D. CLIO ROAD/WELCH BLVD. & DAYTON STREET

2015-2019 CRASH DATA

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

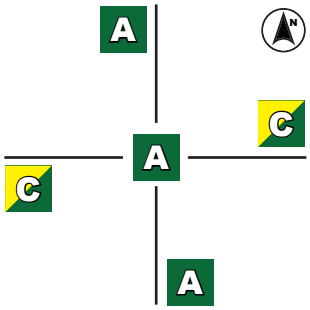
2045 OPERATIONS

LEVEL OF SERVICE

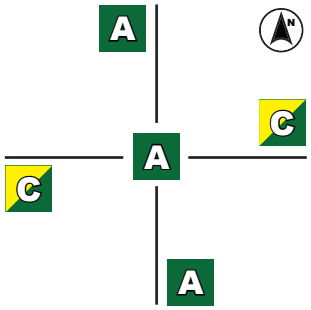
A B C D E F

NO BUILD

AM PEAK

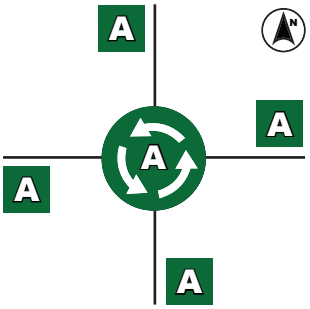


PM PEAK

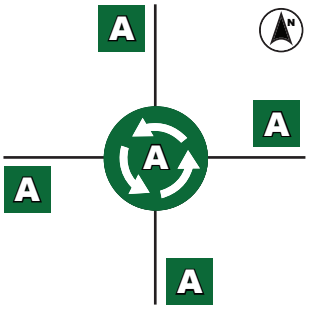


ROUNDABOUT

AM PEAK



PM PEAK



Opinion of probable cost for single-lane roundabout

$1.33 MILLION

D. Clio Road/Welch Boulevard and Dayton Street

The intersection of Clio Road/Welch Boulevard and Dayton Street was included in the early preliminary engineering phase with support from the City of Flint due to intersection operations. This intersection is a secondary analysis Tier Three intersection.

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

No-Build Conditions

The intersection of Clio Road/Welch Boulevard and Dayton Street is a signalized intersection. Clio Road is a north/south road with five lanes, two lanes in each direction with a center left-turn lane. Welch Boulevard is a northwest/southeast road with four lanes, two lanes in each direction. At the intersection with Dayton Street, the approach has an exclusive left-turn lane, two through lanes, and a right-turn slip lane. Dayton Street is an east/west road, with two lanes in each direction. At the intersection with Clio Road/Welch Boulevard, the approaches present an exclusive left-turn lane and a shared through/right-turn lane. Traffic signals are supported by mast arms. There are pedestrian crossings at all legs of the intersection.

A commercial building is present in the northwest quadrant. In the northeast quadrant is the Clio Road Market. The southeast quadrant has a residential vacant field. The Genesee County Free Medical Clinic is located in the southwest quadrant. There are overhead electrical cables crossing through the intersection on the west and north sides of the intersection.

An aerial of the existing intersection can be seen in Figure 5.

Figure 5: Aerial view of Clio Road/Welch Boulevard and Dayton Street

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 during the AM and PM peak hours.

The 95th percentile queue lengths were reviewed at the intersection and the results showed all approaches experienced a maximum queue length of 95 feet (6 vehicles) during the AM peak hour and 136 feet (9 vehicles) during the PM peak hour.

The operational analysis results for the future no-build conditions are presented in Table 12.

Table 12: Operational Analysis for 2045 No-Build Condition

Intersection	Approach	AM Peak		PM Peak	
		Delay/LOS	Queue (veh)*	Delay/LOS	Queue (veh)*
Clio Road/Welch Boulevard and Dayton Street	Eastbound	24.6/C	2 (30 ft)	25.4/C	2 (34 ft)
	Westbound	24.9/C	1 (22 ft)	25.8/C	2 (24 ft)
	Northbound	6.2/A	4 (67 ft)	7.1/A	7 (116 ft)
	Southbound	6.5/A	6 (95 ft)	7.3/A	9 (136 ft)
	Overall	**7.8/A**		**8.8/A**	

* 95th percentile queue length.

Roundabout Conditions

The proposed roundabout configuration for the intersection of Clio Road/Welch Boulevard and Dayton Street is a single-lane circulating. The proposed single-lane roundabout configuration will likely fit inside the existing right-of-way. The proposed inscribed diameter for the concept roundabout

is 100 feet. The driveway configuration for the Clio Road Market should be investigated due to the existing driveways closeness to the proposed roundabout entry/exit radius.

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 and PM peak hours.

The 95th percentile queue lengths were reviewed at the intersection and the results showed all approaches experienced a maximum queue length of one (1) vehicle during the AM peak hour and three (3) vehicles during the PM peak hour.

The operation analysis for the future roundabout (build) conditions are presented in Table 13.

Table 13: Operational Analysis for 2045 Roundabout (Build) Condition

Intersection	Approach	AM Peak		PM Peak	
		Delay/LOS	Queue (veh)*	Delay/LOS	Queue (veh)*
Clio Road/Welch Blvd and West Dayton Street (Single-lane RAB)	Eastbound	2.2/A	0.0	4.2/A	0.1
	Westbound	3.8/A	0.1	4.7/A	0.2
	Northbound	5.8/A	0.7	9.3/A	2.9
	Southbound	6.7/A	1.2	9.8/A	3.3
	Overall	**6.1/A**		**9.2/A**	

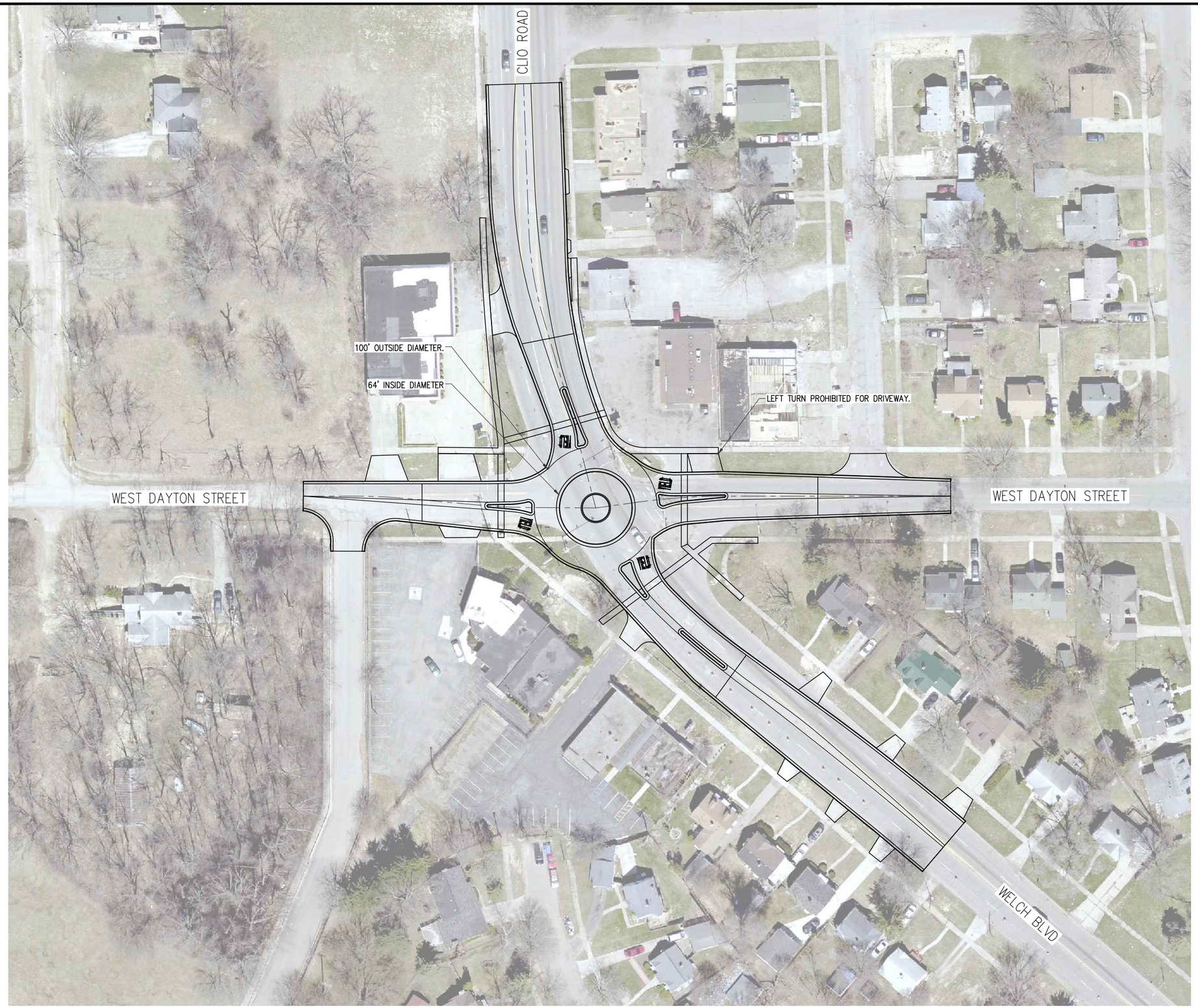
* 95th percentile queue length.

Opinion of probable cost were developed for a single-lane roundabout. The total probable cost is $1.33 million in year 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 or an earmark.

Recommendation

A roundabout appears feasible at this location but will require coordination with the Clio Road Market for driveway reconfiguration.



CLIO ROAD/WELCH BLVD
AND DAYTON STREET
ROUNDABOUT CONCEPT
SCALE: 1" = 80'

0 40 ft 80 ft

CONCEPT PLAN – FOR DISCUSSION PURPOSES ONLY

PLAN DATE: MAY 27, 2021

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

PREPARED FOR
GENESEE COUNTY ROAD COMMISSION
ROUNDABOUT CONCEPTS
CLIO ROAD/WELCH BLVD. AND WEST DAYTON STREET
ROUNDABOUT CONCEPT

FIGURE NO.
25

JOB No: 19C0262

PLOTTED: 6/3/2021 3:03 PM R:\Projects\19C0262\Dwg\Masters\Dwg Concepts\Clio-Welch_Dayton_Concept.dwg

Clio Road & West Dayton Street - 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: 817411, Location: 43.038493, -83.732244

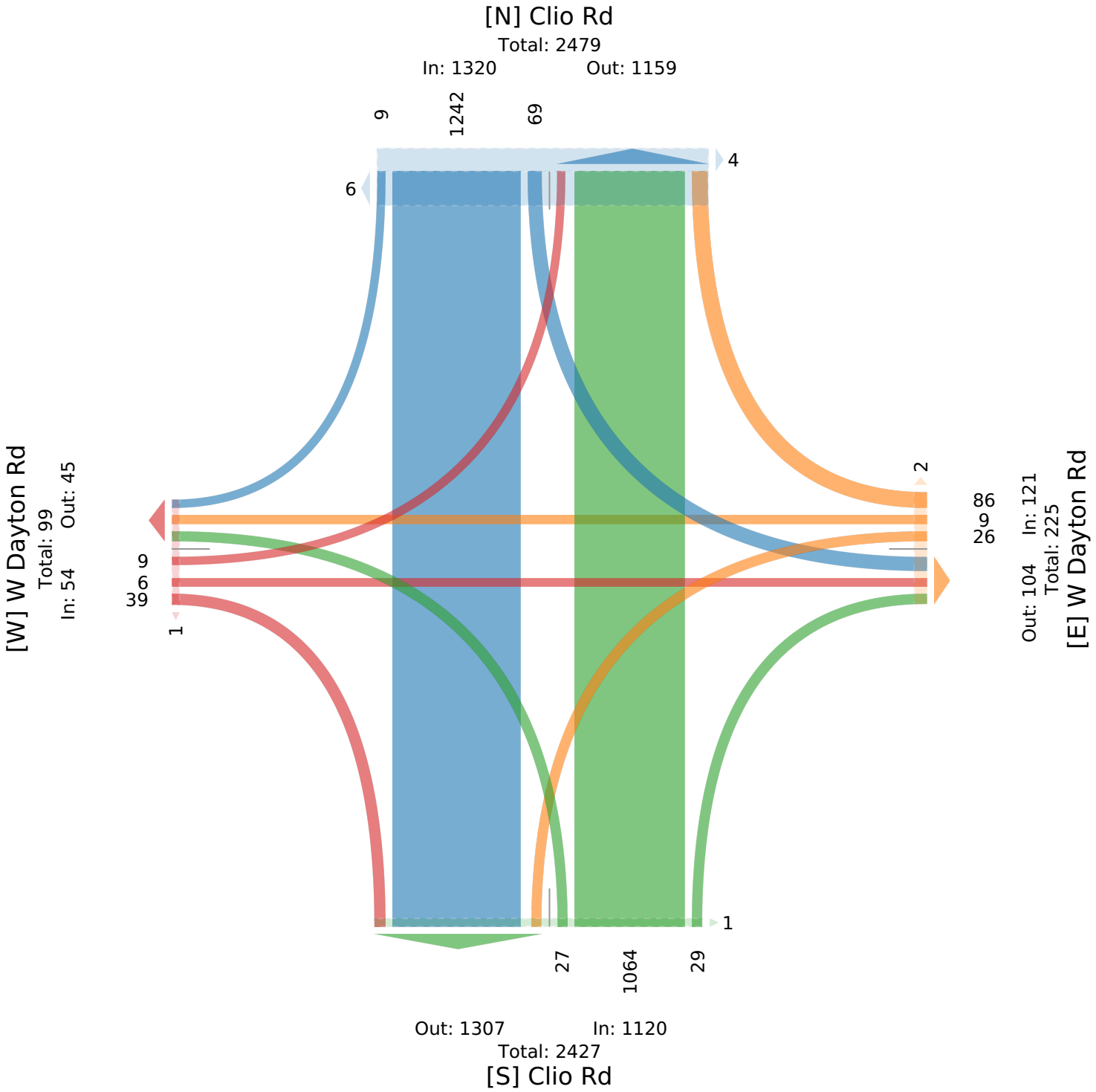
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	W Dayton Rd						W Dayton Rd						Clio Rd						Clio Rd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	**Int**
2021-03-09 7:00AM	0	0	0	0	**0**	0	0	0	1	0	**1**	0	0	19	0	0	**19**	0	1	24	0	0	**25**	0	**45**
7:15AM	0	0	1	0	**1**	0	0	0	2	0	**2**	0	1	28	0	0	**29**	0	3	39	0	0	**42**	0	**74**
7:30AM	0	2	2	0	**4**	0	1	1	4	0	**6**	0	1	33	1	0	**35**	0	2	47	1	0	**50**	0	**95**
7:45AM	0	0	0	0	**0**	0	0	0	2	0	**2**	0	0	27	0	0	**27**	0	5	55	0	0	**60**	0	**89**
Hourly Total	0	2	3	0	**5**	0	1	1	9	0	**11**	0	2	107	1	0	**110**	0	11	165	1	0	**177**	0	**303**
8:00AM	0	0	1	0	**1**	0	0	1	6	0	**7**	0	0	31	1	0	**32**	0	4	57	1	0	**62**	0	**102**
8:15AM	0	0	3	0	**3**	0	2	0	3	0	**5**	0	4	44	0	0	**48**	1	7	54	0	0	**61**	0	**117**
8:30AM	1	0	0	0	**1**	0	1	0	0	0	**1**	0	2	50	1	0	**53**	0	2	60	1	0	**63**	0	**118**
8:45AM	0	0	4	0	**4**	0	1	0	2	0	**3**	1	1	46	0	0	**47**	0	0	62	1	0	**63**	1	**117**
Hourly Total	1	0	8	0	**9**	0	4	1	11	0	**16**	1	7	171	2	0	**180**	1	13	233	3	0	**249**	1	**454**
4:00PM	1	0	4	0	**5**	0	1	0	5	0	**6**	0	5	105	3	0	**113**	0	5	114	1	0	**120**	1	**244**
4:15PM	1	0	2	0	**3**	1	2	0	11	0	**13**	0	3	115	2	0	**120**	0	4	113	0	0	**117**	2	**253**
4:30PM	1	0	9	0	**10**	0	4	1	1	0	**6**	1	1	97	1	0	**99**	0	6	103	0	0	**109**	0	**224**
4:45PM	2	0	3	0	**5**	0	1	2	11	0	**14**	0	1	102	0	0	**103**	0	6	110	0	0	**116**	1	**238**
Hourly Total	5	0	18	0	**23**	1	8	3	28	0	**39**	1	10	419	6	0	**435**	0	21	440	1	0	**462**	4	**959**
5:00PM	1	0	3	0	**4**	0	4	0	13	0	**17**	0	3	104	2	0	**109**	0	8	97	1	0	**106**	0	**236**
5:15PM	1	3	3	0	**7**	0	2	2	9	0	**13**	0	1	80	7	0	**88**	0	5	111	0	0	**116**	1	**224**
5:30PM	0	0	3	0	**3**	0	5	1	6	0	**12**	0	3	101	7	0	**111**	0	6	103	2	0	**111**	1	**237**
5:45PM	1	1	1	0	**3**	0	2	1	10	0	**13**	0	1	82	4	0	**87**	0	5	93	1	0	**99**	3	**202**
Hourly Total	3	4	10	0	**17**	0	13	4	38	0	**55**	0	8	367	20	0	**395**	0	24	404	4	0	**432**	5	**899**
Total	9	6	39	0	**54**	1	26	9	86	0	**121**	2	27	1064	29	0	**1120**	1	69	1242	9	0	**1320**	10	**2615**
% Approach	16.7%	11.1%	72.2%	0%	**-**	-	21.5%	7.4%	71.1%	0%	**-**	-	2.4%	95.0%	2.6%	0%	**-**	-	5.2%	94.1%	0.7%	0%	**-**	-	**-**
% Total	0.3%	0.2%	1.5%	0%	**2.1%**	-	1.0%	0.3%	3.3%	0%	**4.6%**	-	1.0%	40.7%	1.1%	0%	**42.8%**	-	2.6%	47.5%	0.3%	0%	**50.5%**	-	**-**
Lights	8	5	39	0	**52**	-	26	8	79	0	**113**	-	25	1051	27	0	**1103**	-	59	1226	9	0	**1294**	-	2562
% Lights	88.9%	83.3%	100%	0%	**96.3%**	-	100%	88.9%	91.9%	0%	**93.4%**	-	92.6%	98.8%	93.1%	0%	**98.5%**	-	85.5%	98.7%	100%	0%	**98.0%**	-	98.0%
Single-Unit Trucks	0	0	0	0	**0**	-	0	0	1	0	**1**	-	0	6	2	0	**8**	-	0	11	0	0	**11**	-	20
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	1.2%	0%	**0.8%**	-	0%	0.6%	6.9%	0%	**0.7%**	-	0%	0.9%	0%	0%	**0.8%**	-	0.8%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	2
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.2%	0%	0%	**0.2%**	-	0.1%
Buses	1	1	0	0	**2**	-	0	1	6	0	**7**	-	2	7	0	0	**9**	-	10	3	0	0	**13**	-	31
% Buses	11.1%	16.7%	0%	0%	**3.7%**	-	0%	11.1%	7.0%	0%	**5.8%**	-	7.4%	0.7%	0%	0%	**0.8%**	-	14.5%	0.2%	0%	0%	**1.0%**	-	1.2%
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	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	10	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-

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

Clio Road & West Dayton Street - 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: 817411, Location: 43.038493, -83.732244

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



Clio Road & West Dayton Street - TMC

Tue Mar 9, 2021
AM Peak (8 AM - 9 AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 817411, Location: 43.038493, -83.732244

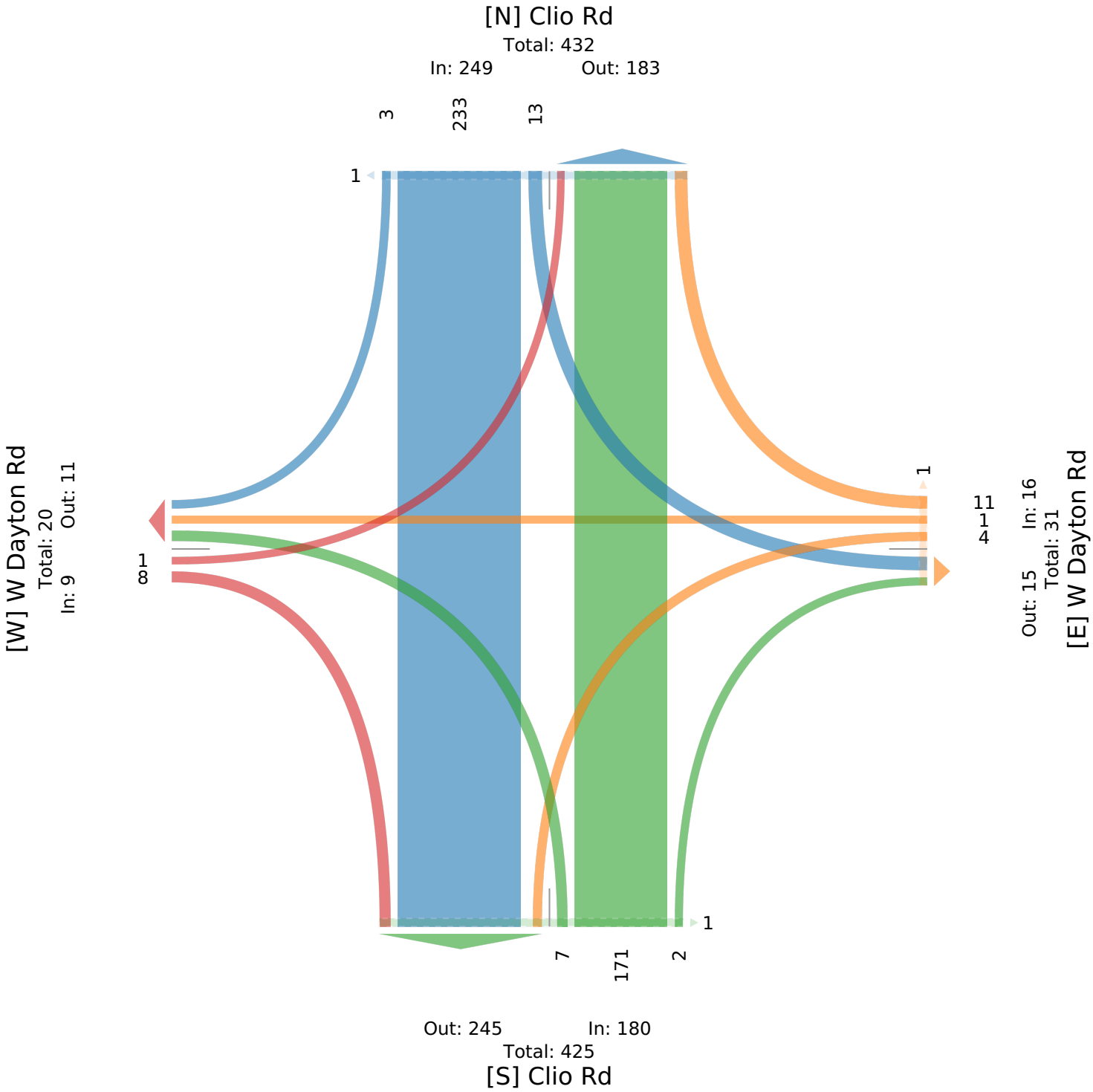
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	W Dayton Rd						W Dayton Rd						Clio Rd						Clio Rd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	**Int**
2021-03-09 8:00AM	0	0	1	0	**1**	0	0	1	6	0	**7**	0	0	31	1	0	**32**	0	4	57	1	0	**62**	0	**102**
8:15AM	0	0	3	0	**3**	0	2	0	3	0	**5**	0	4	44	0	0	**48**	1	7	54	0	0	**61**	0	**117**
8:30AM	1	0	0	0	**1**	0	1	0	0	0	**1**	0	2	50	1	0	**53**	0	2	60	1	0	**63**	0	**118**
8:45AM	0	0	4	0	**4**	0	1	0	2	0	**3**	1	1	46	0	0	**47**	0	0	62	1	0	**63**	1	**117**
Total	1	0	8	0	**9**	0	4	1	11	0	**16**	1	7	171	2	0	**180**	1	13	233	3	0	**249**	1	**454**
% Approach	11.1%	0%	88.9%	0%	**-**	-	25.0%	6.3%	68.8%	0%	**-**	-	3.9%	95.0%	1.1%	0%	**-**	-	5.2%	93.6%	1.2%	0%	**-**	-	-
% Total	0.2%	0%	1.8%	0%	**2.0%**	-	0.9%	0.2%	2.4%	0%	**3.5%**	-	1.5%	37.7%	0.4%	0%	**39.6%**	-	2.9%	51.3%	0.7%	0%	**54.8%**	-	-
PHF	0.250	-	0.500	-	**0.563**	-	0.500	0.250	0.458	-	**0.571**	-	0.438	0.855	0.500	-	**0.849**	-	0.464	0.940	0.750	-	**0.988**	-	0.962
Lights	0	0	8	0	**8**	-	4	1	9	0	**14**	-	7	167	2	0	**176**	-	10	229	3	0	**242**	-	440
% Lights	0%	0%	100%	0%	**88.9%**	-	100%	100%	81.8%	0%	**87.5%**	-	100%	97.7%	100%	0%	**97.8%**	-	76.9%	98.3%	100%	0%	**97.2%**	-	96.9%
Single-Unit Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	3	0	0	**3**	-	0	2	0	0	**2**	-	5
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	1.8%	0%	0%	**1.7%**	-	0%	0.9%	0%	0%	**0.8%**	-	1.1%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.4%	0%	0%	**0.4%**	-	0.2%
Buses	1	0	0	0	**1**	-	0	0	2	0	**2**	-	0	1	0	0	**1**	-	3	1	0	0	**4**	-	8
% Buses	100%	0%	0%	0%	**11.1%**	-	0%	0%	18.2%	0%	**12.5%**	-	0%	0.6%	0%	0%	**0.6%**	-	23.1%	0.4%	0%	0%	**1.6%**	-	1.8%
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	-	-	-	-	-	1	-	-	-	-	-	1	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-

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

Clio Road & West Dayton Street - TMC
Tue Mar 9, 2021
AM Peak (8 AM - 9 AM)
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 817411, Location: 43.038493, -83.732244

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



Clio Road & West Dayton Street - TMC

Tue Mar 9, 2021
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 817411, Location: 43.038493, -83.732244

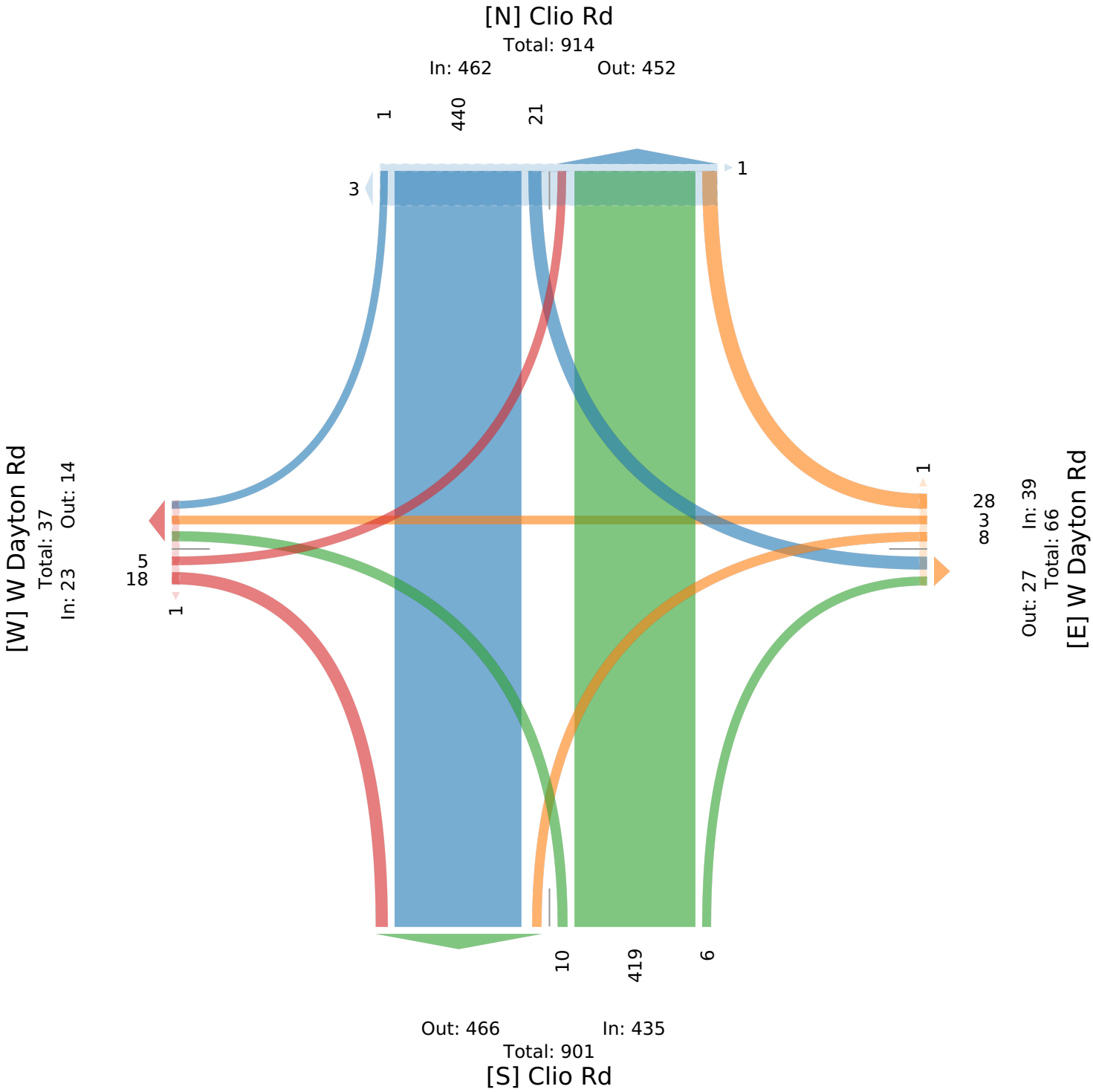
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	W Dayton Rd						W Dayton Rd						Clio Rd						Clio Rd						
Direction	Eastbound						Westbound						Northbound						Southbound						
Time	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	L	T	R	U	**App**	Ped*	**Int**
2021-03-09 4:00PM	1	0	4	0	**5**	0	1	0	5	0	**6**	0	5	105	3	0	**113**	0	5	114	1	0	**120**	1	**244**
4:15PM	1	0	2	0	**3**	1	2	0	11	0	**13**	0	3	115	2	0	**120**	0	4	113	0	0	**117**	2	**253**
4:30PM	1	0	9	0	**10**	0	4	1	1	0	**6**	1	1	97	1	0	**99**	0	6	103	0	0	**109**	0	**224**
4:45PM	2	0	3	0	**5**	0	1	2	11	0	**14**	0	1	102	0	0	**103**	0	6	110	0	0	**116**	1	**238**
Total	5	0	18	0	**23**	1	8	3	28	0	**39**	1	10	419	6	0	**435**	0	21	440	1	0	**462**	4	**959**
% Approach	21.7%	0%	78.3%	0%	**-**	-	20.5%	7.7%	71.8%	0%	**-**	-	2.3%	96.3%	1.4%	0%	**-**	-	4.5%	95.2%	0.2%	0%	**-**	-	**-**
% Total	0.5%	0%	1.9%	0%	**2.4%**	-	0.8%	0.3%	2.9%	0%	**4.1%**	-	1.0%	43.7%	0.6%	0%	**45.4%**	-	2.2%	45.9%	0.1%	0%	**48.2%**	-	**-**
PHF	0.625	-	0.500	-	**0.575**	-	0.500	0.375	0.636	-	**0.696**	-	0.500	0.911	0.500	-	**0.906**	-	0.875	0.965	0.250	-	**0.963**	-	0.948
Lights	5	0	18	0	**23**	-	8	3	27	0	**38**	-	9	415	5	0	**429**	-	19	437	1	0	**457**	-	947
% Lights	100%	0%	100%	0%	**100%**	-	100%	100%	96.4%	0%	**97.4%**	-	90.0%	99.0%	83.3%	0%	**98.6%**	-	90.5%	99.3%	100%	0%	**98.9%**	-	98.7%
Single-Unit Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	1	0	**2**	-	0	2	0	0	**2**	-	4
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.2%	16.7%	0%	**0.5%**	-	0%	0.5%	0%	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	1	0	**1**	-	1	3	0	0	**4**	-	2	1	0	0	**3**	-	8
% Buses	0%	0%	0%	0%	**0%**	-	0%	0%	3.6%	0%	**2.6%**	-	10.0%	0.7%	0%	0%	**0.9%**	-	9.5%	0.2%	0%	0%	**0.6%**	-	0.8%
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	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	4	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	0%	-

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

Clio Road & West Dayton Street - TMC
Tue Mar 9, 2021
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 817411, Location: 43.038493, -83.732244

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	10	5	1	14	9	222	3	17	303	4
Future Volume (veh/h)	1	0	10	5	1	14	9	222	3	17	303	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1707	1707	1707	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	2	0	17	8	2	23	11	261	0	18	319	4
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.85	0.85	0.85	0.95	0.95	0.95
Percent Heavy Veh, %	11	11	11	13	13	13	2	2	2	3	3	3
Cap, veh/h	362	0	331	365	26	303	712	2221		750	2228	28
Arrive On Green	0.22	0.00	0.22	0.22	0.22	0.22	0.63	0.63	0.00	0.63	0.63	0.63
Sat Flow, veh/h	1287	0	1472	1274	117	1348	1057	3647	0	1110	3566	45
Grp Volume(v), veh/h	2	0	17	8	0	25	11	261	0	18	158	165
Grp Sat Flow(s),veh/h/ln	1287	0	1472	1274	0	1465	1057	1777	0	1110	1763	1848
Q Serve(g_s), s	0.1	0.0	0.7	0.4	0.0	1.1	0.3	2.4	0.0	0.5	2.9	3.0
Cycle Q Clear(g_c), s	1.2	0.0	0.7	1.1	0.0	1.1	3.3	2.4	0.0	2.9	2.9	3.0
Prop In Lane	1.00		1.00	1.00		0.92	1.00		0.00	1.00		0.02
Lane Grp Cap(c), veh/h	362	0	331	365	0	330	712	2221		750	1102	1155
V/C Ratio(X)	0.01	0.00	0.05	0.02	0.00	0.08	0.02	0.12		0.02	0.14	0.14
Avail Cap(c_a), veh/h	362	0	331	365	0	330	712	2221		750	1102	1155
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	0.0	24.3	24.7	0.0	24.4	6.9	6.1	0.0	6.7	6.2	6.2
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.1	0.0	0.4	0.0	0.1	0.0	0.1	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.5	0.2	0.0	0.7	0.1	1.4	0.0	0.2	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	24.6	24.9	0.0	24.9	6.9	6.2	0.0	6.7	6.4	6.4
LnGrp LOS	C	A	C	C	A	C	A	A		A	A	A
Approach Vol, veh/h		19			33			272	A		341	
Approach Delay, s/veh		24.6			24.9			6.2			6.5	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		56.0		24.0		56.0		24.0				
Change Period (Y+Rc), s		* 6		* 6		* 6		* 6				
Max Green Setting (Gmax), s		* 50		* 18		* 50		* 18				
Max Q Clear Time (g_c+I1), s		5.3		3.2		5.0		3.1				
Green Ext Time (p_c), s		1.8		0.0		2.0		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection: 1: Welch Blvd/Clio Road & Dayton Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	6	50	15	38	14	86	47	40	121	65
Average Queue (ft)	0	7	2	6	1	30	7	6	50	17
95th Queue (ft)	4	30	10	22	7	67	28	26	95	48
Link Distance (ft)		421		475		520	520		578	578
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	50		60		110			80		
Storage Blk Time (%)		0		0		0			1	
Queuing Penalty (veh)		0		0		0			0	

Network Summary

Network wide Queuing Penalty: 0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	23	10	4	36	13	545	8	27	572	1
Future Volume (veh/h)	7	0	23	10	4	36	13	545	8	27	572	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1856	1856	1856	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	12	0	38	14	6	51	14	599	0	28	602	1
Peak Hour Factor	0.60	0.60	0.60	0.70	0.70	0.70	0.91	0.91	0.91	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	3	3	3	1	1	1	1	1	1
Cap, veh/h	359	0	362	370	38	322	544	2239		544	2293	4
Arrive On Green	0.22	0.00	0.22	0.22	0.22	0.22	0.63	0.63	0.00	0.63	0.63	0.63
Sat Flow, veh/h	1368	0	1610	1359	168	1430	823	3676	0	826	3669	6
Grp Volume(v), veh/h	12	0	38	14	0	57	14	599	0	28	294	309
Grp Sat Flow(s),veh/h/ln	1368	0	1610	1359	0	1598	823	1791	0	826	1791	1884
Q Serve(g_s), s	0.6	0.0	1.5	0.7	0.0	2.3	0.6	6.0	0.0	1.3	5.9	5.9
Cycle Q Clear(g_c), s	2.9	0.0	1.5	2.2	0.0	2.3	6.5	6.0	0.0	7.3	5.9	5.9
Prop In Lane	1.00		1.00	1.00		0.89	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	359	0	362	370	0	360	544	2239		544	1119	1178
V/C Ratio(X)	0.03	0.00	0.10	0.04	0.00	0.16	0.03	0.27		0.05	0.26	0.26
Avail Cap(c_a), veh/h	359	0	362	370	0	360	544	2239		544	1119	1178
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	24.6	25.5	0.0	24.9	8.2	6.8	0.0	8.4	6.7	6.7
Incr Delay (d2), s/veh	0.2	0.0	0.6	0.2	0.0	0.9	0.1	0.3	0.0	0.2	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	0.0	1.1	0.4	0.0	1.7	0.2	3.5	0.0	0.4	3.6	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.2	0.0	25.2	25.7	0.0	25.9	8.3	7.0	0.0	8.6	7.3	7.3
LnGrp LOS	C	A	C	C	A	C	A	A		A	A	A
Approach Vol, veh/h		50			71			613	A		631	
Approach Delay, s/veh		25.4			25.8			7.1			7.3	
Approach LOS		C			C			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		56.0		24.0		56.0		24.0				
Change Period (Y+Rc), s		* 6		* 6		* 6		* 6				
Max Green Setting (Gmax), s		* 50		* 18		* 50		* 18				
Max Q Clear Time (g_c+I1), s		8.5		4.9		9.3		4.3				
Green Ext Time (p_c), s		4.6		0.1		4.1		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection: 1: Welch Blvd/Clio Road & Dayton Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	43	31	18	37	20	132	97	96	155	92
Average Queue (ft)	6	12	3	8	2	68	30	17	85	37
95th Queue (ft)	27	34	15	24	10	116	69	53	136	76
Link Distance (ft)		421		475		520	520		576	576
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	50		60		110			80		
Storage Blk Time (%)	1	0		0		1			5	
Queuing Penalty (veh)	0	0		0		0			1	

Network Summary

Network wide Queuing Penalty: 2

Clio Road/Welch Blvd. and W. Dayton Street – Single – AM Peak

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

File View Help

Project	Clio Road/Welch Blvd and Day	Date	4-Jun-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	161

	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-Clio Road	Y	0	0	12.00	1	15.00	1	305.00	35.00	32.00	100.00	18.00	1	15.00	1	12.00	1	0	1.000
2	EB-Dayton Street	Y	88	0	10.00	1	15.00	1	190.00	50.00	15.00	100.00	18.00	1	15.00	1	10.00	1	0	1.000
3	NB-Welch Blvd	Y	228	0	12.00	1	15.00	1	350.00	35.00	32.00	100.00	18.00	1	15.00	1	12.00	1	0	1.000
4	WB-Dayton Street	Y	272	0	12.00	1	15.00	1	245.00	50.00	24.00	100.00	18.00	1	15.00	1	12.00	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-Clio Road	3.0	1.00			0	17	303	4	0	0.750	1.125	0.750	0	30	60	
2	EB-Dayton Street	11.0	1.00			0	1	0	10	0	0.750	1.125	0.750	0	30	60	
3	NB-Welch Blvd	2.0	1.00			0	9	222	3	0	0.750	1.125	0.750	0	30	60	
4	WB-Dayton Street	13.0	1.00			0	5	1	14	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	Byp	Leg
1	SB-Clio Road	None	324		15		1121		0.2890		6.65		6.65	0.45		1.16		A		A
2	EB-Dayton Street	None	11		325		887		0.0124		2.19		2.19	0.01		0.03		A		A
3	NB-Welch Blvd	None	234		18		1142		0.2048		5.75		5.75	0.28		0.74		A		A
4	WB-Dayton Street	None	20		232		887		0.0226		3.80		3.80	0.02		0.06		A		A
All	Intersection												6.11							A

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

Clio Road/Welch Blvd. and W. Dayton Street – Single – PM Peak

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

File View Help

Project	Clio Road/Welch Blvd and Day	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	162

	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-Clio Road	Y	0	0	12.00	1	15.00	1	305.00	35.00	32.00	100.00	18.00	1	15.00	1	12.00	1	0	1.000
2	EB-Dayton Street	Y	88	0	10.00	1	15.00	1	190.00	50.00	15.00	100.00	18.00	1	15.00	1	10.00	1	0	1.000
3	NB-Welch Blvd	Y	228	0	12.00	1	15.00	1	350.00	35.00	32.00	100.00	18.00	1	15.00	1	12.00	1	0	1.000
4	WB-Dayton Street	Y	272	0	12.00	1	15.00	1	245.00	50.00	24.00	100.00	18.00	1	15.00	1	12.00	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-Clio Road	1.0	1.00			0	27	572	1	0	0.750	1.125	0.750	0	30	60	
2	EB-Dayton Street	0.0	1.00			0	7	0	23	0	0.750	1.125	0.750	0	30	60	
3	NB-Welch Blvd	1.0	1.00			0	13	545	8	0	0.750	1.125	0.750	0	30	60	
4	WB-Dayton Street	3.0	1.00			0	10	4	36	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	Byp	Leg
1	SB-Clio Road	None	600		27		1160		0.5172		9.77		9.77	1.29		3.27		A		A
2	EB-Dayton Street	None	30		609		930		0.0323		4.25		4.25	0.04		0.10		A		A
3	NB-Welch Blvd	None	566		34		1157		0.4893		9.31		9.31	1.14		2.91		A		A
4	WB-Dayton Street	None	50		565		888		0.0563		4.65		4.65	0.07		0.18		A		A
All	Intersection												9.22							A

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

Intersection
Clio Road/Welch Blvd and West Dayton Street

Opinion of Probable Cost

By: Rowe PSC
Date: 5/24/2021

PAY ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	AMOUNT
Mobilization (10%)	1	LSUM	$90,000.00	$90,000.00
Sidewalk, Rem	400	Syd	$10.00	$4,000.00
Pavt, Rem	7500	Syd	$10.00	$75,000.00
Curb and Gutter, Rem	2500	Ft	$10.00	$25,000.00
Embankment, CIP	3000	Cyd	$15.00	$45,000.00
Excavation, Earth	2200	Cyd	$10.00	$22,000.00
Aggregate Base	3400	Ton	$21.00	$71,400.00
Shoulder, Cl II	0	Ton	$25.00	$0.00
Approach, Cl II	0	Ton	$25.00	$0.00
HMA, 4E10	1500	Ton	$85.00	$127,500.00
HMA Approach	3	Ton	$50.00	$150.00
Conc Pavt, Nonreinf, 9 inch	2300	Syd	$45.00	$103,500.00
Joint, Contraction, Cp	1850	Ft	$10.00	$18,500.00
Joint, Expansion, E2	330	Ft	$25.00	$8,250.00
Joint, Expansion, E3	830	Ft	$15.00	$12,450.00
Driveway, Nonreinf Conc, 9 inch	500	Syd	$50.00	$25,000.00
Curb and Gutter, Conc, Det B1	2240	Ft	$25.00	$56,000.00
Curb and Gutter, Conc, Det D1	210	Ft	$25.00	$5,250.00
Curb, Conc. Det E1	70	Ft	$25.00	$1,750.00
Driveway Opening, Conc, Det M	425	Ft	$22.00	$9,350.00
Detectable Warning Surface	40	Ft	$40.00	$1,600.00
Curb Ramp Opening, Conc	56	Ft	$25.00	$1,400.00
Sidewalk, Conc, 4 inch	4300	Sft	$5.00	$21,500.00
Sidewalk Ramp, Conc, 6 inch	780	Sft	$10.00	$7,800.00
Conc Pavt, Decorative Colored, 9 inch	3100	Sft	$12.50	$38,750.00
Turf Establishment, Performance	3000	Syd	$5.00	$15,000.00
MOT	1	LSUM	$67,000.00	$67,000.00
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				**$988,150**

CONTINGENCY (20%)	$197,630.0
ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2021)	$1,185,780.0
3% ANNUAL INFLATION 2021 TO 2025	*$148,825.84*
ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2025)	**$1,334,605.84**

* 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 caclulated for the outer radius of the roundabout
E3 joint expansion was caclulated 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 acqusition costs not inlcuded
Joints assumed for central island/splitter islands
Pavement and curb removals include the assumption the south east island at the intersection will be removed.

NUMBER OF CRASHES OR INJURED PERSONS.

	YEAR 1 2015	YEAR 2 2016	YEAR 3 2017	YEAR 4 2018	YEAR 5 2019
Fatal and A-Injury Reduction	%REDUCTION	78%	Roundabout		
Number of Crashes	0	0	0	0	1
A-Injured or Killed Persons	0	0	0	0	2
Minor Crash Reduction	%REDUCTION	57%	0		
Number of Crashes	0	0	0	0	15
	0	0	0	0	14
	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
	%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:	2	For reference only
# of Fatalilties:	0	For reference only; "Q" accounts for the risk of a fatality.
PROJECT COST ESTIMATE :	$1,334,606	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:

Clio Road/Welch Blvd and Dayton Street
Genesee County Roundabout Study
1505403, 1526401, 1532601
0, 1.1430708, 0.1498394
Roundabout

COMPUTED BENEFITS DERIVED THROUGH CRASH REDUCTION

TOR 2021 Date **9-Jul-21**

Project: **Clio Road/Welch Blvd and Dayton Street** City/Twp. **City of Flint**

Prepared By: **ROWE Professional Services Company** County **Genesee County**

PR: **1505403, 1526401, 1532** FR MP Range: **0, 1.1430708, 0.1498394**

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 x [(Q x R1) + (BCOST x R2) + (PDOCOST x R3)]

WHERE:

BTOTAL =	Total Benefit in Dollars Over Years Used	$650,034
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.	1.6
R2 =	Reduction in B-Injury crashes:	0.0
R3 =	Reduction in PDO and C-injury crashes:	8.0
Q =	[FATCOST + ((I/F) x INJCOST)] / [1 + (I/F)]	
=	[1,659,000 + (6.10 x 96,200)] / [1 + 6.10]	$316,400
	for AREA TYPE "Urban"	
I/F =		6.10

Q-Reference	Q	A-Inuries	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 $130,007

With an inflation rate of 2.50%

B=Annual Benefit=Present Value (with Inflation) $166,420

C = Project Cost $1,334,606

TOR=C/B=COST/ANNUAL BENEFIT= **8.02**

D. Clio/Welch and Dayton

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