



**TROY CITY COUNCIL
WORK SESSION & COMMITTEE MEETING
COUNCIL CHAMBERS, CITY HALL
100 S. Market Street, Troy, Ohio**

MONDAY, SEPTEMBER 11, 2023, 6:00 PM

Committee of the Whole

(Chaired by Council President Lutz)

1. Work Session to review and discuss the Intersection Feasibility Study of the West Main Street and Experiment Farm Road/South Stanfield Road intersection. No legislative action is anticipated regarding the Work Session.

Other Committees/Items may be added.

9-1-2023

cc: Mayor
Mr. Titterington, Mr. Kerber
Mr. Frigge, Departments, Media



Patrick E. J. Titterington
Director of Public Service & Safety
937-335-1725
Patrick.titterington@troyohio.gov

MEMORANDUM

TO: Mr. Lutz, President of Council

FROM: Patrick E. J. Titterington, Director of Public Service and Safety 

DATE: September 1, 2023

SUBJECT: **WORK SESSION REGARDING THE INTERSECTION FEASIBILITY STUDY OF WEST MAIN STREET AND EXPERIMENT FARM ROAD/SOUTH STANFIELD ROAD**

RECOMMENDATION:

That a Council Work Session be held on September 11, 2023 for staff and the consultant to review the Intersection Feasibility Study regarding West Main Street and Experiment Farm Road/South Stanfield Road for the purpose of providing feedback to staff and the consultant.

BACKGROUND:

The intersection of West Main Street with Experiment Farm Road/South Stanfield Road will be Phase 3 of the South Stanfield Road Improvement Project. The firm of American Structurepoint Inc. was authorized to update the 2020 traffic impact study and evaluate the intersection for design alternatives. The study scenarios are:

1. Maintain the existing traffic signal
2. A design with a traffic signal with improvements
3. A roundabout

American Structurepoint Inc. recommends a roundabout, which would be a major change to that highly traveled intersection. The study is attached.

So that the City can submit a funding application and solicit proposals for specifications/full project design/cost estimates, there needs to be a determination as to which scenario the design is to be based upon.

REQUESTED ACTION:

That a Council Work Session be established for Council to review the Intersection Feasibility Study and provide feedback regarding which scenario is to be selected. This would not require any legislative action at this time.

encl.



Intersection Feasibility Study

**W Main Street & Experiment Farm Road/S Stanfield Road
City of Troy, OH**

August 30, 2023



AMERICAN
STRUCTUREPOINT
INC.

2550 CORPORATE EXCHANGE DRIVE, SUITE 300
COLUMBUS, OHIO 43231
614.901.2235

www.structurepoint.com

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Executive Summary

Study Purpose

The purpose of this traffic study is to update the 2020 traffic impact study and evaluate the intersection design alternatives for W Main Street & Experiment Farm Road/S Stanfield Road in Troy, OH.

Traffic Forecast

Turning movement counts were collected at the study intersections in May 2023. Data was collected during the week to capture both the weekday commute. Traffic volumes were projected to a Design Year of 2047 based upon a historic background growth rate of 1.0% per year.

Study Scenarios

The scenarios evaluated in this study are listed as follows:

1. Existing Traffic Signal
2. Traffic Signal w/ Improvements
3. Roundabout

Capacity Analysis

A capacity analysis was evaluated for the existing traffic signal for the Existing Year 2023 and Design Year 2047 traffic volumes while the proposed traffic signal improvements and roundabout were evaluated for the Design Year 2047 traffic volumes. Scenario 1 was analyzed as a No-Build condition. Scenarios 2 and 3 were analyzed to determine the required intersection geometry to achieve acceptable operating conditions. Analysis of signalized conditions was performed in Synchro, and the analysis of the roundabout was performed in SIDRA.

The operating conditions of intersections were considered to be acceptable if found to operate at LOS D or better for the overall intersection, with no approach operating worse than LOS E. Additionally, the 95th percentile queue lengths were monitored so that impacts to adjacent intersections would be avoided. Intersection improvements were implemented until the criteria for acceptable traffic operations were met. Conceptual layouts for the traffic signal with improvements (Scenario 2) and the roundabout (Scenario 3) are shown on the following page, respectively.

Recommendations

Based upon the capacity analysis results, the multi-lane roundabout concept presented as Scenario 3 is considered to be the recommended option. In comparison to the proposed signal concept, the roundabout is expected to operate with lower average vehicle delays during the Design Year (2047) AM and PM peak hours.

The roundabout concept was designed with an ICD of 160'. Due to the required lane configurations and footprint, the proposed roundabout is anticipated to conform to the existing roadway cross section without requiring additional changes outside the area of influence of the roundabout. This would allow for the roundabout to be constructed with minimal impact to the surrounding areas of the intersection.

Traffic Signal Conceptual Layout



Roundabout Conceptual Layout (Recommended)





1.0 Introduction

1.1 Purpose

The purpose of this traffic study is to update the previously completed traffic study from 2020 to evaluate the traffic operations during the Current Year (2023) and the Design Year (2047) at the intersection of W Main Street & Experiment Farm Road/S Stanfield Road in Troy, OH. The project location is shown in

Figure 1.1.

This study will assess the anticipated design year operations of the intersection with existing traffic signal control, the traffic signal with proposed intersection improvements, and a proposed roundabout. The study area consists of the major intersection plus three (3) adjacent intersections/driveways in the vicinity of the W Main Street & Experiment Farm Road/S Stanfield Road commercial area.

1.2 Study Approach

The study area consists of the major intersection of the W Main Street & Experiment Farm Road/S Stanfield Road as listed in **Table 1.1** and shown on **Figure 1.2**.

Table 1.1 – Study Intersections

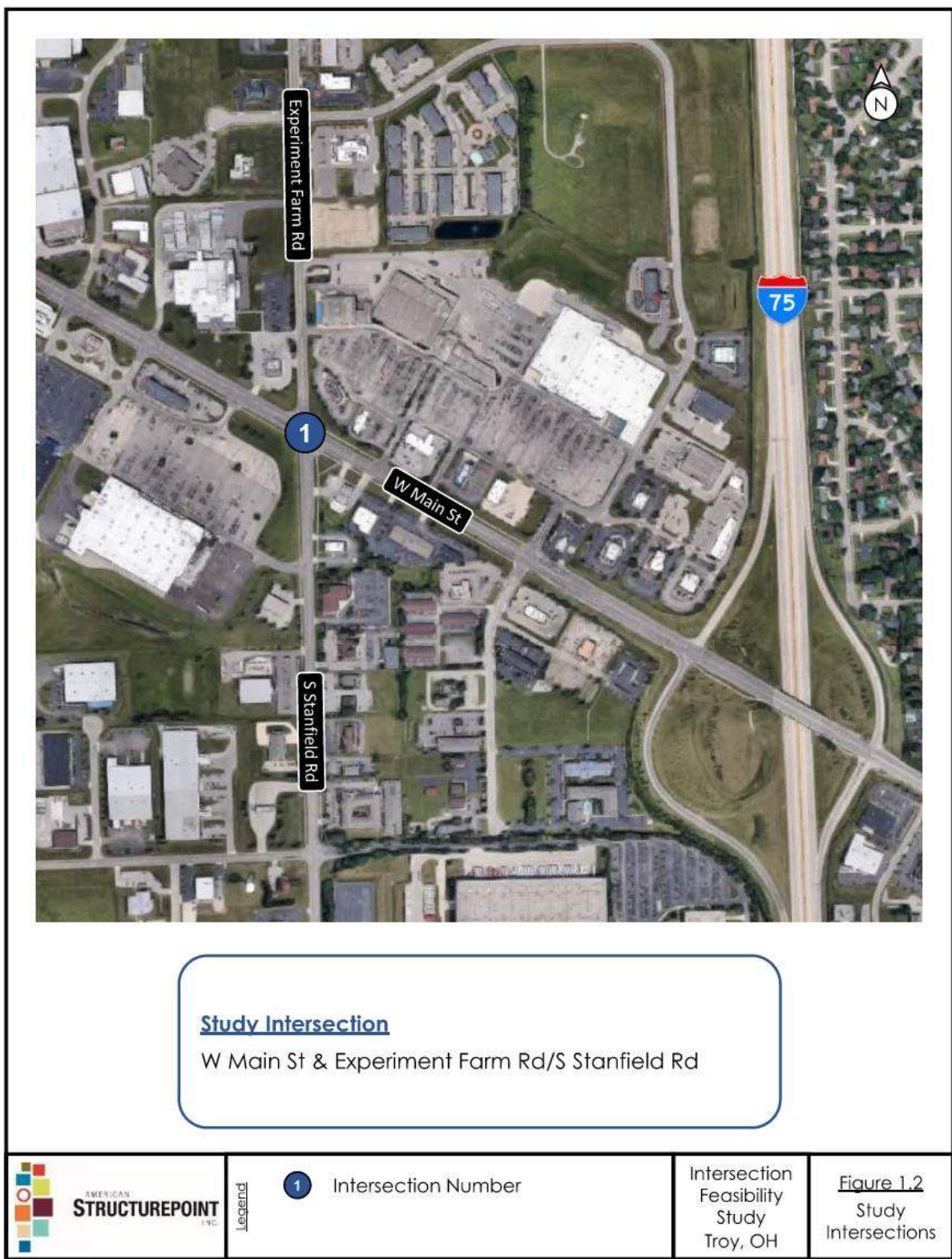
No.	Intersection Name	Existing Intersection Control Type
1	W Main Street & Experiment Farm Road/S Stanfield Road	Signalized

The scenarios evaluated in this study are shown in **Table 1.2**. A capacity analysis was conducted for the existing traffic signal for the Current Year (2023) and the Design Year (2047). Each proposed scenario was analyzed to evaluate traffic operations for the Design Year (2047) only. The analysis focuses on the intersection at W Main Street & Experiment Farm Road/S Stanfield Road. The study scenarios are described in further detail in the following sections.

Table 1.2 – Study Scenarios

No.	Description
1	Existing Traffic Signal
2	Traffic Signal w/ Proposed Improvements
3	Proposed Roundabout

Figure 1.2 – Study Intersection



2019.00436

Defining the built environment.

1.2.1 Scenario 1: Existing Traffic Signal

Scenario 1 evaluates the No-Build Current Year and Design Year conditions of the existing traffic signal at the intersection of W Main Street & Experiment Farm Road/S Stanfield Road. The purpose of the No-Build scenario is to document the current and expected long-term deficiencies of the current signal configuration and to provide justification for intersection improvements.

1.2.2 Scenario 2: Traffic Signal w/ Improvements

Scenario 2 evaluates the scenario in which the intersection of W Main Street & Experiment Farm Road/S Stanfield Road remains signalized with intersection improvements (added thru lanes or added turn lanes or phasing/timing improvements) that are required to achieve acceptable traffic operations during the design year.

1.2.3 Scenario 3: Roundabout

Scenario 3 evaluates the scenario in which the intersection of W Main Street & Experiment Farm Road/S Stanfield Road is converted to a multi-lane roundabout. The roundabout will be evaluated to determine the size and footprint that is required to achieve acceptable traffic operations during the design year.

2.0 Background Information

2.1 Study Area Roadways

The following sections document the existing characteristics of the roadways within the study area. The current lane configurations and traffic control for the study intersection is shown in **Figure 2.1**.

2.1.1 W Main Street

W Main Street is an east/west roadway that is classified as a Minor Arterial. Within the proposed study area, W Main Street is a five-lane roadway (center two-way left turn lane) with left and right turn lanes at major intersections and minor driveways. The posted speed limit is 40 mph within the study area.

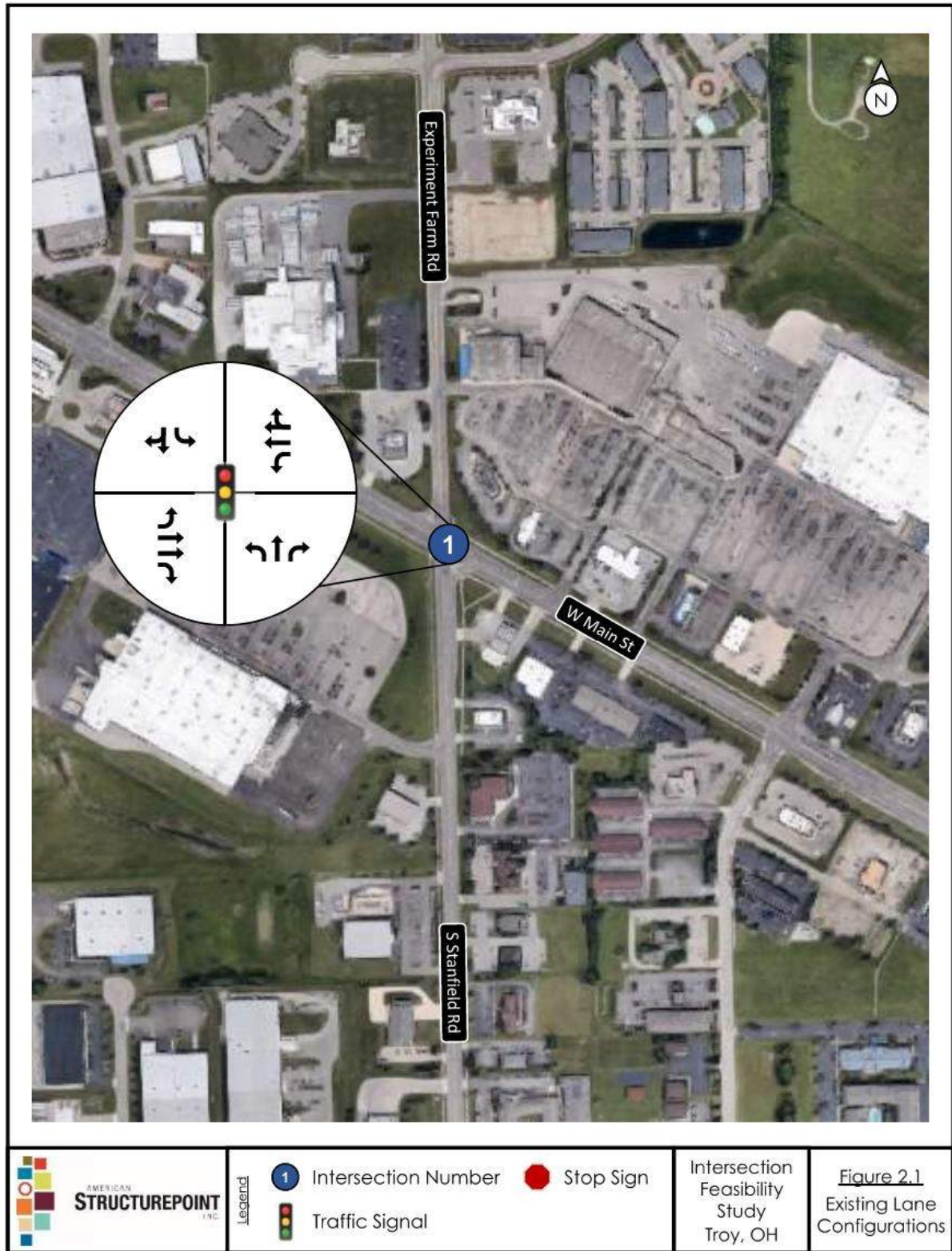
2.1.2 Experiment Farm Road

Experiment Farm Road is a north/south roadway that is classified as a Major Collector. Experiment Farm Road, north of W Main Street, is a three-lane (center two-way left turn lane) roadway with a posted speed limit of 35 mph. Within the study limits, Experiment Farm Road primarily serves commercial land uses before transitioning into residential and industrial land uses.

2.1.3 S Stanfield Road

S Stanfield Road is a north/south roadway that is classified as a Major Collector. S Stanfield Road, south of W Main Street, is a four-lane undivided roadway with a posted speed limit of 35 mph. Within the study limits, S Stanfield Road primarily serves commercial land uses prior to serving industrial and residential land uses.

Figure 2.1 – Existing Lane Configurations



2019.00436

Defining the built environment.

3.0 Traffic Forecast

The expected construction year for this feasibility study is assumed to be 2024; therefore, traffic data was forecasted to a Design Year of 2047 based on a 20-year horizon period.

3.1 Traffic Data Collection

Turning movement counts were collected at the study intersection on Thursday May 18, 2023, using MioVision camera technology. The count data was collected from 6 AM – 9 AM, 4 PM – 6 PM, and the video information was used to derive traffic movement information through the study intersection for the AM and PM peak hours. The traffic volumes from the previously completed traffic study were collected on Wednesday November 20, 2019. The AM and PM peak hours for 2019 and 2023 can be shown in **Table 3.1**. The 2023 collected traffic volumes are approximately 7% less than the traffic volumes collected in 2019.

The Existing Year (2023) traffic volumes for the weekday AM and PM peak hours are shown on

Figure 3.1 and Figure 3.2, respectively. The complete turning movement counts can be found in **Appendix A**.

Table 3.1 – Traffic Counts Comparison

Intersection Movement	2019 Traffic Volumes		2023 Traffic Volumes	
	AM Peak (7:00 9:00)	PM Peak (4:30 5:30)	AM Peak (7:15 8:15)	PM Peak (4:00 5:00)
NB Left	39	91	37	82
NB Thru	70	154	85	121
NB Right	190	300	150	230
SB Left	135	214	87	187
SB Thru	86	193	104	144
SB Right	22	128	25	125
EB Left	67	117	64	136
EB Thru	701	730	643	680
EB Right	74	74	67	97
WB Left	244	277	238	270
WB Thru	409	820	394	812
WB Right	83	106	79	137
Total	2120	3204	1973	3021



Figure 3.1 – Existing Year Traffic Volumes (2023 AM)

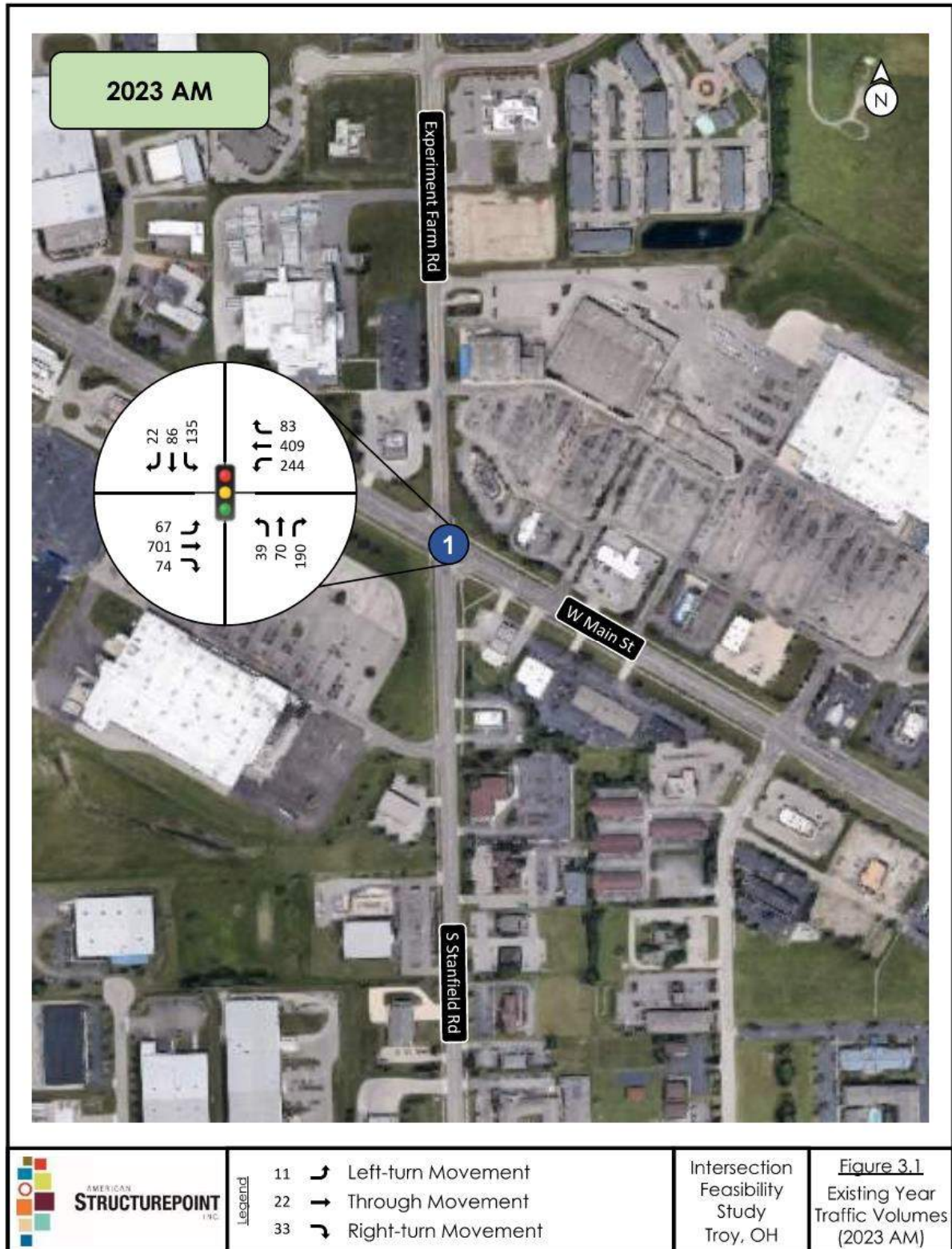
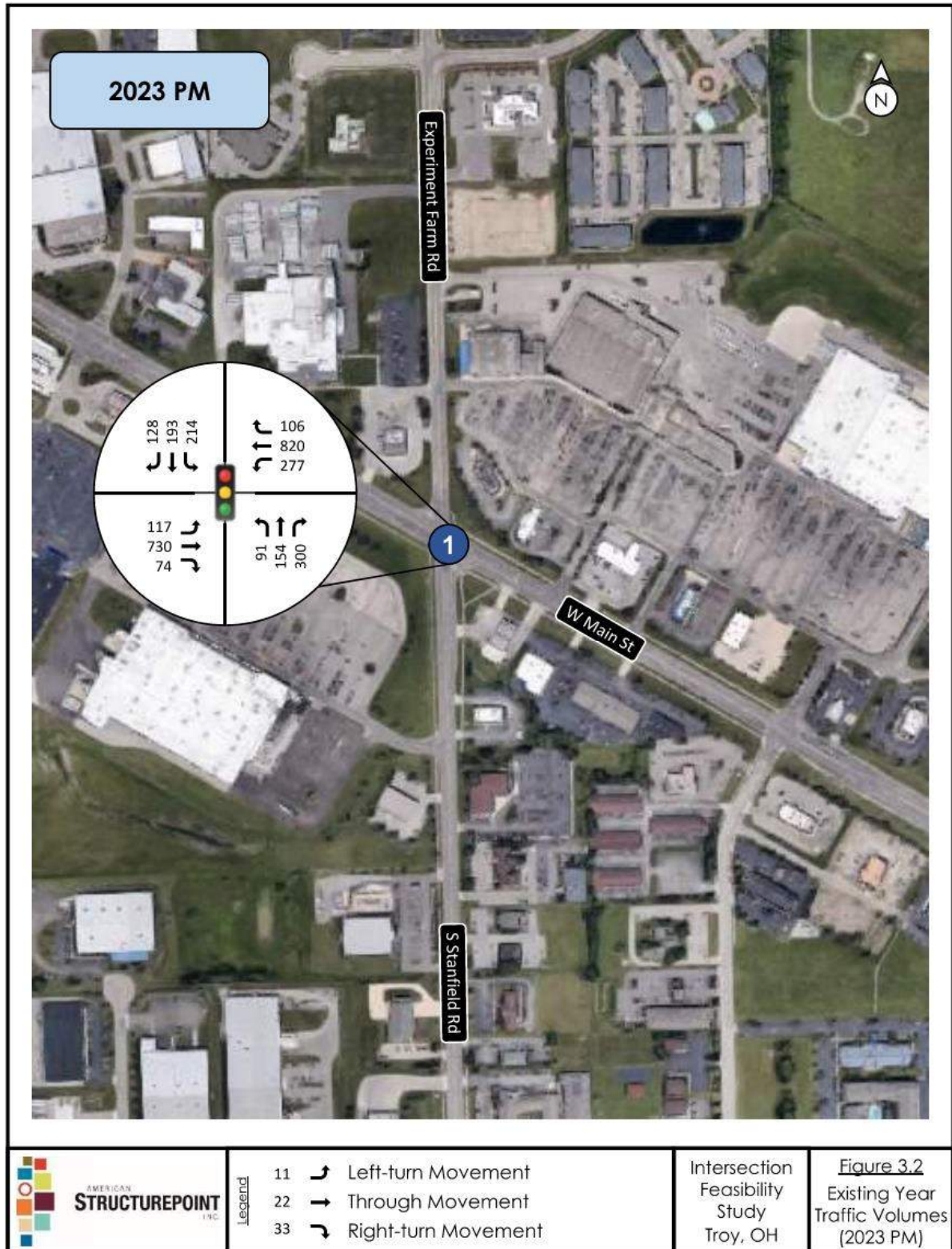




Figure 3.2 – Existing Year Traffic Volumes (2023 PM)



3.2 Traffic Volume Projections

Background traffic growth accounts for a regional increase in traffic that can be attributed to overall population growth and commercial, residential, or industrial land development in the surrounding areas. These factors contribute to the increase in traffic volumes across the study area roadway network.

The background growth rate was determined based upon historic average daily traffic counts obtained from previous studies, ODOT's Transportation Information Mapping System (TIMS), and conversations with City personnel. A linear annual growth rate of 1.0% per year was chosen and applied to the 2023 traffic counts to obtain the traffic volumes for the Design Year 2047. The projected Design Year 2047 traffic volumes are provided in **Figure 3.3** and **Figure 3.4** respectively for the AM and PM peak hours.



Figure 3.3 – Design Year Traffic Volumes (2047 AM)

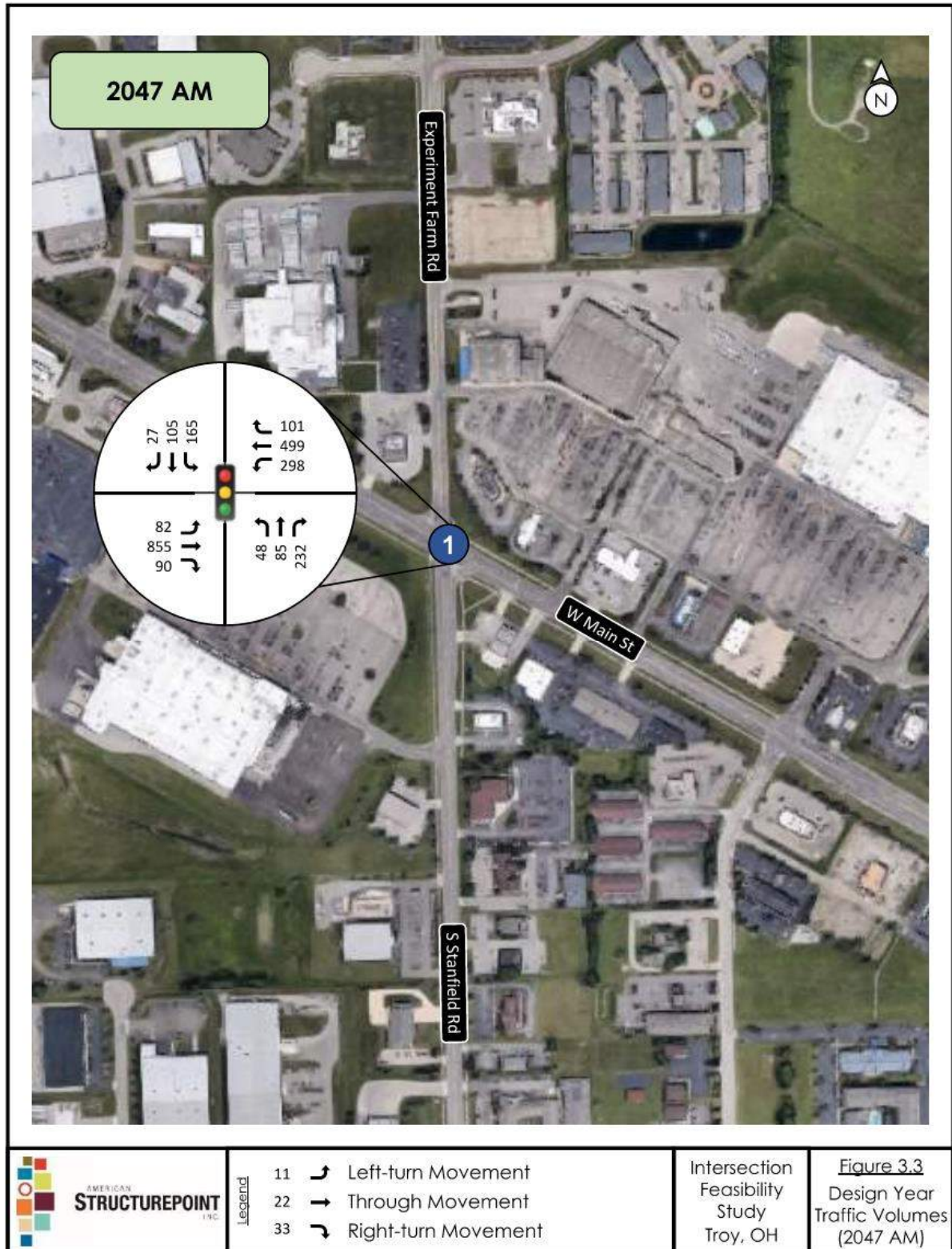
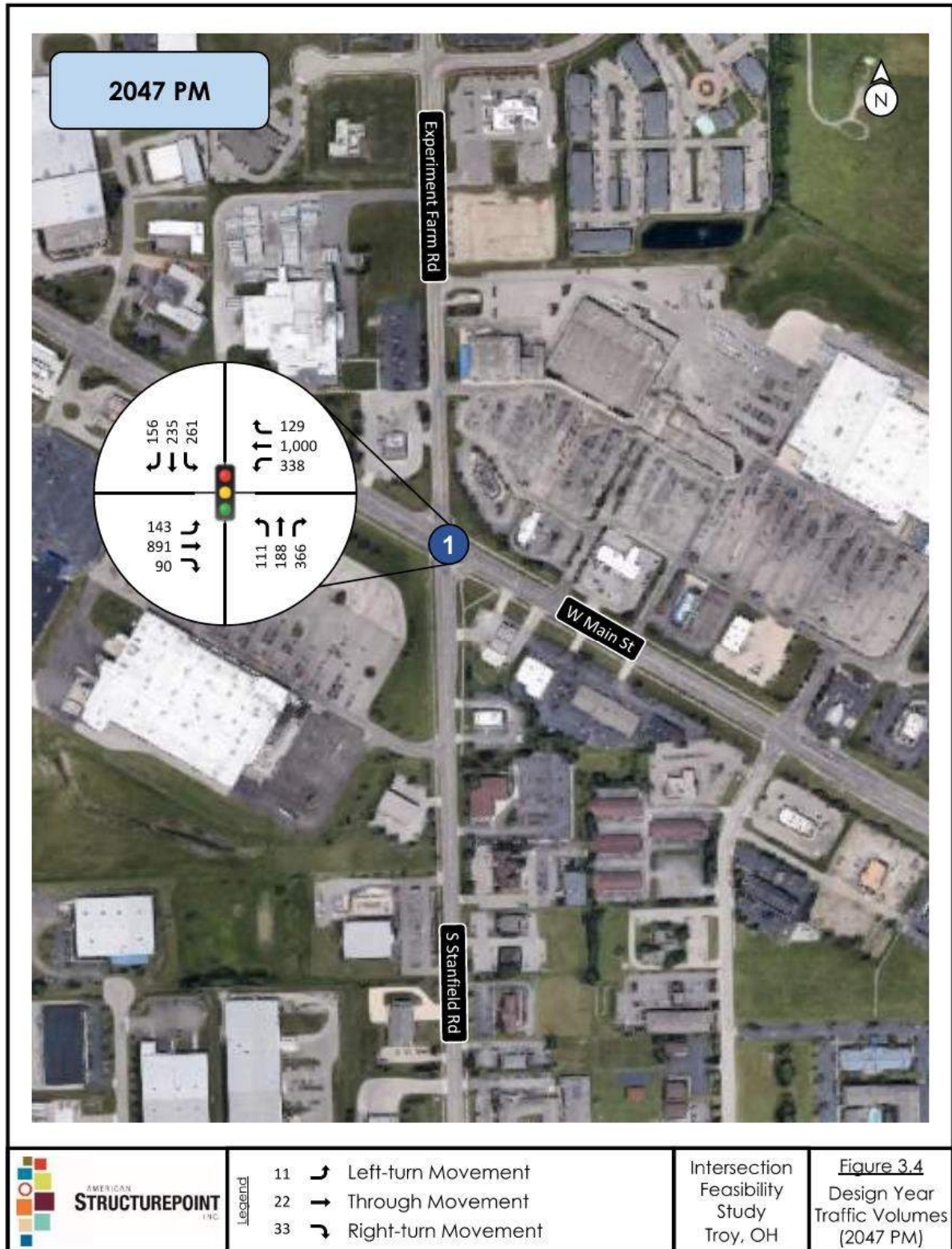




Figure 3.4 – Design Year Traffic Volumes (2047 PM)



4.0 Capacity Analysis

4.1 Methodology

A capacity analysis was evaluated for each of the study scenarios. Synchro 9 was used for the analysis of the signalized and stop-controlled intersections, and SIDRA 9 was used for the analysis of the roundabout. **Table 4.1** provides the LOS criteria as defined in the *Highway Capacity Manual*. Per the traffic operations analysis design software guidelines for SIDRA, roundabout LOS should be reported as the same as signalized intersections.

Table 4.1 – LOS Thresholds

LOS	Delay per Vehicle (seconds)	
	Signalized/Roundabout Intersection	Stop Controlled Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

The operating conditions of intersections were considered to be acceptable if found to operate at LOS D or better for the overall intersection, with no approach operating worse than LOS E. The 95th percentile queue lengths on each approach were considered to be unacceptable if shown to have an impact on adjacent intersections, i.e., queue spillback that extends beyond the upstream intersection. A volume-to-capacity (v/c) ratio over 1.0 was considered unacceptable, as this indicates that an approach has inadequate capacity to handle the demand volume. Capacity improvements needed for the intersection were identified if the aforementioned criteria were not met.

Turn lane storage lengths were defined so that sufficient storage would be provided to accommodate the 95th percentile queue lengths within the storage bay of the turn lane. Where practical, the recommended turn lane length accounts for the queue length of the adjacent through lane such that the through lane would not block entry into the turn lane.

4.2 Scenario 1 – No Build Traffic Signal Capacity Analysis

The capacity analysis for Scenario 1 evaluated the Existing Year 2023 and Design Year 2047 operating conditions of the study area intersections with existing lane configurations and traffic signal control. The capacity analysis results are provided for the AM and PM peak hours in **Tables 4.2 through 4.4**, respectively.

Table 4.2 – Capacity Analysis Results: No Build – Existing Year (2023)

Peak Hour	Intersection	Approach	LOS	Delay (sec/veh)	v/c	95 th % Queue Length (ft)
AM	W Main Street & Experiment Farm/Stanfield Rd	NB	B	19.5	0.44	89
		SB	C	32.7	0.46	119
		EB	B	19.1	0.48	221
		WB	B	16.7	0.57	155
		Overall	B	19.8	--	--
PM	W Main Street & Experiment Farm/Stanfield Rd	NB	C	18.5	0.51	115
		SB	D	35.8	0.72	219
		EB	C	21.6	0.58	235
		WB	D	38.2	0.86	458
		Overall	C	30.0	--	--

Table 4.2.1 – Capacity Analysis Results: No Build – Design Year (2047)

Peak Hour	Intersection	Approach	LOS	Delay (sec/veh)	v/c	95 th % Queue Length (ft)
AM	W Main Street & Experiment Farm/Stanfield Rd	NB	B	19.9	0.4	103
		SB	C	32.9	0.41	141
		EB	C	24.3	0.69	285
		WB	C	25.5	0.79	356
		Overall	C	25.1	--	--
PM	W Main Street & Experiment Farm/Stanfield Rd	NB	C	22.8	0.58	138
		SB	D	43.9	0.84	327
		EB	C	25.3	0.73	306
		WB	F	123.8	1.33	624
		Overall	E	67.5	--	--

**Reflects operations for left-turn movement only at each approach (two-way stop control)*

The capacity analysis results for Scenario 1 indicate that the intersection of W Main Street & Experiment Farm Road/S Stanfield Road is expected to operate at overall LOS C during the 2023 PM peak hour and overall LOS E with the westbound approach operating at LOS F during the 2047 PM peak hour. These results indicate that intersection improvements are required in order to achieve acceptable operating conditions. The proposed intersection improvements are evaluated further in the analysis of Scenario 2 and Scenario 3. Additionally, the westbound approach is expected to have v/c ratio above 1.0 which indicates the approach would be operating overcapacity. The 95th percentile queue length on the southbound approach is 327 feet. These results indicate that intersection improvements are required in order to achieve acceptable operating conditions.

4.3 Scenario 2 – Traffic Signal Improvements Capacity Analysis

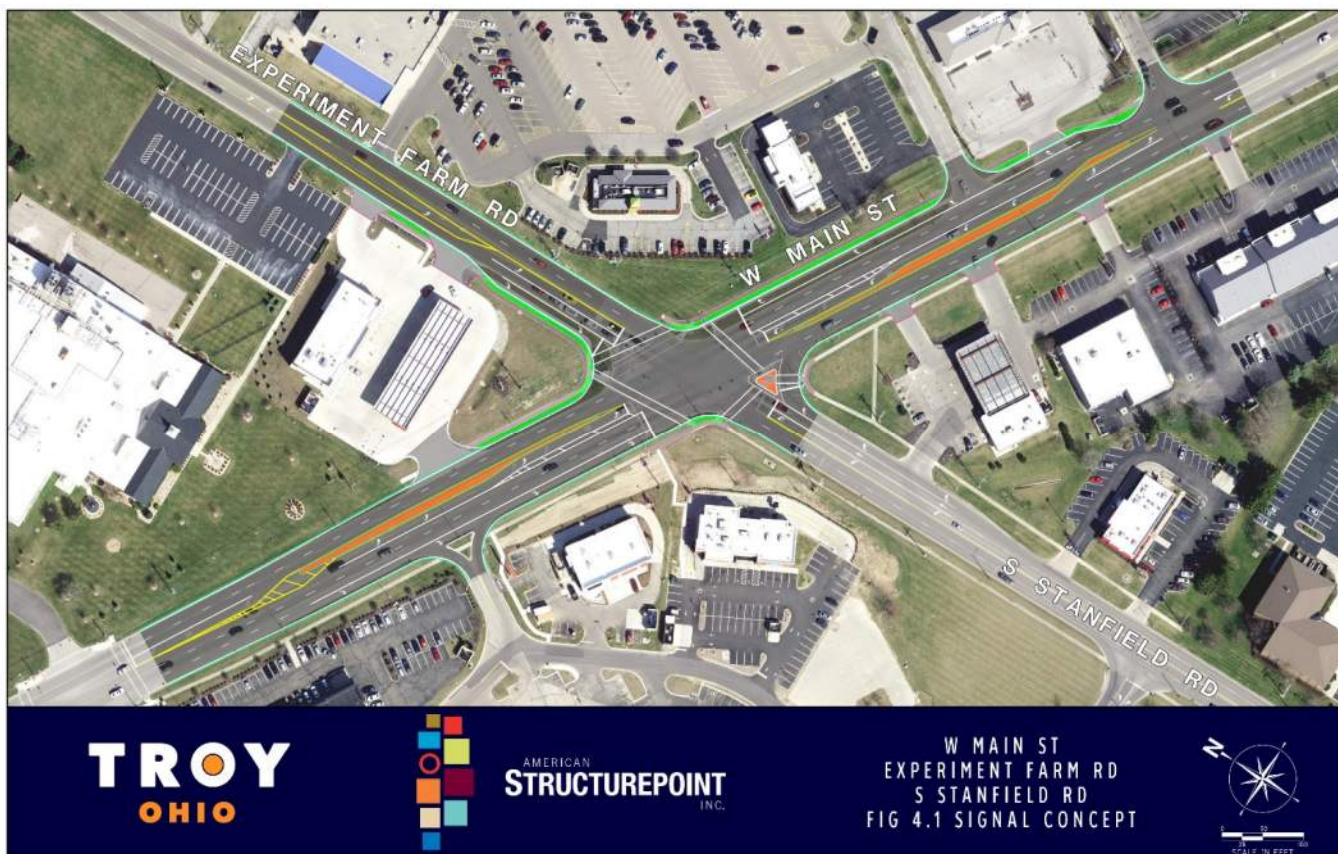
The capacity analysis for Scenario 2 focuses on the evaluation at the intersection of W Main Street & Experiment Farm Road/S Stanfield Road and the required intersection improvements to achieve acceptable traffic operations with traffic signal control. In order to meet the criteria for acceptable traffic operations, the intersection of W Main Street & Experiment Farm Road/S Stanfield Road requires an exclusive westbound to northbound right-turn lane for W Main Street. In addition, Experiment Farm Road requires an exclusive southbound to westbound right-turn lane. Signal timing optimization was also performed due to the geometric changes.

The capacity analysis results show that the proposed traffic signal is expected to operate at LOS D or better during the peak hours. The Synchro output for the signalized intersection analysis is provided in **Appendix C**. The conceptual layout for Scenario 2 is detailed in **Figure 4.1**. The capacity analysis results for Scenario 2 are provided in **Table 4.3**. The Synchro output for the signalized intersection analysis is provided in **Appendix B**.

Table 4.3 – Capacity Analysis Results: Traffic Signal Improvements

Peak Hour	Intersection	Approach	LOS	Delay (sec/veh)	v/c	95 th % Queue Length (ft)
AM	W Main Street & Experiment Farm/Stanfield Rd	NB	B	18.8	0.39	106
		SB	C	29.9	0.41	126
		EB	C	24.4	0.68	294
		WB	C	21.0	0.79	296
		Overall	C	23.0	--	--
PM	W Main Street & Experiment Farm/Stanfield Rd	NB	C	24.7	0.60	143
		SB	D	38.2	0.88	228
		EB	B	29.0	0.77	316
		WB	C	33.6	0.97	362
		Overall	C	31.6	--	--

Figure 4.1 – Conceptual Layout (Traffic Signal)



4.4 Scenario 3 – Roundabout Capacity Analysis

The capacity analysis for Scenario 3 focuses on the required roundabout footprint and lane configurations to achieve acceptable traffic operations at the intersection of W Main Street & Experiment Farm Road/S Stanfield Road.

SIDRA (Version 9) software was utilized to perform the roundabout capacity analysis. The default settings in SIDRA were modified for select parameters based on the guidelines provided in the ODOT *Location and Design Manual – Volume 1*.

A multi-lane roundabout is required at the intersection of W Main Street & Experiment Farm Road/S Stanfield Road in order to meet the criteria for acceptable traffic operations. The roundabout is expected to sufficiently accommodate the Design Year (2047) traffic projections with two (2) shared thru lanes for all approaches with the exception of the northbound approach which consists of a single thru/left-turn lane and a right-only lane. The capacity analysis results show that the proposed roundabout is expected to operate at LOS C or better during the peak hours. The conceptual layout for Scenario 3 for the Design Year 2047 is detailed in **Figure 4.2**. The capacity analysis results for Scenario 3 are provided in **Table 4.4**. The SIDRA output is provided in **Appendix C**.

Table 4.4 – Capacity Results: Roundabout

Peak Hour	Intersection	Approach	LOS	Delay (sec/veh)	v/c	95 th % Queue Length (ft)
AM	W Main Street & Experiment Farm/Stanfield Rd	NB	A	9.4	0.38	54
		SB	A	9.9	0.40	59
		EB	A	7.9	0.54	122
		WB	A	6.6	0.47	98
		Overall	A	7.9	--	--
PM	W Main Street & Experiment Farm/Stanfield Rd	NB	B	14.2	0.67	115
		SB	D	42.7	1.00	429
		EB	C	31.4	0.88	485
		WB	B	15.3	0.81	365
		Overall	C	24.2	--	--

Figure 4.2 – Conceptual Layout (Roundabout)



5.0 Cost Estimates

Total project costs were estimated for both Scenario 2 (Traffic Signal) and Scenario 3 (Roundabout). Present day costs for construction were taken from the historical bid data provided by ODOT for the year 2023. The costs were then inflated to 2026 costs assuming an inflation rate of 16.8%. A contingency of 20% was also used for the construction cost. A breakdown of both cost estimates is provided in **Appendix C**.

Scenario 2: Traffic Signal

The total project cost for the signal alternative was estimated at **\$3.6M**.

Scenario 3: Roundabout

The total project cost for the roundabout alternative was estimated at **\$4.2M**.

Due to variations in construction and labor costs, and the inclusion of both contingency and inflation in the opinion of probable construction costs, the anticipated difference in total project cost for both alternatives is considered to be negligible. In summary, the cost of the project is **not** anticipated to have a bearing on the recommended alternative that is selected.

6.0 Recommendations

Based upon the capacity analysis results, the roundabout configuration as described in Scenario 3 is considered to be the recommended option as average vehicle delays during the Design Year peak hours and 95th percentile queue lengths are lower across all approaches for the Design Year peak hours.

6.1 W Main Street & Experiment Farm Road/S Stanfield Road

The intersection of W Main Street & Experiment Farm Road/S Stanfield Road is proposed to be a multi-lane roundabout. Based on the capacity analysis results, the roundabout configuration is proposed to consist of the following geometry:

- Northbound Approach
 - Shared thru/left-turn lane
 - Right-turn only lane
- Southbound Approach
 - Shared thru/left-turn lane
 - Shared thru/right-turn lane (250' storage length)
- Eastbound Approach
 - Shared thru/left-turn lane
 - Shared thru/right-turn lane
- Westbound Approach
 - Shared thru/left-turn lane
 - Shared thru/right-turn lane

As shown in **Figure 4.2**, with an inscribed circle diameter (ICD) of 160', the proposed roundabout is anticipated to conform to the existing roadway cross section without requiring additional changes outside of the area of influence of the roundabout. Upon completion of the roundabout, the W Main Street approaches will have similar characteristics to the existing roadway with the exception of the change in traffic control type. The nature of the study area and the existing intersection alignment allow for the roundabout to be constructed with minimal impact to the surrounding area.

Truck turning movements through the proposed roundabout have been calculated and can be found in **Appendix D**.

Appendix A – Traffic Data

W Main & Experiment Farm/Stanfield - TMC

Thu May 18, 2023

Full Length (6 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1069037, Location: 40.055808, -84.240631



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Stanfield Southbound					Main Westbound					Stanfield Northbound					Main Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2023-05-18 6:00AM	3	5	13	0	21	11	40	14	0	65	26	3	5	0	34	6	96	3	0	105	225
6:15AM	1	4	18	0	23	18	64	34	0	116	19	11	1	0	31	12	103	6	0	121	291
6:30AM	6	20	17	0	43	30	89	29	0	148	20	15	8	0	43	23	132	16	0	171	405
6:45AM	3	11	18	0	32	53	88	48	0	189	20	23	14	0	57	15	147	18	0	180	458
Hourly Total	13	40	66	0	119	112	281	125	0	518	85	52	28	0	165	56	478	43	0	577	1379
7:00AM	9	22	31	0	62	7	81	33	0	121	34	12	11	0	57	8	192	3	0	203	443
7:15AM	6	23	17	0	46	17	92	43	0	152	42	18	10	0	70	14	179	12	0	205	473
7:30AM	7	22	27	0	56	26	116	65	0	207	38	16	8	0	62	18	175	16	0	209	534
7:45AM	6	25	20	0	51	18	101	75	0	194	40	16	5	0	61	16	155	18	0	189	495
Hourly Total	28	92	95	0	215	68	390	216	0	674	154	62	34	0	250	56	701	49	0	806	1945
8:00AM	6	34	23	0	63	18	85	55	0	158	30	35	14	0	79	19	134	18	0	171	471
8:15AM	8	12	36	0	56	15	79	56	0	150	56	24	9	0	89	16	141	14	0	171	466
8:30AM	11	28	23	0	62	24	86	60	0	170	36	30	5	0	71	19	141	23	0	183	486
8:45AM	6	21	26	0	53	25	94	51	0	170	34	23	16	0	73	14	117	23	0	154	450
Hourly Total	31	95	108	0	234	82	344	222	0	648	156	112	44	0	312	68	533	78	0	679	1873
4:00PM	37	35	64	0	136	30	217	71	0	318	70	29	25	0	124	25	154	36	0	215	793
4:15PM	24	33	34	0	91	39	212	69	0	320	47	30	17	0	94	25	175	31	0	231	736
4:30PM	36	32	45	0	113	32	207	66	0	305	56	30	18	0	104	20	179	33	0	232	754
4:45PM	28	44	44	0	116	36	176	64	0	276	57	32	22	0	111	27	172	36	0	235	738
Hourly Total	125	144	187	0	456	137	812	270	0	1219	230	121	82	0	433	97	680	136	0	913	3021
5:00PM	33	32	48	0	113	32	182	67	0	281	64	42	22	0	128	19	190	33	0	242	764
5:15PM	14	31	41	0	86	20	215	74	0	309	49	41	27	0	117	16	192	39	0	247	759
5:30PM	16	34	44	0	94	19	183	61	0	263	36	35	22	0	93	23	178	40	0	241	691
5:45PM	28	24	27	0	79	19	161	54	0	234	44	24	17	0	85	17	166	35	0	218	616
Hourly Total	91	121	160	0	372	90	741	256	0	1087	193	142	88	0	423	75	726	147	0	948	2830
Total	288	492	616	0	1396	489	2568	1089	0	4146	818	489	276	0	1583	352	3118	453	0	3923	11048
% Approach	20.6%	35.2%	44.1%	0%	-	11.8%	61.9%	26.3%	0%	-	51.7%	30.9%	17.4%	0%	-	9.0%	79.5%	11.5%	0%	-	-
% Total	2.6%	4.5%	5.6%	0%	12.6%	4.4%	23.2%	9.9%	0%	37.5%	7.4%	4.4%	2.5%	0%	14.3%	3.2%	28.2%	4.1%	0%	35.5%	-
Lights	282	482	571	0	1335	451	2450	1027	0	3928	765	475	263	0	1503	342	2997	447	0	3786	10552
% Lights	97.9%	98.0%	92.7%	0%	95.6%	92.2%	95.4%	94.3%	0%	94.7%	93.5%	97.1%	95.3%	0%	94.9%	97.2%	96.1%	98.7%	0%	96.5%	95.5%
Articulated Trucks	1	1	24	0	26	23	57	37	0	117	37	3	7	0	47	7	67	1	0	75	265
% Articulated Trucks	0.3%	0.2%	3.9%	0%	1.9%	4.7%	2.2%	3.4%	0%	2.8%	4.5%	0.6%	2.5%	0%	3.0%	2.0%	2.1%	0.2%	0%	1.9%	2.4%
Buses and Single-Unit Trucks	5	9	21	0	35	15	61	25	0	101	16	11	6	0	33	3	54	5	0	62	231
% Buses and Single-Unit Trucks	1.7%	1.8%	3.4%	0%	2.5%	3.1%	2.4%	2.3%	0%	2.4%	2.0%	2.2%	2.2%	0%	2.1%	0.9%	1.7%	1.1%	0%	1.6%	2.1%

*L: Left, R: Right, T: Thru, U: U-Turn

W Main & Experiment Farm/Stanfield - TMC

Thu May 18, 2023

Full Length (6 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1069037, Location: 40.055808, -84.240631



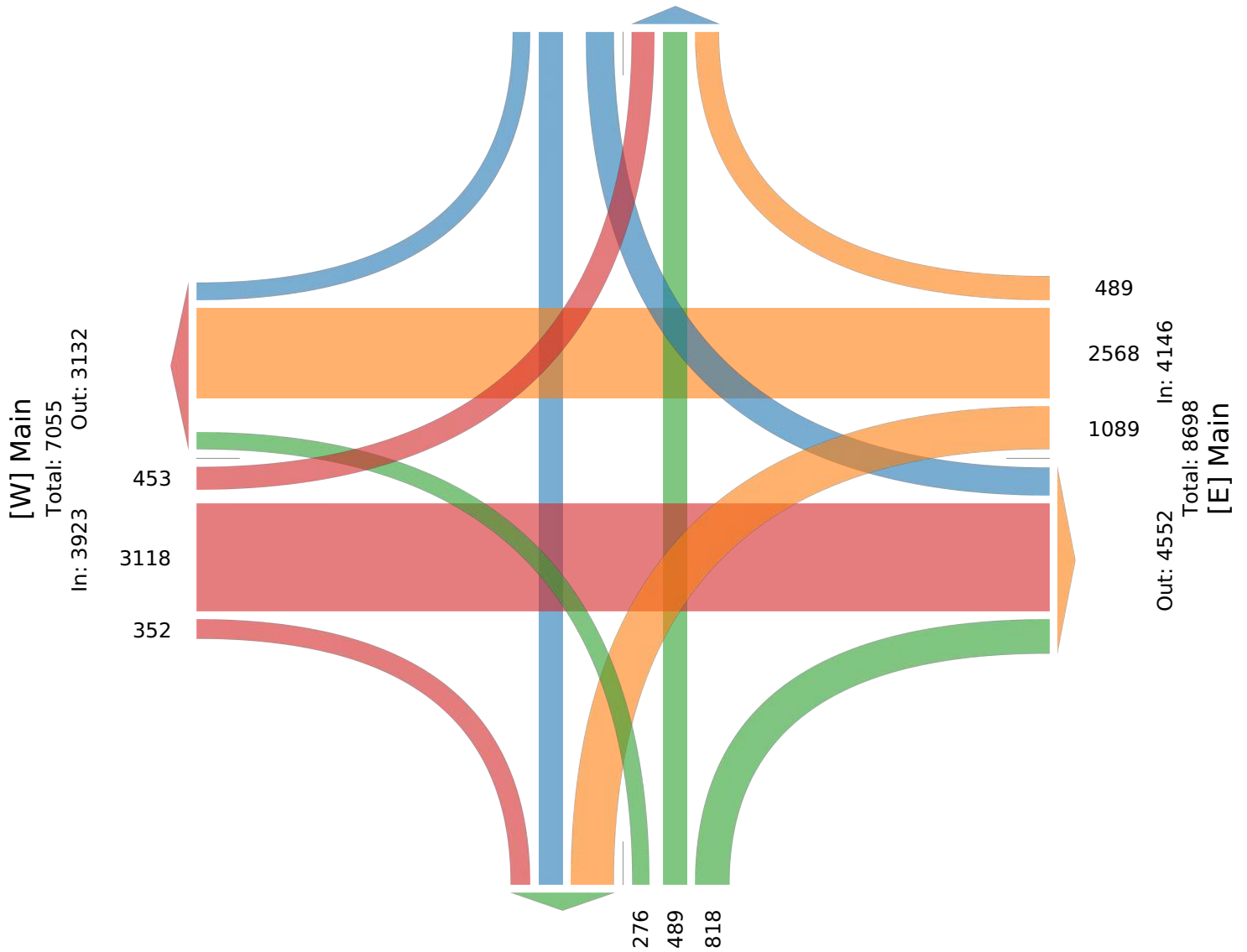
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Stanfield

Total: 2827

In: 1396 Out: 1431

288
492
616



Out: 1933 In: 1583

Total: 3516

[S] Stanfield

W Main & Experiment Farm/Stanfield - TMC

Thu May 18, 2023

AM Peak (7:15 AM - 8:15 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1069037, Location: 40.055808, -84.240631



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Stanfield Southbound					Main Westbound					Stanfield Northbound					Main Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2023-05-18 7:15AM	6	23	17	0	46	17	92	43	0	152	42	18	10	0	70	14	179	12	0	205	473
7:30AM	7	22	27	0	56	26	116	65	0	207	38	16	8	0	62	18	175	16	0	209	534
7:45AM	6	25	20	0	51	18	101	75	0	194	40	16	5	0	61	16	155	18	0	189	495
8:00AM	6	34	23	0	63	18	85	55	0	158	30	35	14	0	79	19	134	18	0	171	471
Total	25	104	87	0	216	79	394	238	0	711	150	85	37	0	272	67	643	64	0	774	1973
% Approach	11.6%	48.1%	40.3%	0%	-	11.1%	55.4%	33.5%	0%	-	55.1%	31.3%	13.6%	0%	-	8.7%	83.1%	8.3%	0%	-	-
% Total	1.3%	5.3%	4.4%	0%	10.9%	4.0%	20.0%	12.1%	0%	36.0%	7.6%	4.3%	1.9%	0%	13.8%	3.4%	32.6%	3.2%	0%	39.2%	-
PHF	0.893	0.765	0.806	-	0.857	0.760	0.849	0.793	-	0.859	0.893	0.607	0.661	-	0.861	0.882	0.898	0.889	-	0.926	0.924
Lights	25	101	71	0	197	71	358	220	0	649	140	82	36	0	258	65	616	62	0	743	1847
% Lights	100%	97.1%	81.6%	0%	91.2%	89.9%	90.9%	92.4%	0%	91.3%	93.3%	96.5%	97.3%	0%	94.9%	97.0%	95.8%	96.9%	0%	96.0%	93.6%
Articulated Trucks	0	0	8	0	8	4	19	10	0	33	9	2	1	0	12	2	15	0	0	17	70
% Articulated Trucks	0%	0%	9.2%	0%	3.7%	5.1%	4.8%	4.2%	0%	4.6%	6.0%	2.4%	2.7%	0%	4.4%	3.0%	2.3%	0%	0%	2.2%	3.5%
Buses and Single-Unit Trucks	0	3	8	0	11	4	17	8	0	29	1	1	0	0	2	0	12	2	0	14	56
% Buses and Single-Unit Trucks	0%	2.9%	9.2%	0%	5.1%	5.1%	4.3%	3.4%	0%	4.1%	0.7%	1.2%	0%	0%	0.7%	0%	1.9%	3.1%	0%	1.8%	2.8%

* L: Left, R: Right, T: Thru, U: U-Turn

W Main & Experiment Farm/Stanfield - TMC

Thu May 18, 2023

AM Peak (7:15 AM - 8:15 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1069037, Location: 40.055808, -84.240631



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Stanfield

Total: 444

In: 216 Out: 228

25
104
87

[W] Main

Total: 1230
In: 774 Out: 456

64
643
67

79
394
238

In: 711
Total: 1591
Out: 880
[E] Main

37
85
150

Out: 409 In: 272
Total: 681

[S] Stanfield

W Main & Experiment Farm/Stanfield - TMC

Thu May 18, 2023

PM Peak (4 PM - 5 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1069037, Location: 40.055808, -84.240631



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Stanfield Southbound					Main Westbound					Stanfield Northbound					Main Eastbound					
Time	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	R	T	L	U	App	Int
2023-05-18 4:00PM	37	35	64	0	136	30	217	71	0	318	70	29	25	0	124	25	154	36	0	215	793
4:15PM	24	33	34	0	91	39	212	69	0	320	47	30	17	0	94	25	175	31	0	231	736
4:30PM	36	32	45	0	113	32	207	66	0	305	56	30	18	0	104	20	179	33	0	232	754
4:45PM	28	44	44	0	116	36	176	64	0	276	57	32	22	0	111	27	172	36	0	235	738
Total	125	144	187	0	456	137	812	270	0	1219	230	121	82	0	433	97	680	136	0	913	3021
% Approach	27.4%	31.6%	41.0%	0%	-	11.2%	66.6%	22.1%	0%	-	53.1%	27.9%	18.9%	0%	-	10.6%	74.5%	14.9%	0%	-	-
% Total	4.1%	4.8%	6.2%	0%	15.1%	4.5%	26.9%	8.9%	0%	40.4%	7.6%	4.0%	2.7%	0%	14.3%	3.2%	22.5%	4.5%	0%	30.2%	-
PHF	0.845	0.818	0.730	-	0.838	0.878	0.935	0.951	-	0.952	0.821	0.945	0.820	-	0.873	0.898	0.950	0.944	-	0.971	0.952
Lights	124	144	180	0	448	126	786	266	0	1178	216	118	80	0	414	94	650	136	0	880	2920
% Lights	99.2%	100%	96.3%	0%	98.2%	92.0%	96.8%	98.5%	0%	96.6%	93.9%	97.5%	97.6%	0%	95.6%	96.9%	95.6%	100%	0%	96.4%	96.7%
Articulated Trucks	0	0	4	0	4	8	12	3	0	23	6	0	1	0	7	2	19	0	0	21	55
% Articulated Trucks	0%	0%	2.1%	0%	0.9%	5.8%	1.5%	1.1%	0%	1.9%	2.6%	0%	1.2%	0%	1.6%	2.1%	2.8%	0%	0%	2.3%	1.8%
Buses and Single-Unit Trucks	1	0	3	0	4	3	14	1	0	18	8	3	1	0	12	1	11	0	0	12	46
% Buses and Single-Unit Trucks	0.8%	0%	1.6%	0%	0.9%	2.2%	1.7%	0.4%	0%	1.5%	3.5%	2.5%	1.2%	0%	2.8%	1.0%	1.6%	0%	0%	1.3%	1.5%

* L: Left, R: Right, T: Thru, U: U-Turn

W Main & Experiment Farm/Stanfield - TMC

Thu May 18, 2023

PM Peak (4 PM - 5 PM) - Overall Peak Hour

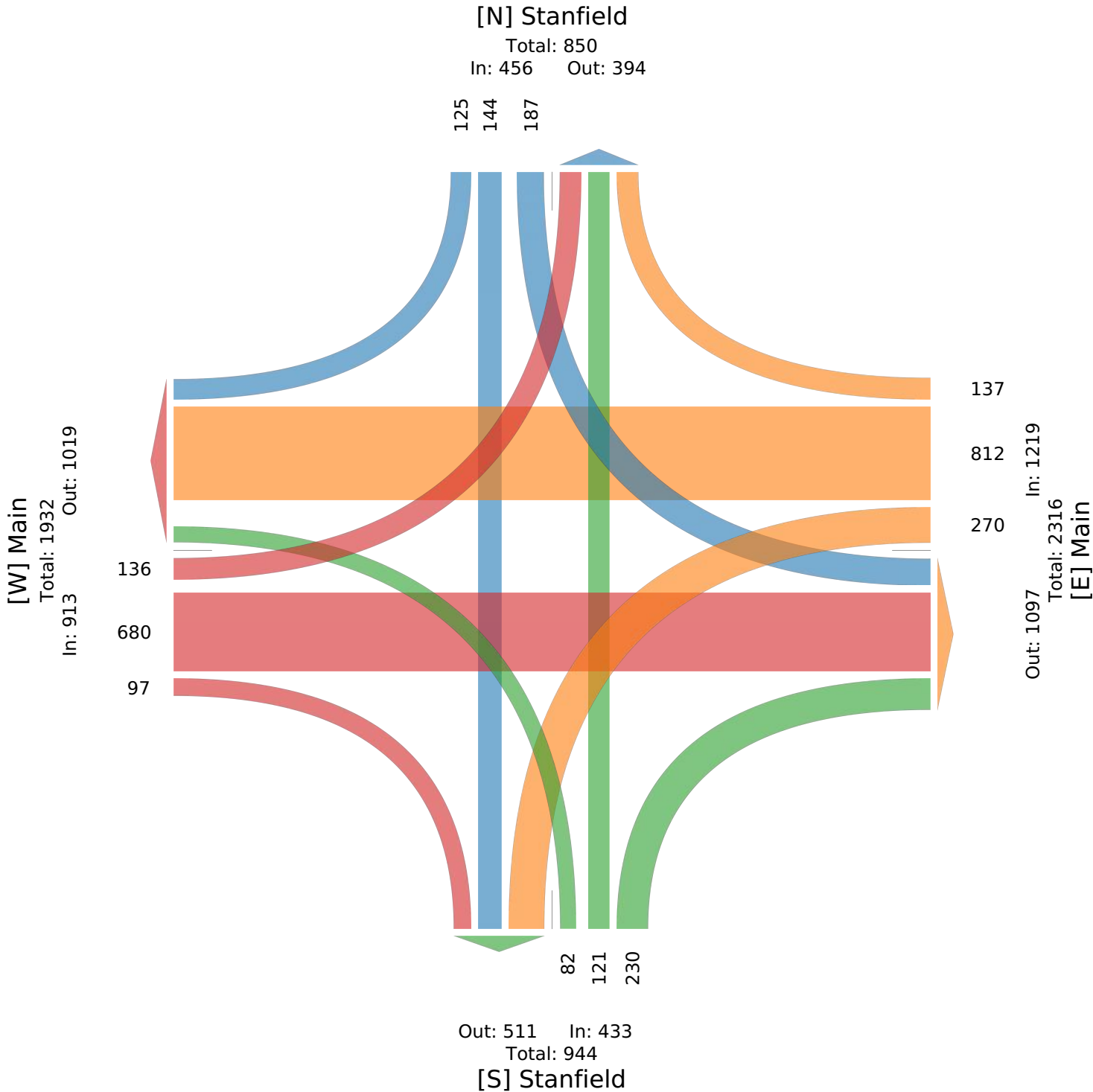
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1069037, Location: 40.055808, -84.240631



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



2023 Existing Year 2023 - AM Peak Hour Traffic Volumes

Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	TOTAL
W Main St & Experiment Farm/Stanfield Rd	37	85	150	87	104	25	64	643	67	238	394	79	1973
	272			216			774			711			

**Growth
Rate
1.0%**

2047 Design Year 2047 - AM Peak Hour Traffic Volumes

Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	TOTAL
W Main St & Experiment Farm/Stanfield Rd	46	105	186	108	129	31	79	797	83	295	489	98	2446
	337			268			959			882			

2023 Existing Year 2023 - PM Peak Hour Traffic Volumes

Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	TOTAL
W Main St & Experiment Farm/Stanfield Rd	82	121	230	187	144	125	136	680	97	270	812	137	3021
	433			456			913			1219			

**Growth
Rate
1.0%**

2047 Design Year 2047 - PM Peak Hour Traffic Volumes

Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	TOTAL
W Main St & Experiment Farm/Stanfield Rd	102	150	285	232	179	155	169	843	120	335	1007	170	3747
	537			566			1132			1512			

Appendix B – Capacity Analysis Output

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

08/25/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	643	67	238	394	79	37	85	150	87	104	25
Future Volume (vph)	64	643	67	238	394	79	37	85	150	87	104	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		105	280		0	0		300	130		25
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	80			80			80			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.975				0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3505	1509	1736	3347	0	1687	1792	1538	1703	1787	0
Flt Permitted	0.462			0.274			0.668			0.641		
Satd. Flow (perm)	878	3505	1509	501	3347	0	1186	1792	1538	1149	1787	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			183		26				185		12	
Link Speed (mph)		40			40			35			35	
Link Distance (ft)		1272			1200			1186			1440	
Travel Time (s)		21.7			20.5			23.1			28.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	7%	4%	5%	6%	7%	6%	5%	6%	4%	0%
Adj. Flow (vph)	70	699	73	259	428	86	40	92	163	95	113	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	699	73	259	514	0	40	92	163	95	140	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes									Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

08/25/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	11.0	26.7	26.7	10.6	26.7		11.0	24.5	24.5	11.0	24.5	
Total Split (s)	18.0	39.0	39.0	12.0	33.0		12.0	27.0	27.0	12.0	27.0	
Total Split (%)	20.0%	43.3%	43.3%	13.3%	36.7%		13.3%	30.0%	30.0%	13.3%	30.0%	
Maximum Green (s)	12.0	32.3	32.3	6.4	26.3		6.0	20.5	20.5	6.0	20.5	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9		3.0	3.6	3.6	3.0	3.6	
All-Red Time (s)	3.0	2.8	2.8	2.6	2.8		3.0	2.9	2.9	3.0	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.7	6.7	5.6	6.7		6.0	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effect Green (s)	46.5	37.8	37.8	53.9	43.2		17.7	12.4	12.4	18.9	14.8	
Actuated g/C Ratio	0.52	0.42	0.42	0.60	0.48		0.20	0.14	0.14	0.21	0.16	
v/c Ratio	0.13	0.48	0.10	0.57	0.32		0.15	0.37	0.44	0.34	0.46	
Control Delay	10.0	22.0	0.3	16.0	17.1		24.0	38.4	7.7	28.0	35.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	10.0	22.0	0.3	16.0	17.1		24.0	38.4	7.7	28.0	35.8	
LOS	B	C	A	B	B		C	D	A	C	D	
Approach Delay		19.1			16.7			19.5			32.7	
Approach LOS		B			B			B			C	
Queue Length 50th (ft)	16	164	0	65	96		17	48	0	41	68	
Queue Length 95th (ft)	38	221	0	#127	155		38	89	40	74	119	
Internal Link Dist (ft)		1192			1120			1106			1360	
Turn Bay Length (ft)	160		105	280					300	130		
Base Capacity (vph)	615	1470	739	456	1620		266	408	493	278	419	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.11	0.48	0.10	0.57	0.32		0.15	0.23	0.33	0.34	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 86 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 19.8

Intersection LOS: B

Intersection Capacity Utilization 62.8%

ICU Level of Service B

Analysis Period (min) 15

Lanes, Volumes, Timings

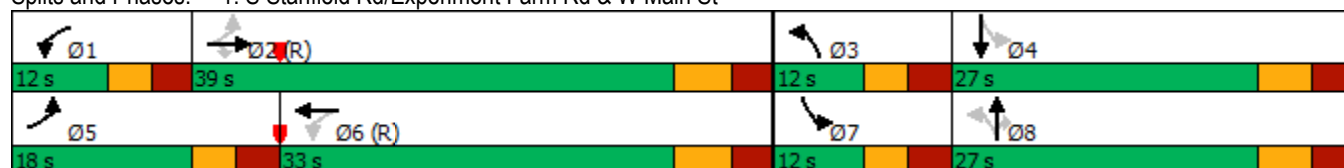
1: S Stanfield Rd/Experiment Farm Rd & W Main St

08/25/2023

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: S Stanfield Rd/Experiment Farm Rd & W Main St



Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

08/25/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	680	97	270	812	137	82	121	230	187	144	125
Future Volume (vph)	136	680	97	270	812	137	82	121	230	187	144	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		105	280		0	0		300	130		25
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	80			80			80			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.978				0.850		0.930	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3505	1509	1736	3358	0	1687	1792	1538	1703	1730	0
Flt Permitted	0.126			0.273			0.388			0.631		
Satd. Flow (perm)	239	3505	1509	499	3358	0	689	1792	1538	1131	1730	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			183		21				250		45	
Link Speed (mph)		40			40			35			35	
Link Distance (ft)		1272			1200			1186			1440	
Travel Time (s)		21.7			20.5			23.1			28.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	7%	4%	5%	6%	7%	6%	5%	6%	4%	0%
Adj. Flow (vph)	148	739	105	293	883	149	89	132	250	203	157	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	739	105	293	1032	0	89	132	250	203	293	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes									Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

08/25/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	11.0	26.7	26.7	10.6	26.7		11.0	24.5	24.5	11.0	24.5	
Total Split (s)	18.0	39.0	39.0	12.0	33.0		12.0	27.0	27.0	12.0	27.0	
Total Split (%)	20.0%	43.3%	43.3%	13.3%	36.7%		13.3%	30.0%	30.0%	13.3%	30.0%	
Maximum Green (s)	12.0	32.3	32.3	6.4	26.3		6.0	20.5	20.5	6.0	20.5	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9		3.0	3.6	3.6	3.0	3.6	
All-Red Time (s)	3.0	2.8	2.8	2.6	2.8		3.0	2.9	2.9	3.0	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.7	6.7	5.6	6.7		6.0	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effect Green (s)	43.8	33.0	33.0	41.7	31.7		23.5	17.0	17.0	24.7	19.4	
Actuated g/C Ratio	0.49	0.37	0.37	0.46	0.35		0.26	0.19	0.19	0.27	0.22	
v/c Ratio	0.51	0.58	0.16	0.82	0.86		0.36	0.39	0.51	0.58	0.72	
Control Delay	18.3	25.3	0.7	40.3	37.6		24.6	34.2	7.9	31.6	38.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	18.3	25.3	0.7	40.3	37.6		24.6	34.2	7.9	31.6	38.7	
LOS	B	C	A	D	D		C	C	A	C	D	
Approach Delay		21.6			38.2			18.5			35.8	
Approach LOS		C			D			B			D	
Queue Length 50th (ft)	42	176	0	91	292		34	64	0	84	132	
Queue Length 95th (ft)	80	235	3	#257	#458		66	115	59	137	219	
Internal Link Dist (ft)		1192			1120			1106			1360	
Turn Bay Length (ft)	160		105	280					300	130		
Base Capacity (vph)	330	1285	669	358	1198		246	408	543	348	428	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.45	0.58	0.16	0.82	0.86		0.36	0.32	0.46	0.58	0.68	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 86 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 30.0

Intersection LOS: C

Intersection Capacity Utilization 75.1%

ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings

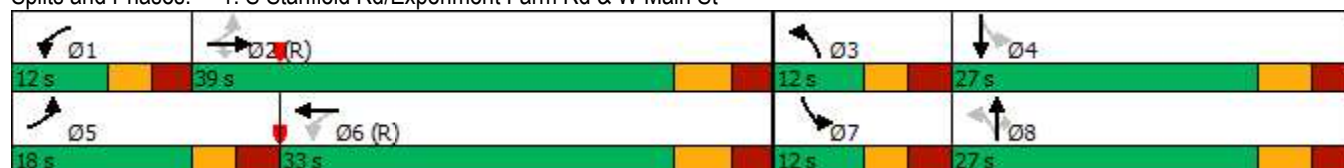
1: S Stanfield Rd/Experiment Farm Rd & W Main St

08/25/2023

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: S Stanfield Rd/Experiment Farm Rd & W Main St



Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/01/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	797	83	295	489	98	46	105	186	108	129	31
Future Volume (vph)	79	797	83	295	489	98	46	105	186	108	129	31
Satd. Flow (prot)	1805	3505	1509	1736	3347	0	1687	1792	1538	1703	1787	0
Flt Permitted	0.409			0.150			0.639			0.633		
Satd. Flow (perm)	777	3505	1509	274	3347	0	1135	1792	1538	1135	1787	0
Satd. Flow (RTOR)			183		26				202		13	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	7%	4%	5%	6%	7%	6%	5%	6%	4%	0%
Adj. Flow (vph)	86	866	90	321	532	107	50	114	202	117	140	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	866	90	321	639	0	50	114	202	117	174	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	11.0	26.7	26.7	10.6	26.7		11.0	24.5	24.5	11.0	24.5	
Total Split (s)	18.0	39.0	39.0	12.0	33.0		12.0	27.0	27.0	12.0	27.0	
Total Split (%)	20.0%	43.3%	43.3%	13.3%	36.7%		13.3%	30.0%	30.0%	13.3%	30.0%	
Maximum Green (s)	12.0	32.3	32.3	6.4	26.3		6.0	20.5	20.5	6.0	20.5	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9		3.0	3.6	3.6	3.0	3.6	
All-Red Time (s)	3.0	2.8	2.8	2.6	2.8		3.0	2.9	2.9	3.0	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.7	6.7	5.6	6.7		6.0	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effect Green (s)	41.5	32.3	32.3	51.1	41.3		19.2	13.9	13.9	20.4	16.3	
Actuated g/C Ratio	0.46	0.36	0.36	0.57	0.46		0.21	0.15	0.15	0.23	0.18	
v/c Ratio	0.19	0.69	0.14	0.79	0.41		0.18	0.41	0.50	0.40	0.52	
Control Delay	11.3	28.0	0.4	37.0	19.7		23.2	37.6	9.1	28.2	36.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	11.3	28.0	0.4	37.0	19.7		23.2	37.6	9.1	28.2	36.1	
LOS	B	C	A	D	B		C	D	A	C	D	
Approach Delay		24.3			25.5			19.9			32.9	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	21	217	0	109	132		21	59	0	50	86	
Queue Length 95th (ft)	48	285	0	#356	210		43	103	55	85	141	
Internal Link Dist (ft)		1192			1120			1106			1360	
Turn Bay Length (ft)	160		105	280					300	130		
Base Capacity (vph)	525	1257	658	405	1548		279	408	506	295	424	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/01/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.16	0.69	0.14	0.79	0.41		0.18	0.28	0.40	0.40	0.41	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 86 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 25.1

Intersection LOS: C

Intersection Capacity Utilization 71.9%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: S Stanfield Rd/Experiment Farm Rd & W Main St

 Ø1	 Ø2 (R)	 Ø3	 Ø4
12 s	39 s	12 s	27 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
18 s	33 s	12 s	27 s

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/01/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	843	120	335	1007	170	102	150	285	232	179	155
Future Volume (vph)	169	843	120	335	1007	170	102	150	285	232	179	155
Satd. Flow (prot)	1805	3505	1509	1736	3358	0	1687	1792	1538	1703	1732	0
Flt Permitted	0.129			0.177			0.271			0.600		
Satd. Flow (perm)	245	3505	1509	323	3358	0	481	1792	1538	1075	1732	0
Satd. Flow (RTOR)			183		21				240		45	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	7%	4%	5%	6%	7%	6%	5%	6%	4%	0%
Adj. Flow (vph)	184	916	130	364	1095	185	111	163	310	252	195	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	916	130	364	1280	0	111	163	310	252	363	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	11.0	26.7	26.7	10.6	26.7		11.0	24.5	24.5	11.0	24.5	
Total Split (s)	18.0	39.0	39.0	12.0	33.0		12.0	27.0	27.0	12.0	27.0	
Total Split (%)	20.0%	43.3%	43.3%	13.3%	36.7%		13.3%	30.0%	30.0%	13.3%	30.0%	
Maximum Green (s)	12.0	32.3	32.3	6.4	26.3		6.0	20.5	20.5	6.0	20.5	
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9		3.0	3.6	3.6	3.0	3.6	
All-Red Time (s)	3.0	2.8	2.8	2.6	2.8		3.0	2.9	2.9	3.0	2.9	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.7	6.7	5.6	6.7		6.0	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effect Green (s)	43.7	32.3	32.3	38.8	29.8		24.8	18.3	18.3	26.0	20.7	
Actuated g/C Ratio	0.49	0.36	0.36	0.43	0.33		0.28	0.20	0.20	0.29	0.23	
v/c Ratio	0.60	0.73	0.20	1.33	1.14		0.52	0.45	0.62	0.72	0.84	
Control Delay	22.5	29.2	1.8	194.1	103.8		29.9	34.8	13.9	38.0	48.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	22.5	29.2	1.8	194.1	103.8		29.9	34.8	13.9	38.0	48.0	
LOS	C	C	A	F	F		C	C	B	D	D	
Approach Delay		25.3			123.8			22.8			43.9	
Approach LOS		C			F			C			D	
Queue Length 50th (ft)	56	234	0	~243	~486		42	79	32	105	175	
Queue Length 95th (ft)	108	306	15	#419	#624		80	138	113	#178	#327	
Internal Link Dist (ft)		1192			1120			1106			1360	
Turn Bay Length (ft)	160		105	280					300	130		
Base Capacity (vph)	330	1257	658	274	1125		212	408	535	352	432	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/01/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.56	0.73	0.20	1.33	1.14		0.52	0.40	0.58	0.72	0.84	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 86 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.33

Intersection Signal Delay: 67.5

Intersection LOS: E

Intersection Capacity Utilization 88.2%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: S Stanfield Rd/Experiment Farm Rd & W Main St



Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/02/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	797	83	295	489	98	46	105	186	108	129	31
Future Volume (vph)	79	797	83	295	489	98	46	105	186	108	129	31
Satd. Flow (prot)	1805	3505	1509	1736	3438	1524	1687	1792	1538	1703	1827	1615
Flt Permitted	0.454			0.152			0.668			0.604		
Satd. Flow (perm)	863	3505	1509	278	3438	1524	1186	1792	1538	1083	1827	1615
Satd. Flow (RTOR)			256						258			258
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	3%	7%	4%	5%	6%	7%	6%	5%	6%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	86	866	90	321	532	107	50	114	202	117	140	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	866	90	321	532	107	50	114	202	117	140	34
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	7	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	26.7	26.7	10.6	26.7	11.0	11.0	24.5	24.5	11.0	24.5	24.5
Total Split (s)	11.0	37.3	37.3	17.1	43.4	11.0	11.0	24.6	24.6	11.0	24.6	24.6
Total Split (%)	12.2%	41.4%	41.4%	19.0%	48.2%	12.2%	12.2%	27.3%	27.3%	12.2%	27.3%	27.3%
Maximum Green (s)	5.0	30.6	30.6	11.5	36.7	5.0	5.0	18.1	18.1	5.0	18.1	18.1
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9	3.0	3.0	3.6	3.6	3.0	3.6	3.6
All-Red Time (s)	3.0	2.8	2.8	2.6	2.8	3.0	3.0	2.9	2.9	3.0	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.7	6.7	5.6	6.7	6.0	6.0	6.5	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	40.5	32.6	32.6	54.2	42.4	54.1	18.2	12.7	12.7	20.6	17.1	17.1
Actuated g/C Ratio	0.45	0.36	0.36	0.60	0.47	0.60	0.20	0.14	0.14	0.23	0.19	0.19
v/c Ratio	0.19	0.68	0.13	0.79	0.33	0.12	0.19	0.45	0.46	0.41	0.40	0.07
Control Delay	10.7	28.3	0.4	30.9	17.1	10.0	25.1	40.1	5.2	30.7	36.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	28.3	0.4	30.9	17.1	10.0	25.1	40.1	5.2	30.7	36.5	0.3
LOS	B	C	A	C	B	B	C	D	A	C	D	A

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/02/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		24.4			21.0			18.8			29.9	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	19	224	0	96	104	27	21	60	0	52	75	0
Queue Length 95th (ft)	44	294	0	#269	150	55	46	106	27	90	126	0
Internal Link Dist (ft)		1192			1001			1336			682	
Turn Bay Length (ft)	160			450		280			300	130		130
Base Capacity (vph)	463	1268	709	408	1618	915	267	360	515	282	382	542
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.68	0.13	0.79	0.33	0.12	0.19	0.32	0.39	0.41	0.37	0.06

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 86 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.0

Intersection LOS: C

Intersection Capacity Utilization 70.6%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: S Stanfield Rd/Experiment Farm Rd & W Main St

					
Ø1	Ø2 (R)		Ø3	Ø4	
17.1 s	37.3 s		11 s	24.6 s	
					
Ø5	Ø6 (R)		Ø7	Ø8	
11 s	43.4 s		11 s	24.6 s	

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/02/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	843	120	335	1007	170	102	150	285	232	179	155
Future Volume (vph)	169	843	120	335	1007	170	102	150	285	232	179	155
Satd. Flow (prot)	1805	3505	1509	1736	3438	1524	1687	1792	1538	1703	1827	1615
Flt Permitted	0.156			0.124			0.582			0.583		
Satd. Flow (perm)	296	3505	1509	227	3438	1524	1033	1792	1538	1045	1827	1615
Satd. Flow (RTOR)			256						258			258
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	3%	7%	4%	5%	6%	7%	6%	5%	6%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	184	916	130	364	1095	185	111	163	310	252	195	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	916	130	364	1095	185	111	163	310	252	195	168
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	7	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	26.7	26.7	10.6	26.7	11.0	11.0	24.5	24.5	11.0	24.5	24.5
Total Split (s)	11.0	37.3	37.3	17.1	43.4	11.0	11.0	24.6	24.6	11.0	24.6	24.6
Total Split (%)	12.2%	41.4%	41.4%	19.0%	48.2%	12.2%	12.2%	27.3%	27.3%	12.2%	27.3%	27.3%
Maximum Green (s)	5.0	30.6	30.6	11.5	36.7	5.0	5.0	18.1	18.1	5.0	18.1	18.1
Yellow Time (s)	3.0	3.9	3.9	3.0	3.9	3.0	3.0	3.6	3.6	3.0	3.6	3.6
All-Red Time (s)	3.0	2.8	2.8	2.6	2.8	3.0	3.0	2.9	2.9	3.0	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.7	6.7	5.6	6.7	6.0	6.0	6.5	6.5	6.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	38.8	30.6	30.6	52.0	37.4	49.1	20.4	14.9	14.9	21.6	17.1	17.1
Actuated g/C Ratio	0.43	0.34	0.34	0.58	0.42	0.55	0.23	0.17	0.17	0.24	0.19	0.19
v/c Ratio	0.73	0.77	0.19	0.97	0.77	0.22	0.41	0.55	0.66	0.88	0.56	0.33
Control Delay	35.2	31.8	0.6	63.8	27.2	11.7	28.9	40.9	14.6	60.7	40.1	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	31.8	0.6	63.8	27.2	11.7	28.9	40.9	14.6	60.7	40.1	2.2
LOS	D	C	A	E	C	B	C	D	B	E	D	A

Lanes, Volumes, Timings

1: S Stanfield Rd/Experiment Farm Rd & W Main St

06/02/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		29.0			33.6			24.7			38.2	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	47	242	0	~152	277	52	47	85	26	117	104	0
Queue Length 95th (ft)	#144	316	0	#362	359	90	85	143	105	#228	168	7
Internal Link Dist (ft)		1192			1001			1336			682	
Turn Bay Length (ft)	160			450		280			300	130		130
Base Capacity (vph)	253	1191	682	376	1427	831	271	360	515	287	376	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.77	0.19	0.97	0.77	0.22	0.41	0.45	0.60	0.88	0.52	0.31

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 86 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 31.6

Intersection LOS: C

Intersection Capacity Utilization 83.3%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: S Stanfield Rd/Experiment Farm Rd & W Main St

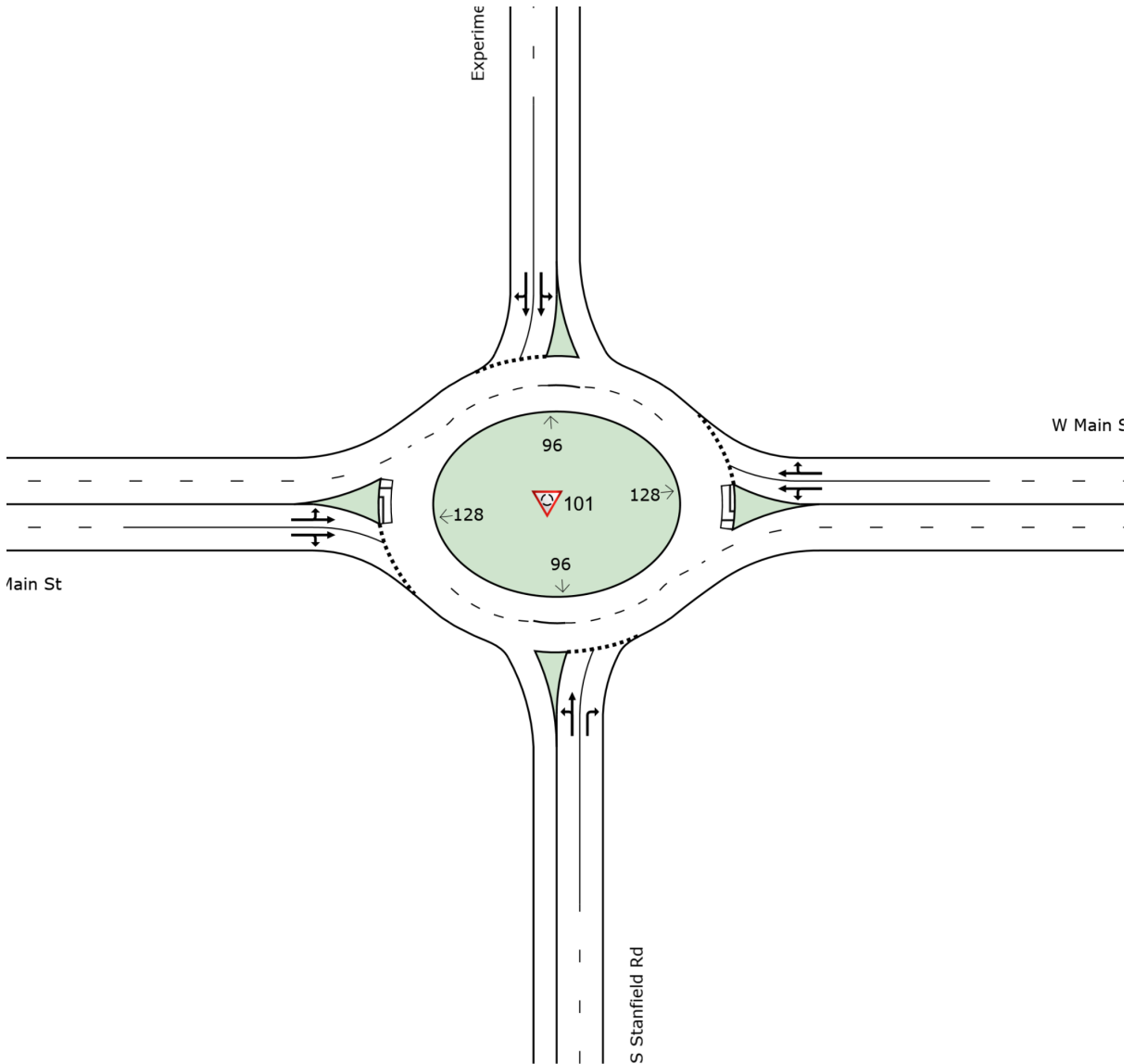
17.1 s		37.3 s		11 s		24.6 s	
11 s		43.4 s		11 s		24.6 s	

SITE LAYOUT

 **Site: 101 [W Main St & Experiment Farm Rd/S Stanfield Rd - 2047 PM (Site Folder: General)]**

Scenario 3 (Sensitivity)
Design Year 2047
Environment Factor = 1.10
Site Category: RAB
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

📍 Site: 101 [W Main St & Experiment Farm Rd/S Stanfield Rd - 2047 AM (Site Folder: General)]

Scenario 3 (Sensitivity)
Design Year 2047
Environment Factor = 1.20
Site Category: RAB
Roundabout

Vehicle Movement Performance														
Mov Turn	ID	INPUT VOLUMES	[Total HV]	veh/h %	DEMAND FLOWS	[Total HV]	veh/h %	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE	Prop. Effective Stop Rate	Aver. No. Cycles	Aver. Speed
South: S Stanfield Rd														
3	L2	46	2.7	50	2.7	0.339	14.2	LOS B	1.7	43.3	0.78	0.89	0.83	32.8
8	T1	105	3.6	114	3.6	0.339	8.2	LOS A	1.7	43.3	0.78	0.89	0.83	31.4
18	R2	186	6.7	202	6.7	0.383	8.8	LOS A	2.0	53.5	0.79	0.90	0.87	32.1
Approach														
		337	5.2	366	5.2	0.383	9.4	LOS A	2.0	53.5	0.78	0.90	0.85	32.0
East: W Main St														
1	L2	98	7.6	107	7.6	0.465	12.3	LOS B	3.6	95.5	0.64	0.62	0.64	34.3
6	T1	489	9.1	532	9.1	0.465	6.0	LOS A	3.6	98.3	0.63	0.61	0.63	35.7
16	R2	295	10.2	321	10.2	0.465	5.8	LOS A	3.6	98.3	0.63	0.60	0.63	33.6
Approach														
		882	9.3	959	9.3	0.465	6.6	LOS A	3.6	98.3	0.63	0.61	0.63	34.8
North: Experiment Farm Rd														
7	L2	108	18.2	117	18.2	0.396	13.9	LOS B	2.2	58.7	0.73	0.86	0.78	32.5
4	T1	129	2.9	140	2.9	0.396	6.6	LOS A	2.2	58.7	0.73	0.86	0.78	31.5
14	R2	31	0.0	34	0.0	0.086	9.4	LOS A	0.3	8.7	0.65	0.78	0.65	31.9
Approach														
		268	8.7	291	8.7	0.396	9.9	LOS A	2.2	58.7	0.72	0.85	0.77	32.0
West: W Main St														
5	L2	79	3.1	86	3.1	0.542	14.1	LOS B	4.7	121.3	0.78	0.79	0.84	33.9
2	T1	797	4.2	866	4.2	0.542	7.5	LOS A	4.7	122.4	0.77	0.75	0.82	35.4
12	R2	83	3.0	90	3.0	0.542	7.0	LOS A	4.7	122.4	0.77	0.71	0.80	33.0
Approach														
		959	4.0	1042	4.0	0.542	8.0	LOS A	4.7	122.4	0.77	0.75	0.82	35.0
All Vehicles														
		2446	6.6	2659	6.6	0.542	7.9	LOS A	4.7	122.4	0.72	0.73	0.75	34.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akgelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

📍 Site: 101 [W Main St & Experiment Farm Rd/S Stanfield Rd - 2047 PM (Site Folder: General)]

Scenario 3 (Sensitivity)
Design Year 2047
Environment Factor = 1.10
Site Category: RAB
Roundabout

Vehicle Movement Performance													
ID	Mov Turn	INPUT VOLUMES		[Total HV] %	DEMAND FLOWS		[Total HV] %	v/c	sec	95% BACK OF QUEUE [Veh. Dist]	Rate	Cycles	
		Prop. Effective	Aver. No. Speed		Deg. Satn	Aver. Delay							Level of Service
South: S Stanfield Rd													
3	L2	102	2.4	110	2.4	0.661	20.1	LOS C	4.5	113.6	0.91	1.08	30.1
8	T1	150	2.5	161	2.5	0.661	14.0	LOS B	4.5	113.6	0.91	1.08	28.9
18	R2	285	6.1	306	6.1	0.627	12.3	LOS B	4.4	114.9	0.92	1.06	30.6
Approach													
		537	4.4	577	4.4	0.661	14.2	LOS B	4.5	114.9	0.92	1.07	30.0
East: W Main St													
1	L2	335	1.5	360	1.5	0.812	21.2	LOS C	13.5	342.7	1.00	1.11	30.3
6	T1	1007	3.2	1083	3.2	0.812	13.7	LOS B	14.1	365.2	1.00	1.07	32.5
16	R2	170	8.0	183	8.0	0.812	13.3	LOS B	14.1	365.2	1.00	1.05	30.9
Approach													
		1512	3.4	1626	3.4	0.812	15.3	LOS B	14.1	365.2	1.00	1.08	31.8
North: Experiment Farm Rd													
7	L2	232	3.7	249	3.7	1.019	55.7	LOS F	16.9	429.3	1.00	1.73	20.4
4	T1	179	0.0	192	0.0	1.019	49.2	LOS F	16.9	429.3	1.00	1.73	19.9
14	R2	155	0.8	167	0.8	0.565	15.9	LOS B	3.2	80.9	0.90	1.02	29.2
Approach													
		566	1.7	609	1.7	1.019	42.7	LOS D	16.9	429.3	0.97	1.54	22.0
West: W Main St													
5	L2	169	0.0	182	0.0	0.879	38.7	LOS D	16.1	411.4	1.00	1.46	24.8
2	T1	843	4.4	906	4.4	0.879	30.4	LOS C	18.8	484.7	1.00	1.46	26.4
12	R2	120	3.1	129	3.1	0.879	28.6	LOS C	18.8	484.7	1.00	1.45	25.5
Approach													
		1132	3.6	1217	3.6	0.879	31.4	LOS C	18.8	484.7	1.00	1.46	26.0
All Vehicles													
		3747	3.3	4029	3.3	1.019	24.2	LOS C	18.8	484.7	0.98	1.26	27.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akgelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix C – Cost Estimates

 Main St / Experiment Farm Rd / Stanfield Rd SIGNAL ALTERNATIVE - PRELIMINARY COST ESTIMATE					
DESCRIPTION	ITEM	QUANTITY	UNIT	\$/UNIT	TOTAL \$
ROADWAY					
Clearing and Grubbing	201	1	Lump	\$10,000.00	\$10,000
Pavement Removed	202	2408	Sq. Yd.	\$10.00	\$24,080
Walk Removed	202	6815	Sq. Ft.	\$2.00	\$13,630
Curb and Gutter Removed	202	4618	Lin. Ft.	\$7.00	\$32,326
Concrete Island Removed	202	49	Sq. Yd.	\$30.00	\$1,470
Excavation	203	2100	Cu. Yd.	\$18.00	\$37,800
Embankment	203	1100	Cu. Yd.	\$13.00	\$14,300
Subgrade Compaction	204	5058	Sq. Yd.	\$1.00	\$5,058
Proof Rolling	204	2	Hr.	\$180.00	\$360
Pavement Planing, Asphalt Concrete, 1.25"	254	14272	Sq. Yd.	\$6.00	\$85,632
4" Concrete Walk	608	5704	Sq. Ft.	\$6.00	\$34,224
Curb Ramp	608	342	Sq. Ft.	\$12.00	\$4,104
ROADWAY SUBTOTAL					\$262,984
EROSION CONTROL					
Seeding & Mulching	659	4300	Sq. Yd.	\$2.00	\$8,600
Topsoil, 4"	659	475	Cu. Yd.	\$51.00	\$24,225
Storm Water Pollution Prevention Plan	832	1	Lump	\$5,000.00	\$5,000
Erosion Control	832	35000	Each	\$1.00	\$35,000
EROSION CONTROL SUBTOTAL					\$72,825
DRAINAGE					
Underdrain	605	4057	Lin. Ft.	\$12.00	\$48,684
Storm Sewer and Structures	611	2250	Lin. Ft.	\$350.00	\$787,500
BMP Treatment	895	1	Each	\$25,000.00	\$25,000
DRAINAGE SUBTOTAL					\$861,184
PAVEMENT					
Asphalt Concrete Base (6")	301	559	Cu. Yd.	\$150.00	\$83,844
Aggregate Base (6")	304	559	Cu. Yd.	\$60.00	\$33,538
Tack Coat (0.075 Gal/Sq. Yd.)	407	1322	Gal.	\$4.00	\$5,288
Asphalt Concrete Surface Course (1.25")	441	612	Cu. Yd.	\$250.00	\$153,002
Asphalt Concrete Intermediate Course (1.75")	441	163	Cu. Yd.	\$225.00	\$36,682
Driveway (Concrete)	452	911	Sq. Yd.	\$80.00	\$72,880
Curb and Gutter, Type 2	609	4057	Lin. Ft.	\$30.00	\$121,710
Concrete Traffic Island (6')	609	793	Sq. Yd.	\$175.00	\$138,833
PAVEMENT SUBTOTAL					\$645,777
LIGHTING					
Lighting	625	1	Lump	\$225,000.00	\$225,000
LIGHTING SUBTOTAL					\$225,000
TRAFFIC CONTROL					
Signing	630	1	Lump	\$40,000.00	\$40,000
Edge Line	644	0.37	Mile	\$6,000.00	\$2,193
Lane Line	644	0.60	Mile	\$5,500.00	\$3,289
Center Line	644	0.25	Mile	\$10,000.00	\$2,492
Channelizing Line	644	3000	Lin. Ft.	\$2.00	\$6,000
Crosswalk Line	644	793	Lin. Ft.	\$4.00	\$3,172
Transverse Line	644	455	Lin. Ft.	\$6.00	\$2,730
Dotted Line	644	222	Lin. Ft.	\$2.00	\$444
Lane Arrow	644	34	Each	\$120.00	\$4,080
Stop Line	644	244	Lin. Ft.	\$6.50	\$1,586
Removal of Existing Traffic Signal System	632	1	Each	\$4,000.00	\$4,000
Traffic Signal Installation	632	1	Each	\$250,000.00	\$250,000
TRAFFIC CONTROL SUBTOTAL					\$319,986
Subtotal				SUBTOTAL	\$2,387,756
20% Contingency					\$477,551
16.8% Inflation (estimated construction in 2026)					\$481,372
Total Construction Cost					\$3,346,678
Maintaining Traffic (3% of Total Construction Cost)		1	Lump	\$100,400	\$100,400
Field Office, Type B	619	9	Month	\$1,800	\$16,200
Construction Layout Stakes (0.75% of Total Construction Cost)	623	1	Lump	\$25,100	\$25,100
Mobilization (Per ODOT CMS)	624	1	Lump	\$100,000	\$100,000
TOTAL PROJECT COST					\$3,588,379

This estimated does not include Right-of-Way or utility relocation costs

This estimate represents our Professional Opinion of the Probable Project Construction Cost.

The estimate is taken from the historical bid data provided by ODOT for the year 2023.

For items where historical bid data provided by ODOT was not available, other similar bid data sources were used to determine costs.

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 Main St / Experiment Farm Rd / Stanfield Rd ROUNDBOUT ALTERNATIVE - PRELIMINARY COST ESTIMATE					
DESCRIPTION	ITEM	QUANTITY	UNIT	\$/UNIT	TOTAL \$
ROADWAY					
Clearing and Grubbing	201	1	Lump	\$10,000.00	\$10,000
Pavement Removed	202	12253	Sq. Yd.	\$10.00	\$122,529
Walk Removed	202	8526	Sq. Ft.	\$2.00	\$17,052
Curb Removed	202	326	Lin. Ft.	\$4.00	\$1,304
Curb and Gutter Removed	202	3145	Lin. Ft.	\$7.00	\$22,015
Concrete Island Removed	202	49	Sq. Yd.	\$30.00	\$1,470
Excavation	203	5000	Cu. Yd.	\$18.00	\$90,000
Embankment	203	2500	Cu. Yd.	\$13.00	\$32,500
Subgrade Compaction	204	13266	Sq. Yd.	\$1.00	\$13,266
Proof Rolling	204	5	Hr.	\$180.00	\$900
Pavement Planing, Asphalt Concrete, 1.25"	254	1028	Sq. Yd.	\$6.00	\$6,169
4" Concrete Walk	608	8700	Sq. Ft.	\$6.00	\$52,200
Curb Ramp	608	600	Sq. Ft.	\$12.00	\$7,200
ROADWAY SUBTOTAL					\$376,605
EROSION CONTROL					
Seeding & Mulching	659	6500	Sq. Yd.	\$2.00	\$13,000
Topsoil, 4"	659	715	Cu. Yd.	\$51.00	\$36,465
Storm Water Pollution Prevention Plan	832	1	Lump	\$5,000.00	\$5,000
Erosion Control	832	35000	Each	\$1.00	\$35,000
EROSION CONTROL SUBTOTAL					\$89,465
DRAINAGE					
Underdrain	605	6137	Lin. Ft.	\$12.00	\$73,644
Storm Sewer and Structures	611	1800	Lin. Ft.	\$500.00	\$900,000
BMP Treatment	895	1	Each	\$25,000.00	\$25,000
DRAINAGE SUBTOTAL					\$998,644
PAVEMENT					
Asphalt Concrete Base (6")	301	1895	Cu. Yd.	\$150.00	\$284,261
Aggregate Base (6")	304	1955	Cu. Yd.	\$60.00	\$117,307
Tack Coat (0.075 Gal/Sq. Yd.)	407	930	Gal.	\$4.00	\$3,720
Asphalt Concrete Surface Course (1.25")	441	431	Cu. Yd.	\$250.00	\$107,627
Asphalt Concrete Intermediate Course (1.75")	441	553	Cu. Yd.	\$225.00	\$124,364
Driveway (Concrete)	452	839	Sq. Yd.	\$80.00	\$67,111
Non-Reinforced Concrete (7" Truck Apron)	452	360	Sq. Yd.	\$150.00	\$54,033
Curb and Gutter, Type 2	609	3297	Lin. Ft.	\$30.00	\$98,910
Curb, Type 6	609	2508	Lin. Ft.	\$20.00	\$50,160
Curb, Type 9	609	308	Lin. Ft.	\$30.00	\$9,240
Concrete Traffic Island (6")	609	697	Sq. Yd.	\$175.00	\$121,917
PAVEMENT SUBTOTAL					\$1,038,650
LIGHTING					
Lighting	625	1	Lump	\$180,000.00	\$180,000
LIGHTING SUBTOTAL					\$180,000
TRAFFIC CONTROL					
Signing	630	1	Lump	\$40,000.00	\$40,000
Edge Line	644	0.36	Mile	\$6,000.00	\$2,162
Lane Line	644	0.52	Mile	\$5,500.00	\$2,876
Center Line	644	0.23	Mile	\$10,000.00	\$2,330
Channelizing Line	644	1800	Lin. Ft.	\$2.00	\$3,600
Crosswalk Line	644	430	Lin. Ft.	\$4.00	\$1,720
Dotted Line	644	140	Lin. Ft.	\$2.00	\$280
Lane Arrow	644	27	Each	\$120.00	\$3,240
Yield Line	644	201	Lin. Ft.	\$10.00	\$2,010
Removal of Existing Traffic Signal System	632	1	Each	\$4,000.00	\$4,000
TRAFFIC CONTROL SUBTOTAL					\$62,237
LANDSCAPING					
Soft Landscaping	661	1	Lump	\$30,000.00	\$30,000
LANDSCAPING SUBTOTAL					\$30,000
Subtotal				SUBTOTAL	\$2,775,602
20% Contingency					\$555,120
16.8% Inflation (estimated construction in 2026)					\$559,561
Total Construction Cost					\$3,890,284
Maintaining Traffic (5% of Total Construction Cost)		1	Lump	\$194,514	\$194,514
Field Office, Type B	619	12	Month	\$1,800	\$21,600
Construction Layout Stakes (0.75% of Total Construction Cost)	623	1	Lump	\$29,177	\$29,177
Mobilization (Per ODOT CMS)	624	1	Lump	\$100,000	\$100,000
TOTAL PROJECT COST					\$4,235,575

This estimated does not include Right-of-Way or utility relocation costs

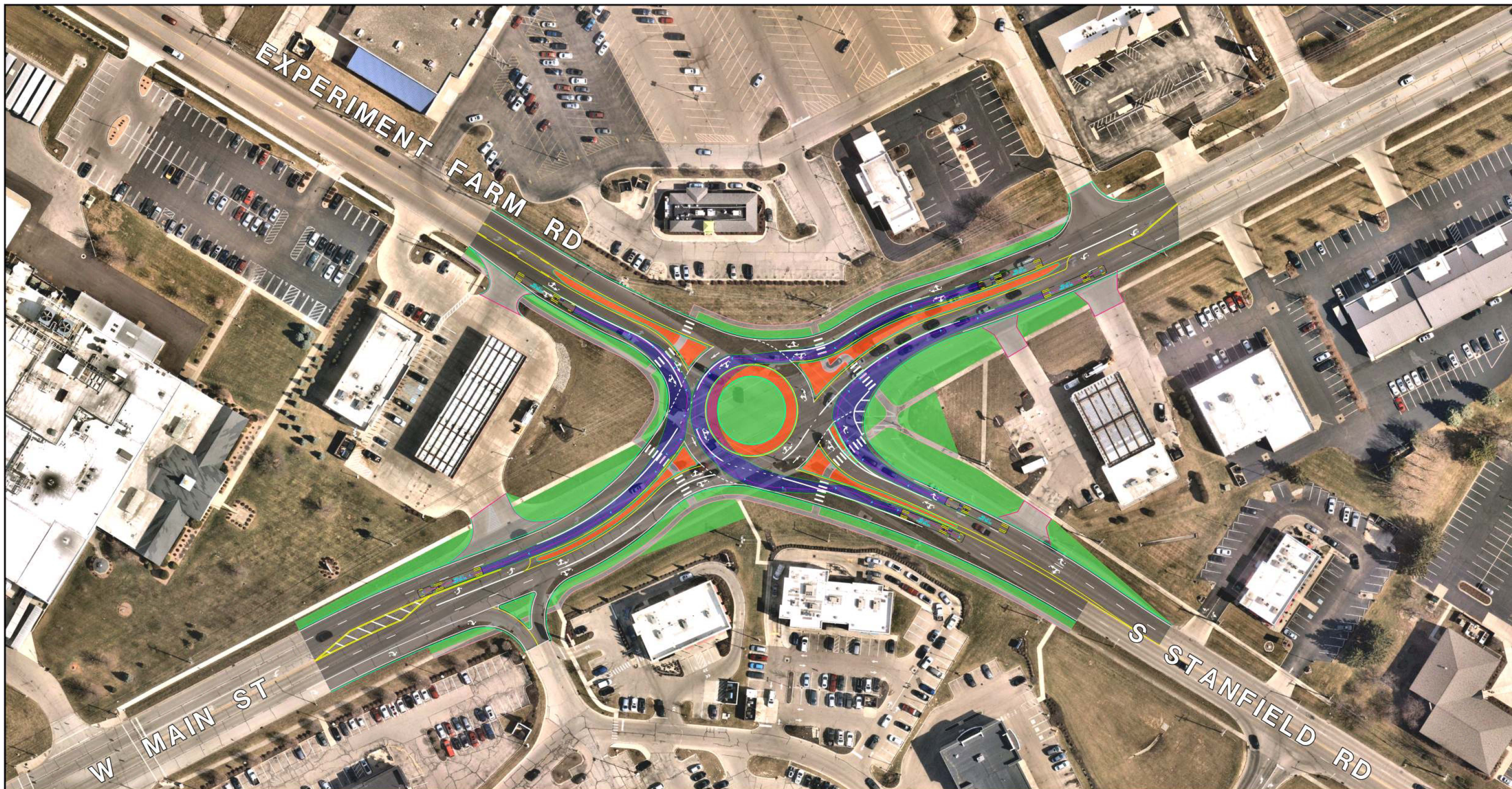
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Appendix D – Truck Turning Movement

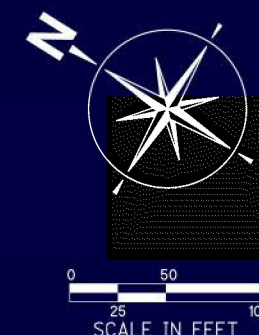


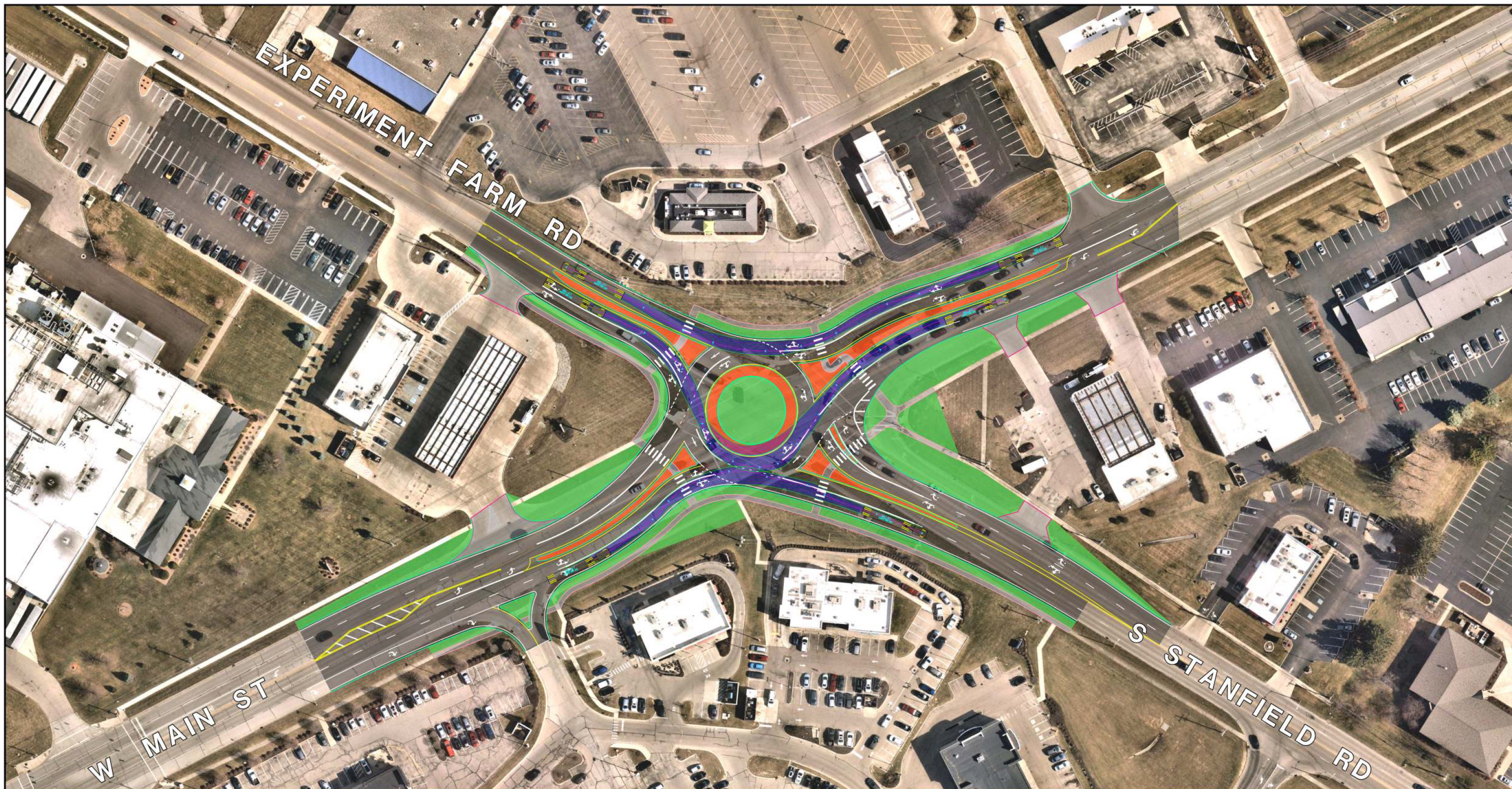
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