

Memo

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Attorney-Client Privilege

FROM: Timothy J. Likens, PE, PTOE

DATE: December 20, 2023

PROJECT NO.: 230233

SUBJECT: Traffic Impact Study – Field Site
Alternative Routes (M-59)

Overview

Fishbeck has been providing traffic engineering services for the Levy site in Springfield Township, Oakland County, Michigan. Per our conference call on October 4, 2023 the following routes have been evaluated:

2a. Ormond Road ↔ Davisburg Road ↔ Milford Road ↔ Clyde Road ↔ Hickory Ridge ↔ M-59

2b. Ormond Road ↔ Davisburg Road ↔ Milford Road ↔ M-59

Along these alternative haul routes, the following intersections will experience truck turning movements and are therefore included in this evaluation:

- a. Ormond Road and Davisburg Road (minor stop-control);
- b. Davisburg Road and Milford Road (minor stop-control);
- c. Milford Road and Clyde Road East (all-way stop-control);
- d. Milford Road and Clyde Road West (all-way stop-control);
- e. Clyde Road and Hickory Ridge Road (all-way stop-control);
- f. Hickory Ridge Road and M-59 (signalized boulevard);
- g. M-59 and WB to EB Crossover at Hickory Ridge Road (signalized); and
- h. M-59 and EB to WB Crossover at Hickory Ridge Road (signalized).

Evaluation of these alternative haul routes included completion of the following key tasks:

1. Visit the site and drive these alternative routes, while recording photos and videos. General observation of pavement conditions were noted and PASER ratings were evaluated based on current conditions.
2. Review current Road Commission for Oakland County (RCOC) and Michigan Department of Transportation (MDOT) maps to identify currently published PASER ratings, classifications, and truck operator designations (seasonal restrictions).
3. Develop maps to highlight key observations from the field review including areas of interest that may relate to hauling operations.

4. Collect turning movement count data at each of the study intersections on a single weekday from 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. and identify the peak hour volumes at each intersection.
5. Model the study intersections along the alternative routes in Synchro traffic analysis software and evaluate operations (vehicle delay, Level of Service, queues) with and without the proposed hauling activity.

Field Review

Fishbeck engineers visited the site and drove the alternative haul routes on October 18, 2023. Field notes, photos, and videos were condensed into PDF maps and Google Earth KMZ files that provide an overview of physical elements along the alternative haul routes. Recorded observations include intersection traffic controls, speed limits, PASER ratings, centerline corrugations, and shoulder widths. A secure cloud file location has been established to deliver these materials for review by Levy.

Operations

Operational results were calculated based on Highway Capacity Manual (HCM) methodologies based on the recorded traffic volumes, intersection geometries, and traffic controls. Overall, the network operates acceptably and will continue to do so with the proposed hauling operation. Changes to vehicle delay and Level of Service are negligible. Current intersection operations are not expected to inhibit hauling operations. Results for future conditions with and without the proposed project are outlined in tables on the following pages of this memo.

Two operational deficiencies were noted in the analyses of future conditions. These issues are currently present and are respective of movements not on the proposed haul routes:

Haul Route 2a (Hickory Ridge Road Route)

At the intersection of M-59 (Highland Road) and Hickory Ridge Road, the NB right turn movement and the NB approach operate at LOS F in the p.m. peak hour. Additionally, significant queueing occurs on this approach, with 95th percentile queues of 991 feet (40 vehicles) in the northbound direction. Currently, there is 100 feet of storage for the right turn movement (4-5 vehicles). During the p.m. peak hour, the NB right turn movement is approximately 2 times heavier than the NB thru movement. The NB right turn movement exceeds the provided storage length for the majority of the peak hour, leading to the queueing issues for northbound traffic. It is not uncommon for thru traffic to be stuck behind a right turning vehicle waiting to merge into the right turn lane and missing the green phase due to these delays.

Haul Route 2b (Milford Road Route)

At the intersection of M-59 (Highland Road) and Milford Road, the EB right turn movement operates at a LOS E in the a.m. and p.m. peak hours. Review of the 95th percentile queue lengths indicates that the 95th percentile queue does not exceed 152 feet (6 vehicles) in the a.m. peak hour and 152 feet (6 vehicles) in the p.m. peak hour. Both of these queue lengths are typical for a signalized intersection.

Outcomes

Based on our field observations, modeling, and analysis of the alternative haul routes, we believe the decision to utilize either of these routes would be based on the physical rather than operational characteristics. Factors such as pavement condition, shoulder widths, curvature/turning radii, and adjacent land uses are expected to drive decision-making rather than operational impacts or concerns. We recommend the best course of action is to review these findings with you to determine Levy's direction to select a preferred route, update the traffic impact study report, and/or conduct further investigation.

Table 1 – LOS Analysis for No-Build Conditions – Haul Route 2a (without hauling operations)

Approach	Lane Group	LOS/Delay(s)			
		a.m. Peak Hour		p.m. Peak Hour	
Ormond Road and Davisburg Road (NB Stop-Controlled)					
EB Davisburg Road	Thru	A	0.0	A	0.0
	Right	A	0.0	A	0.0
	Overall	A	0.0	A	0.0
WB Davisburg Road	Left	A	8.1	A	7.9
	Thru	A	0.0	A	0.0
	Overall	A	4.0	A	3.6
NB Ormond Road	Overall	B	12.0	B	14.0
Overall		A	4.8	A	5.5
Milford Road and Davisburg Road (EB/WB Stop-Controlled)					
EB Davisburg Road	Overall	C	16.7	B	13.2
WB Davisburg Road	Overall	B	12.4	B	13.9
NB Milford Road	Overall	A	0.0	A	0.1
SB Milford Road	Overall	A	3.2	A	3.6
Overall		A	4.8	A	5.5
Milford Road and Harvey Lake Road and White Lake Road (All-Way Stop-Controlled)					
EB Milford Road	Overall	B	11.0	B	14.9
WB White Lake Road	Overall	B	11.1	C	15.2
NB Harvey Lake Road	Left/Thru	A	9.9	C	17.7
	Right	A	9.0	A	9.5
	Overall	A	9.5	C	16.1
SB Milford Road	Left/Thru	B	12.6	B	12.4
	Right	A	8.5	A	9.6
	Overall	B	11.7	B	11.7
Overall		B	11.0	B	14.9
Milford Road and Clyde Road (All-Way Stop-Controlled)					
EB Clyde Road	Overall	A	8.4	A	9.8
WB Milford Road	Overall	A	9.0	B	10.6
NB Milford Road	Overall	A	8.3	A	9.9
Overall		A	8.6	B	10.1
Hickory Ridge Road and Clyde Road (All-Way Stop-Controlled)					
EB Clyde Road	Left	B	10.1	B	10.3
	Thru/Right	B	10.2	B	10.1
	Overall	B	10.2	B	10.2
WB Clyde Road	Left	B	11.2	B	10.5
	Thru/Right	A	9.7	B	10.8
	Overall	B	10.7	B	10.7
NB Hickory Ridge Road	Left	A	9.3	A	9.6
	Thru/Right	B	10.4	C	15.7
	Overall	B	10.3	B	15.0
SB Hickory Ridge Road	Left	A	9.5	A	9.7
	Thru/Right	B	14.7	B	10.1
	Overall	B	14.0	A	10.0
Overall		B	12.2	B	12.5
M-59 (Highland Road) and Hickory Ridge Road (Signalized)					
EB M-59 (Highland Road)	Thru	A	6.3	A	8.2
	Right	A	3.5	A	2.0
	Overall	A	5.5	A	7.2
WB M-59 (Highland Road)	Thru	B	10.6	A	9.8
	Right	A	9.9	A	2.6
	Overall	B	10.6	A	8.8
NB Hickory Ridge Road	Thru	C	23.8	C	32.4
	Right	C	33.1	F	158.0
	Overall	C	31.2	F	111.9
SB Hickory Ridge Road	Thru	C	34.3	C	26.0
	Right	C	26.0	C	26.5
	Overall	C	30.9	C	26.3
Overall		B	15.6	D	38.6
EB M-59 (Highland Road) and WB to EB Crossover/True Value Hardware (Signalized)					
EB M-59 (Highland Road)	Overall	A	8.6	A	6.8
NB True Value Hardware	Overall	C	24.4	C	28.1
SB Crossover	Overall	C	27.9	C	28.0
Overall		B	11.5	A	9.7
WB M-59 (Highland Road) and EB to WB Crossover (Signalized)					
WB M-59 (Highland Road)	Overall	A	6.6	B	15.1
NB Crossover	Overall	D	47.2	C	32.3
Overall		B	12.6	B	19.6

Table 2 – LOS Analysis for Future Conditions – Haul Route 2a (with hauling operations)

Approach	Lane Group	LOS/Delay(s)			
		a.m. Peak Hour		p.m. Peak Hour	
Ormond Road and Davisburg Road (NB Stop-Controlled)					
EB Davisburg Road	Thru	A	0.0	A	0.0
	Right	A	0.0	A	0.0
	Overall	A	0.0	A	0.0
WB Davisburg Road	Left	A	8.2	A	7.9
	Thru	A	0.0	A	0.0
	Overall	A	4.1	A	3.6
NB Ormond Road	Overall	B	14.4	C	17.7
Overall		A	5.6	A	6.9
Milford Road and Davisburg Road (EB/WB Stop-Controlled)					
EB Davisburg Road	Overall	C	17.1	B	13.4
WB Davisburg Road	Overall	C	17.4	C	17.4
NB Milford Road	Overall	A	0.0	A	0.1
SB Milford Road	Overall	A	3.2	A	3.6
Overall		A	6.2	A	6.7
Milford Road and Harvey Lake Road and White Lake Road (All-Way Stop-Controlled)					
EB Milford Road	Overall	C	15.1	C	19.0
WB White Lake Road	Overall	B	11.7	C	16.3
NB Harvey Lake Road	Left/Thru	B	10.5	C	19.1
	Right	A	9.4	A	9.8
	Overall	A	10.0	C	17.3
SB Milford Road	Left/Thru	B	13.4	B	12.9
	Right	A	9.2	B	10.3
	Overall	B	12.2	B	12.0
Overall		B	12.6	C	16.6
Milford Road and Clyde Road (All-Way Stop-Controlled)					
EB Clyde Road	Overall	A	9.2	B	10.9
WB Milford Road	Overall	A	9.1	B	11.2
NB Milford Road	Overall	A	8.4	B	10.3
Overall		A	9.0	B	10.8
Hickory Ridge Road and Clyde Road (All-Way Stop-Controlled)					
EB Clyde Road	Left	B	10.4	B	10.5
	Thru/Right	B	10.5	B	10.3
	Overall	B	10.5	B	10.4
WB Clyde Road	Left	B	12.6	B	11.9
	Thru/Right	A	9.9	B	11.0
	Overall	B	11.8	B	11.4
NB Hickory Ridge Road	Left	A	9.5	A	9.7
	Thru/Right	B	11.2	C	17.6
	Overall	B	11.1	C	16.8
SB Hickory Ridge Road	Left	A	9.8	A	9.9
	Thru/Right	C	15.5	B	10.4
	Overall	B	14.7	B	10.3
Overall		B	12.8	B	13.6
M-59 (Highland Road) and Hickory Ridge Road (Signalized)					
EB M-59 (Highland Road)	Thru	A	6.5	A	8.2
	Right	A	3.6	A	1.5
	Overall	A	5.6	A	7.0
WB M-59 (Highland Road)	Thru	B	11.3	A	9.3
	Right	B	12.1	A	2.9
	Overall	B	11.4	A	8.3
NB Hickory Ridge Road	Thru	C	23.8	C	32.4
	Right	C	33.5	F	158.0
	Overall	C	31.6	F	111.9
SB Hickory Ridge Road	Thru	C	34.3	C	26.0
	Right	C	28.0	C	27.9
	Overall	C	31.6	C	27.2
Overall		B	16.4	D	38.3
EB M-59 (Highland Road) and WB to EB Crossover/True Value Hardware (Signalized)					
EB M-59 (Highland Road)	Overall	A	9.3	A	7.4
NB True Value Hardware	Overall	C	23.8	C	27.4
SB Crossover	Overall	C	29.0	C	29.1
Overall		B	12.3	B	10.5
WB M-59 (Highland Road) and EB to WB Crossover (Signalized)					
WB M-59 (Highland Road)	Overall	A	7.4	B	16.2
NB Crossover	Overall	D	46.9	C	32.0
Overall		B	13.6	C	20.4
Ormond Road and Site Driveway (EB Stop-Controlled)					
EB Site Driveway	Overall	B	13.3	B	13.9
NB Ormond Road	Overall	A	0.2	A	0.0
SB Ormond Road	Overall	A	0.0	A	0.0
Overall		A	0.8	A	0.7

Table 3 – LOS Analysis for No-Build Conditions – Haul Route 2b (without hauling operations)

Approach	Lane Group	LOS/Delay(s)			
		a.m. Peak Hour		p.m. Peak Hour	
Ormond Road and Davisburg Road (NB Stop-Controlled)					
EB Davisburg Road	Thru	A	0.0	A	0.0
	Right	A	0.0	A	0.0
	Overall	A	0.0	A	0.0
WB Davisburg Road	Left	A	8.1	A	7.9
	Thru	A	0.0	A	0.0
	Overall	A	4.0	A	3.6
NB Ormond Road	Overall	B	12.0	B	14.0
Overall		A	4.8	A	5.5
Milford Road and Davisburg Road (EB/WB Stop-Controlled)					
EB Davisburg Road	Overall	C	16.7	B	13.2
WB Davisburg Road	Overall	B	12.4	B	13.9
NB Milford Road	Overall	A	0.0	A	0.1
SB Milford Road	Overall	A	3.2	A	3.6
Overall		A	4.8	A	5.5
Milford Road and Harvey Lake Road and White Lake Road (All-Way Stop-Controlled)					
EB Milford Road	Overall	B	11.0	B	14.9
WB White Lake Road	Overall	B	11.1	C	15.3
NB Harvey Lake Road	Left/Thru	A	9.9	C	17.7
	Right	A	9.0	A	9.5
	Overall	A	9.5	C	16.1
SB Milford Road	Left/Thru	B	12.6	B	12.5
	Right	A	8.5	A	9.6
	Overall	B	11.7	B	11.8
Overall		B	11.0	B	14.9
Milford Road and Clyde Road (All-Way Stop-Controlled)					
EB Clyde Road	Overall	A	8.4	A	9.8
WB Milford Road	Overall	A	9.0	B	10.6
NB Milford Road	Overall	A	8.3	A	9.9
Overall		A	8.6	B	10.1
Milford Road and E Wardlow Road/Apollo Center Bus Driveway (Signalized)					
EB Apollo Center Bus Driveway	Left	C	20.5	A	0.0
	Thru/Right	B	19.8	B	19.8
	Overall	C	20.2	B	19.8
WB Wardlow Road	Left	C	22.6	C	21.8
	Thru/Right	C	20.2	C	21.0
	Overall	C	22.2	C	21.5
NB Milford Road	Left/Thru	A	8.4	B	11.6
	Right	A	8.0	A	8.5
	Overall	A	8.3	B	11.0
SB Milford Road	Left	A	9.4	B	15.2
	Thru/Right	B	10.2	A	9.5
	Overall	B	10.2	B	10.2
Overall		B	11.9	B	12.1
M-59 (Highland Road) and Milford Road (Signalized)					
EB M-59 (Highland Road)	Left	B	15.9	B	18.3
	Thru	C	24.5	C	26.0
	Right	E	56.6	E	69.5
	Overall	C	29.5	C	33.6
WB M-59 (Highland Road)	Thru	B	11.7	B	17.8
	Right	A	7.9	A	9.1
	Overall	B	11.3	B	16.9
NB Hickory Ridge Road	Thru	C	23.9	C	28.0
	Right	C	25.8	C	32.5
	Overall	C	25.1	C	30.3
SB Milford Road	Thru	C	29.5	C	23.9
	Right	C	26.3	C	23.3
	Overall	C	28.1	C	23.7
Overall		C	25.2	C	29.8
EB M-59 (Highland Road) and WB to EB Crossover (Signalized)					
EB M-59 (Highland Road)	Overall	B	12.4	B	12.3
SB Crossover	Overall	B	19.7	C	24.5
Overall		B	13.9	B	14.9
WB M-59 (Highland Road) and EB to WB Crossover (NB Stop-Controlled)					
WB M-59 (Highland Road)	Overall	A	0.0	A	0.0
NB Crossover	Overall	B	14.5	C	19.0
Overall		A	0.4	A	1.1

Table 4 – LOS Analysis for Future Conditions – Haul Route 2b (with hauling operations)

Approach	Lane Group	LOS/Delay(s)			
		a.m. Peak Hour		p.m. Peak Hour	
Ormond Road and Davisburg Road (NB Stop-Controlled)					
EB Davisburg Road	Thru	A	0.0	A	0.0
	Right	A	0.0	A	0.0
	Overall	A	0.0	A	0.0
WB Davisburg Road	Left	A	8.2	A	8.0
	Thru	A	0.0	A	0.0
	Overall	A	4.1	A	3.7
NB Ormond Road	Overall	B	13.6	B	17.8
Overall		A	5.3	A	6.7
Milford Road and Davisburg Road (EB/WB Stop-Controlled)					
EB Davisburg Road	Overall	C	17.1	B	13.4
WB Davisburg Road	Overall	C	17.4	B	17.4
NB Milford Road	Overall	A	0.0	A	0.1
SB Milford Road	Overall	A	3.2	A	3.6
Overall		A	6.2	A	6.7
Milford Road and Harvey Lake Road and White Lake Road (All-Way Stop-Controlled)					
EB Milford Road	Overall	C	15.1	C	19.0
WB White Lake Road	Overall	B	11.7	C	16.3
NB Harvey Lake Road	Left/Thru	B	10.5	C	19.1
	Right	A	9.4	A	9.8
	Overall	A	10.0	C	17.3
SB Milford Road	Left/Thru	B	13.4	B	12.9
	Right	A	9.2	B	10.3
	Overall	B	12.2	B	12.0
Overall		B	12.6	C	16.6
Milford Road and Clyde Road (All-Way Stop-Controlled)					
EB Clyde Road	Overall	A	8.6	B	10.1
WB Milford Road	Overall	B	10.1	B	12.1
NB Milford Road	Overall	A	8.5	B	10.5
Overall		A	9.2	B	11.0
Milford Road and E Wardlow Road/Apollo Center Bus Driveway (Signalized)					
EB Apollo Center Bus Driveway	Left	C	20.5	A	0.0
	Thru/Right	B	19.8	B	19.8
	Overall	C	20.2	B	19.8
WB Wardlow Road	Left	C	22.6	C	21.8
	Thru/Right	C	20.2	C	21.0
	Overall	C	22.2	C	21.5
NB Milford Road	Left/Thru	A	8.8	B	12.2
	Right	A	8.0	A	8.5
	Overall	A	8.6	B	11.4
SB Milford Road	Left	A	9.9	B	16.1
	Thru/Right	B	10.7	A	9.9
	Overall	B	10.7	B	10.6
Overall		B	12.1	B	12.5
M-59 (Highland Road) and Milford Road (Signalized)					
EB M-59 (Highland Road)	Left	B	16.0	B	18.3
	Thru	C	24.8	C	26.1
	Right	E	56.0	E	68.4
	Overall	C	29.5	C	33.3
WB M-59 (Highland Road)	Thru	B	11.9	B	17.8
	Right	A	8.2	A	9.4
	Overall	B	11.4	B	16.9
NB Hickory Ridge Road	Thru	C	23.7	C	28.0
	Right	C	25.6	C	32.5
	Overall	C	25.0	C	30.3
SB Milford Road	Thru	C	29.1	C	23.9
	Right	C	28.9	C	24.8
	Overall	C	29.0	C	24.3
Overall		C	25.3	C	29.7
EB M-59 (Highland Road) and WB to EB Crossover (Signalized)					
EB M-59 (Highland Road)	Overall	B	12.4	B	12.4
SB Crossover	Overall	C	20.8	C	25.0
Overall		B	14.2	B	15.1
WB M-59 (Highland Road) and EB to WB Crossover (NB Stop-Controlled)					
WB M-59 (Highland Road)	Overall	A	0.0	A	0.0
NB Crossover	Overall	C	15.3	C	20.1
Overall		A	0.5	A	1.2
Ormond Road and Site Driveway (EB Stop-Controlled)					
EB Site Driveway	Overall	B	13.3	B	12.8
NB Ormond Road	Overall	A	0.2	A	0.0
SB Ormond Road	Overall	A	0.0	A	0.0
Overall		A	0.8	A	0.8

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