just yards away from the proposed Civic Center and across Elizabeth Lake Road from Lakes Town Center. Amid this access to public institutions, shopping, and dining, recreational spaces like Hawley Park and Stanley Park are in close proximity as well.

Redevelopment Site: Civic Center

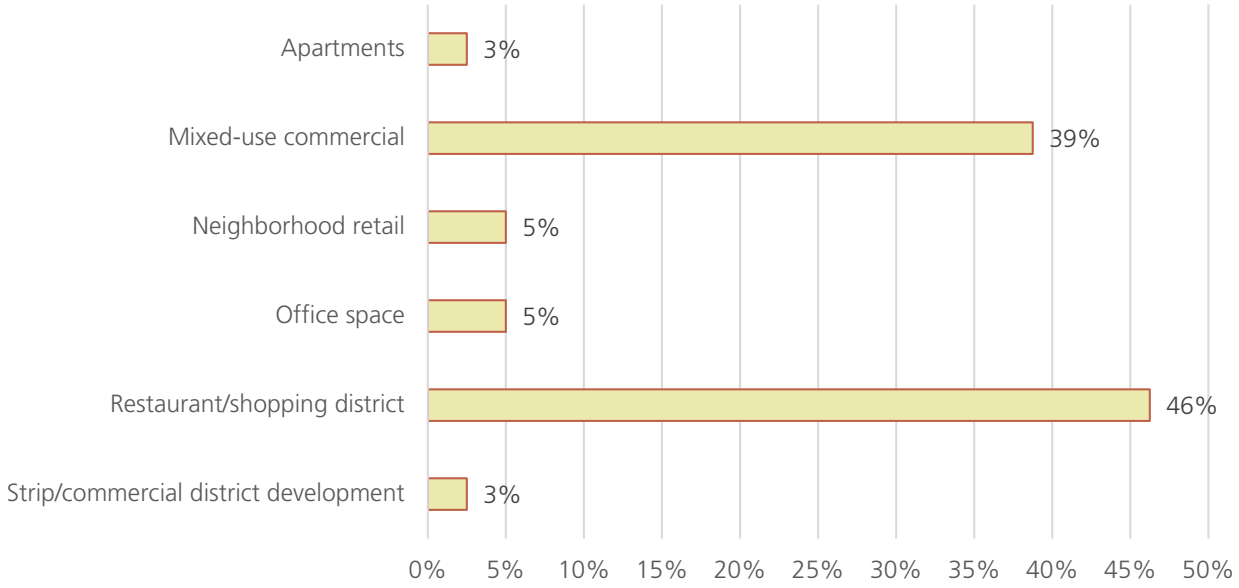
Sources: Michigan Open Data Portal, Oakland County, White Lake Township

60 Feet

Beckett & Raeder, Inc.

During the redevelopment workshop, attendees were asked to indicate which uses they would support should this site become developed. These thoughts are compiled in Figure 5.

Figure 5: Favorable Uses Adjacent to the Civic Center/Lakes Town Center



Along with indicating the uses they would support at this site, a few attendees also left comments to provide context to their responses or to offer additional suggestions. The majority of commentors expressed their opposition to developing the site or adding more storefronts to the Township. Some respondents shared uses offering restaurants, dining opportunities, and/or shopping areas should have character and follow an appealing aesthetic form. Finally, a suggestion for a farmers' market with fresh fruit and vegetables received support, though not initially presented.

Results

The two most popular uses for this site complement each other well. Developing a restaurant and shopping district to support community entertainment and commercial interests is compatible with mixed-use developments that incorporate residential units in commercial buildings. The site's location across from Lakes Town Center provides a natural expansion with similar uses that emphasize leisure and entertainment.

MASTER PLAN OPEN HOUSE RESULTS

INTRODUCTION

On December 7th, 2023, the Planning Commission hosted an open house during a regularly scheduled meeting to gather public input on three aspects of the White Lake Township Master Plan: three sites of potential redevelopment, the Master Plan's action plan, and the proposed Future Land Use Map (FLUM) and Future Land Use categories. At the time of the open house, the Township's Master Plan had recently entered 63-day review, meaning a complete draft of the 2024 Master Plan was available on the Township's website for public review and comment. Approximately 100 members of the public were in attendance.

The rest of this report will summarize results gathered from the open house on each of the three areas. Feedback provided at the open house offers guidance on the most actionable aspects of the 2024 Master Plan.

- Comments on the potential three redevelopment sites provided a nuanced perspective on the community input that was initially used to conceptualize developments at each place and support a process of community feedback used to ensure continued alignment with community-based visions.
- Observations of the Future Land Use framework (map and categorizations) allow for the reconsideration of proposed future uses alongside their applicability to the culture of the Township in both the present and future.
- Residential preferences related to the proposed action plan provide the opportunity to hone actions to the ones that are most needed.

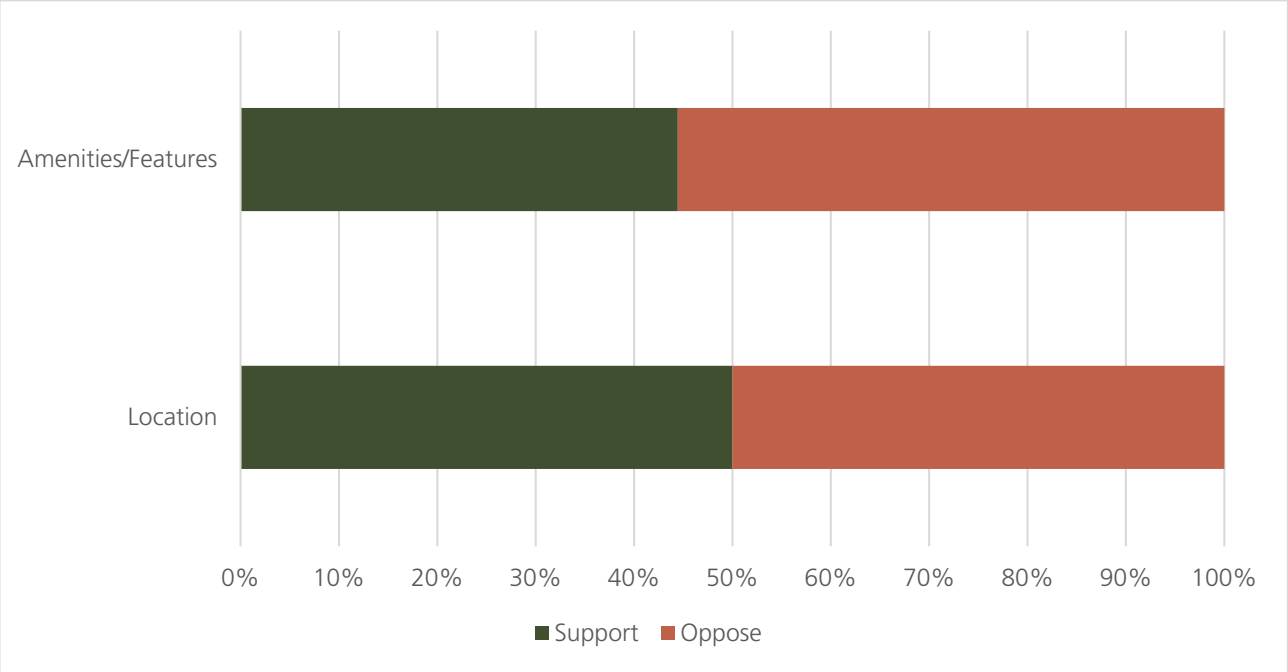
REDEVELOPMENT SITES

The three potential redevelopment sites presented to the public for review were conceptualized based on feedback gathered at a redevelopment workshop held by the White Lake Township Planning Commission in August of 2023. Included with each site was a rendering, a brief description of the uses the site would include, and a series of questions to gauge sentiments related to the site's location, amenities and features, and the likelihood of whether attendees would engage with each component of the site (if at all). The following section details the results of community input and feedback for each site.

Pontiac Lake Gateway

Open house attendees were asked to provide feedback on the Pontiac Lake Gateway property based on the site's location as well as the amenities and features proposed to be included with the development. Of the three redevelopment sites, Pontiac Lake Gateway received the most support from Township residents. The location of the redevelopment site was supported by 50% of all respondents (and opposed by the other 50%). The site's amenities and features had similarly even rates of support and opposition with about 44% in support of the proposal and 56% in opposition.

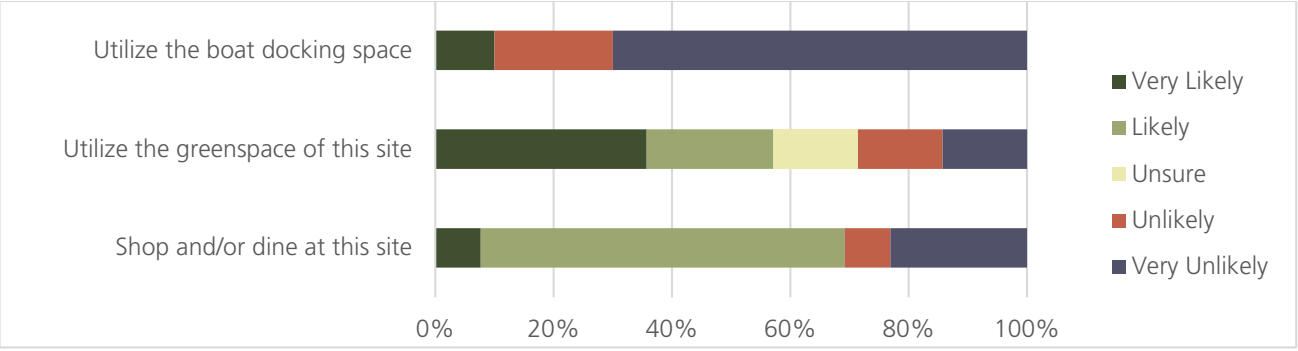
Location and Amenity Approval for Pontiac Lake Gateway



In addition to indicating their general support for or opposition to these aspects of the redevelopment site, open house attendees were asked to further elaborate on their views by sharing specific comments about the site's location and amenities. In general, these comments provided additional suggestions for the site (such as a waterfront restaurant, boat rentals, and fishing areas with handicap access) as well as overall support for the vision of the redevelopment, especially in comparison to the current use of the site. Other comments stated that the waterway was already too congested and therefore needed to be protected.

The final activity to gather feedback on the Pontiac Lake Gateway property asked open house attendees to indicate their likelihood of engaging with the site in several ways based on the proposed amenities. More than 50% of all respondents (69% and 57%, respectively) indicated they would be "likely" or "very likely" to "shop and/or dine" and "utilize the greenspace" of the site. While 90% of respondents stated they were "unlikely" or "very unlikely" to use the boat docking space proposed for the site, this is likely a function of which residents of the Township own a boat that does not already have a designated docking space.

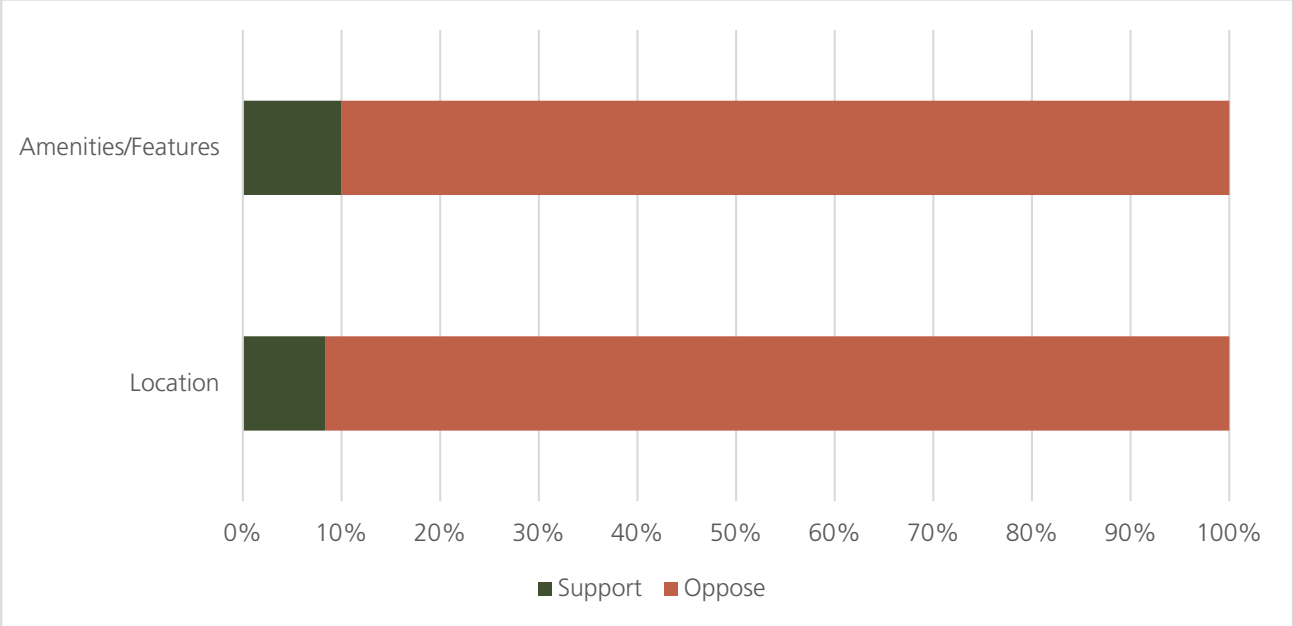
Likelihood to Engage with Site Amenities



Lakes Town Center

Open house attendees were asked to provide feedback on the Lakes Town Center property based on the site's location as well as the amenities and features proposed to be included with the development. The location of the redevelopment site was supported by just over 8% of all respondents, and the site's amenities had similar rates of support with 10% of participating attendees indicating their support for proposed features.

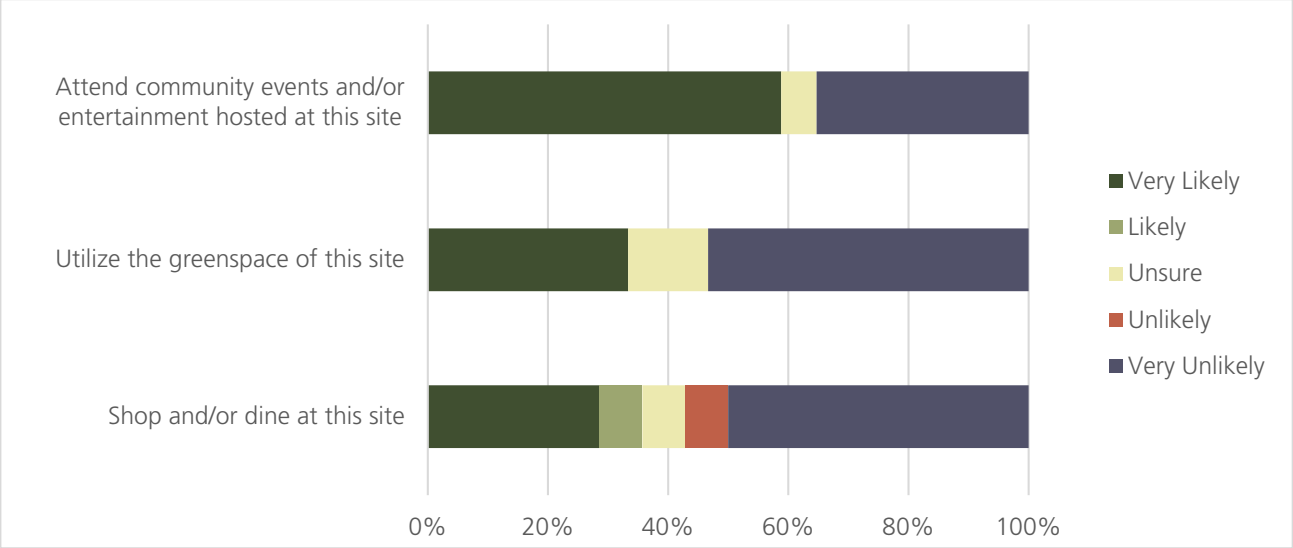
Location and Amenity Approval for Lakes Town Center



In addition to indicating their general support for or opposition to these aspects of the redevelopment site, open house attendees were asked to further elaborate on their views by sharing specific comments about the site's location and amenities. The location of this redevelopment site presented concerns to some attendees related to existing levels of traffic congestion in the area as well as anticipated impacts on Brendel Lake in terms of light and noise pollution. More generally, concerns about the Township's capacity to support new businesses were presented here along with the suggestion to utilize vacant buildings before developing new ones. Many comments about the proposed amenities and features of the site emphasized a desire to promote a farm stand, farmer's market, and/or craft market to honor past uses common to the area. Other comments focused on the needs of the Township's senior citizens, stating a senior living facility may provide benefits to residents based on its proximity to the library and greenspace as well as parking accommodations that serve the needs of this population.

The final activity to gather feedback on Lakes Town Center asked open house attendees to indicate their likelihood of engaging with the site in several ways based on the proposed amenities. Nearly 59% of all respondents indicated they were "very likely" to attend community events/entertainment hosted at the site. Further, about 30% of all respondents indicated they would also be very likely to utilize the site's greenspace and to shop and/or dine at the development – however, about 53% and 57% (respectively) indicated they would be "unlikely" or "very unlikely" to partake in the same activities.

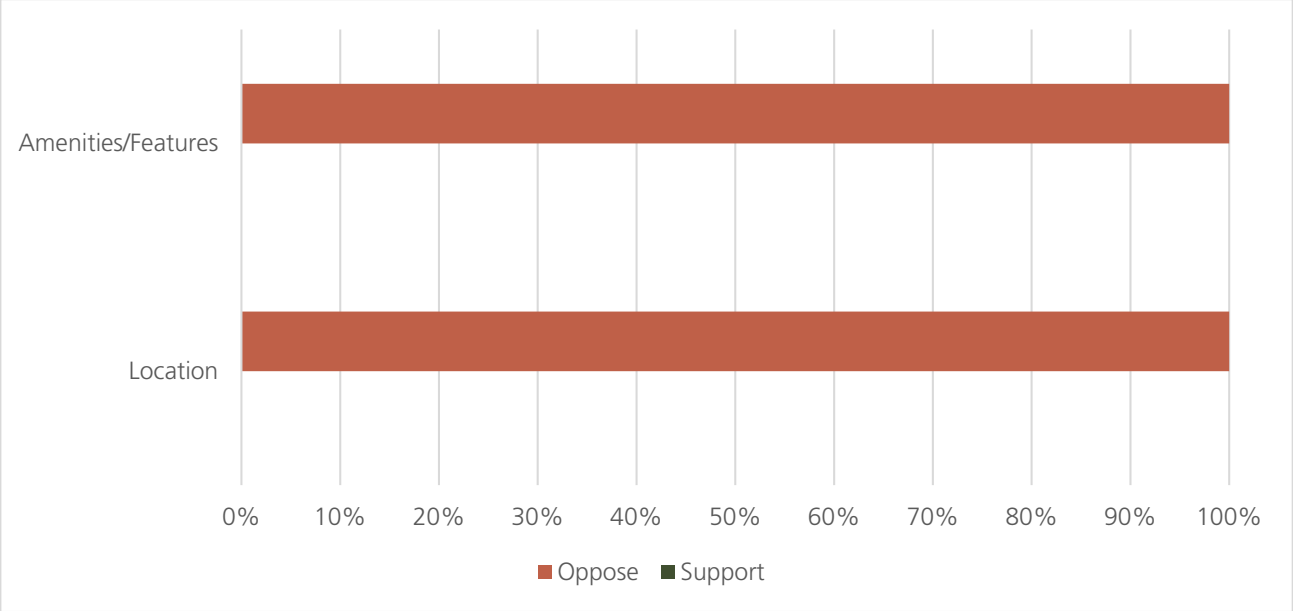
Likelihood to Engage with Site Amenities



Cedar Island Road and Bogie Lake Road

Open house attendees were asked to provide feedback on the west intersection of Cedar Island Road and Bogie Lake Road site based on the site's location as well as the amenities and features proposed to be included with the development. Of the three redevelopment sites, the Cedar Island Road and Bogie Lake Road received the least amount of support from Township residents – virtually 100% of all open house attendees opposed both the site's location and its proposed amenities and features.

Location and Amenity Approval for Cedar Island Road and Bogie Lake Road

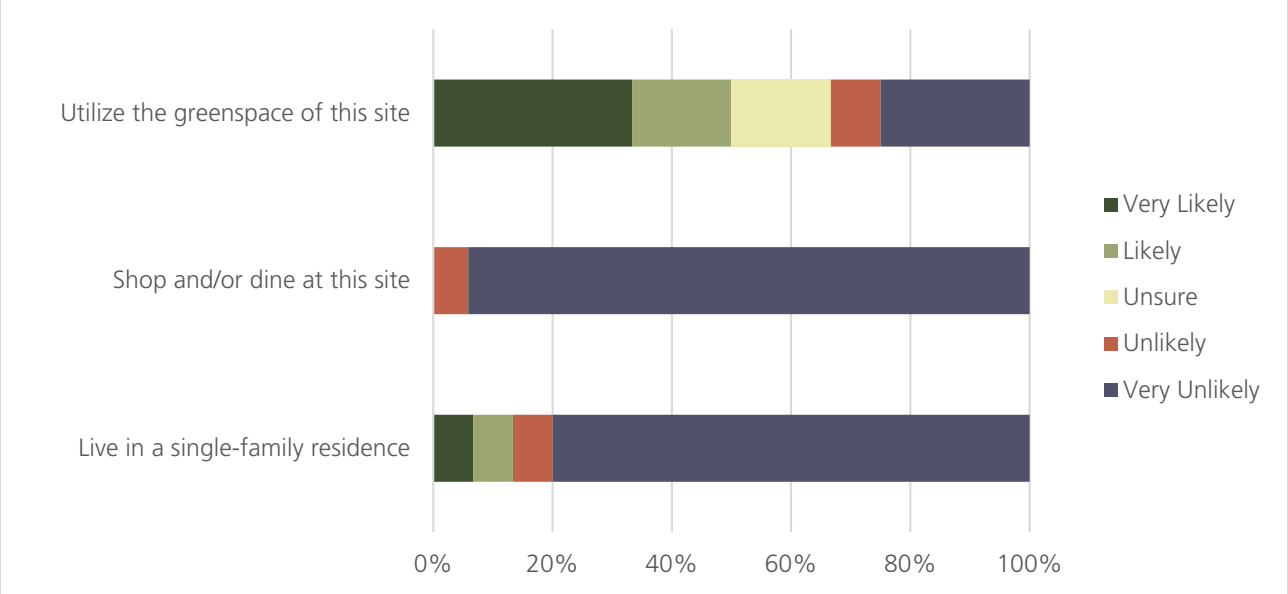


In addition to indicating their general support for or opposition to these aspects of the redevelopment site, open house attendees were asked to further elaborate on their views by sharing specific comments about the site's location and amenities. The location of this redevelopment site presented two primary concerns related to the types of residential housing the site might offer and to the impact

of both residential and commercial traffic in the area. Respondents voiced their opposition to rental housing units as well as residential units of mixed-use developments, instead supporting single-family homes on 1-acre lots. Existing traffic on Bogie Lake Road was cited as a specific hindrance to this redevelopment site, as was its proximity to three schools that do not have capacity for more students and that, in themselves, contribute to traffic during the school year. However, one comment emphasized the benefits of promoting walkability to and from the schools with additional residential developments in the redevelopment. Comments about the site's features and amenities reiterated general opposition to apartments, commercial buildings, and mixed-use developments, again citing concerns with traffic and congestion as the primary drivers for these stances. One attendee suggested the site's land be sold to schools for them to use as a recreation space, or to be developed privately as an indoor recreation center.

The final activity to gather feedback on the Cedar Island Road and Bogie Lake Road property asked open house attendees to indicate their likelihood of engaging with the site in several ways based on the proposed amenities. About 50% of all respondents indicated they were "likely" or "very likely" to utilize the site's greenspace, and about 13% shared they would be open to living in a single-family residential unit on the site. However, 100% of all respondents indicated they were "unlikely" or "very unlikely" to shop and/or dine at the site while the majority of respondents (about 87%) also indicated their unlikelihood to live on the site in a single-family residence.

Likelihood to Engage with Site Amenities



FUTURE LAND USE MAP

Community input for the Future Land Use Map (FLUM) was centered around opportunities to improve clarity in the descriptions of each categorization while also checking to see whether any proposed categorizations seemed misplaced on the FLUM.

In general, public input for this activity emphasized the appreciation residents have for the Township as a community that is not overly focused on commercial or business development. One respondent shared the commercial future land use designations seemed "overly inflated" and expressed the

concern the Township does not have the residents (workers and patrons) to support such an emphasis.

When asked whether the FLU framework (map and categorizations) was expected to support or hinder current or future plans within the Township, five attendees indicated their plans were "supported" while four indicated plans were "hindered." Here, a comment from one attendee again emphasized their appreciation for the current feel of the Township as opposed to a "city feel with lots of business development."

ACTION PLAN

As a culmination of the Master Planning process, 23 actions items were identified as priorities for White Lake Township. Each item is directly informed by the Master Plan's findings, including community input and public opinion. At the open house, attendees were instructed to indicate the three action items of the action plan they believed to be of greatest importance for the Township to pursue and/or prioritize in the near future. The results of this activity are described below.

Highest Priorities

The five most popular action items emphasize the preservation of open spaces and natural areas through several approaches that limit or redirect development to specific parts of the Township while also prioritizing strategies intended to protect environmentally sensitive areas.

1. Preserve natural and open spaces by pursuing commercial development in vacant buildings and/or retrofitting strip malls to support new commercial activities. ***11 votes***
2. Encourage protection of wetlands and installation of green infrastructure along FEMA zones to mitigate harm caused by flooding. ***10 votes***
3. Designate areas around floodplain as conservation areas to limited development and impervious surfaces. ***10 votes***
4. Regulate lakefront development by mandating greenbelts with native vegetation in a buffer zone between the setback and the water's edge to reduce flooding impacts. ***8 votes***
5. Support commercial development by revitalizing buildings that have become vacant and/or retrofitting strip malls to support new commercial activities. ***8 votes***

Moderate Support

The following action items received some level of support from open house attendees and each garnered between one and six votes from White Lake residents. Among the most popular items in this category are those that emphasize transportation and mobility across the Township through non-motorized infrastructure, general safety on behalf of drivers, walkers, and pedestrians, and traffic calming measures to ease congestion across the Township.

1. Educate and share information with Township residents about implementation plans for non-motorized infrastructure that includes a signed bicycle route, bicycle lanes, and shared-use paths. ***6 votes***
2. Address the volume of crashes that take place at intersections along M-59 by improving road safety measures and implementing biking and pedestrian infrastructure. ***5 votes***
3. Implement traffic calming techniques along Cooley Lake Road and M-59 (east of Teggerdine Road) to ease commuter congestion in route to outside communities. ***4 votes***

4. Encourage green infrastructure placement during the site plan review process and/or planned development process. *4 votes*
5. Ensure redevelopment plans align with community-guided ideas at Pontiac Lake Gateway, Cedar Island and Bogie Lake Roads, and around Lakes Town Center. *3 votes*
6. Provide information about voluntary conservation easements to residents, especially those living in environmentally sensitive areas. *3 votes*
7. Retain residents between the ages of 25 and 34 by responding to demand for more housing units, including affordable housing options. *3 votes*
8. Address increasing housing costs and the limited availability of starter homes valued between $150k and $250k by increasing the Township's supply of housing to match the demand. *2 votes*
9. Pursue CDBG funds to support the revitalization of housing units that are deteriorating and/or uninhabitable in order to put them back into the housing market. *2 votes*
10. Accommodate the needs of the Township's disabled population by enforcing ADA compliant design. *1 vote*
11. Recognize the economic hardship that faces households earning below the ALICE threshold by encouraging affordable housing and economic opportunities. *1 vote*
12. Ensure aging housing stock receives appropriate maintenance and renovation to promote its habitability to the greatest extent and to avoid deterioration and demolition. *1 vote*
13. Rezone commercial districts and corridors to allow for mixed-use developments. *1 vote*
14. Educate and share information with Township residents about public transportation options, including upcoming changes in operation. *1 vote*

Not Supported

The following four items did not receive support from any open house attendees. It is important to acknowledge while these areas of focus may be considered lower priorities than previous items, input from attendees of the open house may not fully represent opinions from all residents of the Township.

- Support an increasing senior population by assessing and responding to demand for additional assisted living facilities, nursing homes, and appropriate healthcare facilities.
- Increase housing supply to meet demand for residence in the Township.
- Accommodate future community housing preferences by matching the size and types of housing construction to needs. For example: while single-family homes remain the most prominent preference for Township residents, attached single-family structures (such as duplexes) can also be supported.
- Support the efforts of the Corridor Improvement Authority to promote a sense of place, connectivity, and various activities in commercial corridors across the Township.

WHITE LAKE TOWNSHIP

COMMUNITY DEVELOPMENT DEPARTMENT

DATE: March 1, 2024

TO: Joe Seward, Chairperson
Planning Commission

FROM: Sean O'Neil, Community Development Director

SUBJECT: Amendments to Zoning Ordinance No. 58

Please find attached, recommended amendments to Zoning Ordinance No. 58. The amendments span many different sections of the ordinance and are largely meant to clean up and clarify the language. For the purpose of organization, each proposed amendment is listed out in numbered "Parts" as you move through the document. Our goal is always to clearly convey regulations and eliminate possible confusion. Most of these changes are minor in nature.

I have included a "red lined" version of the proposed amendments. They are a bit easier to review and compare. I look forward to reviewing and discussing these ordinance amendments with you next week, prior to holding a public hearing on April 4th. If you have any questions, or require additional information, please do not hesitate to contact the office.

Thank you.

CHARTER TOWNSHIP OF WHITE LAKE
COUNTY OF OAKLAND
AMENDMENT _____ TO ZONING ORDINANCE

AN ORDINANCE TO AMEND THE ZONING ORDINANCE OF THE CHARTER TOWNSHIP OF WHITE LAKE BY AMENDING ARTICLE 2.0 DEFINITIONS, ARTICLE 3.0 ZONING DISTRICTS, ARTICLE 4.0 USE STANDARDS, ARTICLE 5.0 SITE STANDARDS, ARTICLE 6.0 DEVELOPMENT PROCEDURES, AND ARTICLE 7 ADMINISTRATION, APPEALS, AND ENFORCEMENT, ONLY AS PROVIDED FOR HEREIN.

NOW HEREBY the Charter Township of White Lake ordains the following amendments to the White Lake Charter Township Zoning Ordinance:

PART 1: Amend Article 2.0, Definitions, Section 2.2, Definitions by modifying the following definition as shown below:

ACREAGE PARCEL. Any single-family residential parcel of land in White Lake Township which ~~parcel~~ is not located in or part of a recorded plat~~.~~ or condominium subdivision.

PART 2: Amend Article 2.0, Definitions, Section 2.2, Definitions by adding the following definition as shown below:

ALLEY. A public or private way which affords only a secondary means of access to abutting property and not intended for general traffic circulation.

PART 3: Amend Article 2.0, Definitions, Section 2.2, Definitions by modifying the following definition as shown below:

LOT AREA. The total horizontal area within the lot lines, as defined, of a lot. With the exception of lots zoned AG (Agricultural), SF (Suburban Farms), and R1-A (Single-Family Residential), ~~T~~the lot area of any lot, zoning lot or parcel of land shall also be interpreted to be exclusive of any land in a public or private road right-of-way or easement.

PART 4: Amend Article 2.0, Definitions, Section 2.2, Definitions by adding the following definition as shown below:

ORDINARY HIGH-WATER MARK. The line between upland and bottomland which persists through successive changes in water levels, below which the presence and action of the water is so common or recurrent that the character of the land is marked distinctly from the upland and is apparent in the soil itself, the configuration of the surface of the soil and the vegetation. On an inland lake which has a level established by law, it means the high established level. Where water returns to its natural level as the result of the permanent removal or abandonment of a dam, it means the natural ordinary high-water mark.

PART 5: Amend Article 2.0, Definitions, Section 2.2, Definitions by modifying the following definition as shown below:

PARKING SPACE. An area ~~ten feet by twenty feet (9' x 18')~~ for parking of each automobile or motor vehicle, being exclusive of necessary drives, aisles, entrances or exits, and being fully accessible for the storage or parking of permitted vehicles.

PART 6: Amend Article 2.0, Definitions, Section 2.2, Definitions by adding the following definition as shown below:

RIGHT-OF-WAY. A strip of land acquired by reservation, dedication, prescription, or condemnation and intended to be occupied by a street, pathway/sidewalk/trail, water line, sanitary sewer, and/or other public utilities or facilities.

PART 7: Amend Article 2.0, Definitions, Section 2.2, Definitions by modifying the following definition as shown below:

SETBACK. ~~The minimum horizontal distance between the front of the building, excluding steps and unenclosed porches, and the front street or right-of-way line.~~ The minimum distance by which any building or structure must be separated from a street right-of-way or lot line.

PART 8: Amend Article 2.0, Definitions, Section 2.2, Definitions by modifying the following definition as shown below:

1. **Above-the-Roof Sign.** A sign ~~projecting beyond or above the roof or parapet or that is erected, constructed or maintained upon the roof or parapet of a building~~ that is mounted on, applied to, or otherwise structurally supported by the roof of a building (other than the fascia portion of a mansard roof).

PART 9: Amend Article 2.0, Definitions, Section 2.2, Definitions by modifying the following definition as shown below:

23. **Wall Sign.** A sign attached to, or placed flat against, the exterior wall or surface of any building, no portion of which projects more than twelve (12) inches from the wall. No wall sign shall be erected to extend above the top of the wall to which it is attached.

PART 10: Amend Article 2.0, Definitions, Section 2.2, Definitions by adding the following definition to "SIGN" as shown below:

25. **Parapet Sign.** A sign attached to that portion of a building's exterior wall that projects above the roofline of a building.

PART 11: Amend Article 3.0, Zoning Districts, Section 3.1.1, Agricultural District by modifying the district name as shown below:

~~Agricultural District.~~ Rural Residential District.

PART 12: Amend Article 3.0, Zoning Districts, Section 3.1.1, Agricultural District, Subsection 3.1.1.A by modifying the Intent statement as shown below:

The ~~Agricultural~~ Rural Residential District is established as a district in which the principal use of land is for ~~farming, dairying, forestry operations and other agricultural activities.~~ agricultural use and single-family detached dwellings on acreage parcels. The intent of this article is to protect land needed for agricultural pursuits from encroachment by untimely and unplanned residential, commercial or industrial development.

PART 13: Amend Article 3.0, Zoning Districts, Section 3.1.1, Agricultural District, Subsection 3.1.1.C.iv to read as follows:

iv. Temporary uses within a building §7.20

PART 14: Amend Article 3.0, Section 3.1.2, Suburban Farms by modifying the district name as shown below:

~~Suburban Farms District.~~ Suburban Estates District.

PART 15: Amend Article 3.0, Zoning Districts, Section 3.1.2, Suburban Farms, Subsection 3.1.2.A by modifying the Intent statement as shown below:

The Suburban ~~Farms~~ Estates District is created to establish areas of the Township for single family residen~~c~~ies in a rural environment characterized by low densities and significant open spaces.

PART 16: Amend Article 3.0, Zoning Districts, Section 3.1.2, Suburban Farms, Subsection 3.1.2.F, Development Standards, by modifying the maximum lot coverage as shown below:

~~20%.~~ 30%.

PART 17: Amend Article 3.0, Zoning Districts, Section 3.1.3, R1-A Single Family Residential, Subsection 3.1.3.E, Development Standards, by modifying the maximum lot coverage as shown below:

~~20%.~~ 30%.

PART 18: Amend Article 3.0, Zoning Districts, Section 3.1.4, R1-B Single Family Residential, Subsection 3.1.4.E, Development Standards, by modifying the maximum lot coverage as shown below:

~~20%.~~ 25% for lots served by a private septic system.
30% for lots served by public sanitary sewer.

PART 19: Amend Article 3.0, Zoning Districts, Section 3.1.5, R1-C Single Family Residential, Subsection 3.1.5.E, Development Standards by modifying the maximum lot coverage as shown below:

~~20%.~~ 25% for lots served by a private septic system.
30% for lots served by public sanitary sewer.

PART 20: Amend Article 3.0, Zoning Districts, Section 3.1.6, R1-D Single Family Residential, Subsection 3.1.6.E by modifying the maximum lot coverage as shown below:

~~20%.~~ 25% for lots served by a private septic system.
30% for lots served by public sanitary sewer.

PART 21: Amend Article 3.0, Zoning Districts, Section 3.1.12, Local Business District, Subsection 3.1.12.C, Special Land Uses, to add the following section as Paragraph 3.1.12.C.vii:

vii. Entertainment and/or outdoor dining associated with a restaurant §4.18

PART 22: Amend Article 3.0, Zoning Districts, Section 3.1.14, Restricted Business District, Subsection 3.1.14.C, Special Land Uses, to add the following section as Paragraph 3.1.14.C.xviii:

xviii. Entertainment and/or outdoor dining associated with a restaurant §4.18

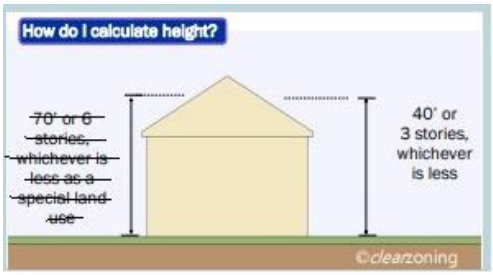
PART 23: Amend Article 3.0, Zoning Districts, Section 3.1.18, Pontiac Lake Gateway District, Subsection 3.1.18.C.v, Special Land Uses, to read as follows:

v. Hotels ~~over three stories~~ §4.33

PART 24: Amend Article 3.0, Zoning Districts, Section 3.1.18, Pontiac Lake Gateway District, Subsection 3.1.18.D, Development Standards, by modifying the maximum building height as shown below:

~~70 feet or 6 stories, whichever is less as a special land use~~
40 feet or 3 stories, whichever is less

PART 25: Amend Article 3.0, Zoning Districts, Section 3.1.18, Pontiac Lake Gateway District, Subsection 3.1.18.D, Development Standards, by modifying the maximum building height illustration as shown below:



PART 26: Amend Article 3.0, Zoning Districts, Section 3.1.18, Pontiac Lake Gateway District, Subsection 3.1.18.D, Development Standards, by modifying the minimum floor height as shown below:

First/ground floor: ~~14~~ 10 feet
Upper floors: ~~10~~ 9 feet

PART 27: Amend Article 3.0, Zoning Districts, Section 3.11, Notes to District Standards, Subsection 3.11.A to read as follows:

A. Minimum lot area, with the exception of lots zoned AG (Agricultural), SF (Suburban Farms), and R1-A (Single-Family Residential), shall not include any right of way or easement for a public road, private road, or access easement. Calculations for determining maximum density and the number of lots permitted shall be based upon net buildable land area (areas such as regulated wetlands, flood plains and open water bodies, areas devoted to storm water retention/ detention, or other, similar areas of the site that are not available for the use and enjoyment of the residents of a site, shall not be included in calculations for determining maximum density and number of lots permitted).

PART 28: Amend Article 3.0, Zoning Districts, Section 3.11, Notes to District Standards, Subsection 3.11.F to strike and replace the regulation as shown below:

~~If at least 60% of the dwelling units on one side of a block have a narrower front setback than the ordinance standard, the minimum front yard setback for new dwelling units shall be the average front yard setback of the existing dwellings on the same side of the block.~~
Garage sales, rummage sales, yard sales, estate sales, and similar activities may be conducted for no longer than three days and no more than twice per calendar year on the same property.

PART 29: Amend Article 3.0, Zoning Districts, Section 3.11, Notes to District Standards, Subsection 3.11.W to strike and replace the regulation as shown below:

~~A maximum 30% lot coverage may be approved administratively by the Director of the Community Development Department or his/ her designee on existing lots of record where all of the following criteria are present:~~

~~i. The lot has sanitary sewer service, and~~

~~ii. Storm water collected from the roof of the home and garage is directed to a storm drain, retention or detention basin, lake or other body of water, and~~

~~iii. The proposed building development complies with all setback requirements of the appropriate zoning district, unless a variance has been approved by the Zoning Board of Appeals.~~

A modular home may be approved if all of the following criteria are present:

A. The dwelling shall be attached to a permanent foundation. The foundation shall be constructed in accordance with the state construction code, and attachment of the dwelling to the foundation shall meet all applicable building codes and other state and federal regulations.

B. The dwelling shall not have exposed wheels, towing mechanism, undercarriage, or chassis.

C. The dwelling shall be certified by the manufacturer or builder to be:

   a. Designed only for erection or installation on a site-built permanent foundation;

   b. Not designed to be moved once so erected or installed;

   c. Designed and manufactured to comply with the state construction code, as adopted by the Township;

   d. Not intended to be used other than on a site-built permanent foundation.

PART 30: Amend Article 3.0, Zoning Districts, Section 3.11, Notes to District Standards, to add the following as Subsection 3.11.Y:

No mechanical units, including heating, ventilation, and air conditioning (HVAC) systems and generators, shall be placed in the front yard or closer than five (5) feet to any side yard lot line or rear yard lot line.

PART 31: Amend Article 4.0, Use Standards, Section 4.18, Eating Establishments with Entertainment and/or Outdoor Dining, to amend the first paragraph to read as follows:

Eating establishments with entertainment and/ or outdoor dining may be permitted in the LB (Local Business) district, RB (Restricted Business) district, GB (General Business) district, and PB (Planned Business) district, subject to the following:

PART 32: Amend Article 4.0, Use Standards, Section 4.21, Government Offices and Township Buildings and Uses Without Service or Storage Yards, to add the following section as 4.21.D:

D. Governmental drive-thrus shall be allowed as an accessory use under this section.

PART 33: Amend Article 4.0, Use Standards, Section 4.33, Motels and Hotels, to amend the first paragraph to read as follows:

Motels and hotels may be permitted ~~in the RB (Restricted Business) district~~ subject to the following conditions:

PART 34: Amend Article 5.0, Site Standards, Section 5.11, Off-Street Parking, Subsection 5.11.M by modifying the table of the amount of required off-street parking as follows:

5.11.M ~~Minimum~~ Maximum Requirements for Off-Street Parking
(note to Planning Commission only, not ordinance text: this is the table title)

~~Minimum~~ Maximum Required Number of Parking Spaces
(note to Planning Commission only, not ordinance text: this is the second column title)

PART 35: Amend Article 5.0, Site Standards, Section 5.11, Off-Street Parking, Subsection 5.11.M by adding a footnote to the table of the amount of required off-street parking as follows:

[1]Unless otherwise specified in this Ordinance, at least 75% of the maximum required number of parking spaces shall be provided.

PART 36: Amend Article 5.0, Site Standards, Section 5.11, Off-Street Parking, Subsection 5.11.M.i.e to read as follows:

Each stacking space in the drive-through lane shall be nine (9) feet wide by ~~twenty~~ eighteen (~~20~~18) feet long.

PART 37: Amend Article 5.0, Site Standards, Section 5.11, Off-Street Parking, Subsection 5.11.Q.xvi to read as follows:

Parking space length may be reduced by ~~two~~ one (~~2~~1) f~~ee~~oot where the space abuts a raised sidewalk.

PART 38: Amend Article 5.0, Site Standards, Section 5.11, Off-Street Parking, Subsection 5.11.Q.xviii to read as follows:

Concrete curb~~ing~~ and gutter shall be provided at the end of all parking areas and stalls. Curb and gutter shall not be counted towards required drive aisle width and parking stall length and width.

PART 39: Amend Article 6.0, Development Procedures, Section 6.8, Site Plan Review and Approval, Subsection 6.8.I to read as follows:

I. Approval Valid for~~ One (1)~~ Two (2) Years

Upon approval of a final site plan by the Planning Commission~~ and approval of a final engineering plan~~, a building permit shall be requested by the applicant within~~ twelve (12~~ twenty-four (24) months or the site plan shall be declared invalid. The Planning Commission may grant a twelve (12) month extension based upon confirmation by the Director of the Community Development Department or his/her designee that there have been no Ordinance changes affecting the site plan since the time of original approval. Upon receipt of a building permit, reasonable construction shall be commenced within six (6) months, and shall be completed within twenty-four (24) months, or the site plan and building permit shall be declared to be invalid, unless the applicant requests an extension.

PART 40: Amend Article 6.0, Development Procedures, Section 6.11, Procedures for Review and Approval of All Special Land Uses, Subsection 6.11.A to read as follows:

A. Approval. If the Planning Commission determines that the particular special land use(s) should be allowed, it shall endorse its approval thereof on the written application and clearly set forth in a special land use permit the particular use(s) which have been allowed and applicable conditions. Thereafter, the enforcing officer may issue a building permit in conformity with the particular special land use so approved. In all cases where a particular special land use has been granted as provided herein, application for a building permit in pursuance thereof must be made and received by the Township not later than~~ one (1)~~ two (2) years thereafter, or such approval shall automatically be revoked, provided, however, the Planning Commission or Township Board may grant an extension thereof for good cause shown under such terms and conditions and for such period of time not exceeding one (1) year as it shall determine to be necessary and appropriate. If granted concurrently, the duration of final site plan approval and special land use approval shall be the same.

PART 41: Amend Article 7.0, Administration, Appeals, and Enforcement, Section 7.39, Approval Periods, to read as follows:

No order of the Zoning Board of Appeals permitting the erection or alteration of a building shall be valid for a period longer than ~~six (6)~~ twelve (12) months, unless a building permit for such erection or alteration is obtained within such period, and such erection or alteration is started and proceeds to completion in accordance with the terms of such permit.

No order of the Zoning Board of Appeals permitting a use of a building or premises shall be valid for a period longer than ~~six (6)~~ twelve (12) months unless such use is established within such period; provided, however, that such order shall continue in force and effect if a building permit for said erection or alteration is obtained within such period, and such erection or alteration is started and proceeds to completion in accordance with such permit.

Conflicts.

If any provision of the White Lake Township Code conflicts with this amendment to the regulations, the most restrictive provision shall be applied.

Severability.

Should any section or part of this ordinance be declared unconstitutional, null or void by a court of competent jurisdiction, such declaration shall not have any effect on the validity of the remaining sections or parts of this ordinance.

Adoption.

A public hearing on this Ordinance was held before the Planning Commission of the Charter Township of White Lake at a regular meeting held on Thursday, _____, 2024. This Ordinance was adopted by the Township Board of the Charter Township of White Lake at a meeting duly called and held on the ____ day of _____, 2024, and ordered to be published as prescribed by the law.

STATE OF MICHIGAN)

) ss.

COUNTY OF OAKLAND)

I, the undersigned, the duly qualified and acting Clerk of the Charter Township of White Lake, Oakland County, Michigan, DO HEREBY CERTIFY that the foregoing is a true and complete copy of certain proceedings taken by the Township Board of said Township at a regular meeting held on _____, 2024.

_____
Anthony L. Noble, Clerk
Charter Township of White Lake