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GBC Residential Enclave

TRAFFIC IMPACT BRIEF

Dunn Capital Corporation

File 122017 | July 31, 2023

Document Control

File:

122017

Date:

July 31, 2023

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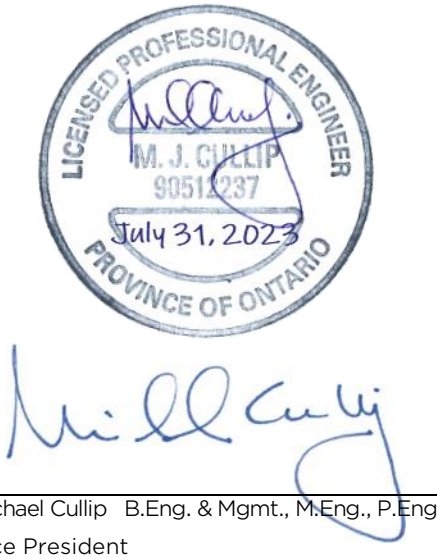	
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Issue	Date	Description
1	November 21, 2022	For Draft Plan Approval
2	July 31, 2023	For Draft Plan Approval

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1 Introduction

Tatham Engineering Limited has been retained by Dunn Capital Corporation to prepare a Traffic Impact Brief in support of the GBC Residential Enclave, a proposed residential development within the Georgian Bay Club, in the Town of The Blue Mountains. The location of the development site is illustrated in Figure 1.

The purpose of this study is to review the proposed development from a transportation perspective, addressing site traffic volumes, on-site circulation, parking requirements and potential impacts to the adjacent road system. Recognizing that the trip generation associated with the proposed expansion will not be significant, the scope of the study has been limited to a traffic brief with a focus on the following:

- existing conditions, including a description of the study area road network, traffic volumes, operations and planned/proposed improvements;
- details of the proposed development and anticipated trip generation;
- on-site circulation and parking provision; and
- transportation impacts associated with the proposed development.

An initial traffic impact brief was issued in November 2022. This updated brief reflects the most current development plan (some lot lines were revised slightly, but otherwise the unit count remains unchanged).

2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

The road network to be addressed by this study consists of Grey Road 40, 7th Line and Club Drive.

2.1.1 Road Sections

Mapping and photographs of the road network are provided in Figure 2 with further details provided below.

Grey Road 40

Key elements/characteristics of Grey Road 40 are as follows:

- under the jurisdiction of Grey County and designated a County Arterial as per the County's *Official Plan*[1];
- oriented east-west through the study area;
- 1 travel lane per direction with paved shoulders on both sides and a rural cross-section;
- posted speed limit of 60 km/h from Highway 26 to approximately 60 metres west of 7th Line; 80 km/h otherwise;
- relatively straight horizontal alignment with vertical curves on either side of 7th Line; and
- assumed planning capacity of 900 vehicles per hour per lane (vphpl) reflective of its arterial road designation.

7th Line

7th Line has the following characteristics:

- under the jurisdiction of the Town of The Blue Mountains and designated a local road under the Town's *Official Plan*[2];
- oriented north-south, terminating at Grey Road 40;

[1] *Recolour Grey, County of Grey Official Plan*. Effective June 7, 2019.
[2] *Town of The Blue Mountains Official Plan*. June 2016.

- 1 travel lane per direction with a rural cross-section with a paved road surface and gravel shoulders from Grey Road 40 to 55 metres south of Club Drive, beyond which it is a gravel road;
- assumed speed limit of 50 km/h as not otherwise posted (while rural roads are often considered 80 km/h unless otherwise posted, given the location within the fringe of the Town's urban area and recognizing that the immediate section of Grey Road 40 has a 60 km/h speed limit, the lower limit has been assumed);
- relatively straight horizontal alignment with slight vertical relief between Club Drive and Grey Road 40; and
- assumed planning capacity of 400 vphpl reflective of its local road status.

Club Drive

Club Drive has the following characteristics:

- private road as part of the Georgian Bay Club, providing access to the golf course and The Private Residences at the Georgian Bay Club;
- oriented east-west through the study area;
- 1 travel lane per direction with a rural cross-section and paved surface; and
- assumed speed limit of 50 km/h (albeit travel speeds are likely less given the private nature of the road).

2.1.2 Intersections

The study area intersections are illustrated in Figure 3 and detailed below.

Grey Road 40 & 7th Line

The intersection of Grey Road 40 with 7th Line is a 3-leg intersection, having the following lane arrangement:

- the south approach (7th Line) has a single shared left-right lane operating under stop control;
- the west approach (Grey Road 40) has a shared through-right lane; and
- the east approach (Grey Road 40) has a shared left-through lane.

7th Line & Club Drive

The intersection of 7th Line with Club Drive is also a 3-leg intersection, configured as follows:

- the east approach (Club Drive) has a single shared left-right lane operating under stop control;
- the south approach (7th Line) has a shared through-right lane; and
- the north approach (7th Line) has a shared left-through lane.

2.2 TRAFFIC VOLUMES

2.2.1 Traffic Counts

Traffic counts were completed by Tatham Engineering at the subject intersections on Tuesday October 4, 2022 (PM period) and Wednesday October 5, 2022 (AM period). Given the time of year, the traffic volumes are considered reflective of typical conditions. The resulting peak hour volumes are illustrated in Figure 4 with the corresponding count data provided in Appendix A.

2.2.2 Factors & Adjustments

Peak Season

Given that the traffic counts completed for this study were undertaken in October, consideration has been given to adjustments to reflect peak season conditions given the recreational nature of the area. A summary of MTO published traffic for the section of Highway 26 from Grey Road 19 to the Thornbury east limits (which encompasses the intersection with Grey Road 40) is provided in Table 1 for the most current 5 year period (latest published data is from 2019), considering Average Annual Daily Traffic (AADT), Summer Average Annual Traffic (SADT) and Winter Average Daily Traffic (WADT).

Table 1: Highway 26 Traffic Volumes – MTO Traffic Counts

YEAR	AADT	SADT	WADT	SADT / AADT	SADT / WADT
2014	8700	10300	7400	1.18	1.39
2015	9100	10700	7750	1.18	1.38
2016	9250	10900	7900	1.18	1.38
2017	9400	10900	8450	1.16	1.29
2018	9500	11000	8450	1.16	1.30
2019	9650	11700	8200	1.21	1.43
Average				**1.18**	**1.36**

As noted, the summer volumes are approximately 20% greater than the average conditions along the highway, and 35% greater than the winter volumes.

Georgian Bay Golf Club

Recognizing that the traffic counts were completed in early October, when golf activity at the Georgian Bay Club is not likely at its peak, additional golf traffic has been considered. Traffic volumes to be generated by the golf course under typical operations have been estimated considering the course size (18 holes) and trip generation rates reported in the *ITE Trip Generation Manual 11th Edition* [3]. The associated trip rates and estimates are provided in Table 2.

Table 2: Trip Generation - Georgian Bay Golf Club

TRIP ELEMENT	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
Golf course trip rates	trips/hole	1.39	0.37	1.76	1.54	1.37	2.91
Golf course trips	18 holes	25	7	32	28	25	53

It is acknowledged that some golf activity is captured in the traffic counts and thus the above trips were reduced by 50% to reflect such. The resulting trips were subsequently assigned to 7th Line and through its intersection with Grey Road 40 in consideration of travel patterns/demands evident through the traffic counts, the results of which are illustrated in Figure 5. While it is expected that some trips will remain within the Georgian Bay Club development (ie. between the residence and the golf club) and hence will not increase traffic volumes on the external road system, all volumes have been allocated to maintain a conservative approach.

2023 Conditions

To reflect 2023 conditions, an annual growth rate of 2% has been assumed along Grey Road 40 and 7th Line, and 0% along Club Drive (as detailed in Section 4.2.1).

2.2.3 2023 Traffic Volumes

The resulting 2023 traffic volumes are illustrated in Figure 6 premised on:

- the October 2022 traffic counts;

[3] *ITE Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers, 2021.

- a seasonal factor of 1.2 applied to volumes on Grey Road 40 (no adjustments were made to 7th Line given its local nature);
- consideration for additional golf course traffic;
- consideration for 2% annual growth on Grey Road 40 and 7th Line to 2023 (no growth on Clud Drive); and
- a minimum of 5 vehicles per movement.

2.3 TRAFFIC OPERATIONS

The assessment of existing conditions provides the baseline from which the future traffic volumes and operations can be assessed.

2.3.1 Intersection Operations

As intersections are typically the bottleneck of the road system, their operations are considered more critical and thus are the focus of the review. The intersection analyses consider:

- the 2023 traffic volumes;
- the existing intersection configurations and controls; and
- procedures outlined in the *2000 Highway Capacity Manual*[4] (using Synchro v.11 software).

For unsignalized intersections, the review considers the the following metrics for the critical, stop controlled movements/approaches:

- average delay (measured in seconds);
- level of service (LOS) - level of service 'A' corresponds to the best operating condition with minimal delays whereas level of service 'F' corresponds to poor operations resulting from high intersection delays (level of service definitions are provided in Appendix B); and
- volume to capacity (v/c) ratios - a v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while v/c of 1.0 indicates capacity has been reached.

A summary of the 2023 intersection analyses is provided in Table 3; corresponding detailed operational worksheets are included in Appendix C.

[4] *Highway Capacity Manual*. Transportation Research Board, Washington DC, 2000.

Table 3: Intersection Operations – 2023

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Grey Road 40 & 7th Line	NB LR	stop	9	A	0.05	10	A	0.07
7th Line & Club Drive	WB LR	stop	9	A	0.02	9	A	0.05

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right

Based on the existing volumes, intersection configurations and controls, the study area intersections provide excellent levels of service (LOS A) during both peak hours. As such, no intersection improvements are required to support the existing conditions.

2.3.2 Road Operations

Further to the intersection operations, consideration has also been given to the operations of Grey Road 40 considering the following:

- the peak hour peak directional traffic volumes (as per Figure 6);
- an assumed lane capacity of 900 vehicles per hour per lane (vphpl); and
- the provision of one through lane per direction.

The resulting road operations are summarized in Table 4. As noted, Grey Road 40 is currently operating at 16% or less of its assumed planning capacity and thus there is significant reserve capacity to accommodate additional growth.

Table 4: Road Operations – 2023

ROAD SECTION & CAPACITY		PEAK TRAFFIC VOLUMES		PEAK V/C RATIOS	
		WB	EB	WB	EB
Grey Road 40 west of 7th Line	900 vphpl[1]	115	120	0.13	0.13
Grey Road 40 east of 7th Line	900 vphpl[1]	135	145	0.15	0.16

[1] Capacity is denoted as vehicles per hour per direction

2.4 ROAD NETWORK IMPROVEMENTS

As the subject intersections and road sections provide acceptable operations, no road system improvements are considered necessary to support the existing conditions.

3 Proposed Development

This section will provide additional details with respect to the proposed development, including its location, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

3.1 LOCATION & LAND-USE

The subject site is located within the Georgian Bay Club at 516689 7th Line in the Town of The Blue Mountains as per Figure 1. The property is bound by Club Drive and residential units (The Private Residences at the Georgian Bay Club) to the north, golf course lands to the east and south, and 7th Line to the west.

The proposed development will consist of 22 single detached residential units as per the development plan provided in Figure 7. Full build-out is assumed by 2025.

3.2 ACCESS

3.2.1 Location & Configuration

The site will be served by a 6.0 metre wide private road (accommodating 2-way traffic) with direct access to Club Drive opposite the existing road access to the private residences (thereby creating a 4-leg intersection), which is located approximately 250 metre east of 7th Line.

3.2.2 Sight Lines

To ensure appropriate manoeuvres to/from the new access road, the available sight lines along Club Drive have been reviewed in consideration of the Transportation Association of Canada geometric road design standards for minimum stopping sight distance (which provides sufficient distance for an approaching motorist to observe a hazard in the road and bring their vehicle to a complete stop prior to the hazard). The following standards are application:

- 65 metres for a design speed of 50 km/h; and
- 85 metres for a design speed of 60 km/h.

Given the existing configuration and alignment of Club Drive, and its intersection with the private residence access to which the new access will be connected, appropriate sight lines will be provided to satisfy the above noted TAC standards.

3.3 CIRCULATION

3.3.1 Vehicle Circulation

As per the development plan, there will be a cul-de-sac at the end of the access road, and a bulb at the internal corner to better facilitate the required residential frontages (ie. provide more lot frontage along the road). Both road features will have a 15 metre radii (measured to the outside edge of the road) and thus can readily accommodate the circulatory needs of appropriate design vehicles (passenger cars, fire trucks, waste collection, etc.); Figure 8 illustrates the turning path of a fire truck.

3.3.2 Pedestrian & Bicycle Circulation

Pedestrian and cyclist travel within the site will be accommodated via the internal private road given the limited volumes that will be served (ie. separate sidewalk and/or trail facilities will not be provided and are not considered necessary).

3.4 PARKING

As per the Town of the Blue Mountains Zoning By-law 2018-65, a single detached residential unit must provide 2 parking spaces per unit. Each residential unit will be provided with a minimum of 2 parking spaces considering driveway and garage accommodations. In this regard, the proposed parking supply exceeds the overall Town requirements.

3.5 TRAFFIC

3.5.1 Trip Generation

The number of vehicle trips to be generated by the proposed development for the weekday AM and PM peak hours has been determined based on type of use, development size, and trip generation rates as per the *ITE Trip Generation Manual, 11th Edition*. Based on the proposed development, trip rates for the following ITE land use category have been employed:

- *single family detached* - ITE code 210.

The associated trip rates and trip estimates are provided in Table 5. As indicated, the proposed development is expected to generate 15 trips during the AM peak hour and 21 trips during the PM peak hour, both of which are considered minor.

Table 5: Trip Generation – GBC Enclave

LAND USE	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
single family detached homes	trips/unit	0.18	0.52	0.70	0.59	0.35	0.94
	22 units	4	11	15	13	8	21

3.5.2 Trip Distribution & Assignment

The distribution of the site traffic volumes reflects the proximity of the development site to the Town of The Blue Mountains to the west and the Town of Collingwood to the east, and travel patterns evident in the traffic counts. It is assumed that all residential travel related to the GBC Enclave will be oriented to/from Grey Road 40 and Highway 26 beyond, recognizing that 7th Line is a gravel rural road to the south of the Georgian Bay Club with limited connectivity. The resulting assumed distribution is as follows:

- 25% to/from the west via Grey Road 40;
- 75% to/from the east via Grey Road 40 (to/from Highway26 and areas beyond); and
- 0% to/from the south via 7th Line (thus maximizing volumes to/from Grey Road 40).

The resulting GBC Enclave site traffic assigned to the road network is illustrated in Figure 9.

4 Future Conditions

This chapter will address the resulting impacts of the proposed development on the adjacent road system. The following areas are to be addressed:

- operations at the study area road system and site access; and
- potential improvements to the study area road network, if necessary.

For the purpose of this study, 2025 and 2030 horizons have been considered to assess the impact of the development on the road network - 2025 represents the assumed full build-out of the site, whereas 2030 reflects a further 5-year horizon.

4.1 ROAD NETWORK

No changes to the immediate study area road system are anticipated and thus the road system as described in Section 2.1.

4.2 TRAFFIC VOLUMES

Traffic volumes expected for the 2025 and 2030 horizon years have been determined based on the existing traffic volumes, historical and projected growth, and consideration for development specific traffic volumes, including the GBC Enclave development.

4.2.1 Background Growth

Population Growth

Based on the Census data for the years 2011 and 2021, the population of the Town of The Blue Mountains increased from 6,453 to 9,390 persons, which translates to an annual growth of 3.8%.

As per the Grey County *Growth Management Strategy Update*[5], the Town's population projections are 8,320 in 2031, 8,660 in 2036 and 8,910 in 2041, all of which are less than the 2021 census. In considering the basis for the projections (2016 population level), an annual growth rate of approximately 1.0% was employed.

The *Highway 26 Transportation Study* also noted that seasonal residential units within the Town of The Blue Mountains are expected to increase from 2,680 units in 2006 to 5,515 units in 2031, realizing an annual growth of 4.9%

[5] *Growth Management Strategy Update*, Hemson Consulting Ltd. December 15, 2015.

Traffic Growth

Historical AADT and SADT volumes on Highway 26 between Grey Road 19 and the Thornbury east limits were reviewed as reported by MTO for the period 2014 to 2019 (the most current 5-year published period) and summarized in Table 6. The resulting annual growth rate for the 5-year period is in the order of 2.1 to 2.6%.

Table 6: Historical Traffic Volumes

ROAD SECTION		ANNUAL TRAFFIC VOLUME						ANNUAL GROWTH
		2011	2012	2013	2014	2015	2016	
Highway 26 Grey Road 19 to Thornbury East Limit	AADT	8,700	9,100	9,250	9,400	9,500	9,650	2.1%
	SADT	10,300	10,700	10,900	10,900	11,000	11,700	2.6%

Other Studies

The *Highway 26 Transportation Study*[6] provides future travel demand forecasts for Highway 26 extending from east of Stayner to west of Thornbury. Through Thornbury, a 2.0% annual growth is anticipated over the period 2010 through to 2035.

Overall Background Growth

In consideration of the noted growth levels in traffic volumes, a 2% annual growth rate has been assumed on Grey Road 40 and 7th Line; 0% growth has been applied to Club Drive given its private nature and recognizing additional consideration will be given to GBC development. While this is slightly lower than the historical growth rates exhibited on Highway 26, the highway is expected to experience greater growth given its regional nature.

4.2.2 Development Growth

Several area developments have been identified that are expected to increase traffic volumes through the study area, as detailed below and illustrated in Figure 10.

The Private Residences at the Georgian Bay Club

The Private Residences at the Georgian Bay Club consist of 56 semi-detached residential units located immediately opposite the GBC Enclave site on the north side of Club Drive. This

[6] *Highway 26 Transportation Study, Needs Assessment Report Volume 1: Main Report*. AECOM, May 2015 (Revised October 2015).

development has been approved and at the time of the traffic counts, 18 of the 56 units were complete and occupied (and hence captured in the traffic counts). Traffic volumes associated with the remaining 38 units have been established and assigned to the road network following the same methodology as employed for the GBC Enclave, a summary of which is provided in Table 7 with additional details provided in Figure 11.

Table 7: Trip Generation – The Private Residences at the Georgian Bay Club

LAND USE	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
single family detached homes	trips/unit	0.18	0.52	0.70	0.59	0.35	0.94
	38 units	7	20	27	23	13	36

Bayside

The Bayside development (also known as Clarksbury/Georgian Glen) is a residential development comprised of 54 residential units located on the north side of Grey Road 40 extending from 7th Line to the rail trail. Access will be provided via Tekiah Road (opposite Indian Circle). The development is currently under construction and thus any complete and occupied units have been reflected in the traffic counts. For the remaining units, given its location, most traffic is expected to be oriented to/from Highway 26 to the east and thus the Bayside development is not expected to contribute significant volumes through the study area.

4.2.3 2025 & 2030 Traffic Volumes

The total traffic volumes for the 2025 and 2030 horizons are provided in Figure 12 and Figure 13 respectively, premised on the following:

- 2023 traffic volumes as per Figure 6 (reflective of peak summer conditions);
- 2% annual growth on Grey Road 40 and 7th Line (0% growth on Club Drive);
- The Private Residences at the Georgian Bay Club remaining traffic as per Figure 11; and
- GBC Enclave traffic as per Figure 9.

4.3 TRAFFIC OPERATIONS

4.3.1 Intersection Operations

The subject intersections were reassessed for the 2025 and 2030 conditions, the results of which are summarized in Table 8 with detailed worksheets provided in Appendix D. As noted, both

intersections will continue to provide excellent levels of service and thus no intersection improvements are required to support the future conditions (and hence no improvements are required to support the proposed GBC Enclave development).

Table 8: Intersection Operations – 2025 & 2030

INTERSECTION, MOVEMENT & CONTROL				WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
				Delay	LOS	V/C	Delay	LOS	V/C
2025	Grey Road 40 & 7th Line	NB LR	stop	10	A	0.09	10	A	0.10
	7th Line & Club Drive	WB LR	stop	9	A	0.05	9	A	0.07
2030	Grey Road 40 & 7th Line	NB LR	stop	10	A	0.10	10	B	0.10
	7th Line & Club Drive	WB LR	stop	9	A	0.05	9	A	0.07

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right

4.3.2 Road Operations

The operations of Grey Road 40 were again investigated considering the 2025 and 2030 traffic volumes, a summary of which is provided in Table 9. As noted, the projected volumes will remain well below the assumed planning capacity of the road (operating levels of 20% or less), indicating that the projected volumes can be readily accommodated.

Table 9: Road Operations – 2025 & 2030

ROAD SECTION & CAPACITY			PEAK TRAFFIC VOLUMES		PEAK V/C RATIOS	
			WB	EB	WB	EB
2025	Grey Road 40 west of 7th Line	900 vphpl[1]	125	130	0.14	0.14
	Grey Road 40 east of 7th Line	900 vphpl[1]	165	165	0.18	0.18
2030	Grey Road 40 west of 7th Line	900 vphpl[1]	135	140	0.15	0.16
	Grey Road 40 east of 7th Line	900 vphpl[1]	180	175	0.20	0.19

[1] Capacity is denoted as vehicles per hour per direction

4.4 ROAD NETWORK IMPROVEMENTS

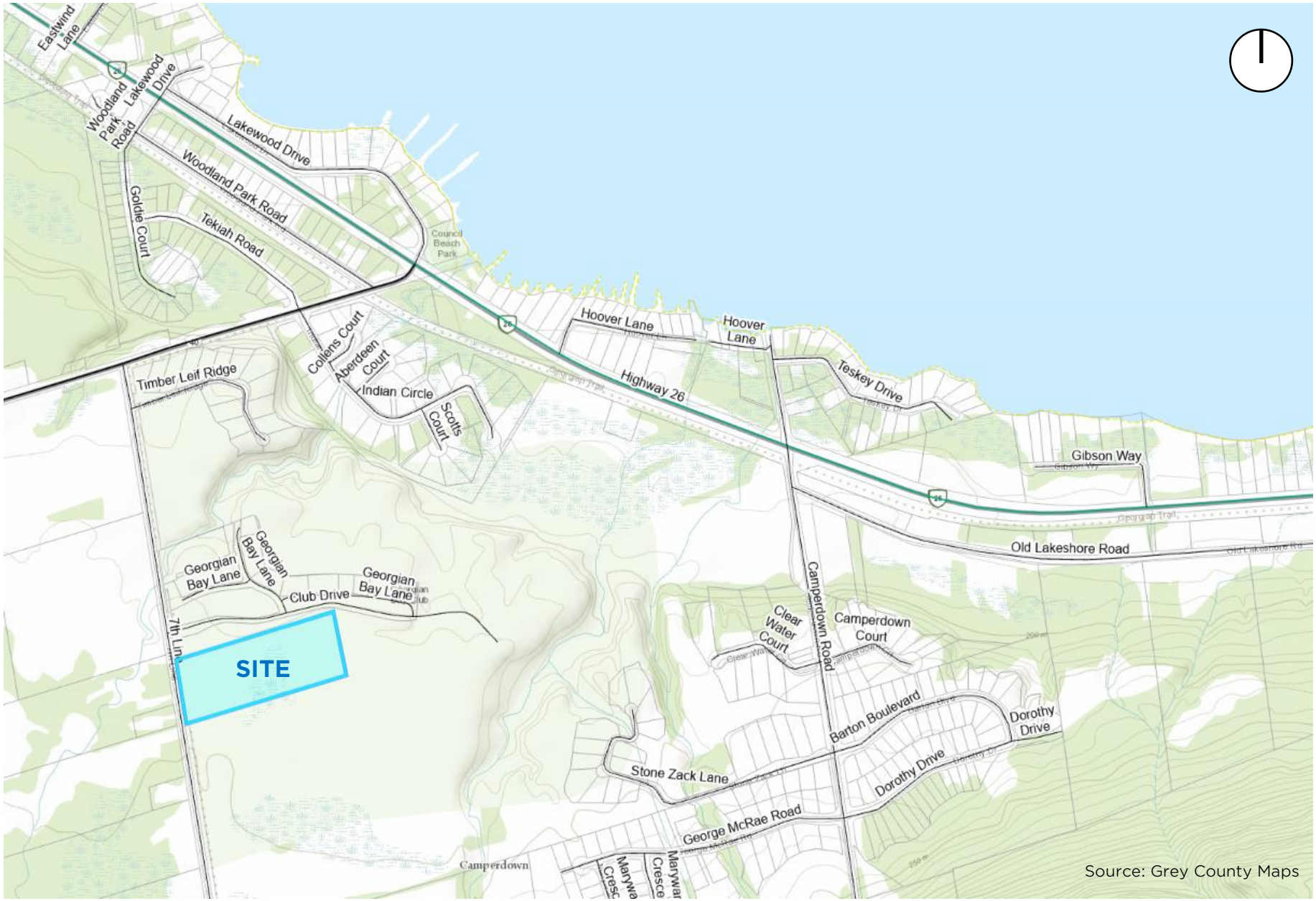
As the subject intersections and road sections will continue to provide acceptable operations following completion of the subject development, no road system improvements are considered necessary to support the existing conditions. Notwithstanding, the need for exclusive turn lanes on 7th Line at Club Drive have been considered, with the following findings.

- Right turn lanes are generally warranted where right turn volumes exceed 60 vehicles per hour and/or impede through traffic. In considering this threshold and the projected right turn volumes (to be minimal), a northbound right turn lane on 7th Line at Club Drive is not required.
- The need for left turn lanes is based on the volume of left turns, the advancing volumes (same direction as the left turns), the opposing volumes and the design speed. As the projected southbound left turn volumes and the opposing northbound through volumes are relatively low, a left turn lane on 7th Line to at Club Drive is not required.

5 Summary

Given the limited traffic volume to be generated by the development of the GBC Enclave site and in considering the traffic volumes on the road system, such will not have any significant impacts to the operations of 7th Line or Grey Road 40 (or Highway 26 for that matter). The operational assessment of the study area intersections indicate that they will experience excellent levels of service and minimal traffic delays through the 2030 horizon. Likewise, the traffic volumes on Grey Road 40 will remain well below the available road capacity. Therefore no improvements are required to accommodate the future traffic volumes and support the proposed GBC Enclave development.

Internally, the proposed road system is consistent with that of the Georgian Bay Club development (ie. 6.0 metre private roads) and will provide appropriate service to the residents and accommodate the necessary design vehicles (eg. emergency and service vehicles). The access road will be located opposite Georgian Bay Lane (the access road to The Private Residences), creating a 4-leg intersection with Club Drive. Given the reduced traffic volumes and travel speeds, coupled with the road and intersection configuration, adequate operations will be provided.

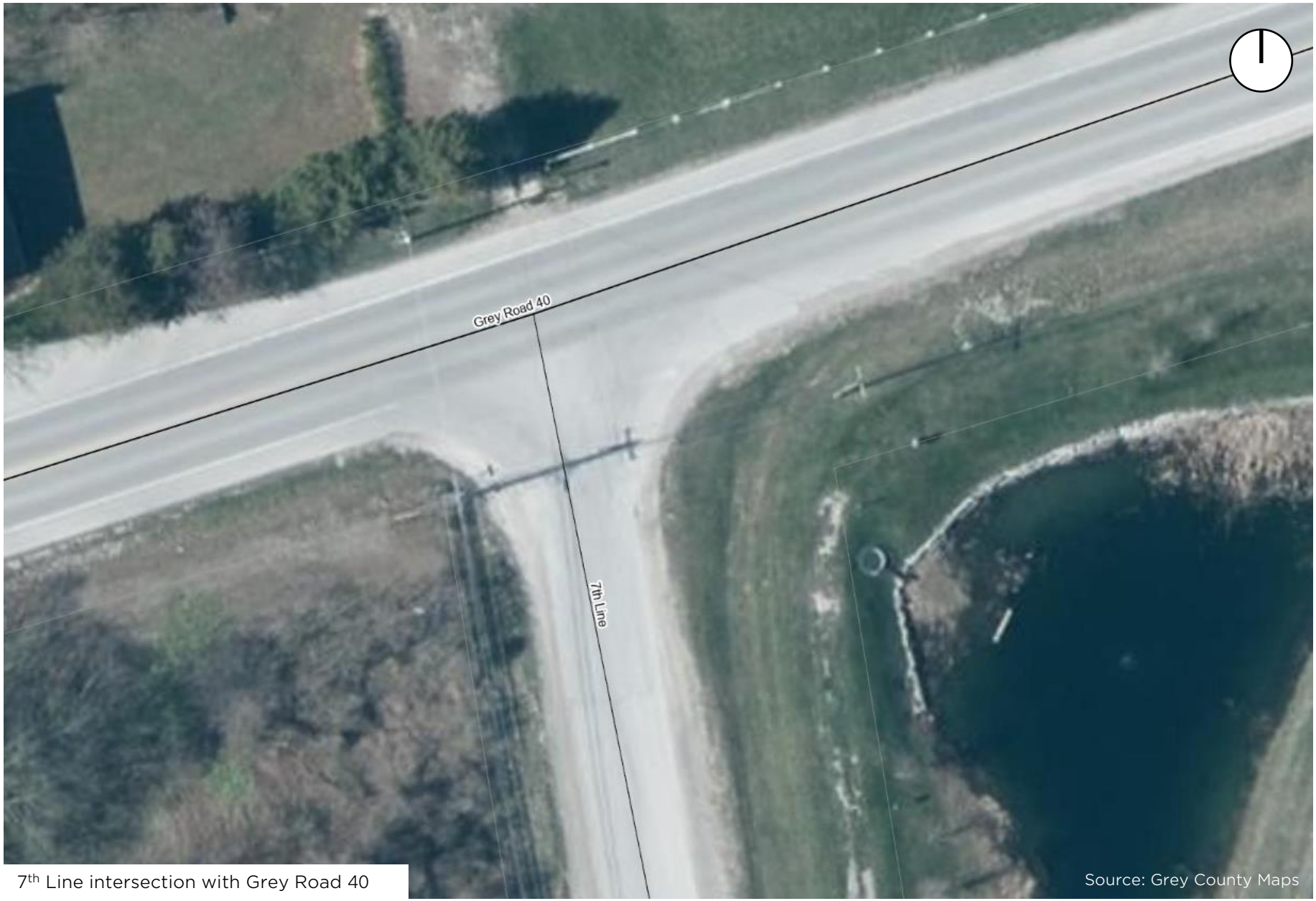


GBC RESIDENTIAL ENCLAVE

Figure 1: Site Location

GBC RESIDENTIAL ENCLAVE

Figure 2: Area Roads



7th Line intersection with Grey Road 40

Source: Grey County Maps

GBC RESIDENTIAL ENCLAVE

Figure 3A: Area Intersections

↑ Looking east along Grey Road 40 at 7th Line

↓ Looking west along Grey Road 40 at 7th Line

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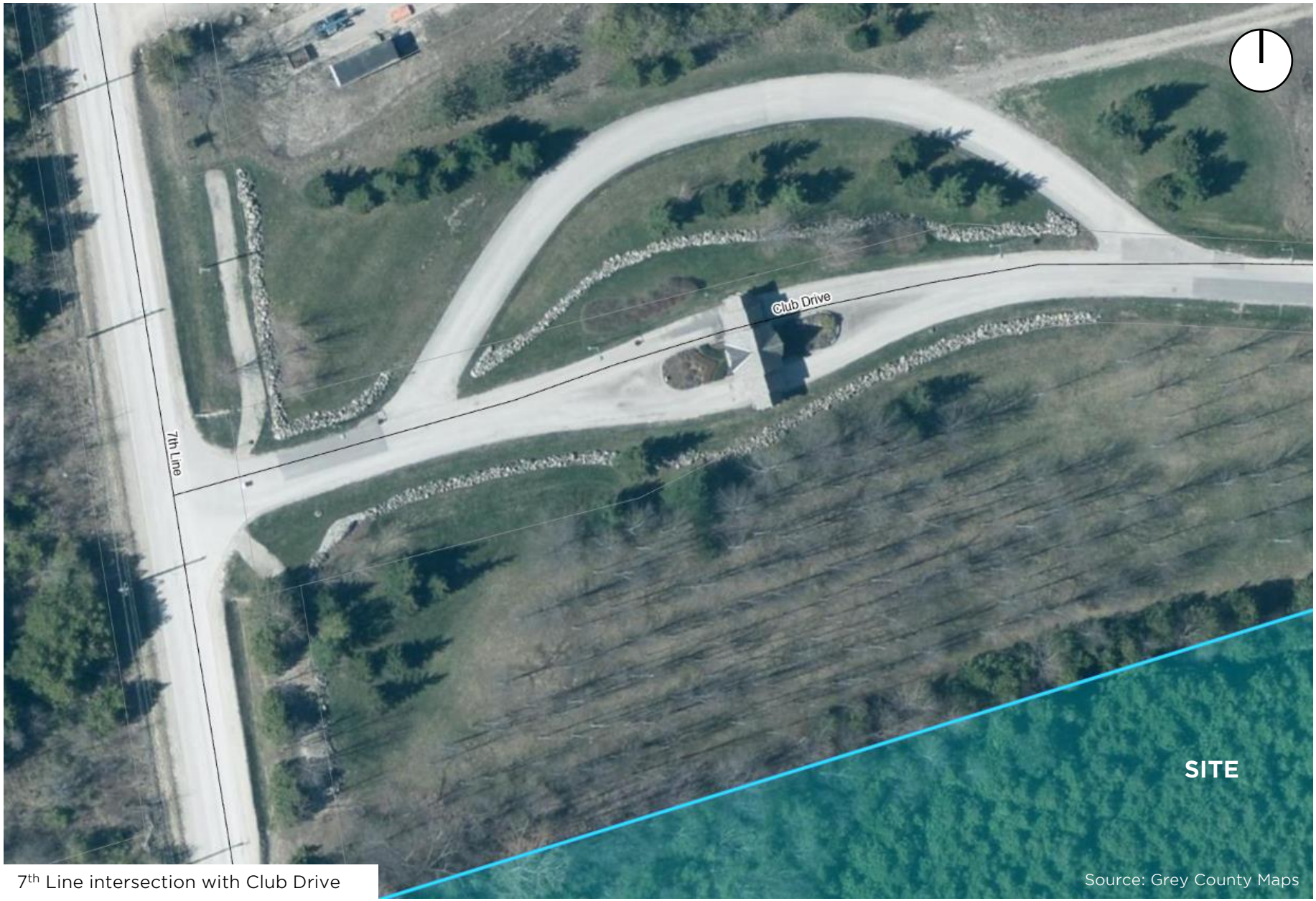
Figure 3B: Area Intersections



7th Line intersection with Club Drive

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Figure 3C: Area Intersections

↑ Looking north along 7th Line from Club Drive

↓ Looking south along 7th Line from Club Drive

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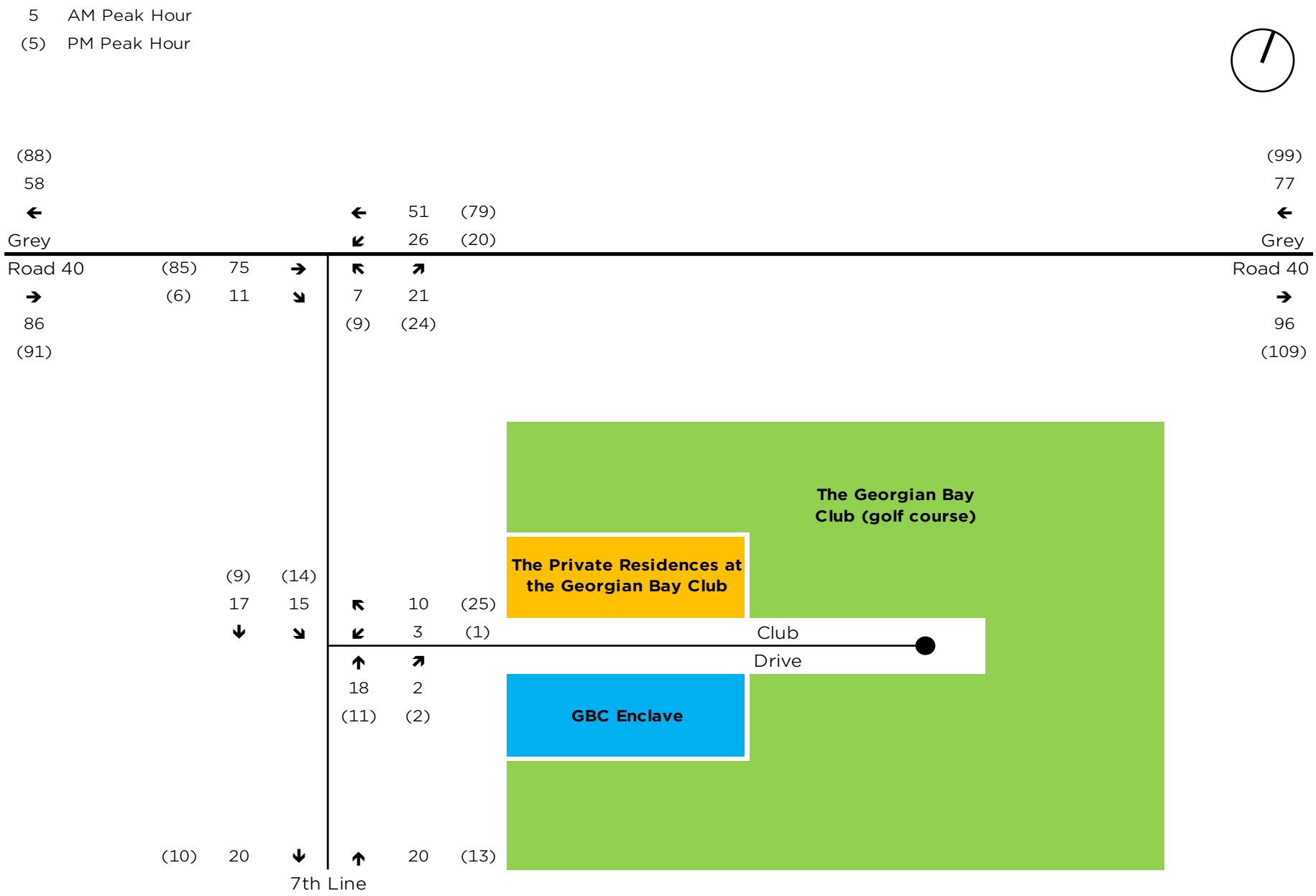
Figure 3D: Area Intersections



GBC RESIDENTIAL ENCLAVE

Figure 4: Traffic Volumes – 2022 Counts

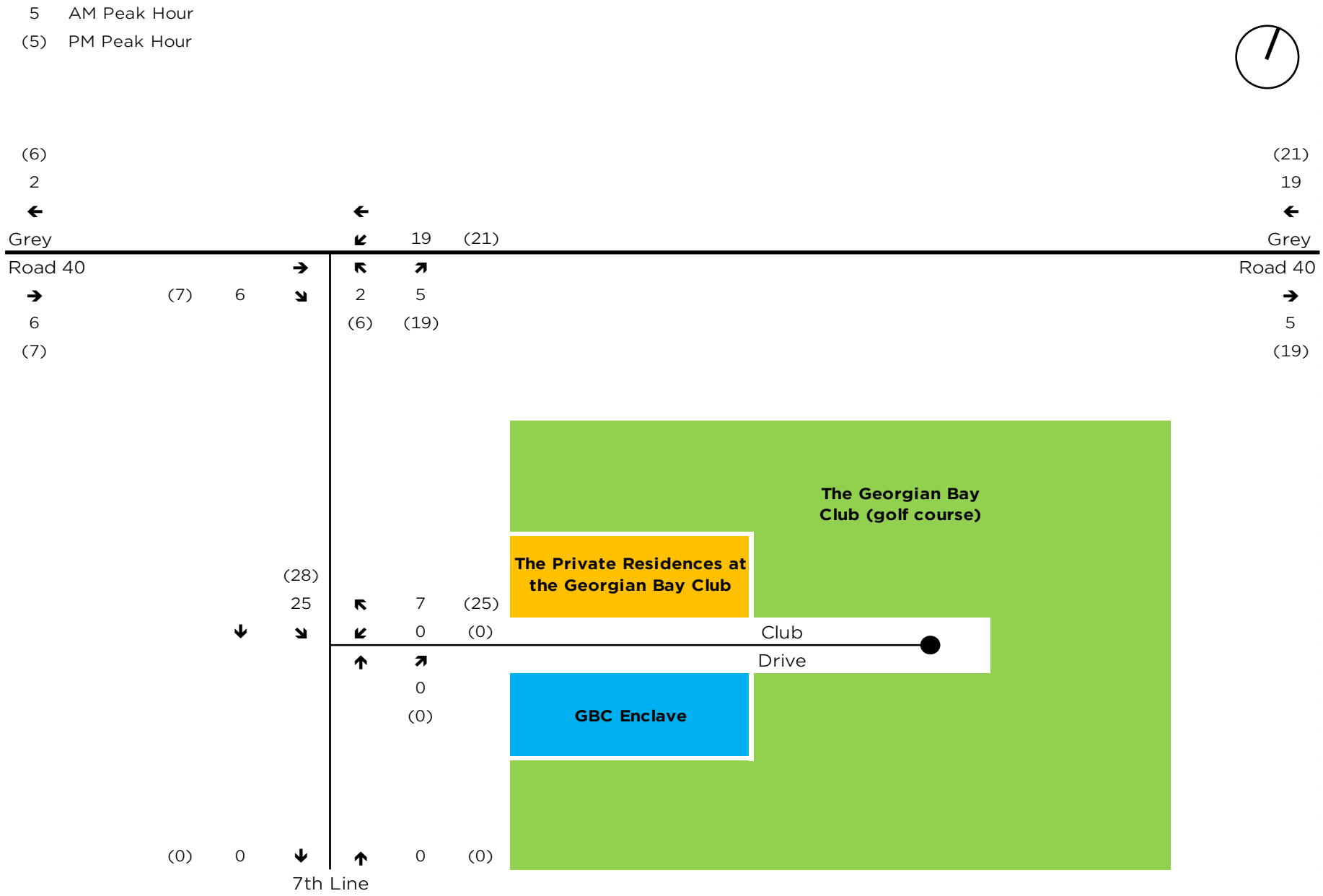


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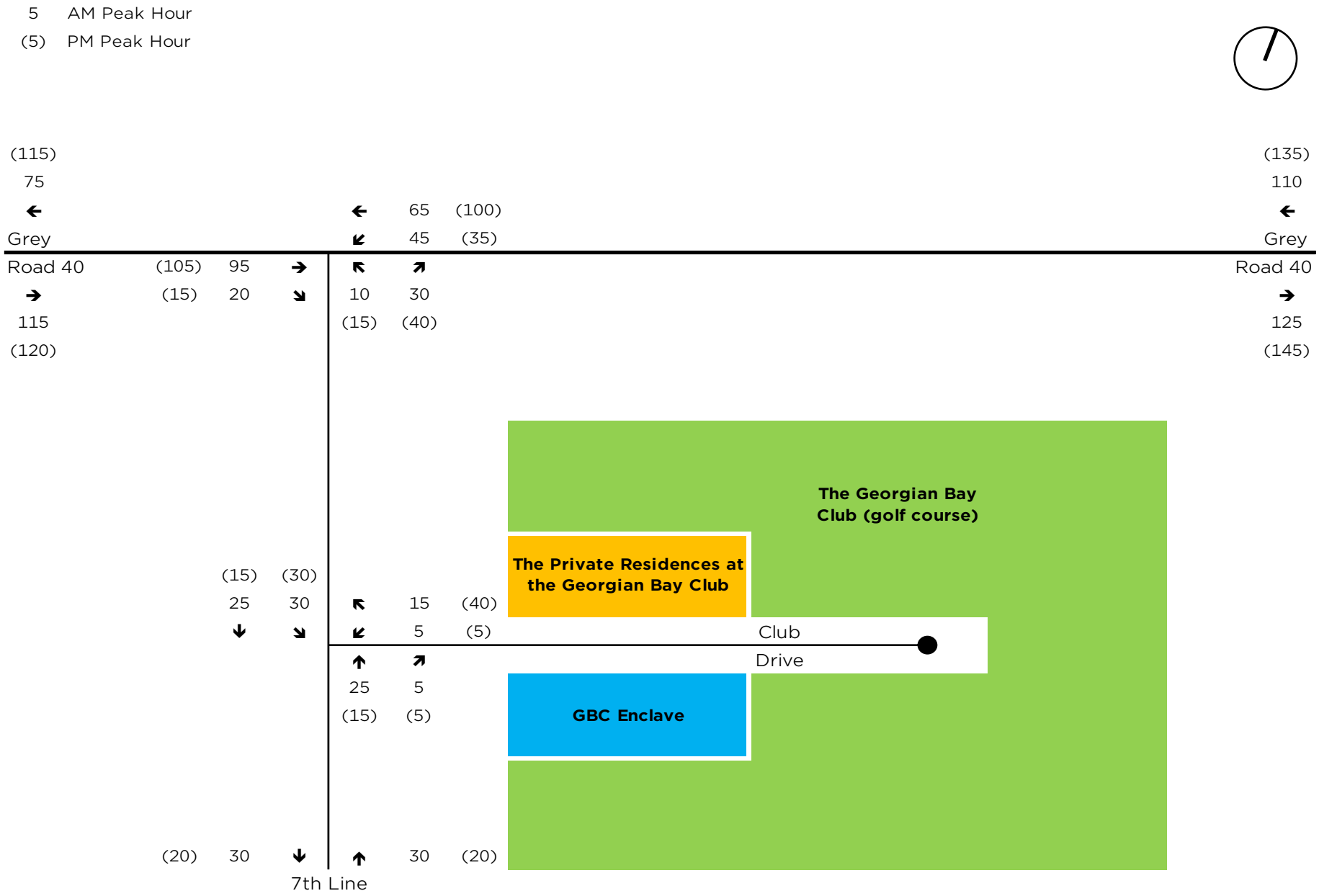
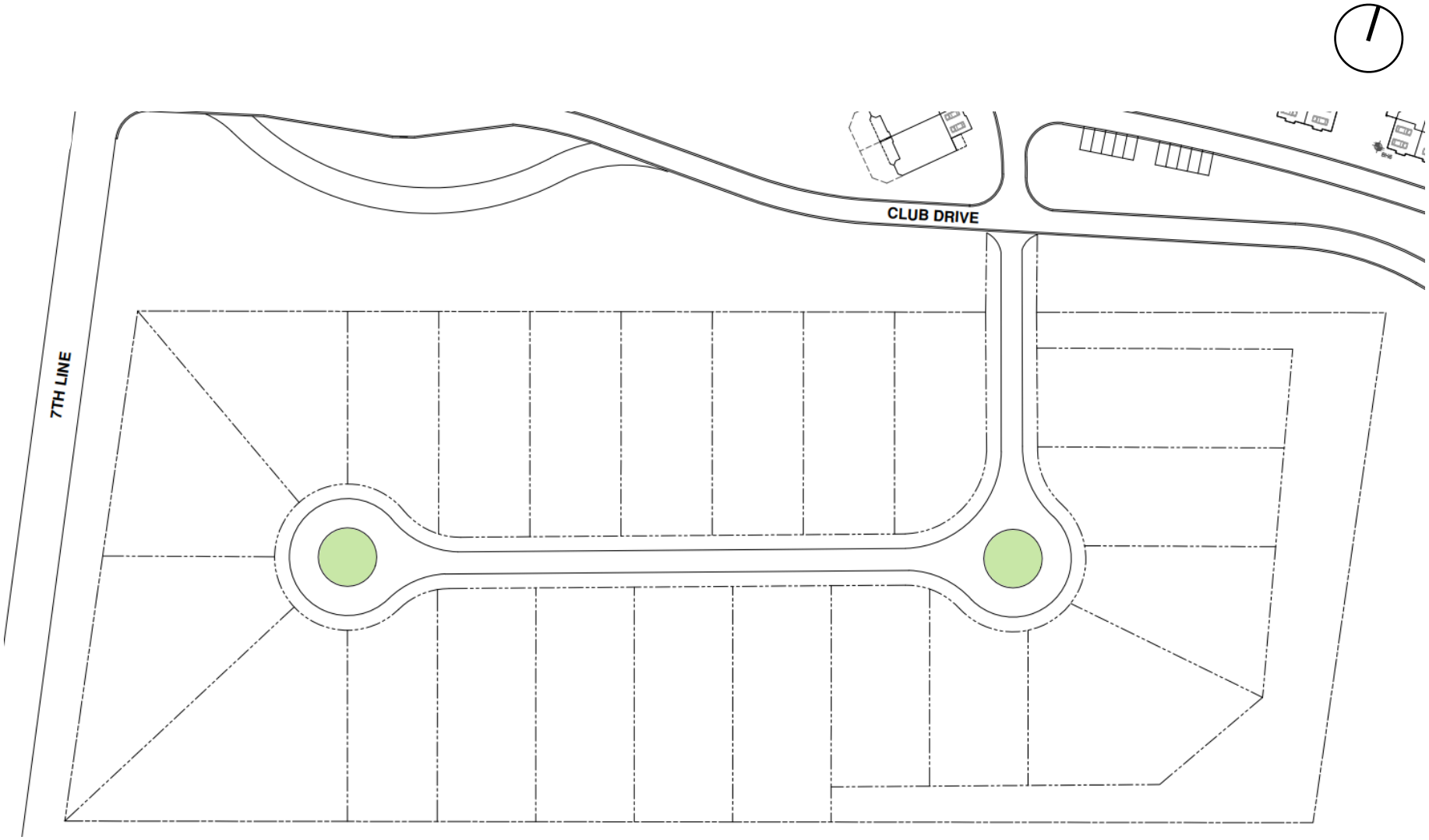
Figure 5: Traffic Volumes – Additional Golf Course Trips



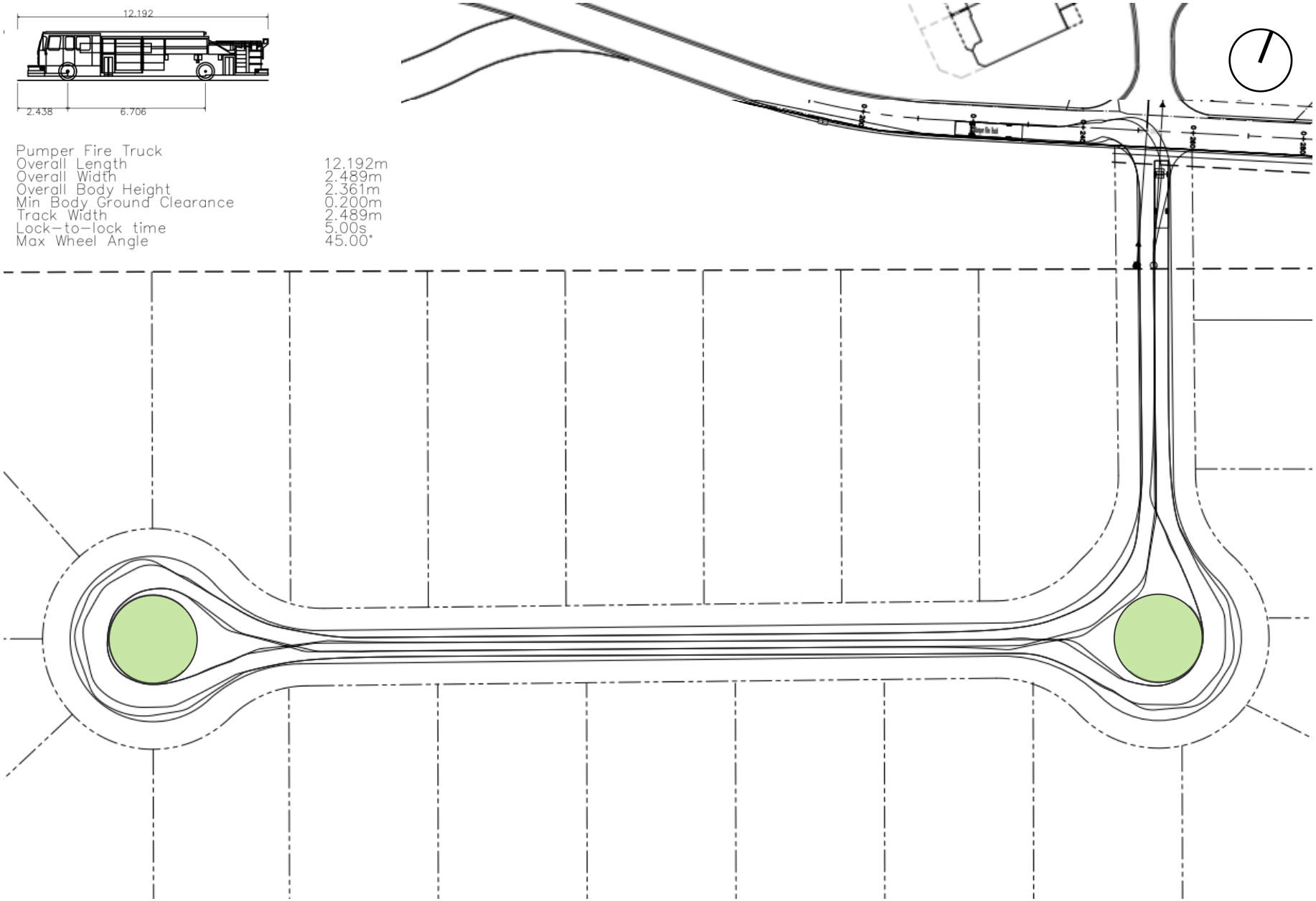
GBC RESIDENTIAL ENCLAVE

Figure 6: Traffic Volumes – 2023 Adjusted



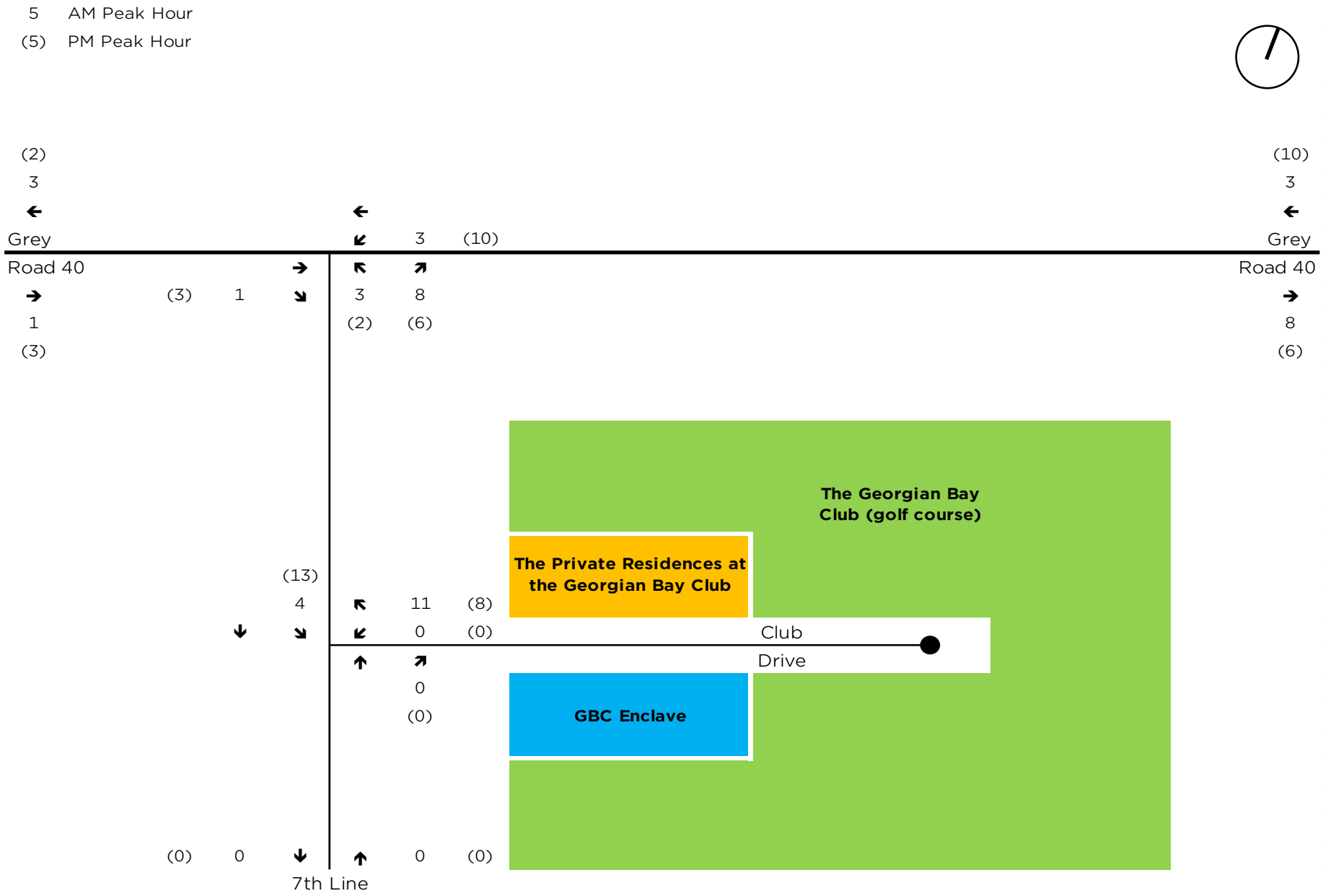
GBC RESIDENTIAL ENCLAVE

Figure 7: Development Plan



GBC RESIDENTIAL ENCLAVE

Figure 8: Site Circulation – Fire Truck

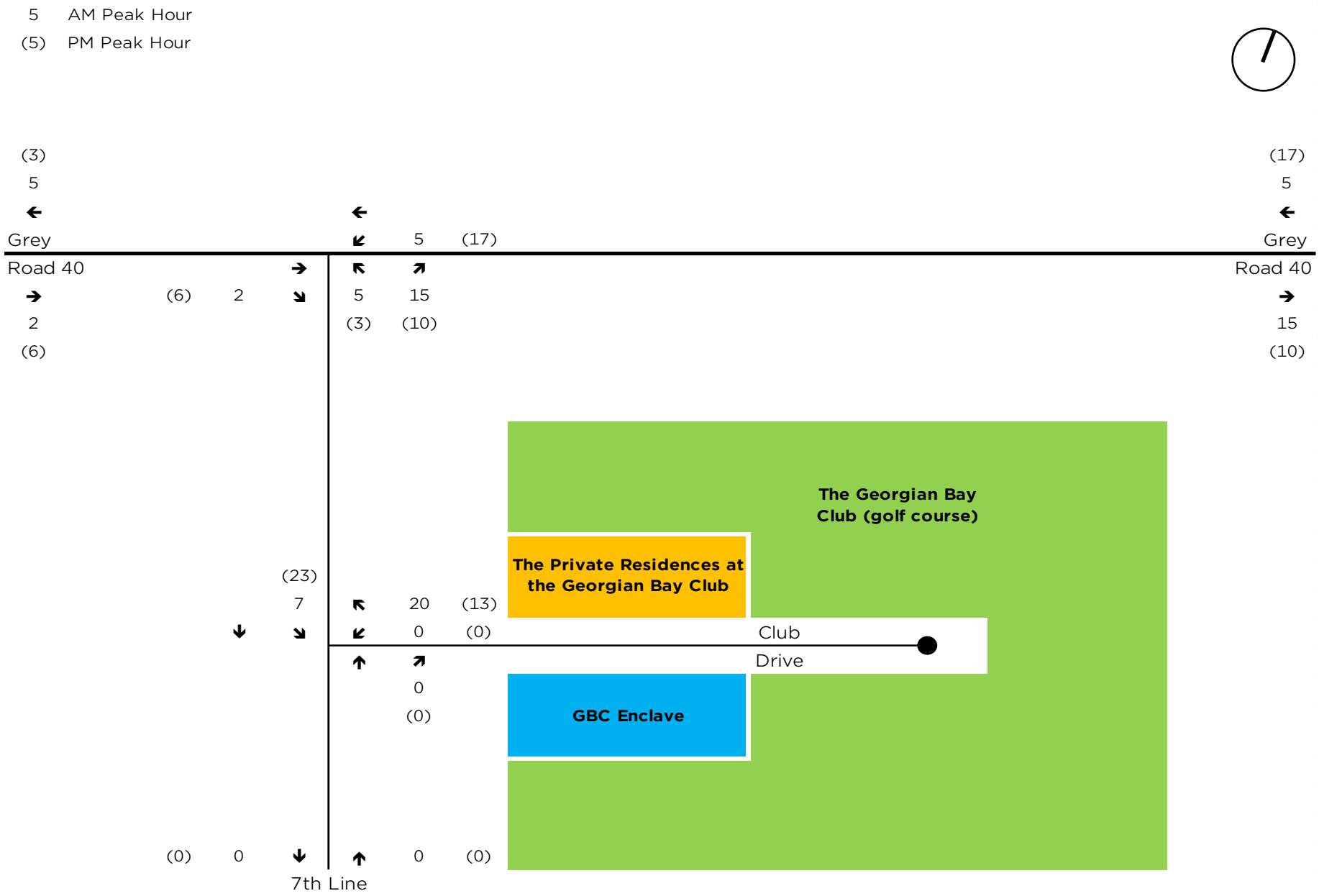


GBC RESIDENTIAL ENCLAVE

Figure 9: Traffic Volumes – GBC Enclave

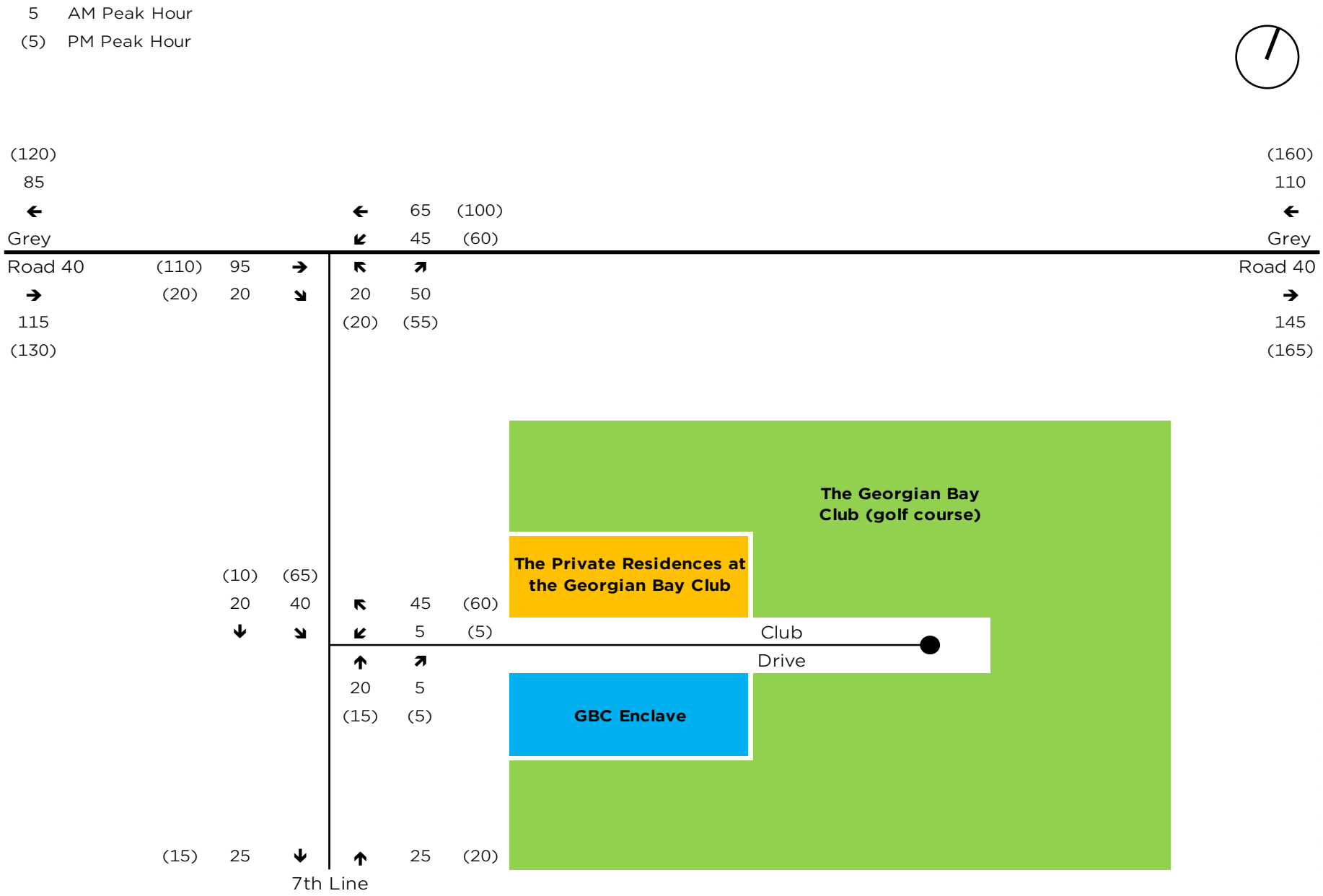
GBC RESIDENTIAL ENCLAVE

Figure 10: Background Developments



GBC RESIDENTIAL ENCLAVE

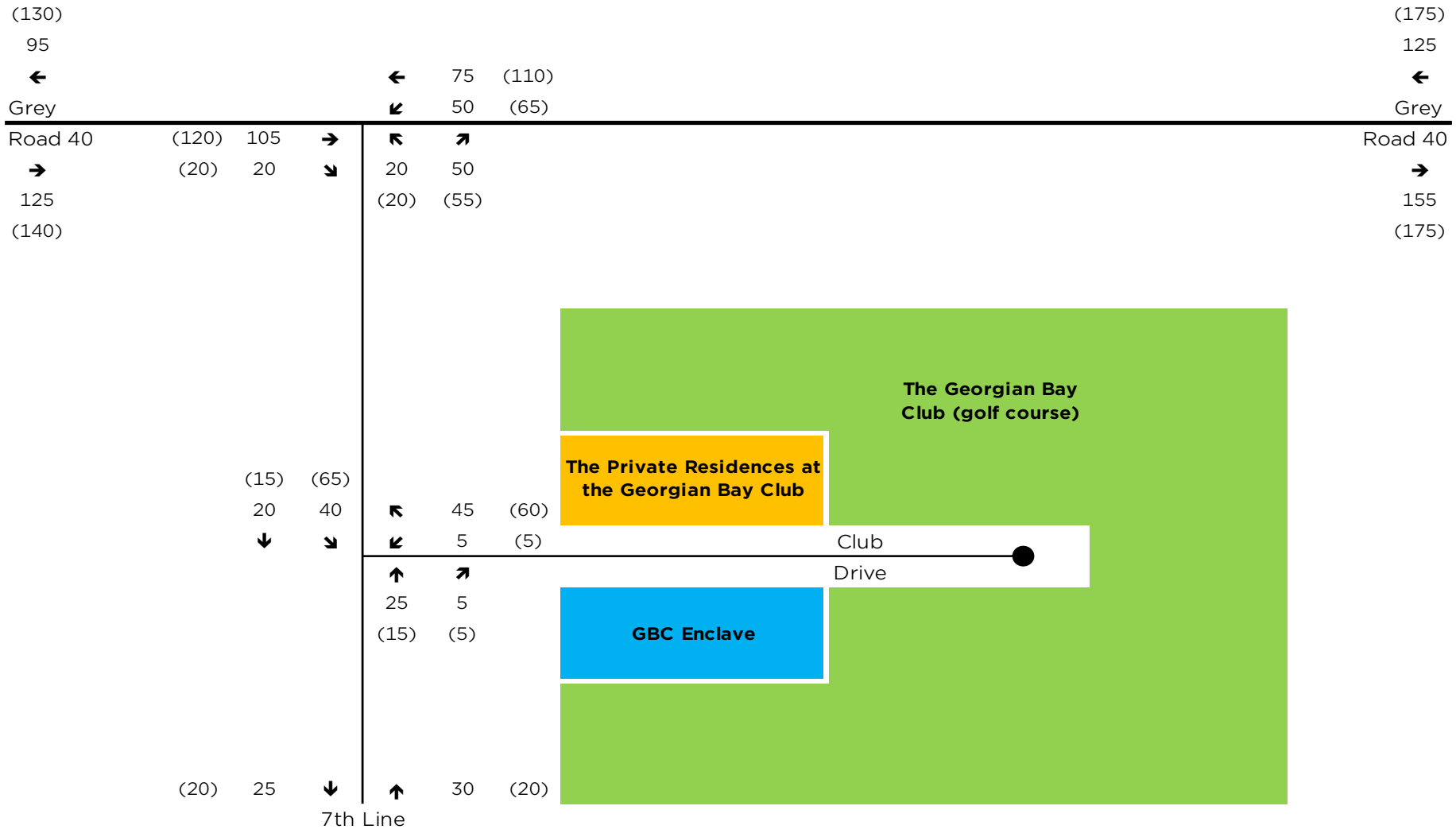
Figure 11: Traffic Volumes – The Private Residences at the Georgian Bay Club



GBC RESIDENTIAL ENCLAVE

Figure 20: Traffic Volumes - 2025

5 AM Peak Hour
(5) PM Peak Hour



GBC RESIDENTIAL ENCLAVE

Figure 13: Traffic Volumes - 2030

Appendix A:
Traffic Counts

TATHAM ENGINEERING

INTERSECTION COUNT
AM PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Hunter Yovanovich	Jurisdiction/Date	TOBM	Oct 4/5, 2022
Weather Conditions	Sunny, 7-17◦C	Major Street	7th Line	N-S
Project Name	GBC Enclave	Minor Street	Club Drive	E-W
Project Number	122017	Intersection Control	stop control on minor street	

Additional Comments: Started Count at 16:02. Construction was noted to be in the area of 6th Line

NORTH LEG	
Total Vehicles	60
% Trucks Entering	15.6%
Vehicles Entering	32
Pedestrians	0
Ped Crossing	↔

7th Line

TOTAL	17	15
Heavy Trucks	0	0
Light Trucks	5	0
Autos	12	15

28	TOTAL
1	Heavy Trucks
6	Light Trucks
21	Autos

EAST LEG	
Total Vehicles	30
% Trucks Entering	7.7%
Vehicles Entering	13
Pedestrians	0
Ped Crossing	↕

Autos	Light Trucks	Heavy Trucks	TOTAL
9	0	1	10
3	0	0	3

Club Drive

NORTH

17	0	0	17
Autos	Light Trucks	Heavy Trucks	TOTAL

Autos	15
Light Trucks	5
Heavy Trucks	0
TOTAL	20

12	2	Autos
6	0	Light Trucks
0	0	Heavy Trucks
18	2	TOTAL

7th Line

WEST LEG	
Ped Crossing	↕
Pedestrians	0
Vehicles Entering	0
% Trucks Entering	-
Total Vehicles	0

SOUTH LEG	
Ped Crossing	↔
Pedestrians	0
Vehicles Entering	20
% Trucks Entering	30.0%
Total Vehicles	40

9:00 to **10:00**

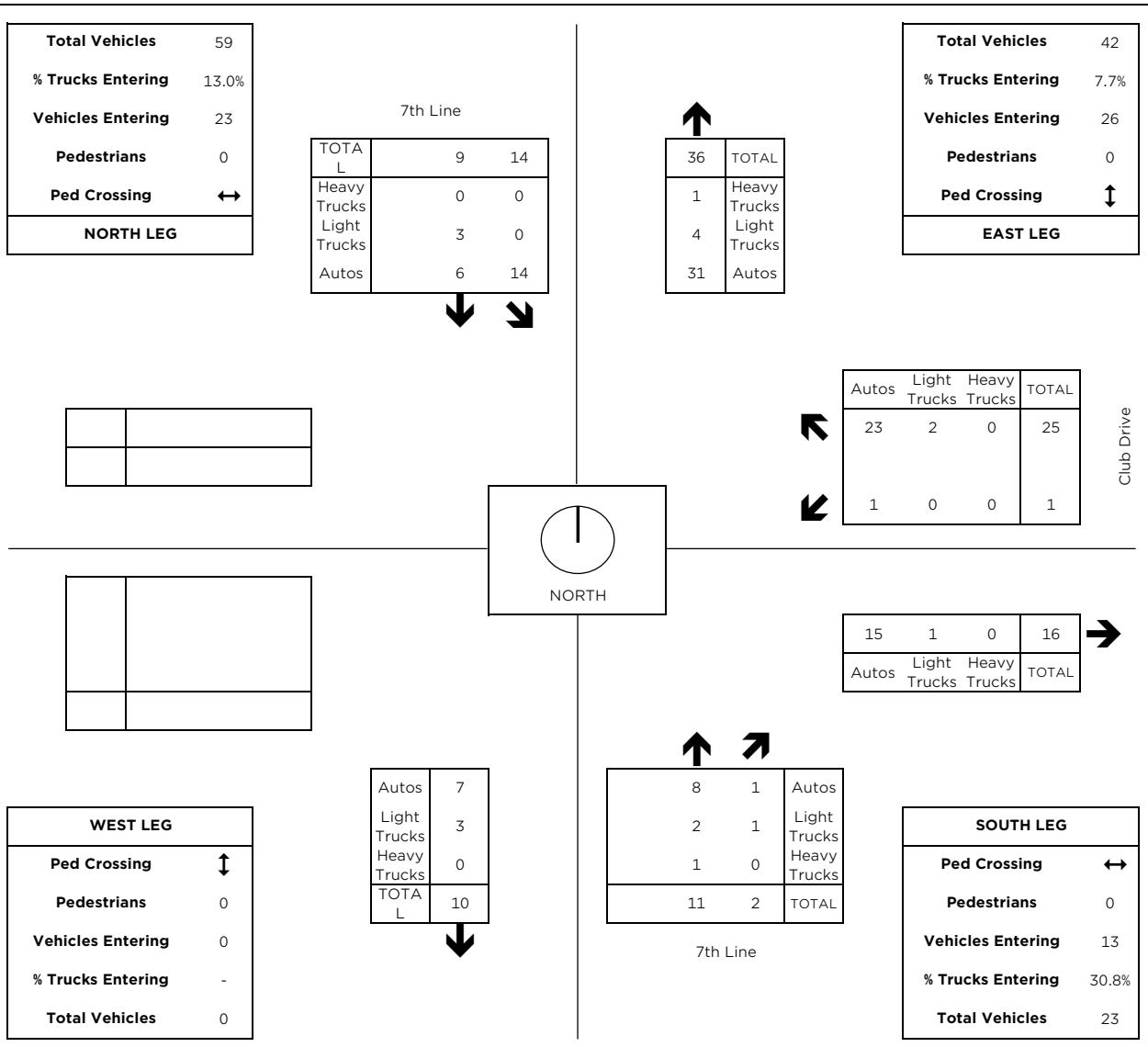
TATHAM ENGINEERING

INTERSECTION COUNT
PM PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Hunter Yovanovich	Jurisdiction/Date	TOBM	Oct 4/5, 2022
Weather Conditions	Sunny, 7-17◦C	Major Street	7th Line	N-S
Project Name	GBC Enclave	Minor Street	Club Drive	E-W
Project Number	122017	Intersection Control	stop control on minor street	

Additional Comments: Started Count at 16:02. Construction was noted to be in the area of 6th Line



16:15 to **17:15**

TATHAM ENGINEERING

INTERSECTION COUNT
AM PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Hunter Yovanovich	Jurisdiction/Date	TOBM	Oct 4/5, 2022
Weather Conditions	Sunny, 7-17◦C	Major Street	Grey Road 40	E-W
Project Name	GBC Enclave	Minor Street	7th Line	N-S
Project Number	122017	Intersection Control	stop control on minor street	

Additional Comments: Construction was noted to be in the area of 6th Line

NORTH LEG	
Total Vehicles	0
% Trucks Entering	-
Vehicles Entering	0
Pedestrians	0
Ped Crossing	↔

EAST LEG	
Total Vehicles	166
% Trucks Entering	22.1%
Vehicles Entering	77
Pedestrians	2
Ped Crossing	↕

TOTAL	Heavy Trucks	Light Trucks	Autos
54	3	4	47

Autos	Light Trucks	Heavy Trucks	TOTAL
44	4	3	51
16	9	1	26

Grey Road 40

NORTH

Grey Road 40

75	2	6	67
11	0	0	11
TOTAL	Heavy Trucks	Light Trucks	Autos

76	10	3	89
Autos	Light Trucks	Heavy Trucks	TOTAL

Autos	27
Light Trucks	9
Heavy Trucks	1
TOTAL	37

3	9	Autos
0	4	Light Trucks
0	1	Heavy Trucks
3	14	TOTAL

7th Line

WEST LEG	
Ped Crossing	↕
Pedestrians	0
Vehicles Entering	86
% Trucks Entering	9.3%
Total Vehicles	140

SOUTH LEG	
Ped Crossing	↔
Pedestrians	0
Vehicles Entering	17
% Trucks Entering	29.4%
Total Vehicles	54

8:15 to **9:15**

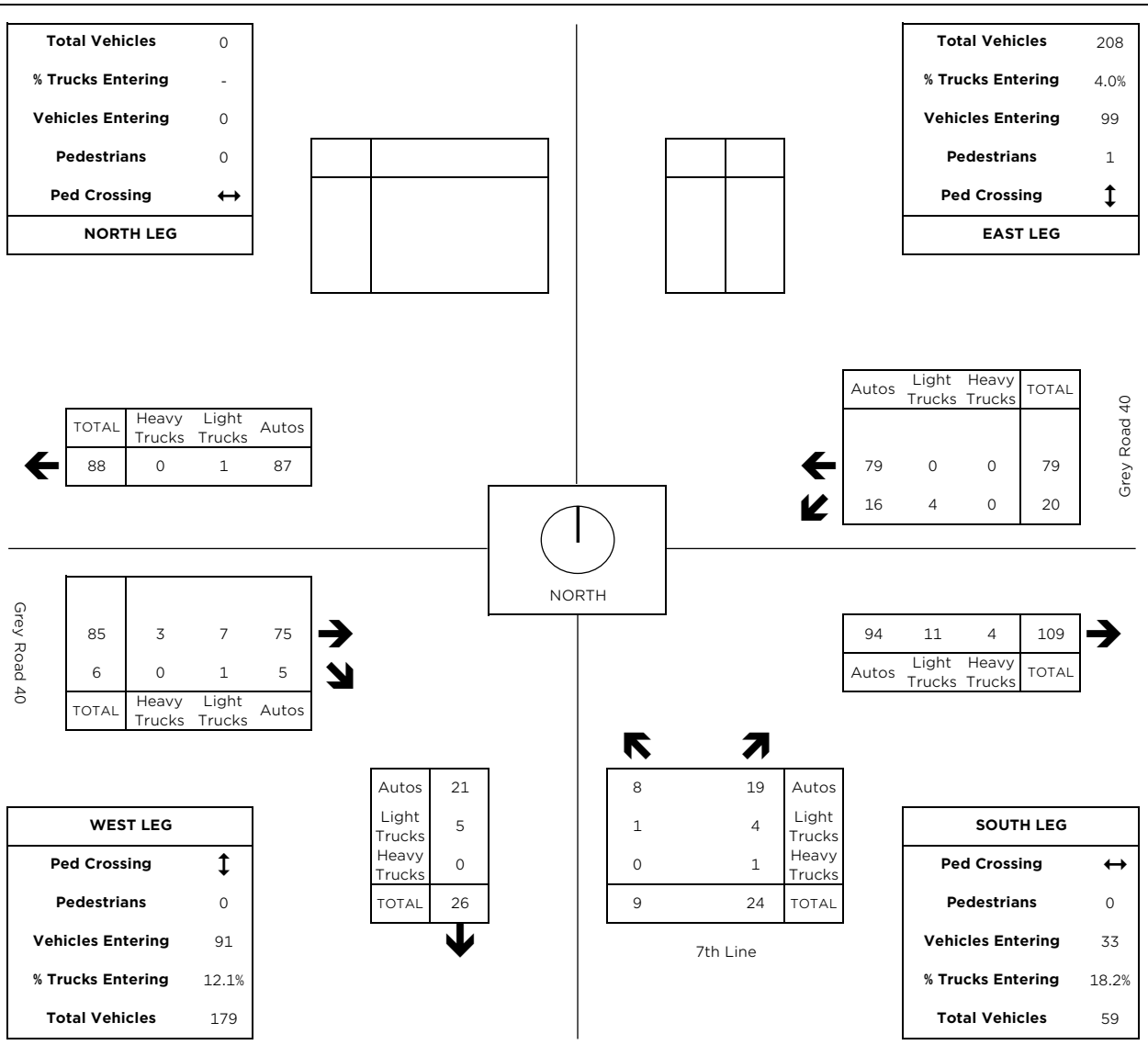
TATHAM ENGINEERING

INTERSECTION COUNT
PM PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Hunter Yovanovich	Jurisdiction/Date	TOBM	Oct 4/5, 2022
Weather Conditions	Sunny, 7-17◦C	Major Street	Grey Road 40	E-W
Project Name	GBC Enclave	Minor Street	7th Line	N-S
Project Number	122017	Intersection Control	stop control on minor street	

Additional Comments: Construction was noted to be in the area of 6th Line



16:15 to **17:15**

Appendix B:
Level of Service Definitions

TATHAM ENGINEERING

Level of Service - Unsignalized Intersections

Level of Service (LOS) for unsignalized intersections is defined in terms of control delay for each critical lane. Control delay include initial deceleration, queue move-up time, stopped delay, and final acceleration delay, and is a function of the service rate or capacity of the approach and degree of saturation.

The following table describes in detail the characteristics of each level:

LOS	Description of Traffic Operations	Delay (sec/veh)
A	Little or no delays	$0 < d \leq 10$
B	Short traffic delays	$10 < d \leq 15$
C	Average traffic delays	$15 < d \leq 25$
D	Long traffic delays	$25 < d \leq 35$
E	Very long traffic delays	$35 < d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$d > 50$

source: 2010 Highway Capacity Manual

TATHAM ENGINEERING

Level of Service - Signalized Intersections

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Only the portion of total delay attributed to the control facility is quantified. This control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay.

The following table describes in detail the characteristics of each level:

LOS	Description of Traffic Operations	Delay (sec/veh)
A	Describes operations with very low control delay, up to 10 seconds/ vehicle. This level of service occurs when progression is extremely favourable and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short cycle lengths may also contribute to low delay.	$d \leq 10$
B	Describes operations with control delay greater than 10 seconds and up to 20 seconds/vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop at this level than at LOS A, causing longer average delays.	$10 < d \leq 20$
C	Describes operations with control delay greater than 20 seconds and up to 35 seconds/vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	$20 < d \leq 35$
D	Describes operations with control delay greater than 35 seconds and up to 55 seconds/vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	$35 < d \leq 55$
E	Describes operations with control delay greater than 55 seconds and up to 80 seconds/vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	$55 < d \leq 80$
F	LOS F describes operations with control delay in excess of 80 seconds/vehicle. This oversaturation, considered to be unacceptable to most drivers, occurs when arrival flow rates exceed the design capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such high delay levels.	$d > 80$

source: 2010 Highway Capacity Manual

Appendix C:
Intersection Operations - 2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	95	20	45	65	10	30
Future Volume (Veh/h)	95	20	45	65	10	30
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	22	49	71	11	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			125		283	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			125		283	114
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	96
cM capacity (veh/h)			1462		683	939

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	125	120	44
Volume Left	0	49	11
Volume Right	22	0	33
cSH	1700	1462	858
Volume to Capacity	0.07	0.03	0.05
Queue Length 95th (ft)	0	3	4
Control Delay (s)	0.0	3.2	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	3.2	9.4
Approach LOS			A

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	15	25	5	30	25
Future Volume (Veh/h)	5	15	25	5	30	25
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	16	27	5	33	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	122	30			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	122	30			32	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			98	
cM capacity (veh/h)	854	1045			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	21	32	60
Volume Left	5	0	33
Volume Right	16	5	0
cSH	992	1700	1580
Volume to Capacity	0.02	0.02	0.02
Queue Length 95th (ft)	2	0	2
Control Delay (s)	8.7	0.0	4.1
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	4.1
Approach LOS	A		

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		19.6%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	105	15	35	100	15	40
Future Volume (Veh/h)	105	15	35	100	15	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	16	38	109	16	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			130		307	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			130		307	122
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	95
cM capacity (veh/h)			1455		667	929

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	130	147	59
Volume Left	0	38	16
Volume Right	16	0	43
cSH	1700	1455	840
Volume to Capacity	0.08	0.03	0.07
Queue Length 95th (ft)	0	2	6
Control Delay (s)	0.0	2.1	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	2.1	9.6
Approach LOS			A

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	40	15	5	30	15
Future Volume (Veh/h)	5	40	15	5	30	15
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	43	16	5	33	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	100	18			21	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	100	18			21	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	96			98	
cM capacity (veh/h)	880	1060			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	21	49
Volume Left	5	0	33
Volume Right	43	5	0
cSH	1038	1700	1595
Volume to Capacity	0.05	0.01	0.02
Queue Length 95th (ft)	4	0	2
Control Delay (s)	8.6	0.0	5.0
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	5.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D: Intersection Operations – 2025 & 2030

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	90	15	40	65	10	25
Future Volume (Veh/h)	90	15	40	65	10	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	16	43	71	11	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			114		263	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		263	106
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	97
cM capacity (veh/h)			1475		705	948

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	114	114	38
Volume Left	0	43	11
Volume Right	16	0	27
cSH	1700	1475	862
Volume to Capacity	0.07	0.03	0.04
Queue Length 95th (ft)	0	2	3
Control Delay (s)	0.0	3.0	9.4
Lane LOS		A	A
Approach Delay (s)	0.0	3.0	9.4
Approach LOS			A

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	15	20	5	30	20
Future Volume (Veh/h)	5	15	20	5	30	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	16	22	5	33	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	112	24			27	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112	24			27	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			98	
cM capacity (veh/h)	866	1052			1587	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	21	27	55
Volume Left	5	0	33
Volume Right	16	5	0
cSH	1001	1700	1587
Volume to Capacity	0.02	0.02	0.02
Queue Length 95th (ft)	2	0	2
Control Delay (s)	8.7	0.0	4.5
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	4.5
Approach LOS	A		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	105	10	35	95	15	35
Future Volume (Veh/h)	105	10	35	95	15	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	11	38	103	16	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			125		298	120
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			125		298	120
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		98	96
cM capacity (veh/h)			1462		675	932

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	125	141	54
Volume Left	0	38	16
Volume Right	11	0	38
cSH	1700	1462	837
Volume to Capacity	0.07	0.03	0.06
Queue Length 95th (ft)	0	2	5
Control Delay (s)	0.0	2.2	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	2.2	9.6
Approach LOS			A

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	40	15	5	30	10
Future Volume (Veh/h)	5	40	15	5	30	10
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	43	16	5	33	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	96	18			21	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	96	18			21	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	96			98	
cM capacity (veh/h)	885	1060			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	48	21	44
Volume Left	5	0	33
Volume Right	43	5	0
cSH	1039	1700	1595
Volume to Capacity	0.05	0.01	0.02
Queue Length 95th (ft)	4	0	2
Control Delay (s)	8.6	0.0	5.5
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	5.5
Approach LOS	A		

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D: Intersection Operations – 2025 & 2030

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	100	20	50	65	20	50
Future Volume (Veh/h)	100	20	50	65	20	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	22	54	71	22	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			131		299	120
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			131		299	120
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		97	94
cM capacity (veh/h)			1454		667	931

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	131	125	76
Volume Left	0	54	22
Volume Right	22	0	54
cSH	1700	1454	835
Volume to Capacity	0.08	0.04	0.09
Queue Length 95th (ft)	0	3	7
Control Delay (s)	0.0	3.4	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	3.4	9.7
Approach LOS			A

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	45	20	5	40	20
Future Volume (Veh/h)	5	45	20	5	40	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	49	22	5	43	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	132	24			27	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	132	24			27	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	95			97	
cM capacity (veh/h)	838	1052			1587	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	54	27	65
Volume Left	5	0	43
Volume Right	49	5	0
cSH	1028	1700	1587
Volume to Capacity	0.05	0.02	0.03
Queue Length 95th (ft)	4	0	2
Control Delay (s)	8.7	0.0	4.9
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	4.9
Approach LOS	A		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	110	20	60	105	20	55
Future Volume (Veh/h)	110	20	60	105	20	55
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	22	65	114	22	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			142		375	131
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			142		375	131
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		96	93
cM capacity (veh/h)			1441		598	919

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	142	179	82
Volume Left	0	65	22
Volume Right	22	0	60
cSH	1700	1441	803
Volume to Capacity	0.08	0.05	0.10
Queue Length 95th (ft)	0	4	8
Control Delay (s)	0.0	3.0	10.0
Lane LOS		A	A
Approach Delay (s)	0.0	3.0	10.0
Approach LOS			A

Intersection Summary			
Average Delay		3.4	
Intersection Capacity Utilization		30.3%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	15	5	65	10
Future Volume (Veh/h)	5	60	15	5	65	10
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	65	16	5	71	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	172	18			21	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	18			21	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	94			96	
cM capacity (veh/h)	782	1060			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	21	82
Volume Left	5	0	71
Volume Right	65	5	0
cSH	1034	1700	1595
Volume to Capacity	0.07	0.01	0.04
Queue Length 95th (ft)	5	0	3
Control Delay (s)	8.7	0.0	6.4
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	6.4
Approach LOS	A		

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	110	20	50	75	20	55
Future Volume (Veh/h)	110	20	50	75	20	55
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	22	54	82	22	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			142		321	131
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			142		321	131
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		97	93
cM capacity (veh/h)			1441		647	919

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	142	136	82
Volume Left	0	54	22
Volume Right	22	0	60
cSH	1700	1441	826
Volume to Capacity	0.08	0.04	0.10
Queue Length 95th (ft)	0	3	8
Control Delay (s)	0.0	3.2	9.8
Lane LOS		A	A
Approach Delay (s)	0.0	3.2	9.8
Approach LOS			A

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	28.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	45	25	5	40	20
Future Volume (Veh/h)	5	45	25	5	40	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	49	27	5	43	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	138	30			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	138	30			32	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	95			97	
cM capacity (veh/h)	832	1045			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	54	32	65
Volume Left	5	0	43
Volume Right	49	5	0
cSH	1021	1700	1580
Volume to Capacity	0.05	0.02	0.03
Queue Length 95th (ft)	4	0	2
Control Delay (s)	8.7	0.0	4.9
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	4.9
Approach LOS	A		

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	19.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	120	20	65	115	20	55
Future Volume (Veh/h)	120	20	65	115	20	55
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	22	71	125	22	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			152		408	141
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			152		408	141
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		96	93
cM capacity (veh/h)			1429		570	907

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	152	196	82
Volume Left	0	71	22
Volume Right	22	0	60
cSH	1700	1429	783
Volume to Capacity	0.09	0.05	0.10
Queue Length 95th (ft)	0	4	9
Control Delay (s)	0.0	3.0	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	3.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	15	5	65	15
Future Volume (Veh/h)	5	60	15	5	65	15
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	65	16	5	71	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	176	18			21	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	176	18			21	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	94			96	
cM capacity (veh/h)	777	1060			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	21	87
Volume Left	5	0	71
Volume Right	65	5	0
cSH	1033	1700	1595
Volume to Capacity	0.07	0.01	0.04
Queue Length 95th (ft)	5	0	3
Control Delay (s)	8.7	0.0	6.1
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	6.1
Approach LOS	A		

Intersection Summary			
Average Delay		6.4	
Intersection Capacity Utilization		21.7%	ICU Level of Service A
Analysis Period (min)		15	