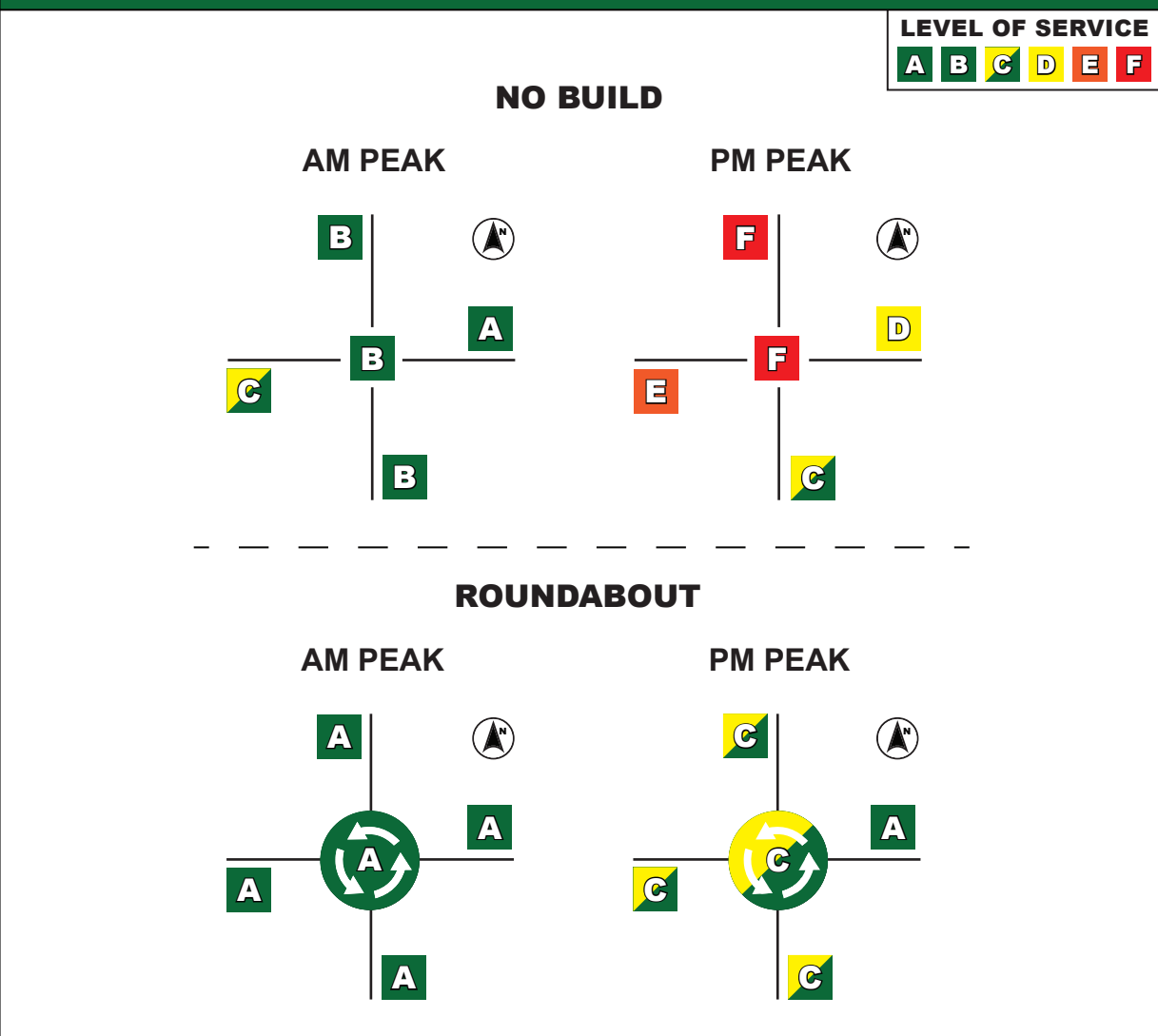


2015-2019 CRASH DATA

CRASHES	INJURIES			
	FATALITIES	TYPE A	TYPE B	TYPE C
10 ANGLE	0	0	2	4
2 HEAD-ON				

2045 OPERATIONS



Opinion of probable cost for single-lane roundabout

\$1.01 MILLION

K. North Leroy Street and North Road

The intersection of North Leroy Street and North Road was included in the early preliminary engineering phase with support from the City of Fenton due to intersection operations and safety concerns. This intersection is included in the 153 intersections that passed the skim analysis for experiencing crashes correctable by a roundabout and is a secondary analysis Tier Three intersection.

During the skim analysis, it was observed that there were 10 angle crashes and 2 head on left turn crashes over the 5-year period. These crashes resulted in zero fatalities, zero type A injuries, two type B injuries, and four type C injuries at the intersection.

No-Build Conditions

The intersection of North Leroy Street and North Road is a signalized intersection. The intersection is three-legged. North Road is an east/west road, with a three-lane cross section (one lane in each direction and a center left-turn lane). The approach laneage at North Leroy Street are exclusive right- and left-turn lanes. North Leroy Street is a north/south road with a five-lane (two lanes in each direction and a center left-turn lane) cross section north of study location and a three-lane (two lanes in each direction with a center left-turn lane) cross section south of the study location. Northbound North Leroy Street approach laneage are exclusive left-turn and through lanes. Southbound North Leroy Street approach laneage are exclusive through and right-turn lanes. Also controlled by the traffic signal is a commercial driveway for businesses on the east side of North Leroy Street. There are pedestrian crossings for the south leg of North Leroy Street and crossing North Road.

In the northwest quadrant is a multi-use build with tenants of Rite-Aid Pharmacy, Hungry Howie's Pizza Restaurant, Metro PCS Mobile, and a tattoo shop. There are multiple businesses also located in the northeast quadrant like CycleFit Sports Bike Shop and Douglas Water Conditioning. The southern quadrant presents a Domino's Pizza Restaurant. There are overhead utilities on the west side of North Leroy Street and crossing the North Road leg. At the ground level, there is a fire hydrant on the east side of North Leroy Street near the pedestrian crossing.

An aerial of the existing intersection can be seen in Figure 12.

Figure 12: Aerial view of North Leroy Street and North Road



An operational analysis of the no-build condition was completed for the intersection using the 2045 forecast traffic volumes. The results of the analysis for the future no-build condition reveals all approaches and movements of the intersection operate at LOS C or better during the AM peak hour. During the PM peak hour, the eastbound approach operates at LOS E, westbound operates at LOS D, northbound operates at LOS C, and southbound operates at LOS F.

The 95th percentile queue lengths were reviewed at the intersection and the results showed all approaches experienced a maximum queue length of 176 feet (9 vehicles) during the AM peak hour and 475 feet (24 vehicles) during the PM peak hour.

The operational analysis results for the future no-build conditions are presented in the table below.

Table 26 : Operational Analysis for 2045 No-Build Condition

Intersection	Approach	AM Peak		PM Peak	
		Delay/LOS	Queue (veh)*	Delay/LOS	Queue (veh)*
North Leroy Street and North Road	Eastbound	22.5/C	7 (135 ft)	72.9/E	24 (475 ft)
	Westbound	0.0/A	0 (0 ft)	36.8/D	1 (17 ft)
	Northbound	12.2/B	5 (93 ft)	32.1/C	11 (218 ft)
	Southbound	18.4/B	9 (176 ft)	138.8/F	17 (338 ft)
	Overall	17.9/B		87.6/F	

* 95th percentile queue length.

Roundabout Conditions

The proposed roundabout configuration for the intersection of North Leroy Street and North Road is a single lane circulating. The proposed single-lane roundabout configuration will not fit inside the existing right-of-way. Based on the concept design, additional right-of-way may be required in the northeast, west, and south. The proposed inscribed diameter for the concept roundabout is 110 feet. The driveway configuration for the Douglas Water Conditioning should be investigated due to the existing driveway location as the fourth leg of the proposed roundabout.

An operational analysis for the single-lane roundabout (build) condition was completed for the intersection using 2045 forecast traffic volumes. The results of the analysis for the roundabout (build) condition reveals all approaches and movements of the intersection operate at LOS A during the AM peak hour and LOS C or better during the PM peak hour. With the implementation of a southbound right-turn bypass lane, the southbound approach and overall intersection delays improve.

The 95th percentile queue lengths were reviewed at the intersection and the results showed all approaches experienced a maximum queue length of three (3) vehicles during the AM peak hour and thirteen (13) vehicles during the PM peak hour.

The operation analysis for the future roundabout (build) conditions are presented in Table 27.

Table 27: Operational Analysis for 2045 Roundabout (Build) Condition

Intersection	Approach	AM Peak		PM Peak	
		Delay/LOS	Queue (veh)*	Delay/LOS	Queue (veh)*
North Leroy Street and North Road (Single Lane Roundabout)	Eastbound	6.9/A	1.1	15.3/C	6.9
	Westbound	0.0/A	0.0	0.0/A	0.0
	Northbound	6.8/A	1.2	18.8/C	10.1
	Southbound	9.5/A	3.1	19.4/C	13.4
	Overall	8.1/A		18.1/C	
North Leroy Street and North Road (Single Lane Roundabout – SB Right-turn Bypass Lane)	Eastbound	6.9/A	1.1	15.3/C	6.9
	Westbound	0.0/A	0.0	0.0/A	0.0
	Northbound	6.8/A	1.2	18.8/C	10.1
	Southbound	6.3/A	1.1	8.5/A	2.3
	Overall	6.8/A		13.6/C	

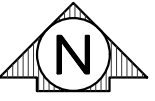
* 95th percentile queue length.

Opinion of probable cost were developed for a single-lane roundabout. The total probable cost is \$1.01 million in 2025 dollars. The probable cost includes a 20 percent contingency and 3 percent inflation. Not included in this fee are the potential costs to relocate any utilities to accommodate the proposed layout. A full breakdown along with all the assumptions can be found in Appendix 3.

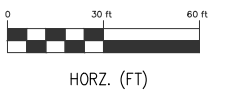
Potential funding sources for this improvement could include regular road improvement funding, CMAQ, or an earmark.

Recommendation

A roundabout would be feasible at this location. There will need to be coordination with the Douglas Water Conditioning about their driveway configuration.



NORTH LEROY AND
NORTH ROAD
ROUNDABOUT CONCEPT
SCALE: 1" = 60'



PLAN DATE: MAY 27, 2021

ROWE PROFESSIONAL SERVICES COMPANY
 The Rowe Building
 540 S. Saginaw St., Suite 200
 Flint, MI 48502
 O: (810) 341-7500
 F: (810) 341-7573
 www.rowepsc.com

PREPARED FOR
GENESEE COUNTY ROAD COMMISSION
ROUNDABOUT CONCEPTS
 NORTH LEROY STREET AND NORTH ROAD
 ROUNDABOUT CONCEPT

FIGURE NO.
10
 JOB No: 19C0262

North Leroy Street & North Road - TMC

Tue Mar 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817410, Location: 42.807444, -83.707205



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

Leg Direction	North Rd Eastbound						East Westbound						N Leroy St Northbound						N Leroy St Southbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-03-09 7:00AM	18	0	7	0	25	0	0	0	0	0	0	1	9	23	0	0	32	0	0	19	27	0	46	0	103
7:15AM	18	1	9	0	28	0	0	0	0	0	0	0	6	28	2	0	36	0	0	28	32	0	60	0	124
7:30AM	36	2	10	0	48	0	0	0	0	0	0	0	17	38	2	0	57	0	0	45	45	0	90	0	195
7:45AM	31	0	21	0	52	0	0	0	0	0	0	0	9	37	0	0	46	0	0	67	67	0	134	0	232
Hourly Total	103	3	47	0	153	0	0	0	0	0	0	1	41	126	4	0	171	0	0	159	171	0	330	0	654
8:00AM	35	0	16	0	51	0	0	0	0	0	0	1	14	51	1	0	66	1	0	60	47	0	107	0	224
8:15AM	43	2	21	0	66	0	0	0	0	0	0	0	17	49	0	0	66	0	0	51	53	0	104	0	236
8:30AM	38	0	12	0	50	0	0	0	0	0	0	0	12	50	1	0	63	1	0	41	40	0	81	0	194
8:45AM	40	0	7	0	47	0	2	1	0	0	3	0	4	50	2	0	56	0	0	56	49	0	105	0	211
Hourly Total	156	2	56	0	214	0	2	1	0	0	3	1	47	200	4	0	251	2	0	208	189	0	397	0	865
4:00PM	70	3	17	0	90	0	1	1	0	0	2	0	19	89	0	0	108	0	0	90	79	0	169	0	369
4:15PM	65	1	22	0	88	1	2	1	0	0	3	3	17	92	0	0	109	0	0	84	66	0	150	0	350
4:30PM	95	1	24	0	120	0	1	0	0	0	1	1	15	109	1	0	125	0	0	91	76	0	167	0	413
4:45PM	101	1	20	0	122	0	0	0	0	0	0	1	20	95	0	0	115	0	0	107	92	0	199	0	436
Hourly Total	331	6	83	0	420	1	4	2	0	0	6	5	71	385	1	0	457	0	0	372	313	0	685	0	1568
5:00PM	99	1	24	0	124	0	0	1	0	0	1	2	13	120	0	0	133	0	0	85	77	0	162	0	420
5:15PM	93	2	22	0	117	0	0	0	0	0	0	0	22	127	0	0	149	0	0	87	91	0	178	0	444
5:30PM	69	0	17	0	86	0	0	1	0	0	1	4	21	63	0	0	84	0	0	91	83	0	174	0	345
5:45PM	75	0	20	0	95	1	2	1	0	0	3	3	24	115	0	0	139	0	0	89	101	0	190	0	427
Hourly Total	336	3	83	0	422	1	2	3	0	0	5	9	80	425	0	0	505	0	0	352	352	0	704	0	1636
Total	926	14	269	0	1209	2	8	6	0	0	14	16	239	1136	9	0	1384	2	0	1091	1025	0	2116	0	4723
% Approach	76.6%	1.2%	22.2%	0%	-	-	57.1%	42.9%	0%	0%	-	-	17.3%	82.1%	0.7%	0%	-	-	0%	51.6%	48.4%	0%	-	-	-
% Total	19.6%	0.3%	5.7%	0%	25.6%	-	0.2%	0.1%	0%	0%	0.3%	-	5.1%	24.1%	0.2%	0%	29.3%	-	0%	23.1%	21.7%	0%	44.8%	-	-
Lights	918	14	266	0	1198	-	8	6	0	0	14	-	237	1118	8	0	1363	-	0	1081	1015	0	2096	-	4671
% Lights	99.1%	100%	98.9%	0%	99.1%	-	100%	100%	0%	0%	100%	-	99.2%	98.4%	88.9%	0%	98.5%	-	0%	99.1%	99.0%	0%	99.1%	-	98.9%
Single-Unit Trucks	5	0	2	0	7	-	0	0	0	0	0	-	0	12	1	0	13	-	0	8	4	0	12	-	32
% Single-Unit Trucks	0.5%	0%	0.7%	0%	0.6%	-	0%	0%	0%	0%	0%	-	0%	1.1%	11.1%	0%	0.9%	-	0%	0.7%	0.4%	0%	0.6%	-	0.7%
Articulated Trucks	2	0	0	0	2	-	0	0	0	0	0	-	0	3	0	0	3	-	0	1	0	0	1	-	6
% Articulated Trucks	0.2%	0%	0%	0%	0.2%	-	0%	0%	0%	0%	0%	-	0%	0.3%	0%	0%	0.2%	-	0%	0.1%	0%	0%	0%	-	0.1%
Buses	1	0	1	0	2	-	0	0	0	0	0	-	2	2	0	0	4	-	0	1	6	0	7	-	13
% Buses	0.1%	0%	0.4%	0%	0.2%	-	0%	0%	0%	0%	0%	-	0.8%	0.2%	0%	0%	0.3%	-	0%	0.1%	0.6%	0%	0.3%	-	0.3%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	1	-	0	0	0	0	0	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0.1%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	10	-	-	-	-	-	2	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	50.0%	-	-	-	-	-	62.5%	-	-	-	-	-	100%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	50.0%	-	-	-	-	-	37.5%	-	-	-	-	-	0%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

North Leroy Street & North Road - TMC

Tue Mar 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

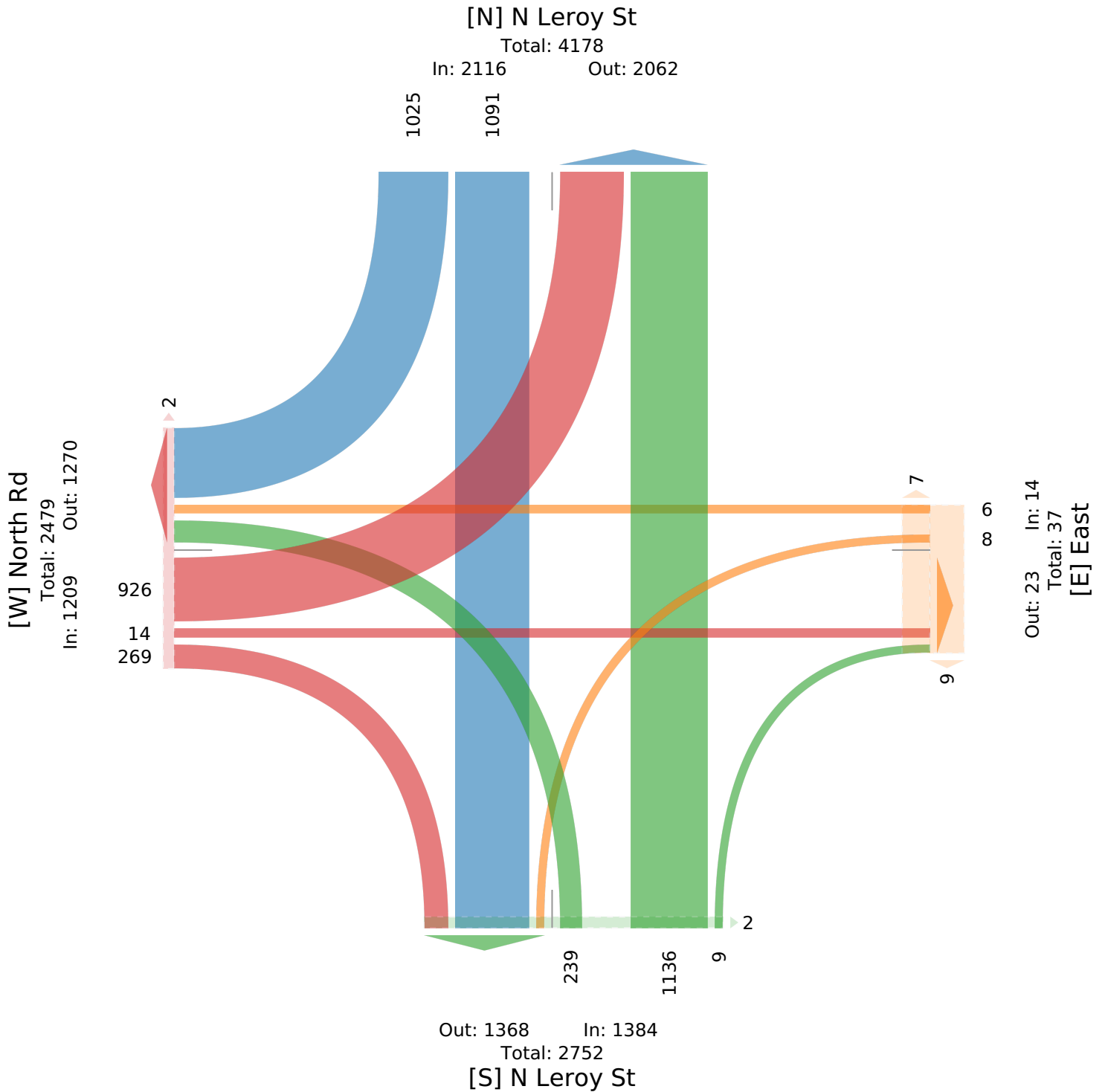
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817410, Location: 42.807444, -83.707205



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



North Leroy Street & North Road - TMC

Tue Mar 9, 2021

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817410, Location: 42.807444, -83.707205



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

Leg Direction	North Rd Eastbound						East Westbound						N Leroy St Northbound						N Leroy St Southbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-03-09 7:30AM	36	2	10	0	48	0	0	0	0	0	0	0	17	38	2	0	57	0	0	45	45	0	90	0	195
7:45AM	31	0	21	0	52	0	0	0	0	0	0	0	9	37	0	0	46	0	0	67	67	0	134	0	232
8:00AM	35	0	16	0	51	0	0	0	0	0	0	1	14	51	1	0	66	1	0	60	47	0	107	0	224
8:15AM	43	2	21	0	66	0	0	0	0	0	0	0	17	49	0	0	66	0	0	51	53	0	104	0	236
Total	145	4	68	0	217	0	0	0	0	0	0	1	57	175	3	0	235	1	0	223	212	0	435	0	887
% Approach	66.8%	1.8%	31.3%	0%	-	-	0%	0%	0%	0%	-	-	24.3%	74.5%	1.3%	0%	-	-	0%	51.3%	48.7%	0%	-	-	-
% Total	16.3%	0.5%	7.7%	0%	24.5%	-	0%	0%	0%	0%	0%	-	6.4%	19.7%	0.3%	0%	26.5%	-	0%	25.1%	23.9%	0%	49.0%	-	-
PHF	0.843	0.500	0.810	-	0.822	-	-	-	-	-	-	-	0.838	0.853	0.375	-	0.886	-	-	0.832	0.791	-	0.812	-	0.943
Lights	143	4	67	0	214	-	0	0	0	0	0	-	56	171	2	0	229	-	0	217	207	0	424	-	867
% Lights	98.6%	100%	98.5%	0%	98.6%	-	0%	0%	0%	0%	-	-	98.2%	97.7%	66.7%	0%	97.4%	-	0%	97.3%	97.6%	0%	97.5%	-	97.7%
Single-Unit Trucks	1	0	0	0	1	-	0	0	0	0	0	-	0	2	1	0	3	-	0	5	3	0	8	-	12
% Single-Unit Trucks	0.7%	0%	0%	0%	0.5%	-	0%	0%	0%	0%	-	-	0%	1.1%	33.3%	0%	1.3%	-	0%	2.2%	1.4%	0%	1.8%	-	1.4%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	1	-	0	0	0	0	0	-	1
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0.6%	0%	0%	0.4%	-	0%	0%	0%	0%	0%	-	0.1%
Buses	1	0	1	0	2	-	0	0	0	0	0	-	1	0	0	0	1	-	0	1	2	0	3	-	6
% Buses	0.7%	0%	1.5%	0%	0.9%	-	0%	0%	0%	0%	-	-	1.8%	0%	0%	0%	0.4%	-	0%	0.4%	0.9%	0%	0.7%	-	0.7%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	1	-	0	0	0	0	0	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0.6%	0%	0%	0.4%	-	0%	0%	0%	0%	0%	-	0.1%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

North Leroy Street & North Road - TMC

Tue Mar 9, 2021

AM Peak (7:30 AM - 8:30 AM)

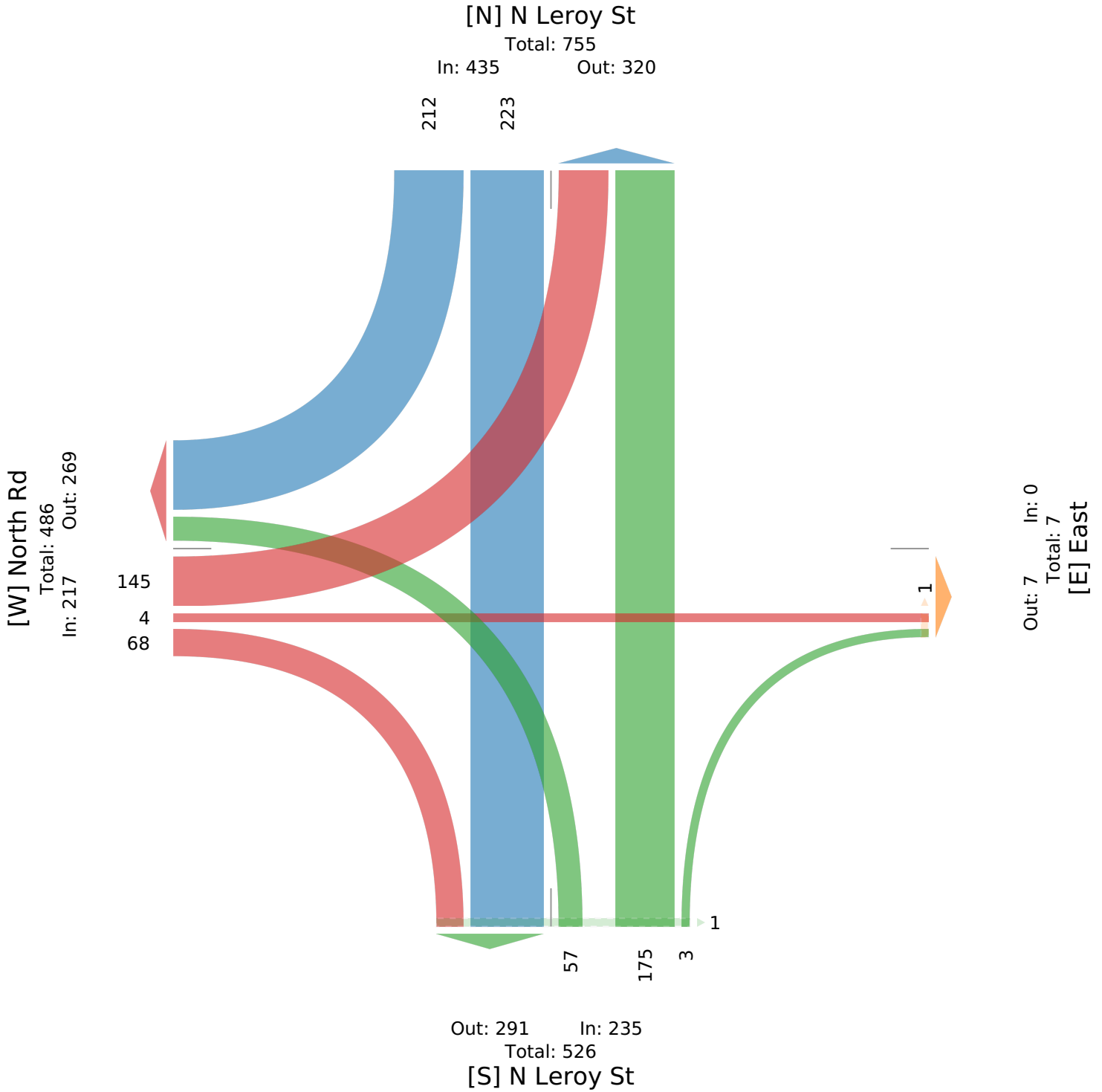
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817410, Location: 42.807444, -83.707205



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



North Leroy Street & North Road - TMC

Tue Mar 9, 2021

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817410, Location: 42.807444, -83.707205



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

Leg Direction	North Rd Eastbound						East Westbound						N Leroy St Northbound						N Leroy St Southbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-03-09 4:30PM	95	1	24	0	120	0	1	0	0	0	1	1	15	109	1	0	125	0	0	91	76	0	167	0	413
4:45PM	101	1	20	0	122	0	0	0	0	0	0	1	20	95	0	0	115	0	0	107	92	0	199	0	436
5:00PM	99	1	24	0	124	0	0	1	0	0	1	2	13	120	0	0	133	0	0	85	77	0	162	0	420
5:15PM	93	2	22	0	117	0	0	0	0	0	0	0	22	127	0	0	149	0	0	87	91	0	178	0	444
Total	388	5	90	0	483	0	1	1	0	0	2	4	70	451	1	0	522	0	0	370	336	0	706	0	1713
% Approach	80.3%	1.0%	18.6%	0%	-	-	50.0%	50.0%	0%	0%	-	-	13.4%	86.4%	0.2%	0%	-	-	0%	52.4%	47.6%	0%	-	-	-
% Total	22.7%	0.3%	5.3%	0%	28.2%	-	0.1%	0.1%	0%	0%	0.1%	-	4.1%	26.3%	0.1%	0%	30.5%	-	0%	21.6%	19.6%	0%	41.2%	-	-
PHF	0.960	0.625	0.938	-	0.974	-	0.250	0.250	-	-	0.500	-	0.795	0.888	0.250	-	0.876	-	-	0.864	0.913	-	0.887	-	0.965
Lights	386	5	90	0	481	-	1	1	0	0	2	-	70	449	1	0	520	-	0	368	335	0	703	-	1706
% Lights	99.5%	100%	100%	0%	99.6%	-	100%	100%	0%	0%	100%	-	100%	99.6%	100%	0%	99.6%	-	0%	99.5%	99.7%	0%	99.6%	-	99.6%
Single-Unit Trucks	2	0	0	0	2	-	0	0	0	0	0	-	0	2	0	0	2	-	0	2	1	0	3	-	7
% Single-Unit Trucks	0.5%	0%	0%	0%	0.4%	-	0%	0%	0%	0%	0%	-	0%	0.4%	0%	0%	0.4%	-	0%	0.5%	0.3%	0%	0.4%	-	0.4%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Buses	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Buses	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	25.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	75.0%	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

North Leroy Street & North Road - TMC

Tue Mar 9, 2021

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

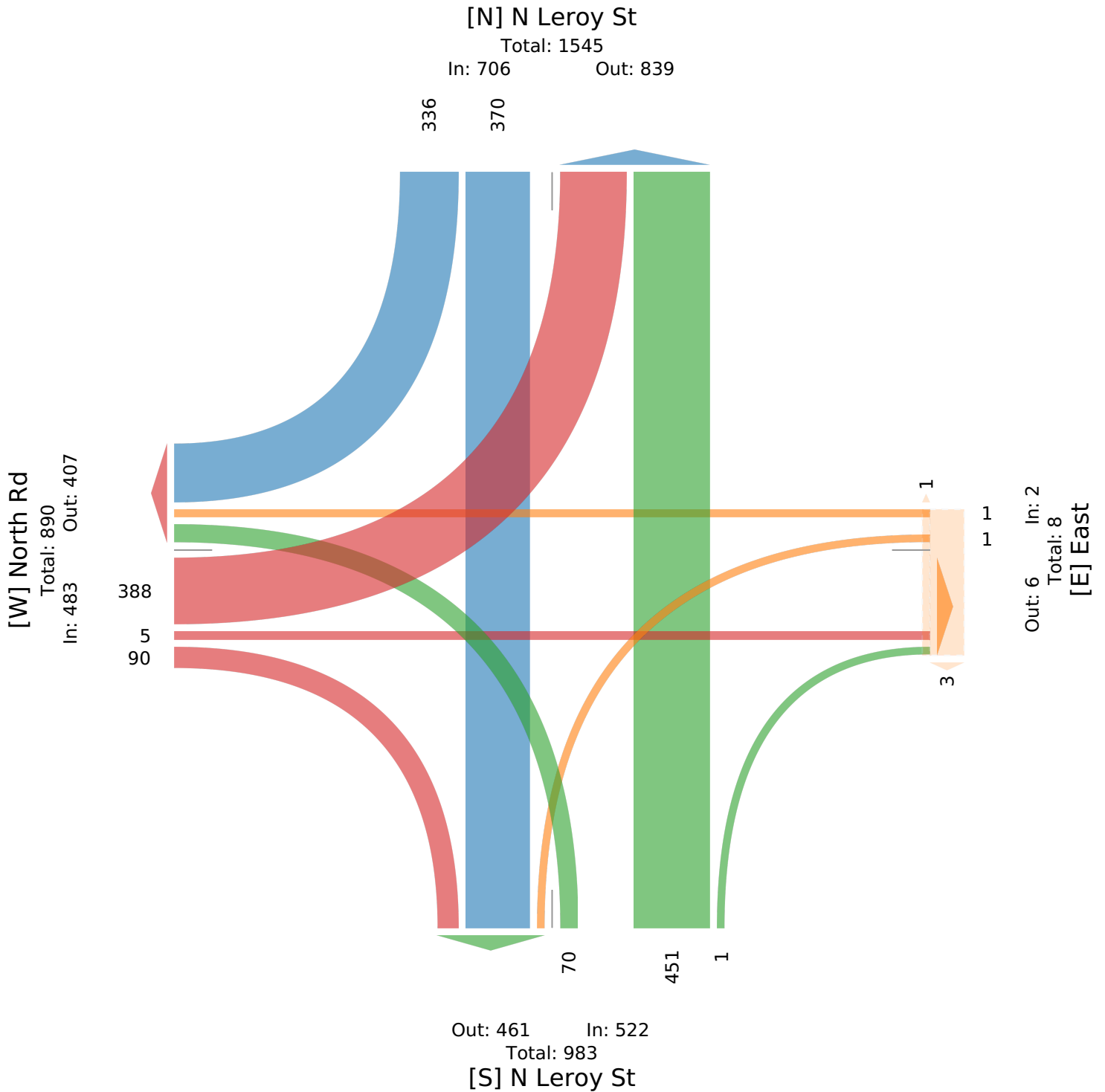
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817410, Location: 42.807444, -83.707205



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



HCM Signalized Intersection Capacity Analysis

1: Leroy Street & North Road/Commercial Driveway

2045 No Build
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↖	↗
Traffic Volume (vph)	189	5	88	0	0	0	74	228	4	0	290	276
Future Volume (vph)	189	5	88	0	0	0	74	228	4	0	290	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5				5.5	5.5			5.5	5.5
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	1.00
Frt		1.00	0.85				1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)		1794	1599				1770	1858			1845	1568
Flt Permitted		0.95	1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)		1794	1599				1770	1858			1845	1568
Peak-hour factor, PHF	0.82	0.82	0.82	0.92	0.92	0.92	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	230	6	107	0	0	0	83	256	4	0	358	341
RTOR Reduction (vph)	0	0	77	0	0	0	0	0	0	0	0	124
Lane Group Flow (vph)	0	236	30	0	0	0	83	260	0	0	358	217
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Turn Type	Split	NA	Prot				Prot	NA			NA	pt+ov
Protected Phases	2	2	2	4	4		3	13			1	12
Permitted Phases										1		
Actuated Green, G (s)		19.5	19.5				14.5	39.5			19.5	44.5
Effective Green, g (s)		19.5	19.5				14.5	39.5			19.5	44.5
Actuated g/C Ratio		0.28	0.28				0.21	0.56			0.28	0.64
Clearance Time (s)		5.5	5.5				5.5				5.5	
Vehicle Extension (s)		3.0	3.0				3.0				3.0	
Lane Grp Cap (vph)		499	445				366	1048			513	996
v/s Ratio Prot		c0.13	0.02				0.05	c0.14			c0.19	0.14
v/s Ratio Perm												
v/c Ratio		0.47	0.07				0.23	0.25			0.70	0.22
Uniform Delay, d1		21.0	18.6				23.1	7.7			22.6	5.4
Progression Factor		1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2		3.2	0.3				1.4	0.6			7.7	0.5
Delay (s)		24.2	18.9				24.5	8.3			30.3	5.9
Level of Service		C	B				C	A			C	A
Approach Delay (s)		22.5			0.0			12.2			18.4	
Approach LOS		C			A			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.9				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			21.5		
Intersection Capacity Utilization			54.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection: 1: Leroy Street & North Road/Commercial Driveway

Movement	EB	EB	NB	NB	SB	SB
Directions Served	LT	R	L	TR	LT	R
Maximum Queue (ft)	164	121	79	120	198	94
Average Queue (ft)	79	46	32	47	98	31
95th Queue (ft)	135	93	65	93	176	75
Link Distance (ft)	333	333		431	465	465
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		

Network Summary

Network wide Queuing Penalty: 0

HCM Signalized Intersection Capacity Analysis
 1: Leroy Street & North Road/Commercial Driveway

2045 No Build
 PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↖	↗
Traffic Volume (vph)	505	7	117	1	1	0	91	587	1	0	481	437
Future Volume (vph)	505	7	117	1	1	0	91	587	1	0	481	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.0		5.5	5.5			5.5	5.5
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1811	1615		1854		1805	1900			1900	1615
Flt Permitted		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (perm)		1811	1615		1854		1805	1900			1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.60	0.60	0.60	0.88	0.88	0.88	0.89	0.89	0.89
Adj. Flow (vph)	532	7	123	2	2	0	103	667	1	0	540	491
RTOR Reduction (vph)	0	0	89	0	0	0	0	0	0	0	0	221
Lane Group Flow (vph)	0	539	34	0	4	0	103	668	0	0	540	270
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split	NA	Prot	Split	NA		Prot	NA			NA	pt+ov
Protected Phases	2	2	2	4	4		3	13			1	12
Permitted Phases										1		
Actuated Green, G (s)		19.5	19.5		1.0		14.5	28.0			13.5	38.5
Effective Green, g (s)		19.5	19.5		1.0		14.5	28.0			13.5	38.5
Actuated g/C Ratio		0.28	0.28		0.01		0.21	0.40			0.19	0.55
Clearance Time (s)		5.5	5.5		5.0		5.5				5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0				3.0	
Lane Grp Cap (vph)		504	449		26		373	760			366	888
v/s Ratio Prot		c0.30	0.02		c0.00		0.06	c0.35			c0.28	0.17
v/s Ratio Perm												
v/c Ratio		1.07	0.08		0.15		0.28	0.88			1.48	0.30
Uniform Delay, d1		25.2	18.6		34.1		23.3	19.4			28.2	8.5
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		59.9	0.3		2.7		1.8	13.7			228.2	0.9
Delay (s)		85.2	18.9		36.8		25.2	33.2			256.5	9.4
Level of Service		F	B		D		C	C			F	A
Approach Delay (s)		72.9			36.8			32.1			138.8	
Approach LOS		E			D			C			F	
Intersection Summary												
HCM 2000 Control Delay			87.6									F
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			70.0						21.5			
Intersection Capacity Utilization			105.0%									G
Analysis Period (min)			15									
c Critical Lane Group												

Intersection: 1: Leroy Street & North Road/Commercial Driveway

Movement	EB	EB	B7	WB	NB	NB	SB	SB
Directions Served	LT	R	T	LTR	L	TR	LT	R
Maximum Queue (ft)	400	252	409	32	149	262	392	231
Average Queue (ft)	362	76	218	3	46	124	198	65
95th Queue (ft)	475	192	520	17	100	218	338	149
Link Distance (ft)	328	328	394	177		532	467	467
Upstream Blk Time (%)	53		32				1	
Queuing Penalty (veh)	0		0				0	
Storage Bay Dist (ft)					100			
Storage Blk Time (%)					1	9		
Queuing Penalty (veh)					4	8		

Network Summary

Network wide Queuing Penalty: 12

N. Leroy Street and North Road – Single with SB Right Bypass – AM Peak

Rodel - R:\Projects\19C0262\Docs\Design\RODEL_Analysis\10. Leroy_North\Leroy_North_Single_SBR-By-pass.rod

File View Help



Project: Leroy Street and North Road Date: 19-Aug-2021 Model: Rodel 2017 Timeslice: 7.5 Full Geometry Peak: AM Feet RHD
 Name: 2045 Flows: 2045 Delay: Control Results: Veh Peak60/15m Synthetic Flow Profile Conf: 50 Light 117

Approach Geometry							Entry Geometry				Circ Geom			Exit Geometry				Entry Capacity Mods	
Leg Name	Bearing	G	V	n	E	n	L'	R	Φ	D	C	n	Ex	n	Vx	n	-> Cap (v/h)	Xwalk Fact	
1 SB-Leroy Street	0	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000	
2 EB-North Road	140	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000	
3 NB-Leroy Street	219	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000	
4 WB-Commercia...	288	0	11.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	11.00	1	0	1.000	

Volume Modifiers			Turning Volumes (veh/hr)						Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Leg Name	%Truck	Factor	U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Ratio1	Ratio2	Ratio3	Time1	Time2	Time3		
1 SB-Leroy Street	3.0	1.00	0	0	290	0	276	0.750	1.125	0.750	0	30	60		
2 EB-North Road	1.0	1.00	0	189	5	88	0	0.750	1.125	0.750	0	30	60		
3 NB-Leroy Street	2.0	1.00	0	74	228	4	0	0.750	1.125	0.750	0	30	60		
4 WB-Commercia...	0.0	1.00	0	0	0	0	0	0.750	1.125	0.750	0	30	60		

Calibration
 Accidents
 Economics
 Bypass

Run

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Leroy Street	Yield	290	276	74	74	1135	1028	0.2554	0.2685	6.32	7.12	6.71	0.39	0.43	1.02	1.13	A	A	A
2	EB-North Road	None	282		290		1059		0.2662		6.89		6.89	0.43		1.13		A		A
3	NB-Leroy Street	None	306		194		1093		0.2798		6.82		6.82	0.45		1.18		A		A
4	WB-Commercial ...	None	0		0		0		0.0000		0.00		0.00	0.00		0.00		A		A
All	Intersection												6.79							A

Results 60
 Results 15
 Int / Slope - 60
 Int / Slope - 15
 Economics
 Global Results

N. Leroy Street and North Road – Single with SB Right Bypass – PM Peak

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File View Help



Project: Leroy Street and North Road Date: 19-Aug-2021 Model: Rodel 2017 Timeslice: 7.5 Full Geometry Peak: PM Feet RHD
 Name: 2045 Flows: 2045 Delay: Control Results: Veh Peak60/15m Synthetic Flow Profile Conf: 50 Light 118

Approach Geometry							Entry Geometry				Circ Geom			Exit Geometry				Entry Capacity Mods	
Leg Name	Bearing	G	V	n	E	n	L'	R	Φ	D	C	n	Ex	n	Vx	n	-+ Cap (v/h)	Xwalk Fact	
1 SB-Leroy Street	0	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000	
2 EB-North Road	140	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000	
3 NB-Leroy Street	219	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000	
4 WB-Commercia...	288	0	11.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	11.00	1	0	1.000	

Volume Modifiers			Turning Volumes (veh/hr)						Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Leg Name	%Truck	Factor	U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Ratio1	Ratio2	Ratio3	Time1	Time2	Time3		
1 SB-Leroy Street	0.0	1.00	0	0	481	0	437	0.750	1.125	0.750	0	30	60		
2 EB-North Road	0.0	1.00	0	505	7	117	0	0.750	1.125	0.750	0	30	60		
3 NB-Leroy Street	0.0	1.00	0	91	587	1	0	0.750	1.125	0.750	0	30	60		
4 WB-Commercia...	0.0	1.00	0	1	1	0	0	0.750	1.125	0.750	0	30	60		

Calibration Accidents Economics Bypass Run

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Leroy Street	Yield	481	437	93	93	1195	1050	0.4026	0.4163	8.08	8.99	8.51	0.83	0.88	2.14	2.28	A	A	A
2	EB-North Road	None	629		482		979		0.6424		15.30		15.30	2.85		6.94		C		C
3	NB-Leroy Street	None	679		512		963		0.7054		18.84		18.84	4.27		10.08		C		C
4	WB-Commercial ...	None	2		1182		585		0.0034		0.04		0.04	0.00		0.00		A		A
All	Intersection												13.57							B

Results 60 Results 15 Int / Slope - 60 Int / Slope - 15 Economics Global Results

N. Leroy Street and North Road – Single – AM Peak

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File View Help



Project Date Model Timeslice Full Geometry Peak Feet **RHD**
 Name Flows Delay Results Peak60/15m Synthetic Flow Profile Conf Light 101

Approach Geometry						
	Leg Name	•	Bearing	G	V	n
1	SB-Leroy Street	Y	0	0	12.00	1
2	EB-North Road	Y	140	0	12.00	1
3	NB-Leroy Street	Y	219	0	12.00	1
4	WB-Commercia...	Y	288	0	11.00	1

Entry Geometry						Circ Geom		
E	n	L'	R	Φ	D	C	n	
15.00	1	150.00	55.00	30.00	120.00	18.00	1	
15.00	1	150.00	55.00	30.00	120.00	18.00	1	
15.00	1	150.00	55.00	30.00	120.00	18.00	1	
15.00	1	150.00	55.00	30.00	120.00	18.00	1	

Exit Geometry			
Ex	n	Vx	n
15.00	1	22.00	2
15.00	1	12.00	1
15.00	1	12.00	1
15.00	1	11.00	1

Entry Capacity Mods	
-+ Cap (v/h)	Xwalk Fact
0	1.000
0	1.000
0	1.000
0	1.000

Volume Modifiers		
Leg Name	%Truck	Factor
1 SB-Leroy Street	3.0	1.00
2 EB-North Road	1.0	1.00
3 NB-Leroy Street	2.0	1.00
4 WB-Commercia...	0.0	1.00

Turning Volumes (veh/hr)					
	U-Turn	Exit-3	Exit-2	Exit-1	Bypass
	0	0	290	276	0
	0	189	5	88	0
	0	74	228	4	0
	0	0	0	0	0

Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Ratio1	Ratio2	Ratio3	Time1	Time2	Time3	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	

Calibration
 Accidents
 Economics
 Bypass

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Leroy Street	None	566		74		1135		0.4985		9.45		9.45	1.20		3.05		A		A
2	EB-North Road	None	282		290		1059		0.2662		6.89		6.89	0.43		1.13		A		A
3	NB-Leroy Street	None	306		194		1093		0.2798		6.82		6.82	0.45		1.18		A		A
4	WB-Commercial ...	None	0		0		0		0.0000		0.00		0.00	0.00		0.00		A		A
All	Intersection												8.13							A

Results 60
 Results 15
 Int / Slope - 60
 Int / Slope - 15
 Economics
 Global Results

N. Leroy Street and North Road – Single – PM Peak

Rodel - C:\Users\902JAM\OneDrive - ROWE PSC\19C0262_GeneseeCountyRAB\RODEL\Leroy_North_Single.rod

File View Help



Project: Leroy Street and North Road Date: 4-Jun-2021 Model: Rodel 2017 Timeslice: 7.5 Full Geometry Peak: PM Feet **RHD**
 Name: 2045 Flows: 2045 Delay: Control Results: Veh Peak60/15m Synthetic Flow Profile Conf: 50 Light 102

Approach Geometry						Entry Geometry					Circ Geom			Exit Geometry				Entry Capacity Mods	
Leg Name	Bearing	G	V	n		E	n	L'	R	Φ	D	C	n	Ex	n	Vx	n	-+ Cap (v/h)	Xwalk Fact
1 SB-Leroy Street	Y	0	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	22.00	2	0	1.000
2 EB-North Road	Y	140	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000
3 NB-Leroy Street	Y	219	0	12.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	12.00	1	0	1.000
4 WB-Commercia...	Y	288	0	11.00	1	15.00	1	150.00	55.00	30.00	120.00	18.00	1	15.00	1	11.00	1	0	1.000

Volume Modifiers			Turning Volumes (veh/hr)						Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Leg Name	%Truck	Factor	U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Ratio1	Ratio2	Ratio3	Time1	Time2	Time3		
1 SB-Leroy Street	0.0	1.00	0	0	481	437	0	0.750	1.125	0.750	0	30	60		
2 EB-North Road	0.0	1.00	0	505	7	117	0	0.750	1.125	0.750	0	30	60		
3 NB-Leroy Street	0.0	1.00	0	91	587	1	0	0.750	1.125	0.750	0	30	60		
4 WB-Commercia...	0.0	1.00	0	1	1	0	0	0.750	1.125	0.750	0	30	60		

Calibration
 Accidents
 Economics
 Bypass

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Leroy Street	None	918		93		1195		0.7684		19.42		19.42	5.88		13.43		C		C
2	EB-North Road	None	629		482		979		0.6423		15.27		15.27	2.83		6.91		C		C
3	NB-Leroy Street	None	679		512		963		0.7054		18.84		18.84	4.27		10.08		C		C
4	WB-Commercial ...	None	2		1182		585		0.0034		0.04		0.04	0.00		0.00		A		A
All	Intersection												18.05							C

Results 60
 Results 15
 Int / Slope - 60
 Int / Slope - 15
 Economics
 Global Results

Intersection	
N. Leroy and North Street	
Opinion of Probable Cost	By: Rowe PSC Date: 5/26/2021

PAY ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	AMOUNT
Mobilization (10%)	1	LSUM	\$68,000.00	\$68,000.00
Sidewalk, Rem	350	Syd	\$10.00	\$3,500.00
Pavt, Rem	4100	Syd	\$10.00	\$41,000.00
Curb and Gutter, Rem	1600	Ft	\$10.00	\$16,000.00
Embankment, CIP	3000	Cyd	\$15.00	\$45,000.00
Excavation, Earth	2000	Cyd	\$10.00	\$20,000.00
Aggregate Base	1500	Ton	\$21.00	\$31,500.00
Shoulder, CI II	0	Ton	\$25.00	\$0.00
Approach, CI II	0	Ton	\$25.00	\$0.00
HMA, 4E10	460	Ton	\$85.00	\$39,100.00
HMA Approach	15	Ton	\$50.00	\$750.00
Conc Pavt, Nonreinf, 9 inch	2100	Syd	\$45.00	\$94,500.00
Joint, Contraction, Cp	2000	Ft	\$10.00	\$20,000.00
Joint, Expansion, E2	350	Ft	\$25.00	\$8,750.00
Joint, Expansion, E3	620	Ft	\$15.00	\$9,300.00
Driveway, Nonreinf Conc, 9 inch	340	Syd	\$50.00	\$17,000.00
Curb and Gutter, Conc, Det B1	1250	Ft	\$25.00	\$31,250.00
Curb and Gutter, Conc, Det D1	220	Ft	\$25.00	\$5,500.00
Curb, Conc, Det E1	110	Ft	\$25.00	\$2,750.00
Driveway Opening, Conc, Det M	480	Ft	\$22.00	\$10,560.00
Detectable Warning Surface	60	Ft	\$40.00	\$2,400.00
Curb Ramp Opening, Conc	84	Ft	\$25.00	\$2,100.00
Sidewalk, Conc, 4 inch	2600	Sft	\$5.00	\$13,000.00
Sidewalk Ramp, Conc, 6 inch	240	Sft	\$10.00	\$2,400.00
Conc Pavt, Decorative Colored, 9 inch	3800	Sft	\$12.50	\$47,500.00
Turf Establishment, Performance	5500	Syd	\$5.00	\$27,500.00
MOT	1	LSUM	\$50,250.00	\$50,250.00
Pavement Markings	1	LSUM	\$15,000.00	\$15,000.00
Signing	1	LSUM	\$20,000.00	\$20,000.00
Drainage	1	LSUM	\$100,000	\$100,000.00
TOTAL				\$744,610

CONTINGENCY (20%)	\$148,922.0
ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2021)	\$893,532.0
3% ANNUAL INFLATION 2021 TO 2025	\$112,146.14
ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2025)	\$1,005,678.14

* Notes

6" Agg base used for driveways and shoulders, 8" used for roadway, 12" used for islands (10% of total added)
 Asphalt shoulder gravel thickness was calculated using a 5" depth
 Assumed 5" HMA thickness for approach and 8" thick for HMA roadway

B1 curb was calculated by adding the splitter islands along with the roadways, minus the radius for the roundabout
 E1 curb was calculated for the inner roundabout curb
 E2 joint expansion was calculated for the outer radius of the roundabout

E3 joint expansion was calculated using the radius of curves from the B/C of the roundabout and splitter islands
 D1 curb was calculated for the truck apron
 Drainage includes enclosed storm for all curbed areas, spillways, and underdrain

MOT taken as approximately ~8% of total before mobilization; based on previous roundabout projects
 ROW acquisition costs not included
 Joints assumed for central island/splitter islands

NUMBER OF CRASHES OR INJURED PERSONS.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	2015	2016	2017	2018	2019

Fatal and A-Injury Reduction	%REDUCTION	78%	Roundabout		
Number of Crashes	0	0	0	0	0

A-Injured or Killed Persons	0	0	0	0	0
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Minor Crash Reduction	%REDUCTION	57%	0		
Number of Crashes	0	0	0	0	35
	0	0	0	0	33
	0	0	0	0	2

	%REDUCTION	0%			
Number of Crashes	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
A-Injured or Killed Persons	0	0	0	0	0

	%REDUCTION	0%			
Number of Crashes	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
A-Injured or Killed Persons	0	0	0	0	0

	%REDUCTION	0%			
Number of Crashes	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
A-Injured or Killed Persons	0	0	0	0	0

of A-injuries: 0 For reference only
 # of Fatalities: 0 For reference only; "Q" accounts

for the risk of a fatality.

PROJECT COST ESTIMATE : \$1,005,678 If unknown, enter "0" (zero).
 ADTb (before-volume) 1.0 You may change these
 ADTa (after-volume) 1.1 default ADT values.
 # OF YEARS OF DATA: 5.00 3 to 5 years should be used.
 RATE OF INFLATION: 2.50%
 AREA TYPE: Urban "Rural", "Urban", or "Between"

REMARKS:

Leroy Street and North Road
 Genesee County Roundabout Study
 1502802, 1510803
 0, 0.7095557
 Roundabout

COMPUTED BENEFITS DERIVED THROUGH CRASH REDUCTION

TOR 2021

Date **9-Jul-21**

Project: **Leroy Street and North Road**

City/Twp. **City of Fenton**

Prepared By: **ROWE Professional Services Company**

County **Genesee County**

PR: **1502802, 1510803** PR MP Range: **0, 0.7095557**

The method of evaluating crash costs, used below, is given on page 67 of Roy Jorgensen's report of Highway Safety Improvement Criteria, 1966 edition. This same method is given in the Bureau of Public Roads IM21-3-67. In 1994 we have adapted the Q formula to blend Fatalities and A-injuries only.

In the following analysis the costs provided by the National Safety Council are :

2019 NSC VALUES:

Death	\$1,659,000	=FATCOST
Disabling (A) injury:	\$96,200	=ACOST
B-injury:	\$27,800	=BCOST
PDO and/or Minor Injury Crash:	\$12,200	=PDOCOST

$$BTOTAL = ADTa / ADTb \times [(Q \times R1) + (BCOST \times R2) + (PDOCOST \times R3)]$$

WHERE:

BTOTAL =	Total Benefit in Dollars Over Years Used	\$287,291
ADTa =	Average traffic volume after the improvement	1.1
ADTb =	Average traffic volume before the improvement	1.0
R1 =	Reduction in fatalities and A-Injuries Combined.	0.0
R2 =	Reduction in B-Injury crashes:	1.1
R3 =	Reduction in PDO and C-injury crashes:	18.8
Q =	$[FATCOST + ((I/F) \times INJCOST)] / [1 + (I/F)]$	
=	$[1,659,000 + (6.10 \times 96,200)] / [1 + 6.10]$	\$316,400
	for AREA TYPE "Urban"	
I/F =		6.10

Q-Reference	Q	A-Injuries	Fatalities	I/F
RURAL	\$363,900	6,072	1,255	4.84
URBAN	\$316,400	9,902	1,624	6.10
BETWEEN	\$334,900	15,974	2,879	5.55

Data from Safety Programs Unit
5-Year Statewide Non-Trunkline Crash Figures Used.
(*From 1-1-2015 Through 12-31-2019).

Time of Return (T.O.R.) is based on 5 years of data.

NOINFB =No-Inflation Annual Benefit=BTOTAL/years \$57,458

With an inflation rate of 2.50%

B=Annual Benefit=Present Value (with Inflation) \$73,551

C = Project Cost \$1,005,678

TOR=C/B=COST/ANNUAL BENEFIT= **13.67**

K. N. Leroy and North

1. [2045 AM Peak Hour No Build](#)
2. [2045 PM Peak Hour No Build](#)
3. [2045 AM Peak Hour Roundabout](#)
4. [2045 PM Peak Hour Roundabout](#)
5. [2045 PM Peak Hour Roundabout with Southbound Right Lane](#)