



C.C. Tatham & Associates Ltd.
Consulting Engineers

CEDAR RUN WAKEBOARD CABLE PARK

Town of The Blue Mountains

Traffic Review

prepared by:

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prepared for

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TABLE OF CONTENTS

1	Introduction	1
1.1	Site Description	1
1.2	Objectives	1
2	Existing Conditions	2
2.1	Road Network	2
2.2	Traffic Volumes	2
2.3	Traffic Operations	3
3	Wakeboard Cable Park	4
3.1	Proposed Land Use	4
3.2	Site Access & On-Site Circulation	4
3.3	Site Generated Traffic	4
4	Future Conditions	9
4.1	Road System	9
4.2	Traffic Volumes	9
4.3	Traffic Operations	9
4.4	Sight Line Analysis	11
4.5	Realignment of Clark Street/Grey Road 2 Intersection	13
6	Conclusions	14

APPENDICES

Appendix A: Background Information

Appendix B: Intersection Operations

LIST OF TABLES

Table 1: 2013 & 2018 Peak Hour Traffic Volumes	3
Table 2: Phase 1 Trip Estimates	5
Table 3: Phase 2 Trip Generation Rates	6
Table 4: Phase 2 Trip Estimates	6
Table 5: Phase 1 + Phase 2 Trip Estimates	7
Table 6: Intersection Operations - 2018 Traffic Volumes	11

LIST OF FIGURES

Figure 1: Ste Location	15
Figure 2: Area Road Network	16
Figure 3: 2018 Background Traffic	17
Figure 4: Preliminary Site Plan	18
Figure 5: Site Generated Traffic	19
Figure 6: 2018 Total Traffic	20
Figure 7: Sight Lines at Site Access	21
Figure 8: Sight Lines at Clark Street/Grey Road 2 Intersection	22
Figure 9: Site Lines to/from Highway 26	23
Figure 10: Proposed Realignment of Clark Street	24

1 Introduction

C.C. Tatham & Associates Ltd. has been retained by 2533827 Ontario Limited to prepare a Traffic Review in support of the proposed Official Plan Amendment (OPA), Rezoning, and Site Plan Approval for a proposed Wakeboard Cable Park in the Town of The Blue Mountains (TOBM). In consideration of the limited size of the development and hence traffic volumes that it will generate, a traffic review was considered appropriate in lieu of a full traffic impact study. The methodology employed in the review, and the corresponding findings are documented herein.

1.1 Site Description

The site is located near the southwest corner of Grey Road 2 and Clark Street as illustrated in Figure 1. The site consists of 35.78 ha of land formerly referred to as the Cedar Run Horse Park property and is bisected southwest to northeast by an intermittent tributary watercourse. The site is primarily grass covered and includes gravel roads and sand event areas from previous development. It is currently zoned as “Recreational Commercial (C4-12h)” zone and “Hazard (H)” zone under the site specific by-law (By-law 2012-49) applicable to the property. The property is legally described as part Lot 30, Concession 9, Town of The Blue Mountains in Grey County.

1.2 Objectives

The Cedar Run Wakeboard Cable Park property has been the subject of various development reports and approvals over the past years. The primary objectives of this report are as follows:

- inventory the surround road system and establish existing traffic volumes;
- identify the volume of traffic that the Wakeboard Cable Park will generate;
- estimate future traffic volumes with consideration for the Wakeboard Cable Park;
- address future traffic operations on the area road system and at the site access; and
- identify the need for any road system improvements and mitigating measures to support the future volumes and development of the Wakeboard Cable Park.

2 Existing Conditions

2.1 Road Network

As per *The County of Grey Official Plan*¹, Grey Road 2 is classified as a County road. The road is oriented north-south through the study area and has a 2-lane rural cross section (ie. gravel shoulders and open drainage ditches). The road maintains a straight horizontal alignment south of the Clark Street intersection whereas to the north, there is a horizontal curve to the northeast beginning approximately 30 metres north of the centre of the intersection. Grey Road 2 has a posted speed limit of 80 km/h and thus a design speed of 100 km/h has been assumed (posted speed limit + 20 km/h for higher speed roads). For the purpose of this review and as Grey Road 2 is a County road, a theoretical capacity of 900 vehicles per hour per lane (vphpl) has been employed.

As per the *Town of The Blue Mountains Official Plan*², Clark Street is classified as a major collector. The road is oriented east-west through the study area and has a 2-lane rural cross section (ie. gravel shoulders and open drainage ditches). The horizontal alignment of Clark Street is relatively straight; however, it is rolling vertically. Clark Street also has a posted speed limit of 80 km/h, with an assumed 100 km/h design speed. Approximately 600 metres west of the site, a 50 km/h speed limit is posted. As a major collector road, Clark Street has a theoretical planning capacity of 800 vphpl.

The intersection of Clark Street with Grey Road 2 is a 3-leg 'T' intersection with stop control on Clark Street. All approaches consist of a single travel lane in each direction. This intersection is located approximately 125 metres south of the Grey Road 2 intersection with Highway 26 (measured centre to centre).

Photos of the area road network are provided in Figure 2.

2.2 Traffic Volumes

Traffic volumes through the study area have been referenced from the *Highway 26 / Grey Road 2 Intersection Improvements – Municipal Class Environmental Assessment*³, which reflect:

- AM and PM peak hour turning movement counts completed at the intersections of Grey Road 2 with Clark Street and Highway 26 on Tuesday July 16, 2013; and
- Automatic Traffic Recorder (ATR) counts completed on Highway 26, Grey Road 2 and Clark Street over the period Monday July 15, 2013 to Sunday July 21, 2013.

¹ *The County of Grey Official Plan*. June 25, 2012.

² *Town of The Blue Mountains Official Plan*. June 2016.

³ *Highway 26 / Grey Road 2 Intersection Improvements – Municipal Class Environmental Assessment – Schedule B*. The Town of the Blue Mountains, R.J. Burnside & Associates Ltd, May, 2016.

The corresponding intersection volumes, reflective of weekday summer 2013 conditions, are illustrated in Appendix A. It is noted that the Class EA study indicated that the summer weekday PM peak hour reflects the greatest traffic volumes (greater than the AM peak hour and the Saturday peak hour) and hence this period was selected as the design condition for analyses.

Given that the data referenced is greater than 3 years old, new traffic counts would typically be employed. However, given the time of year, and the summer seasonal variations in traffic levels realized through the area, counts completed at this time of year would not be considered representative of summer conditions. In this regard, the 2013 summer volumes were employed, with a factor applied to reflect current conditions (an annual growth rate of 2% was applied to the Highway 26 volumes and 1% to the Grey Road 2 and Clark Street volumes, as employed in the Class EA study and thus the same methodology has been maintained to ensure consistency). As the Class EA considered 2013 and 2018 conditions, a horizon of 2018 has been considered in this assessment to reflect existing conditions. The resulting 2018 traffic volumes are reflected in Figure 3.

2.3 Traffic Operations

A summary of the peak hour traffic volumes on Clark Street and Grey Road 2 (corresponding to the section between Clark Street and Highway 26 which experiences greater volumes), is provided in Table 1. As shown, the 2018 peak hour directional volumes are expected to be in the order of 55 to 100 vehicles per hour on Clark Street and 110 to 170 vph on Grey Road 2. In consideration of the assumed road capacities (800 vphpl for Clark Street given it is a major collector, and 900 vphpl for Grey Road 2 given it is a County Road), both roads are operating well below capacity and thus can readily accommodate additional traffic volumes.

Table 1: 2013 & 2018 Peak Hour Traffic Volumes

Road Section		2013		2018	
		AM	PM	AM	PM
Clark Street	Westbound	52	89	55	100
	Eastbound	66	65	70	75
Grey Road 2	Northbound	103	122	110	135
	Southbound	103	156	110	170

3 Wakeboard Cable Park

3.1 Proposed Land Use

The Cedar Run Wakeboard Cable Park is proposed to consist of a large circular wakeboard pond, a smaller multi-level wakeboard pond, a pro shop/office, a commercial plaza, overnight accommodation cottages, a passive recreation area and associated parking and access roads. A conceptual site plan is provided in Figure 4.

The current development plan is to construct the 2 wakeboard ponds, pro shop/office, parking areas and associated access roads in Phase 1. The commercial plaza and overnight accommodations would be completed in Phase 2, the timing of which has yet to be determined (suffice to say, these uses would be ancillary to the wakeboard cable pond uses). For purposes of this brief, both the Phase 1 and Phase 2 components have been considered.

3.2 Site Access & On-Site Circulation

The site will be served by a single access on the south side of Clark Street, located approximately 525 metres west of the existing Clark Street and Grey Road 2 intersection. The access will operate under stop control and will provide 1 inbound lane and 1 outbound lane.

With respect to on-site circulation, the site will be served by an internal private road with a width of 7.0 metres. As the final layout of the development is not finalized, the final layout of the road network is subject to change. However, it is recognized that the road must be able to support the on-site circulation of emergency vehicles.

3.3 Site Generated Traffic

Phase 1 Trips

Upon review of the land-uses provided in the *ITE Trip Generation Manual, 9th Edition*, it was determined that there are no comparable land-uses for the wakeboard cable park. Therefore, the trip estimates for the site have been established using a first principles approach based on the following information provided by the developer with respect to anticipated operations:

- the park will have 10 to 12 employees;
- park attendance is expected to be approximately 140 riders/spectators per day; and
- visits are to be scheduled throughout the day.

Given the recreational nature of the area, the peak operations will occur on the weekends, with the weekday volumes being somewhat less. However, to maintain a conservative approach, the same peak volumes for the site have been assumed for the weekday also (as the weekday volumes on the road system are greater than the weekend volumes, this will yield the maximum total volumes). It is further noted, that the site is assumed to operate from 10AM to 7PM and thus would not contribute volumes to the AM peak hour (in that it typically occurs between the hours of 7 to 9AM). Notwithstanding, it is assumed that the AM peak hour of the site will coincide with the AM peak hour of the road.

In determining the peak hour site generated traffic volumes, the following have been assumed:

- 15% of riders/spectators will arrive during the AM peak;
- 15% of riders/spectators will depart during the PM peak and a further 15% will arrive;
- 50% of employees will arrive during the AM peak hour;
- 50% of employees will arrive and 50% will depart during the PM peak hour; and
- 1.5 riders/spectators per vehicle and 1 employee per vehicle.

The associated trip estimates for Phase 1 are summarized in Table 2. As noted, the Wakeboard Cable Park is assumed to generate 20 vehicle trips during the AM peak hour and 40 vehicle trips during the PM peak hour (total of inbound and outbound trips).

Table 2: Phase 1 Trip Estimates

Land Use	Amount	Weekday PM Peak Hour			Saturday Peak Hour		
		In	Out	Total	In	Out	Total
riders/spectators	140 persons	14	-	14	14	14	28
employees	12 staff	6	-	6	6	6	12
Total		20	-	20	20	20	40

Phase 2 Trips

The number of vehicle trips to be generated by the proposed cabins and commercial space have been determined based on the development size, land use and trip generation rates provided in the *ITE Trip Generation Manual, 9th Edition*. Based on the proposed land uses, the following have been considered:

- *motel* (ITE code 320);
- *resort hotel* (ITE code 330); and
- *shopping centre* (ITE code 820).

The associated trip rates are provided in Table 3 for the peak hour of each use.

Table 3: Phase 2 Trip Generation Rates

Land Use	Variable	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
motel	occupied rooms	0.23	0.41	0.64	0.31	0.27	0.58
resort hotel	occupied rooms	0.27	0.10	0.37	0.21	0.28	0.49
shopping centre	1000 ft ²	0.60	0.36	0.96	1.78	1.93	3.71

The motel land use was employed as it reflects a higher trip generation rate than the resort hotel land use. The corresponding trips for the Phase 2 development are summarized in Table 4.

Table 4: Phase 2 Trip Estimates

Land Use	Variable	Weekday PM Peak Hour			Saturday Peak Hour		
		In	Out	Total	In	Out	Total
cabins	13 cabins	3	5	8	4	4	8
commercial	5,200 ft ²	3	2	5	9	10	19
Total		6	7	13	13	14	27

Phase 1 + Phase 2 Trips

The total trip estimates of the cable wakeboard park development are summarized in Table 5, assuming completion of both Phases 1 and 2.

Given the nature of the development, it is expected that patrons of the cabin and commercial uses will also be patrons of the wakeboard cable park. As such, the Phase 2 uses would be considered ancillary in nature and thus would not result in new site traffic (over and above what would otherwise be generated by the wakeboard cable park). Notwithstanding, for purposes of this review, 50% of the Phase 2 trip estimates have been maintained to consider other users of the cabins and customers of the commercial space that may not otherwise attend the cable park.

As indicated, the proposed development is expected to generate 27 trips during the weekday AM peak hour and 54 trips during the PM peak hour.

Table 5: Phase 1 + Phase 2 Trip Estimates

	Land Use	Variable	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Ph 1	riders/spectators	140 persons	14	-	14	14	14	28
	employees	12 staff	6	-	6	6	6	12
Ph 2	cabins ¹	13 cabins	1	3	4	2	2	4
	commercial ¹	5,200 ft²	2	1	3	5	5	10
Total			23	4	27	27	27	54

¹ 50% of the Phase 2 trips are assumed to be made by patrons of the wakeboard cable park

Trip Distribution & Assignment

Given the relative uniqueness and recreational nature of the development, it is expected to draw visitors from a regional basis. In consideration of the surrounding built centres (including Thornbury, Collingwood, Meaford and areas beyond) and other recreational draws (Blue Mountain Village), the following distribution has been assumed:

- 60% to/from the east;
- 30% to/from the west; and
- 10% to/from the south.

In establishing the distribution of the site traffic to the road system, the following travel routes/assignments have been assumed:

- 60% via Highway 26 east;
- 20% via Highway 26 west;
- 10% via Clark Street; and
- 10% via Grey Road 2.

The corresponding site generated traffic volumes on the area road system are illustrated in Figure 5.

Comparison with Cedar Run Horse Park

Under the previous development plan, the subject site was to be developed as a horse park, including 3 outdoor horse event arenas, 230 horse stalls and 300 condotel units. As per the *Cedar Run, The Thornbury Horse Park Traffic Impact Assessment*, the development was projected to generate in the

order of 160 trips during a normal weekday PM peak hour and 200 trips during a Saturday peak hour. In addition to this, annual events were planned which were projected to attract 1000 to 2000 horses over the 1 to 2-week event duration.

In comparison, the Wakeboard Cable Park will generate approximately 1/3rd of the trips that were projected for the Horse Park use (and likely less still, recognizing that conservative assumptions have been made with regards to the trip estimates).

4 Future Conditions

4.1 Road System

With regards to the future road system within the study area, the *Highway 26 / Grey Road 2 Intersection Improvements – Municipal Class Environmental Assessment* provided a number of recommendations including:

- traffic volumes at the intersection of Grey Road 2/Highway 26 currently meet the warrants for traffic signal control;
- signalize the Grey Road 2/Highway 26 intersection and provide left turn lanes on all approaches (the east leg currently has one);
- close the existing Lakeshore Road access to Highway 26 and relocate it to the Grey Road 2/Highway 26 intersection, thus forming the north leg;
- the Clark Street/Grey Road 2 intersection should be realigned to improve the available sight lines upon approach to Highway 26 (the realigned Clark Street will be within the envelope established on the Cedar Run lands and/or Fire Hall lands); and
- the warrants for a left turn or right turn lane on Grey Road 2 at its intersection with Clark Street are not likely to be met until the long term (however these warrants will depend on the ultimate traffic volumes to be generated by the Cedar Run horse park development - which is no longer proceeding).

As noted above, the traffic volumes derived in the Class EA report considered the previous horse park development for the subject site, which would have generated greater volumes than the current development proposal.

4.2 Traffic Volumes

Traffic volumes for the 2018 horizon are presented in Figure 6, comprised of the future background volumes (Figure 3) and the site generated volumes (Figure 5).

4.3 Traffic Operations

Road Section Operations

In considering the 2018 volumes and the estimated trips to be generated by the site, the resulting peak hour volumes are projected in the order of:

- 80 to 130 vehicles per hour per direction on Clark Street; and

- 115 to 195 vehicles per hour per direction on Grey Road 2 (between Clark Street and Highway 26).

In consideration of the road classifications and assumed capacities (800 and 900 vehicles per hour per lane on Clark Street and Grey Road 2 respectively), the future 2018 volumes can be readily accommodated (the roads will operate at less than 25%).

Turn Lane Requirements

Prior to reviewing the operations of the key intersections, the need for exclusive turn lanes at the site access was reviewed in that these are warranted by traffic volumes, as opposed to traffic operations.

The need for a left turn lane was reviewed based on the following:

- MTO guidelines for left turn lanes at unsignalized intersections on 2-lane roads;
- a design speed of 100 km/h (reflective of an 80 km/h posted speed limit on Clark Street); and
- the projected 2018 total traffic volumes.

With respect to the need for a right turn lane, MTO criteria indicate the following:

- right turn lanes should be considered when the turning volume exceeds 60 vehicles per hour and have the potential to interfere with through traffic.

Based on the above, turn lanes to serve the site access are not considered necessary.

Intersection Operations

The operations of the study area intersections were reviewed considering the 2018 volumes, existing lane configurations and intersection control, and procedures outlined in the *2000 Highway Capacity Manual*⁴ (using Synchro v.9 software). While the Class EA had documented a number of recommended road improvements, such have not been considered to evaluate and confirm the need for such in context of the Wakeboard Cable Park and the associated/revised traffic projections.

A summary of the analysis is provided in Table 6 in the form of average delay (measured in seconds), level of service (LOS) and volume to capacity (v/c) for the critical movements (stop control moves on the side street and exclusive left turn moves on the major street). LOS A corresponds to the best operating condition with minimal delays whereas LOS F corresponds to poor operations resulting from high intersection delays. Detailed worksheets are included in Appendix B.

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

Table 6: Intersection Operations - 2018 Traffic Volumes

Intersection, Movement & Control			AM Peak Hour			PM Peak Hour		
			delay (s)	LOS	v/c	delay (s)	LOS	v/c
Highway 26 & Grey Road 2	WB L	-	2	A	0.05	2	A	0.07
	NB	stop	16	C	0.28	23	C	0.45
Grey Road 2 & Clark Street	EB	stop	10	A	0.10	11	B	0.15
Site Access	NB	stop	9	A	0.01	9	A	0.03

As indicated, acceptable levels of service will be provided at each intersection under the existing intersection configurations and controls, and thus no improvements are required from a traffic operations perspective. With respect to the improvements noted in the Class EA report, such are not considered necessary in context of the 2018 traffic volumes.

Queue Operations

In addition to the intersection operations, queue operations have also been reviewed given the proximity of the intersections along Grey Road 2 - 125 metres centre to centre. This separation distances affords approximately 105 metres of queue storage before a northbound queue on Grey Road 2 at the Highway 26 intersection would extend into the Clark Street intersection, thus impacting operations.

Based on the 2018 traffic operations, the 95th percentile queue length (ie. the queue length that will only be exceeded 5% of the time) for the northbound movement approaching Highway 26 is projected to be 9 metres during the AM peak hour and 17 metres in the PM peak hour (refer to the operational worksheets in Appendix B). In this regard, the queues can be readily accommodated without impact to the intersection operations.

4.4 Sight Line Analysis

Sight lines have also been reviewed at the proposed site access and at the intersection of Clark Street with Grey Road 2 (in that the issue of restricted sight lines was the rationale for realigning Clark Street).

Minimum Sight Distance Requirement

Based on MTO geometric design standards, the minimum stopping sight distance for a design speed of 100 km/h is 185 metres. This requirement provides sufficient distance for an approaching vehicle to observe a stationary hazard in the road (ie. a vehicle stopped at an intersection waiting to complete a turn) and bring the vehicle to a complete stop prior to the hazard.

Site Access

The available sight lines along Clark Street at the proposed site access are illustrated in Figure 7. As measured, the sight distance is in excess of 500 metres to the east (the intersection at Grey Road 2 is evident) and in excess of 200 metres to the west. As such, the MTO requirement for a 100 km/h design speed is satisfied.

Clark Street/Grey Road 2 Intersection

The available sight lines looking from the Clark Street/Grey Road 2 intersection are illustrated in Figure 8. To the north, the sight distance is approximately 100 metres, limited by the horizontal curve. To the south, the available distance exceeds 400 metres. As such, the 185 metre requirement is satisfied to the south, but not to the north.

It is noted however, that southbound motorists will not be advancing at the posted speed of 80 km/h having just passed through the intersection at Highway 26 and recognizing that the horizontal curve on Grey Road 2 will also restrict the travel speeds. The available 100 metre sight distance corresponds to a design speed of approximately 65 km/h and thus would facilitate travel speeds of up to 55 km/h (maintaining a minimum factor of safety of 10 km/h). The *Highway 26 / Grey Road 2 Intersection Improvements – Municipal Class Environmental Assessment* also noted the likelihood that southbound motorists would be travelling at a reduced speed, and indicated that the horizontal curve can accommodate a design speed of 45 km/h, for which the stopping sight distance requirement is 55 metres.

While the *Highway 26 / Grey Road 2 Intersection Improvements – Municipal Class Environmental Assessment* acknowledges the availability of a 100 metre sight distance to the north (as evident in Figure 9), it notes when queues are present on the Grey Road 2 approach to Highway 26, the sight distance will be limited to 70 metres (in that the northbound queue of vehicles will restrict visibility of the southbound vehicles). This however was premised on the expected traffic volumes and operations as developed for the Class EA study, which will be reduced given the changes to the Cedar Run development. As further illustrated in Figure 9, it is possible to accommodate a 30 metre queue (approximately 4 vehicles) in advance of Highway 26 without impacting the sight lines. Based on the 2018 traffic operations undertaken for this review, the 95th percentile queue is 17 metres, which can be accommodated without impact to the sight lines.

In consideration of the anticipated speed of travel for southbound motorists (as restricted by the horizontal curve) and the limited queue expected at the Highway 26 intersection, the available sight lines to/from the north are considered appropriate. To/from the south, the sight lines exceed the requirements and thus are also appropriate.

4.5 Realignment of Clark Street/Grey Road 2 Intersection

Class EA Realignment

Based on the traffic volumes and analyses undertaken as part of the *Highway 26 / Grey Road 2 Intersection Improvements – Municipal Class Environmental Assessment*, and given the location of the intersection (which is believed to be somewhat hidden for approaching motorists), the Class EA study recommended the realignment of Clark Street upon approach to Grey Road 2 and relocation of the respective intersection further to the south. The following “short to medium” term recommendations were provided in the Class EA:

- secure the lands for the future realignment of Clark Street;
- monitor the traffic operations at the intersection of Clark Street/Grey Road 2, to assess the timing for the realignment of Clark Street, in response to ongoing development in the area; and
- realign Clark Street once traffic conditions warrant and in conjunction with improvements proposed at the intersection of the Highway 26/Grey Road 2.

A possible realignment envelope, as presented in the Class EA, is provided in Appendix A.

Wakeboard Cable Park Proposed Realignment

While the analyses undertaken as part of this review suggests that the realignment is not warranted by the proposed Wakeboard Cable Park development, or necessary to support it, accommodation for it has been provided in the overall development plan as evident in Figure 4 and further denoted in Figure 10. As illustrated, the realignment will include horizontal curves of 250 metre radii, corresponding to a design speed of 80 km/h (while this matches the current posted speed, such is acceptable given the reduced speeds at which vehicles will be travelling, as they approach the stop controlled intersection with Grey Road 2).

The resulting intersection will be shifted approximately 150 metres to the south, thereby providing the following:

- 275 metres separation to the Grey Road 2/Highway 26 intersection (measured centre to centre); and
- a sight distance to/from the north of approximately 215 metres (which exceeds the applicable MTO standards under the 100 km/h design speed).

In context of the above, and the realignment envelope established through the Class EA process, the proposed realignment is considered appropriate.

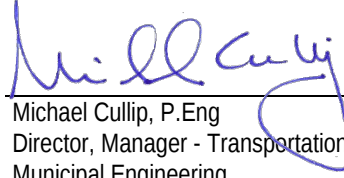
5 Conclusions

Given the traffic volumes to be generated by the proposed Wakeboard Cable Park and in consideration of the available capacity on Clark Street and Grey Road 2, the increase in traffic volumes will not have any appreciable impacts on the adjacent road system. Following a review of the 2 key study area intersections - Clark Street/Grey Road 2 and Grey Road 2/Highway 26 - each will provide acceptable operations with no need for further improvements. Similarly, the site access will provide acceptable operations under the existing lane configurations on Clark Street; no exclusive turn lanes are warranted.

Traffic queues were investigated at the Grey Road 2/Highway 26 intersection to determine if such would have implications on operations or sight lines at the Clark Street/Grey Road 2 intersection. Given the limited northbound queue anticipated for the 2018 horizon upon approach to the highway (17 metres), no issues are anticipated.

Sight lines were reviewed at the site access and deemed appropriate to ensure safe access to/from the site. Likewise, at the intersection of Clark Street/Grey Road 2, the sight lines are considered appropriate. While the sight line to/from the north does not meet the requirement for a 100 km/h design speed, it exceeds the requirement associated with the actual travel speeds anticipated (as dictated by the horizontal curve on Grey Road 2 and recognizing that vehicles will have just passed through the intersection with Highway 26).

It is acknowledged that the *Highway 26 / Grey Road 2 Intersection Improvements – Municipal Class Environmental Assessment* has recommended the realignment of Clark Street upon approach to Grey Road 2 and relocation of the respective intersection to better accommodate future traffic volumes and provide increased sight distances. The Class EA study further notes that the need for such should be monitored in context of area traffic volumes and development growth. As the Cedar Run Wakeboard Cable Park will generate less traffic than otherwise considered in the Class EA (which reflects the previous Cedar Run Horse Park), the noted improvements are not considered necessary at this time. Consideration however has been provided in the development plan to accommodate a future realignment in accordance with the recommendations of the Class EA.

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Wakeboard Cable Park, Traffic Review

Site Location

Figure
1



Looking south along Grey Road 2 from Clark Street



Looking north along Grey Road 2 from Clark Street



Looking north on Grey Road 2 to Clark Street (on the left) and Highway 26 (beyond the curve)

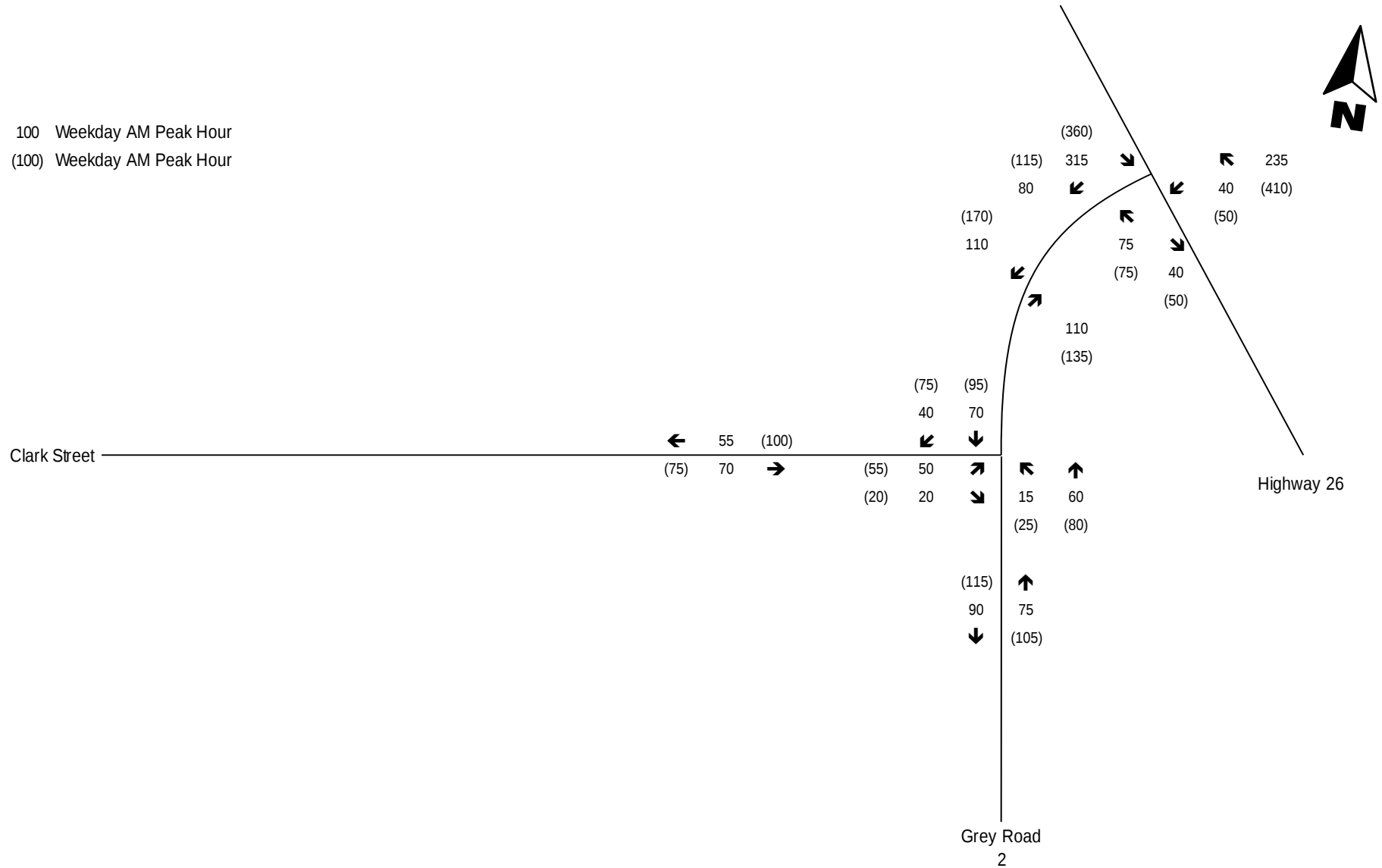


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Wakeboard Cable Park, Traffic Review Area Road Network

**Figure
2**

100 Weekday AM Peak Hour
 (100) Weekday AM Peak Hour

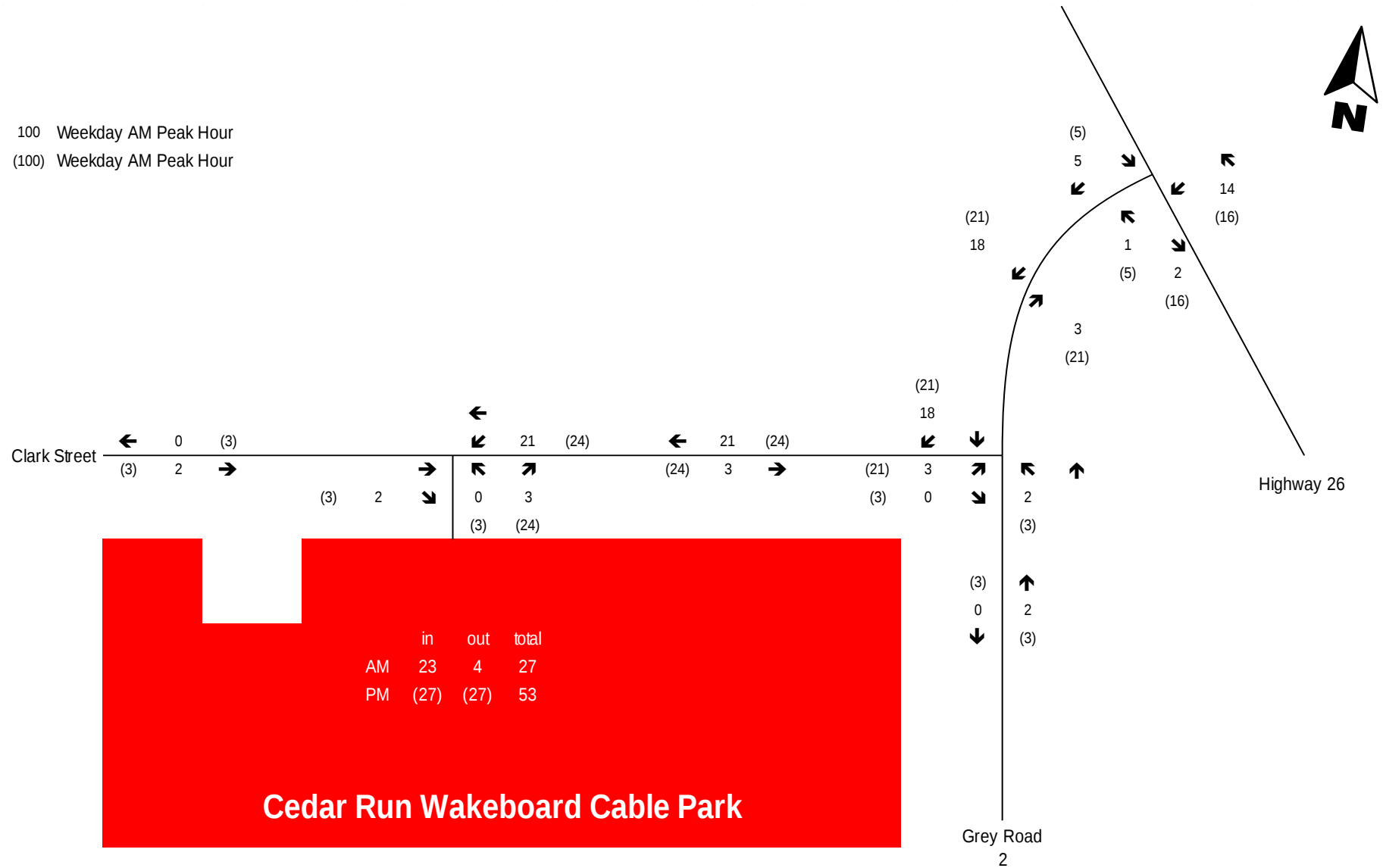


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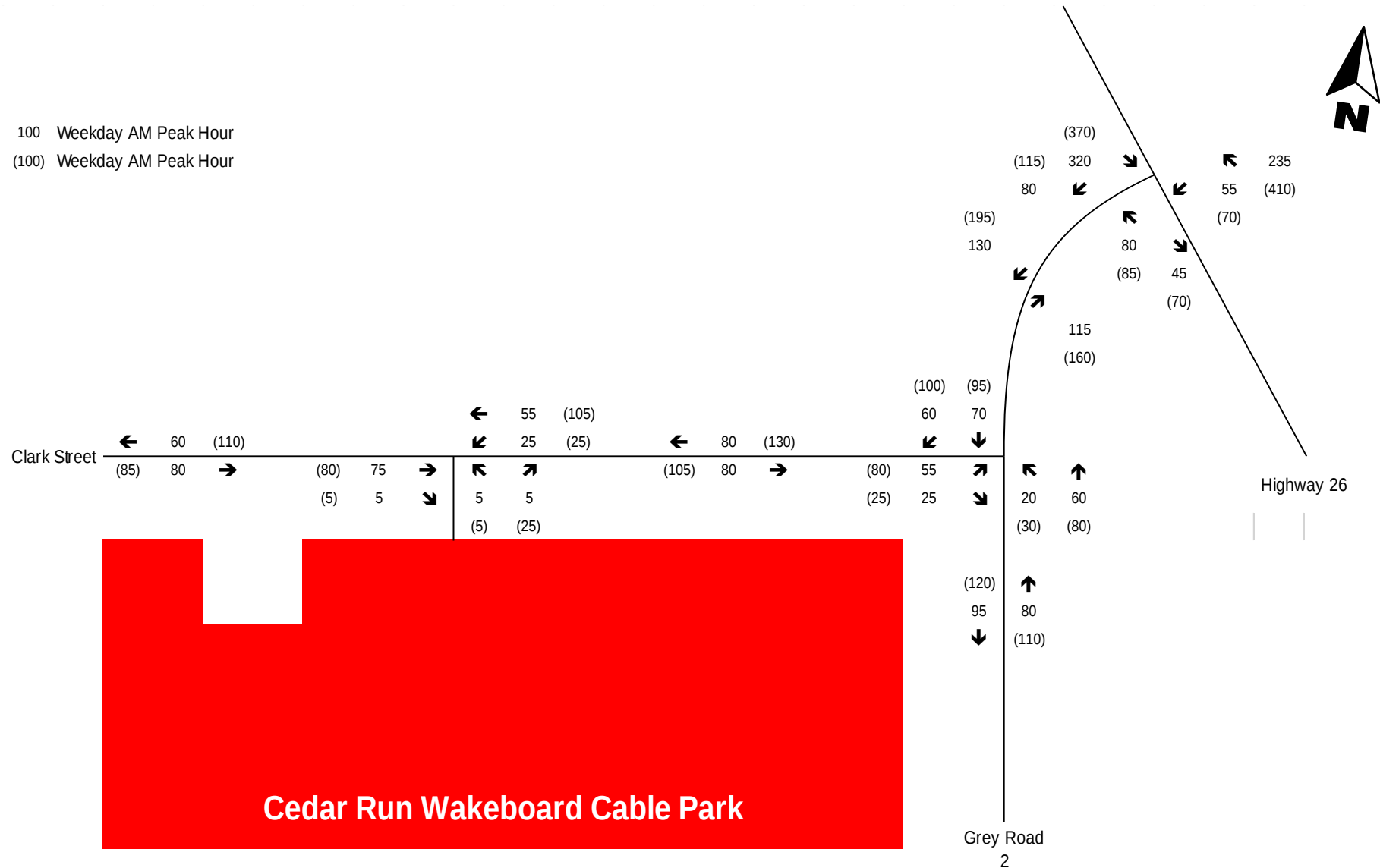
Wakeboard Cable Park, Traffic Review 2018 Background Traffic

Figure
 3

100 Weekday AM Peak Hour
 (100) Weekday AM Peak Hour



100 Weekday AM Peak Hour
 (100) Weekday AM Peak Hour



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Wakeboard Cable Park, Traffic Review 2018 Total Traffic

Figure
 6



Looking west on Clark Street from proposed side access

Looking east on Clark Street from proposed side access





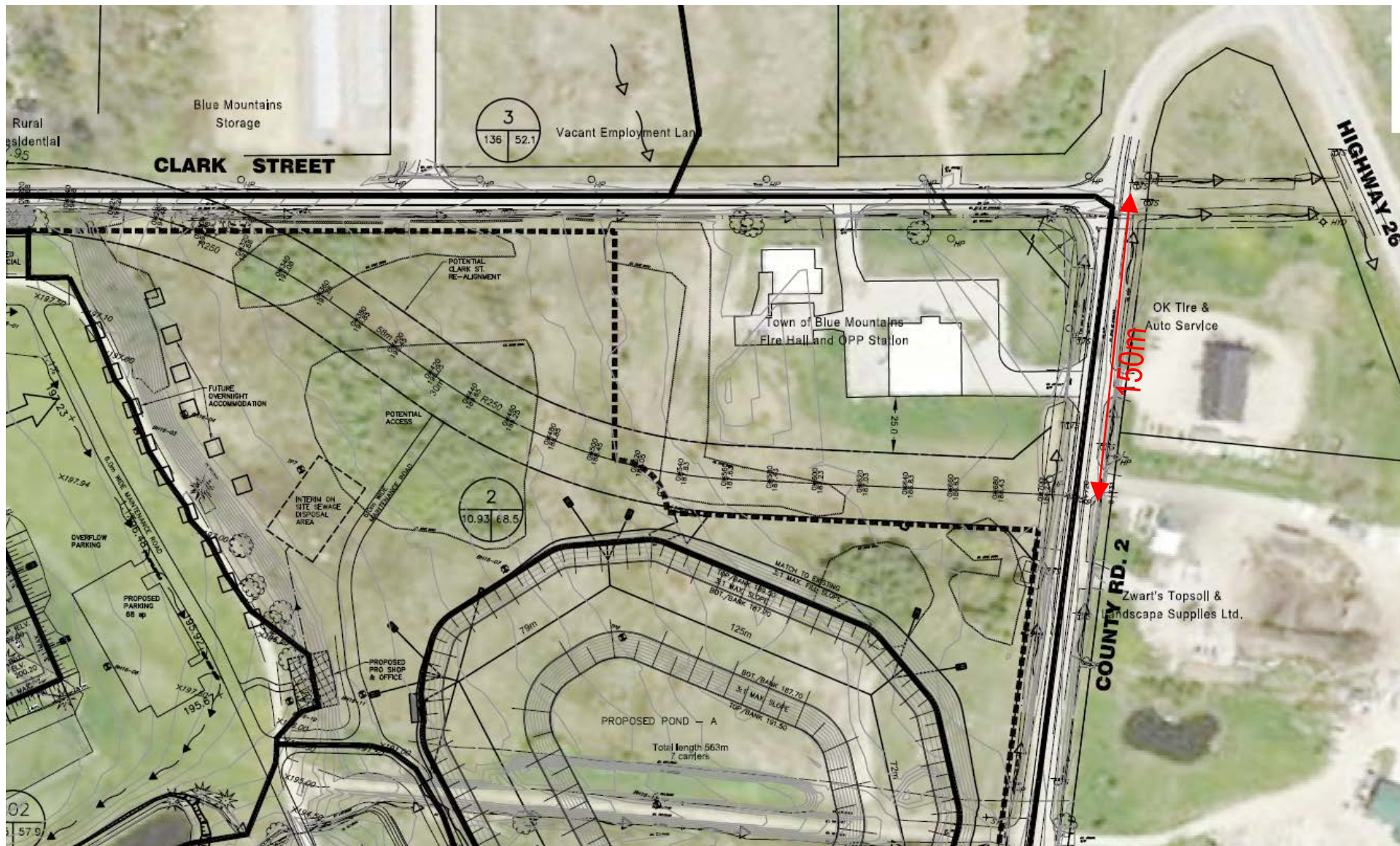
Looking north on Grey Road 2 to Highway 26 from Clark Street



Looking south on Grey Road 2 from Clark Street

source: google streetview





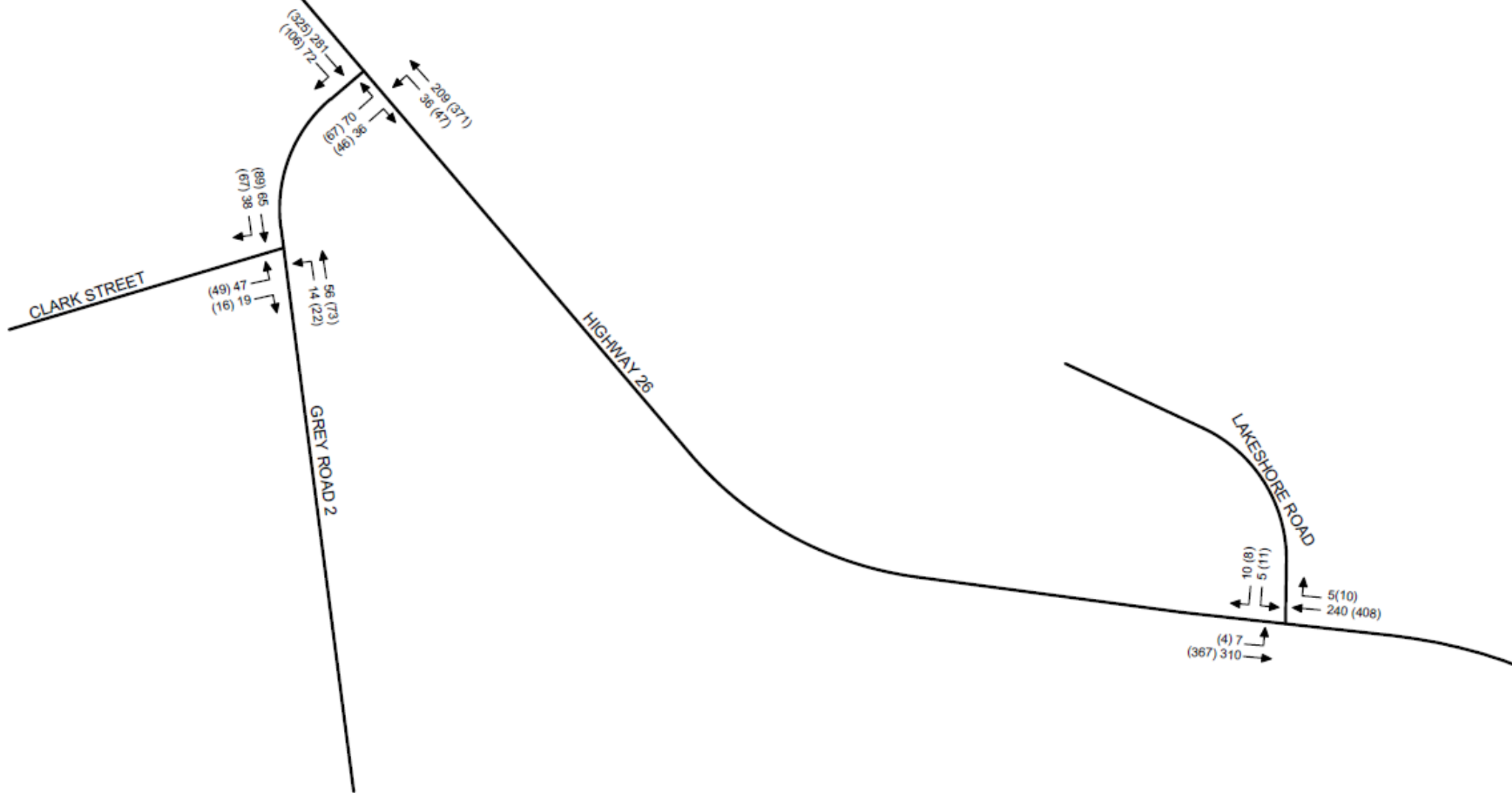
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Wakeboard Cable Park, Traffic Review

Proposed Realignment of Clark Street

Figure

APPENDIX A: BACKGROUND INFORMATION



LEGEND

100 - AM PEAK HOUR (vph)
(100) - PM PEAK HOUR (vph)



Figure Title

CLASS EA - HIGHWAY 26 / GREY RD 2

2013 TRAFFIC VOLUMES

Client

TOWN OF THE BLUE MOUNTAINS

Drawn

JBL

Scale

NTS

Checked

HC

Date

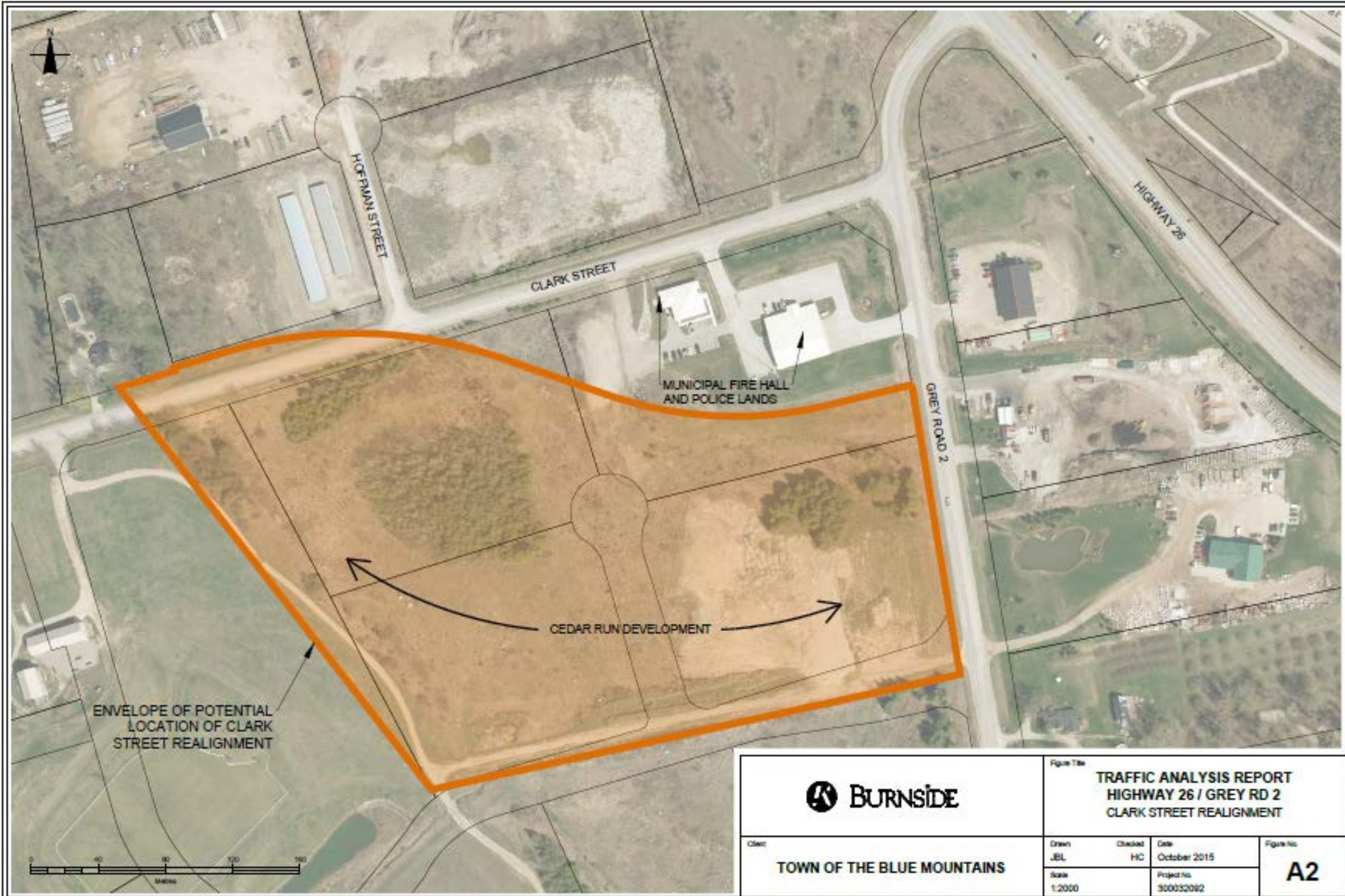
15/01/21

Project No.

300032092

Figure No.

E2



APPENDIX B: INTERSECTION OPERATIONS

HCM Unsignalized Intersection Capacity Analysis

1: Grey Road 2 & Highway 26

2018 AM Total

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	320	80	55	235	80	45
Future Volume (Veh/h)	320	80	55	235	80	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	337	84	58	247	84	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			421		700	337
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			421		700	337
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		78	93
cM capacity (veh/h)			1138		385	705
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	337	84	58	247	131	
Volume Left	0	0	58	0	84	
Volume Right	0	84	0	0	47	
cSH	1700	1700	1138	1700	460	
Volume to Capacity	0.20	0.05	0.05	0.15	0.28	
Queue Length 95th (m)	0.0	0.0	1.2	0.0	8.8	
Control Delay (s)	0.0	0.0	8.3	0.0	15.9	
Lane LOS			A		C	
Approach Delay (s)	0.0		1.6		15.9	
Approach LOS					C	
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			37.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Grey Road 2 & Clark Street

2018 AM Total

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	25	20	60	70	60
Future Volume (Veh/h)	55	25	20	60	70	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	58	26	21	63	74	63
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	210	106	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	210	106	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	97	99			
cM capacity (veh/h)	767	949	1447			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	84	84	137			
Volume Left	58	21	0			
Volume Right	26	0	63			
cSH	815	1447	1700			
Volume to Capacity	0.10	0.01	0.08			
Queue Length 95th (m)	2.6	0.3	0.0			
Control Delay (s)	9.9	2.0	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.9	2.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		3.3				
Intersection Capacity Utilization		26.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Access & Clark Street

2018 AM Total

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↘	↗
Traffic Volume (veh/h)	75	5	25	55	5	5
Future Volume (Veh/h)	75	5	25	55	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	79	5	26	58	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			84		192	82
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			84		192	82
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	99
cM capacity (veh/h)			1513		784	978
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	84	84	10			
Volume Left	0	26	5			
Volume Right	5	0	5			
cSH	1700	1513	870			
Volume to Capacity	0.05	0.02	0.01			
Queue Length 95th (m)	0.0	0.4	0.3			
Control Delay (s)	0.0	2.4	9.2			
Lane LOS		A	A			
Approach Delay (s)	0.0	2.4	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		20.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

1: Grey Road 2 & Highway 26

2018 PM Total

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations					 	
Traffic Volume (veh/h)	370	115	70	410	85	70
Future Volume (Veh/h)	370	115	70	410	85	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	389	121	74	432	89	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume				510	969	389
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				510	969	389
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				93	66	89
cM capacity (veh/h)				1055	261	659
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	389	121	74	432	163	
Volume Left	0	0	74	0	89	
Volume Right	0	121	0	0	74	
cSH	1700	1700	1055	1700	360	
Volume to Capacity	0.23	0.07	0.07	0.25	0.45	
Queue Length 95th (m)	0.0	0.0	1.7	0.0	17.3	
Control Delay (s)	0.0	0.0	8.7	0.0	23.0	
Lane LOS				A	C	
Approach Delay (s)	0.0			1.3	23.0	
Approach LOS				C		
Intersection Summary						
Average Delay				3.7		
Intersection Capacity Utilization				42.3%	ICU Level of Service	A
Analysis Period (min)				15		

HCM Unsignalized Intersection Capacity Analysis

2: Grey Road 2 & Clark Street

2018 PM Total

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	25	30	80	95	100
Future Volume (Veh/h)	80	25	30	80	95	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	26	32	84	100	105
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	300	152	205			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	300	152	205			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	97	98			
cM capacity (veh/h)	675	894	1366			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	110	116	205			
Volume Left	84	32	0			
Volume Right	26	0	105			
cSH	716	1366	1700			
Volume to Capacity	0.15	0.02	0.12			
Queue Length 95th (m)	4.1	0.5	0.0			
Control Delay (s)	10.9	2.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.9	2.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		3.4				
Intersection Capacity Utilization		32.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Access & Clark Street

2018 PM Total

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↱	↘↙	
Traffic Volume (veh/h)	80	5	25	105	5	25
Future Volume (Veh/h)	80	5	25	105	5	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	5	26	111	5	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			89		250	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			89		250	86
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	97
cM capacity (veh/h)			1506		726	972
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	89	137	31			
Volume Left	0	26	5			
Volume Right	5	0	26			
cSH	1700	1506	922			
Volume to Capacity	0.05	0.02	0.03			
Queue Length 95th (m)	0.0	0.4	0.8			
Control Delay (s)	0.0	1.5	9.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.5	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay		1.9				
Intersection Capacity Utilization		23.6%		ICU Level of Service		A
Analysis Period (min)		15				