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May 12,2023 FRE-23004755-A0

Mr. Rob Pero, CET, NBCBO
Building Inspector/Development Officer
Village of New Maryland
584 New Maryland Highway
New Maryland, NB E3C 1K1

Subject: Review of Access Options to the New Maryland Highway from the Former Forbes Property

1 Introduction

1.1 Background

The Village of New Maryland is currently considering a proposal to develop the former Forbes property. The development will consist of the following:

- 1395 square metres of commercial floor space in two separate buildings
- 3 mid rise apartment building with a total of 225 units
- 150 attached garden townhouses

Figure 1 shows the specific location of the development in relation to existing development and the street network, while **Figure 2** presents the current site plan for the proposed development. A larger scale drawing of the site plan is provided in **Appendix 1**.

The proposed development will be constructed in phases. Phase 1 will include the commercial and mid-rise apartment units. The attached garden townhouses (150 units) will be constructed in subsequent phases as shown in **Figure 2.**

1.2 Project Scope

The objective of this traffic study is to make a recommendation as to the most efficient and safest way to provide access to The New Maryland Highway to/from the proposed development of the former Forbes property. The study also takes into consideration the potential construction of a roundabout at the intersection of The New Maryland Highway and Crown Avenue. To meet the study objective, the following work activities were undertaken:

- Based on the development concept as shown in **Figure 2**, an estimate of the trips that will be generated by the overall proposed development in the AM and PM peak hour travel periods was prepared.
- A turning movement traffic count was completed at the New Maryland Highway/Crown Avenue intersection on a Thursday in April, 2023 for the AM and PM peak travel periods. These counts were expanded to estimate 2023 Horizon Year traffic conditions using a 1 percent/annum rate.

- The estimated AM and PM peak hour traffic that is projected to be generated by the proposed development was assigned to the new intersection with The New Maryland Highway. This was completed for the full build out of the proposed development.



Figure 1: Proposed Development Location

- An operational analysis was complete at the proposed new intersection for 2033 traffic conditions to determine levels of service, delays, volume to capacity ratios and queuing on the approaches based on the following access scenarios:
    - All turning movements permitted to and from the new street.
    - Right in and right out only.
    - No left turns out but left turns in permitted. This scenario includes the assumption that a roundabout will be constructed at the New Maryland Highway/Crown Avenue intersection.
- The impacts of the third scenario above on the proposed roundabout at The New Maryland Highway/Crown Avenue were evaluated.
- Based on the results of the previous two work activities, a recommendation was made with respect to the provision of access to and from The New Maryland Highway.
- The results of the analyses were documented in a letter report.

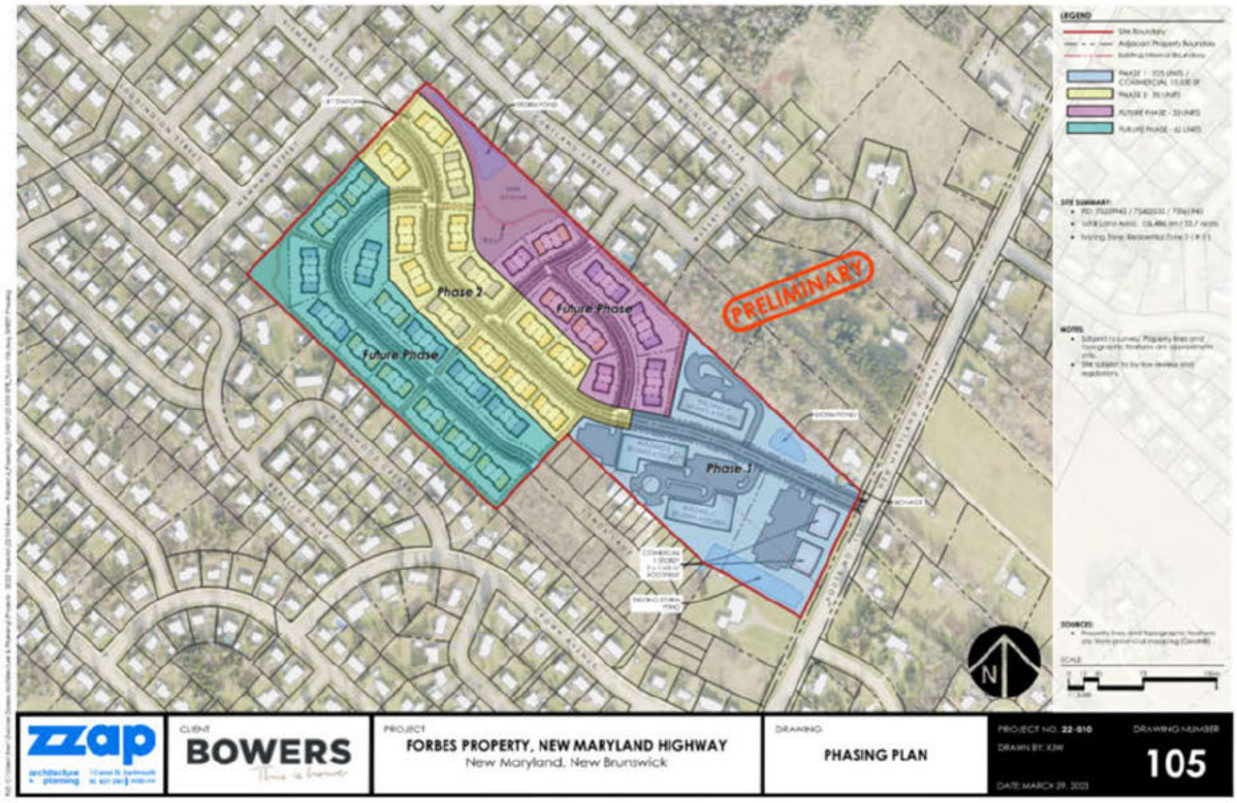


Figure 2: Development Site Plan

1.3 Study Area

The Study Area includes the New Maryland Highway/New Development Street and The New Maryland Highway/Crown Avenue intersections. The New Maryland Highway/Crown Avenue intersection is currently controlled by a stop sign on the Crown Avenue approach, with free flow traffic conditions on The New Maryland Highway. The proposed new intersection would have a stop sign on the New Development Street approach.

2 Traffic Conditions

2.1 Traffic Volumes

Traffic turning movement counts were collected at the New Maryland Highway/Crown Avenue intersection on a Thursday in April, 2023 for the AM and PM peak travel periods. The counts were collected between 0700 and 0900 hours and 1600 t0 1800 hours. A summary of the counts indicate that the AM and PM peak hours of travel are 0730 to 0830 and 1630 to 1730 hours, respectively.

Figure 3 illustrates the existing AM and PM peak hour turning movement volumes at the New Maryland Highway/Crown Avenue intersection. Also shown are the AM and PM volumes on The New Maryland Highway adjacent to the proposed development. **Figure 4** summarizes the 2033 estimated peak hour traffic volumes.

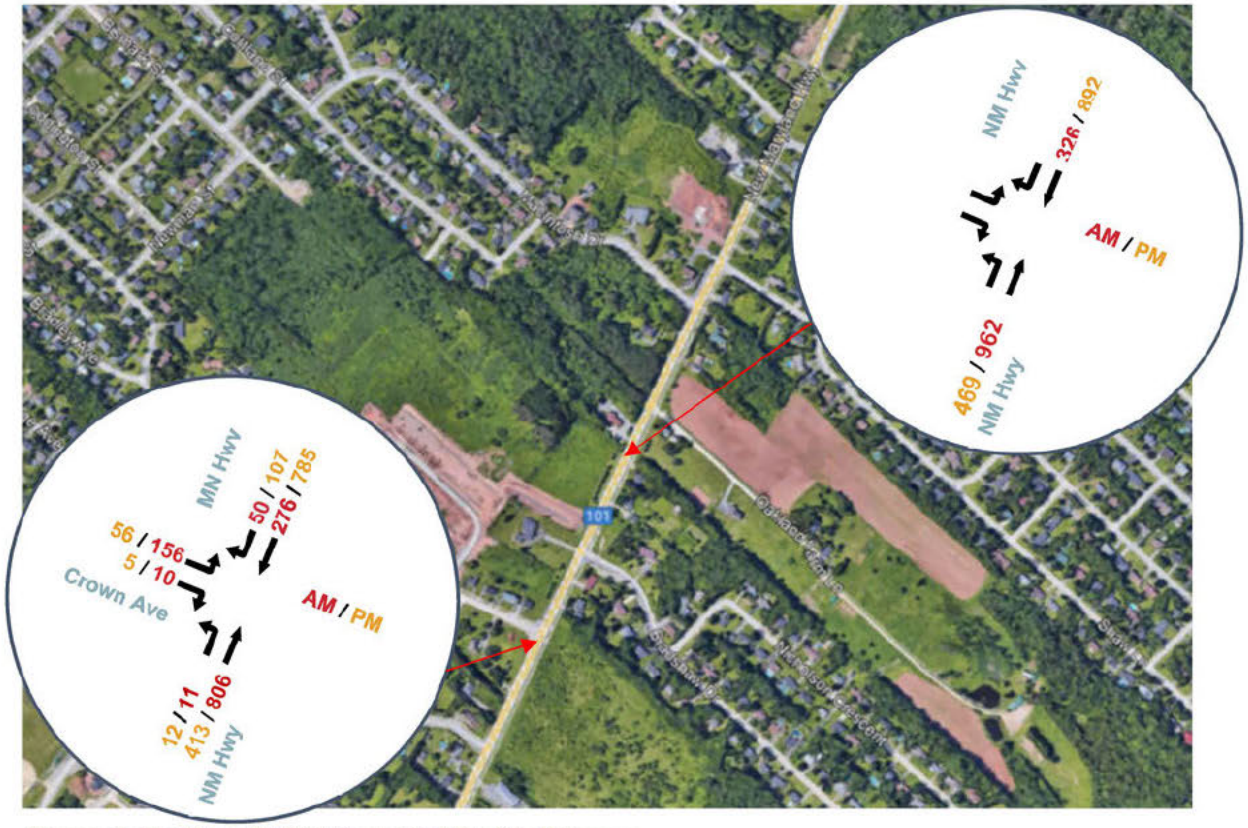


Figure 3: Existing 2023 AM and PM Traffic Volumes

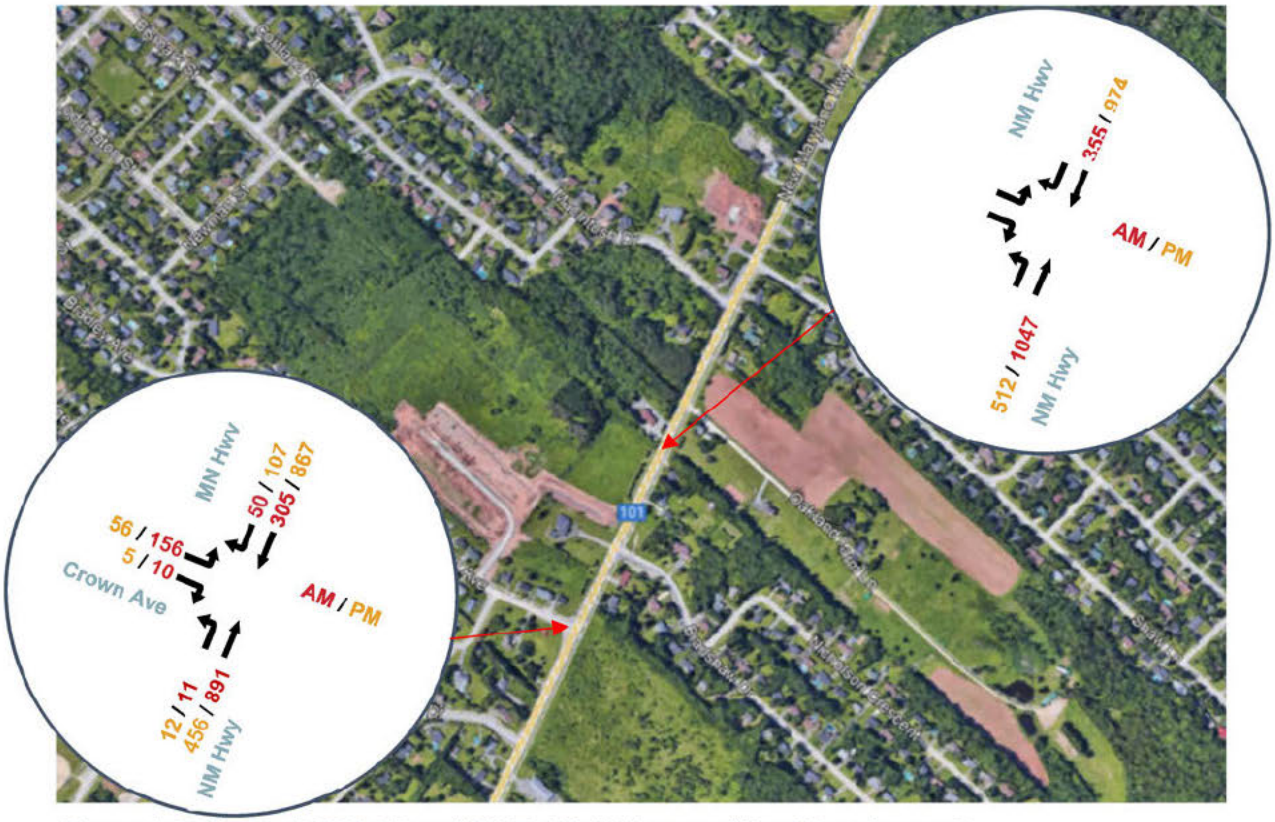


Figure 4: Estimated 2033 AM and PM Traffic Volumes without Development

2.2 Intersection Characteristics

The New Maryland Highway/Crown Avenue intersection is controlled by a stop sign on the Crown Avenue approach and with free flow conditions on the New Maryland Highway approaches. There is a separate through and right turn lane on the New Maryland Highway southbound approach and a separate left turn and through lane on the New Maryland Highway northbound approach. The Crown Avenue approach has a separate left and right turn lane, with channelization of the right turns.

The intersection of the New Maryland Highway/New Development Street will be controlled by a stop sign on the New Development Street approach, with free flow conditions on the New Maryland Highway. There will be a separate left and through lane on the New Maryland Highway northbound approach and a combined through and right turn on the southbound approach. The development access would have one lane in and one lane out.

3 Trip Generation and Assignment

3.1 Trip Generation

The proposed development will include 1395 square metres of commercial floor space, 225 mid-rise apartment units and 150 garden townhouses. Although the development will be built in phases, the analysis in this report is based on the full buildout.

To estimate the trips which will be generated by the proposed apartment development, trip rates published by the Institute of Transportation Engineers (ITE), a well known North American agency, have been utilized. These trip rates have been developed over the years based on numerous studies of the trip generation potential of various types and sizes of existing developments.

Table 1 summarizes the estimated AM and PM peak hour trips, as well as the daily traffic that will be generated to and from the development. A total (in and out) of 197 trips are estimated for the AM peak hour and 278 trips for the PM peak hour. It is assumed that these trips are all new to the Study Area.

Table 1: Estimated Trip Generation

		AM			PM			
Land Use	# Units	In	Out	**Total**	In	Out	**Total**	**Daily Traffic**
Commercial (#822)	1395 sq m	23	15	**38**	52	52	**104**	**865**
Mid-Rise Apartments (#221)	225	20	67	**87**	54	34	**88**	**1025**
Garden Townhouses (#215	150	18	54	**72**	51	35	**86**	**1095**
Total		**61**	**136**	**197**	**157**	**121**	**278**	**2985**

3.2 Trip Assignment

The AM and PM peak hour trips that will be generated by the proposed development were assigned to and from the development's new street based on primarily the existing distribution patterns along the New Maryland Highway. **Figure 5** illustrates this distribution of the generated trips at the New Maryland Highway/New Development Street intersection. **Figure 6** provides a summary of the 2033 AM and PM traffic volumes with the development in place. These volumes represent full access conditions.



Figure 5: Trip Distribution of AM and PM Generated Trips



Figure 6: Estimated 2033 AM and PM Traffic Volumes with Development

4 Level of Service Analysis

4.1 Introduction

Operational conditions for the AM and PM peak hour traffic conditions at the Study Area intersections were evaluated using Synchro 11 traffic analysis software for the stop sign controlled intersections and Sidra software for roundabouts. The analysis is based on 2033 traffic conditions with the full development in place. Key operational measures include level of service (LOS), average vehicle delay and volume to capacity (v/c) ratio. Queuing on the intersection approaches is also recorded.

Standard LOS criteria for traffic signals, stop sign-controlled and roundabout intersections are shown in **Table 2**. Only the criteria for stop sign control and roundabouts are applicable to this study.

The analysis has been based on three access scenarios for the proposed development:

- All turning movements permitted to and from the new street.
- Right in and right out only.
- No left turns out but left turns in permitted. This scenario includes the assumption a roundabout will be constructed at the New Maryland Highway/Crown Avenue intersection.

Table 2 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)		
		Signalized Intersections	Stop Controlled Intersections	Roundabout Intersections
A	Very low delay; most vehicles do not stop (Excellent)	less than 10.0	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (Very Good)	between 10.0 and 20.0	between 10.0 and 15.0	between 10.0 and 20.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through the intersection without stopping (Good)	between 20.0 and 35.0	between 15.0 and 25.0	between 20.0 and 35.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	between 35.0 and 55.0	between 25.0 and 35.0	between 35.0 and 50.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay	between 55.0 and 80.0	between 35.0 and 50.0	between 50.0 and 70.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	greater than 80.0	greater than 50.0	greater than 70.0

4.2 Scenario 1 – Full Access

The evaluation of Scenario 1, as well as the other two scenarios, is based on 2033 traffic conditions with full buildout of the development. Scenario 1 assumes that full access to and from the development is available, with all turning movements permitted. The operational characteristics at the New Maryland Highway/New Development Street intersection for the two peak hours are summarized in **Table 3**. The Synchro software output is provided in **Appendix 2**.

Left turns from the development are projected to experience poor levels of service (LOS) F with average delays per vehicle in the AM peak of 176 seconds and a volume to capacity ratio (v/c) at 1.1, indicating there is more demand than capacity available. Averages delays of 116 seconds per vehicle are projected for the PM peak, with demand approaching capacity (v/c=0.92). The 95th percentile queues on the development approach would reach upwards of 9 vehicles or approximately 65 metres.

It is possible the development would either experience a reduction in generated traffic or the left turning vehicles will utilize other existing streets for access to the New Maryland Highway.

4.3 Scenario 2 – Right in/Right Out Only

With this scenario only right turns in and right turns out would be permitted. Thus, left turns would be required to find alternate routes. From **Table 3** it can be observed that right turns out would experience very good LOS B conditions in the AM peak and satisfactory LOS D conditions in the PM peak. There would be no significant delays and very little queuing. Right turns in would experience no delay. **Appendix 2** includes the Synchro output.

As with Scenario 1, it is possible the development would either experience a reduction in generated traffic or the left turning vehicles will utilize other existing streets for access to the New Maryland Highway.

Table 3: Level of Service Summary of Scenarios

Year	Traffic Control	Overall LOS & Delay (sec/veh)	Overall LOS & Delay (sec/veh)	Criteria	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
New Maryland Highway/New Development Street																
					New Street						**New Maryland Hwy**			**New Maryland Hwy**		
2033 Full Access-Scenario 1	STOP	AM Peak	B 15	V/C	1.11						0.04					
				Delays (s/veh)	176		*Shared*				8	free flow			free flow	*Shared*
				LOS	F						A					
				Queue	9 veh						1 veh					
		PM Peak	A 8	V/C	0.92						0.1					
				Delays (s/veh)	116		*Shared*				11.1	free flow			free flow	*Shared*
				LOS	F						B					
				Queue	7 veh						1 veh					
2033 Right in/Right out Only-Scenario 2	STOP	AM Peak	A 1	V/C			0.23									
				Delays (s/veh)			12					free flow			free flow	*Shared*
				LOS			B									
				Queue			1 veh									
		PM Peak	A 2	V/C			0.52									
				Delays (s/veh)			34					free flow			free flow	*shared*
				LOS			D									
				Queue			3 veh									
2033 Round-about Scenario 3	STOP	AM Peak	A 1	V/C			0.23				0.04					
				Delays (s/veh)			12				8	free flow			free flow	*Shared*
				LOS			B				A					
				Queue			1 veh				1 veh					
		PM Peak	A 3	V/C			0.52				0.1					
				Delays (s/veh)			34				12	free flow			free flow	*shared*
				LOS			D				B					
				Queue			3 veh				1 veh					
Proposed Future Roundabout																
					Crown Ave			**Crown Ave Ext**			**New Maryland Hwy**			**New Maryland Hwy**		
2033 Roundabout		AM Peak	A 7	V/C		0.16			0.3			0.77			0.36	
				Delays (s/veh)	*Shared*	9	*Shared*	*Shared*	15	*Shared*	*Shared*	6	*Shared*	*Shared*	6	*Shared*
				LOS		A			B			A			A	
				Queue		1 veh			3 veh			8 veh			3 veh	
		PM Peak	A 4	V/C		0.1			0.06			0.42			0.75	
				Delays (s/veh)	*Shared*	14	*Shared*	*Shared*	6	*Shared*	*Shared*	4	*Shared*	*Shared*	4	*Shared*
				LOS		B			A			A			A	
				Queue		1 veh			1 veh			2 veh			9 veh	

4.4 Scenario 3 – Roundabout

New Maryland Highway/New Development Street

This scenario would involve no left turns from the development onto the New Maryland Highway but would permit left turns into the development. With this scenario it is important that the intersection be designed to prevent vehicles making a left turn from the development.

This scenario is based on the assumption that a roundabout would be constructed at the New Maryland Highway/Crown Avenue intersection. This would allow left turning traffic from the development to make a right turn and then do a U-turn at the roundabout to proceed northbound on the New Maryland Highway.

At the New Maryland Highway/New Development Street intersection, right turns from the development would experience the same conditions as Scenario 2. There would be no significant delays and very little queuing. Right turns in would experience no delay. Left turns into the development would experience very good LOS B conditions. (See **Table 3** and **Appendix 2** for the analysis results.)

New Maryland Highway Crown Street Roundabout

It was assumed that in 2033 the demand for additional development would result in the fourth leg of the roundabout being constructed. It was also assumed that the traffic on the fourth leg would be similar to the traffic on Crown Avenue. Therefore, the results presented in **Table 3** reflects this additional traffic, as well as the U-turning traffic at the roundabout. **Appendix 2** includes the Sidra software output.

The roundabout is projected to operate at an overall excellent LOS A in both peak periods with individual turn movements at a very good LOS B or better. The maximum 95th percentile queue length on the New Maryland Highway approach is 9 vehicles.

4.5 Summary

Based on the results of the analysis, it is recommended the roundabout scenario be considered since it provides the most efficient and safest option for access to and from the proposed development. The recommendation does not take into consideration costs associated with the scenarios.

It is important with this scenario that the intersection be designed in such a manner as to prevent vehicles making a left turn from the development.

5 Intersection Stopping Sight Distance

From a safety point of view, it is important that the new street location have sufficient stopping sight distance. The minimum stopping sight distance is essential for a vehicle travelling along the New Maryland Highway to be able to stop in time if a vehicle pulls out from the New Development Street.

The posted speed limit on the New Maryland Highway adjacent to the proposed development is 60 km/h. When determining the required stopping sight distance, the design speed is utilized. Generally, the design speed is 10 km/h greater than the posted speed limit, or as in this case 70 km/h. **Table 4** summarizes the minimum requirements for stopping sight distance and intersection turning sight distance based on the criteria given above.

Table 4 – Intersection Stopping and Turning Sight Distance Requirements

Design Speed (km/h)	Stopping Sight Distance (m)	Available
70	105	Yes

The new street will have the required stopping sight distance available.

It should be noted that there is also available intersection sight distance. This is the distance required for vehicles to make a turn from the stop sign without forcing vehicles on the New Maryland Highway to slow to less than 70 percent of their initial speed.

6 Summary of Findings

Summarized below are the major findings for this Traffic Impact Study:

1. The Village of New Maryland is currently considering a proposal to develop the former Forbes property. The development will consist of 1395 square metres of commercial floor space, 3 mid rise apartment buildings with a total of 225 units and 150 attached garden townhouses.
2. The analysis was based on 2033 AM and PM peak hour traffic conditions, a 10-year horizon period.
3. At full build out the proposed development is projected to generate 197 trips to and from the site in the AM peak hour and 278 trips in the PM peak hour.
4. The analysis has been based on three access scenarios for the proposed development.
    a. **Scenario 1** - All turning movements are permitted to and from the development.
    b. **Scenario 2** - Right in and right out only.
    c. **Scenario 3** - No left turns out but left turns in permitted. This scenario includes the assumption a roundabout will be constructed at the New Maryland Highway/Crown Avenue intersection.
5. Under **Scenario 1** left turns from the development will experience poor level of service (LOS) F conditions in both the AM and PM peak hours, with demand exceeding capacity in the AM.
6. **Scenario 2** (right turns only) would function efficiently in the peak travel periods. However, because left turns to and from the development are not permitted, it is possible the development would either experience a reduction in generated traffic or the left turning vehicles will utilize other existing streets for access to the New Maryland Highway. This could happen with **Scenario 1** as well.
7. With **Scenario 3** as described above, the New Maryland Highway/New Development Street intersection will experience no significant delays and very little queuing in the peak travel periods. Right turns in would experience no delay. Left turns into the development would experience very good LOS B conditions.
8. With the construction of a roundabout at the New Maryland Highway/Crown Avenue intersection as part of **Scenario 3**, the roundabout is projected to operate at an overall excellent LOS A in both peak periods with individual turn movements at a very good LOS B or better. The maximum 95th percentile queue length on the New Maryland Highway approach will be 9 vehicles.
9. **Based on the results of the analysis, it is recommended the roundabout scenario be considered since it provides the most efficient and safest option for access to and from the proposed development. The recommendation does not take into consideration costs associated with the scenarios.**
10. **It is important with Scenario 3 that the intersection be designed in such a manner as to prevent vehicles making a left turn from the development.**

7 Closing

Thanks again for the opportunity to offer our services for this assignment. Feel free to contact me directly if you have any concerns or require additional clarification on this report.

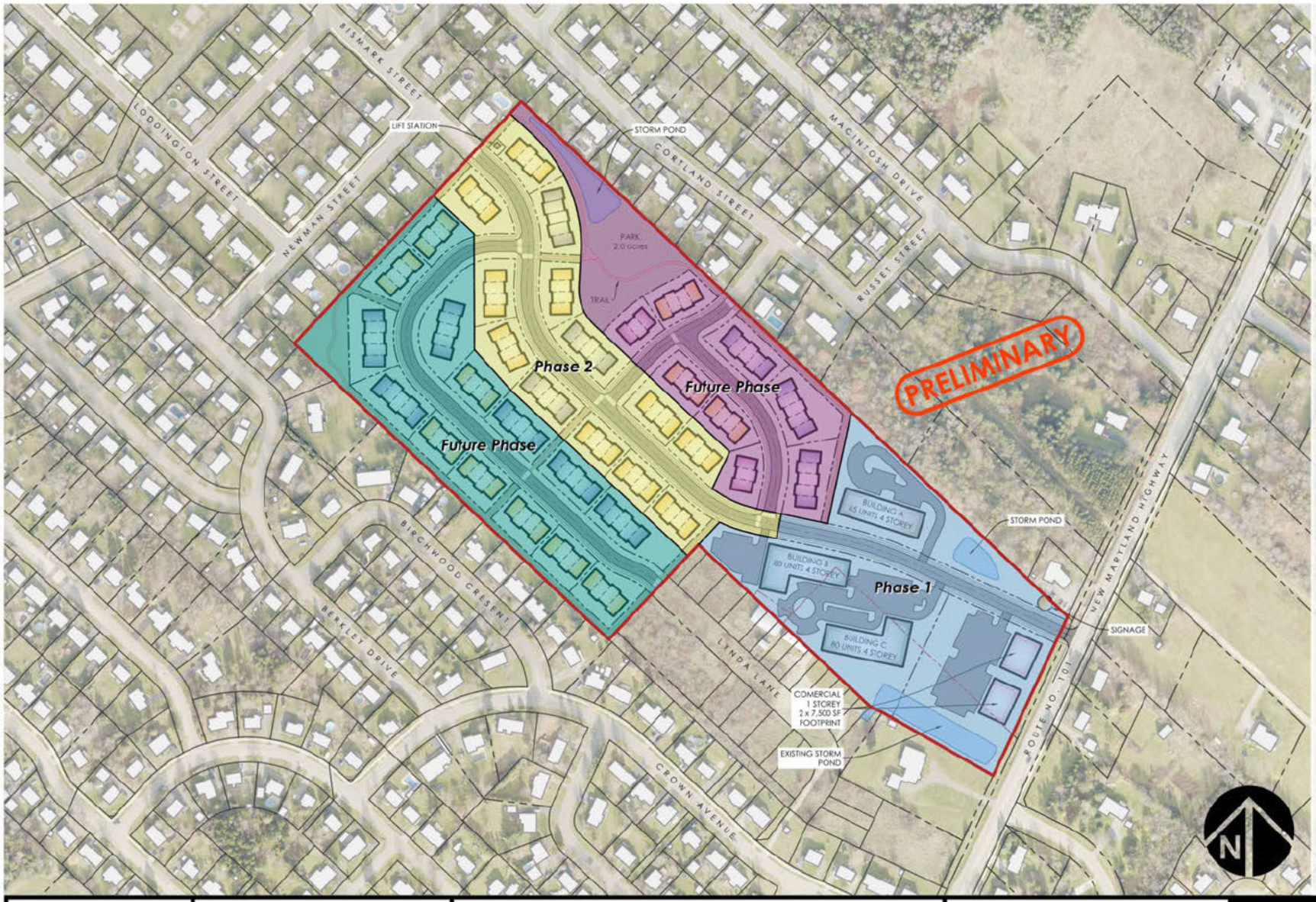
Sincerely,

Don Good, P. Eng.
Senior Traffic Engineer
EXP Services



Attachments:
Appendix A – Development Site Plan
Appendix B – Synchro and Sidra LOS Output

Appendix 1 – Development Site Plan



LEGEND

- Site Boundary
- Adjacent Property Boundary
- Existing Internal Boundary
- PHASE 1 - 225 UNITS / COMMERCIAL 15,000 SF
- PHASE 2 - 55 UNITS
- FUTURE PHASE - 33 UNITS
- FURURE PHASE - 62 UNITS

SITE SUMMARY:

- PID: 75259945 / 75422535 / 75061945
- Total Land Area: 136,486 sm / 33.7 acres
- Existing Zone: Residential Zone 2 (R-2)

NOTES:

- Subject to survey. Property lines and topographic features are approximate only.
- Site subject to by-law review and regulations.

SOURCES:

- Property lines and topographic features are from provincial mapping (GeoNB)

SCALE:

0 15 30 75 150m

1 : 3,000

[redacted]

[redacted]

PROJECT

FORBES PROPERTY, NEW MARYLAND HIGHWAY

New Maryland, New Brunswick

DRAWING

PHASING PLAN

PROJECT NO. **22-010**

DRAWN BY: KJW

DRAWING NUMBER

105

DATE: MARCH 29, 2023

FILE: C:\Users\Ken\Zwicker Zareski Architecture & Planning\Projects - 2022 Projects\22-010 Bowers - Forbes\4_Planning\1-DWG\22-010-SITE_PLAN-104.dwg SHEET: Phasing

Appendix 2 – Synchro and Sidra LOS Output

Intersection	
Int Delay, s/veh	15.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	104	32	45	1047	355	16
Future Vol, veh/h	104	32	45	1047	355	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	35	49	1138	386	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1631	395	403	0	-	0
Stage 1	395	-	-	-	-	-
Stage 2	1236	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 112	654	1156	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	274	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 107	654	1156	-	-	-
Mov Cap-2 Maneuver	~ 107	-	-	-	-	-
Stage 1	652	-	-	-	-	-
Stage 2	274	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	176.2	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1156	-	133	-	-
HCM Lane V/C Ratio	0.042	-	1.111	-	-
HCM Control Delay (s)	8.3	0	176.2	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0.1	-	8.4	-	-

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

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	78	54	512	974	103
Future Vol, veh/h	43	78	54	512	974	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	85	59	557	1059	112

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1790	1115	1171	0	-	0
Stage 1	1115	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	89	253	596	-	-	-
Stage 1	314	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	80	253	596	-	-	-
Mov Cap-2 Maneuver	80	-	-	-	-	-
Stage 1	283	-	-	-	-	-
Stage 2	506	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	115.8	1.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	596	-	143	-	-
HCM Lane V/C Ratio	0.098	-	0.92	-	-
HCM Control Delay (s)	11.7	0	115.8	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.3	-	6.3	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	136	0	1092	355	16
Future Vol, veh/h	0	136	0	1092	355	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	148	0	1187	386	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	395	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	654	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	654	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	654	-	-
HCM Lane V/C Ratio	-	0.226	-	-
HCM Control Delay (s)	-	12.1	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.9	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	121	0	566	974	103
Future Vol, veh/h	0	121	0	566	974	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	132	0	615	1059	112

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1115	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	253	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	253	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	253	-	-
HCM Lane V/C Ratio	-	0.52	-	-
HCM Control Delay (s)	-	33.7	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	2.8	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	136	45	1183	355	16
Future Vol, veh/h	0	136	45	1183	355	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	148	49	1286	386	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	395	403	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	654	1156	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	654	1156	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1156	-	654	-	-
HCM Lane V/C Ratio	0.042	-	0.226	-	-
HCM Control Delay (s)	8.3	-	12.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	121	54	633	974	103
Future Vol, veh/h	0	121	54	633	974	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	132	59	688	1059	112

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1115	1171	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	253	596	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	253	596	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.7	0.9	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	596	-	253	-	-
HCM Lane V/C Ratio	0.098	-	0.52	-	-
HCM Control Delay (s)	11.7	-	33.7	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0.3	-	2.8	-	-

MOVEMENT SUMMARY

Site: 101 [Route 101 Crown Ave - AM (Site Folder: General)]

Route 101 Crown Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Route 101 (S)														
1	L2	11	2.0	12	2.0	0.769	12.7	LOS B	7.7	55.0	0.67	0.72	0.81	56.2
2	T1	886	2.0	933	2.0	0.769	6.1	LOS A	7.7	55.0	0.67	0.72	0.81	55.7
3	R2	11	2.0	12	2.0	0.769	6.7	LOS A	7.7	55.0	0.67	0.72	0.81	53.9
Approach		908	2.0	956	2.0	0.769	6.2	LOS A	7.7	55.0	0.67	0.72	0.81	55.7
East: New Road (E)														
4	L2	10	2.0	11	2.0	0.302	20.4	LOS C	2.3	16.0	0.99	0.98	0.99	43.5
5	T1	5	2.0	5	2.0	0.302	14.0	LOS B	2.3	16.0	0.99	0.98	0.99	42.8
6	R2	100	2.0	105	2.0	0.302	15.0	LOS B	2.3	16.0	0.99	0.98	0.99	41.7
Approach		115	2.0	121	2.0	0.302	15.4	LOS B	2.3	16.0	0.99	0.98	0.99	41.9
North: Route 101 (N)														
7u	U	136	2.0	143	2.0	0.360	11.8	LOS B	2.2	15.5	0.13	0.47	0.13	58.5
7	L2	50	2.0	53	2.0	0.360	9.3	LOS A	2.2	15.5	0.13	0.47	0.13	56.8
8	T1	304	2.0	320	2.0	0.360	2.7	LOS A	2.2	15.5	0.13	0.47	0.13	56.4
9	R2	50	2.0	53	2.0	0.360	3.3	LOS A	2.2	15.5	0.13	0.47	0.13	54.6
Approach		540	2.0	568	2.0	0.360	5.6	LOS A	2.2	15.5	0.13	0.47	0.13	56.8
West: Crown Ave														
10	L2	150	2.0	158	2.0	0.164	9.4	LOS A	0.8	5.3	0.49	0.68	0.49	47.0
11	T1	5	2.0	5	2.0	0.164	3.0	LOS A	0.8	5.3	0.49	0.68	0.49	46.3
12	R2	10	2.0	11	2.0	0.164	4.0	LOS A	0.8	5.3	0.49	0.68	0.49	45.0
Approach		165	2.0	174	2.0	0.164	8.9	LOS A	0.8	5.3	0.49	0.68	0.49	46.9
All Vehicles		1728	2.0	1819	2.0	0.769	6.9	LOS A	7.7	55.0	0.51	0.66	0.58	53.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Route 101 Crown Ave - PM (Site Folder: General)]

Route 101 Crown Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Route 101 (S)														
1	L2	12	2.0	13	2.0	0.424	10.1	LOS B	1.9	13.5	0.36	0.40	0.36	57.8
2	T1	498	2.0	524	2.0	0.424	3.5	LOS A	1.9	13.5	0.36	0.40	0.36	57.4
3	R2	8	2.0	8	2.0	0.424	4.1	LOS A	1.9	13.5	0.36	0.40	0.36	55.4
Approach		518	2.0	545	2.0	0.424	3.6	LOS A	1.9	13.5	0.36	0.40	0.36	57.3
East: New Road (E)														
4	L2	5	2.0	5	2.0	0.061	10.8	LOS B	0.3	2.3	0.64	0.61	0.64	48.9
5	T1	4	2.0	4	2.0	0.061	4.4	LOS A	0.3	2.3	0.64	0.61	0.64	48.1
6	R2	40	2.0	42	2.0	0.061	5.4	LOS A	0.3	2.3	0.64	0.61	0.64	46.7
Approach		49	2.0	52	2.0	0.061	5.9	LOS A	0.3	2.3	0.64	0.61	0.64	47.0
North: Route 101 (N)														
7u	U	121	2.0	127	2.0	0.745	11.8	LOS B	8.5	60.7	0.20	0.38	0.20	59.4
7	L2	80	2.0	84	2.0	0.745	9.4	LOS A	8.5	60.7	0.20	0.38	0.20	57.7
8	T1	863	2.0	908	2.0	0.745	2.7	LOS A	8.5	60.7	0.20	0.38	0.20	57.3
9	R2	107	2.0	113	2.0	0.745	3.4	LOS A	8.5	60.7	0.20	0.38	0.20	55.4
Approach		1171	2.0	1233	2.0	0.745	4.2	LOS A	8.5	60.7	0.20	0.38	0.20	57.3
West: Crown Ave														
10	L2	52	2.0	55	2.0	0.104	15.2	LOS B	0.6	4.6	0.81	0.81	0.81	44.3
11	T1	4	2.0	4	2.0	0.104	8.8	LOS A	0.6	4.6	0.81	0.81	0.81	43.6
12	R2	5	2.0	5	2.0	0.104	9.8	LOS A	0.6	4.6	0.81	0.81	0.81	42.5
Approach		61	2.0	64	2.0	0.104	14.4	LOS B	0.6	4.6	0.81	0.81	0.81	44.1
All Vehicles		1799	2.0	1894	2.0	0.745	4.4	LOS A	8.5	60.7	0.28	0.41	0.28	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.