14b Traffic Impact Report

3040 KILPATRICK AVENUE

Traffic Impact Assessment

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1.0 INTRODUCTION

Watt Consulting Group was retained by Newport Village Courtenay Developments Ltd. to conduct a traffic impact assessment for a proposed residential development at 3040 Kilpatrick Avenue in Courtenay. For the site, the original TIA was undertaken with a mixed-use development in 2016 and most of the proposed land uses have been constructed. This study assesses traffic impacts of the proposed multi-family residential building, reviews the site access, and assesses the need for any mitigation measures. The study reviews the existing traffic operations along with the post development and long-term conditions for all modes of transportation.

1.1 STUDY AREA

See **Figure 1** for the study area and location. The study area includes the following intersections:

- Kilpatrick Avenue / 29th Street / (Signalized)
- Kilpatrick Avenue / 30th Street
- Cliffe Avenue / Anfield Road (Signalized)

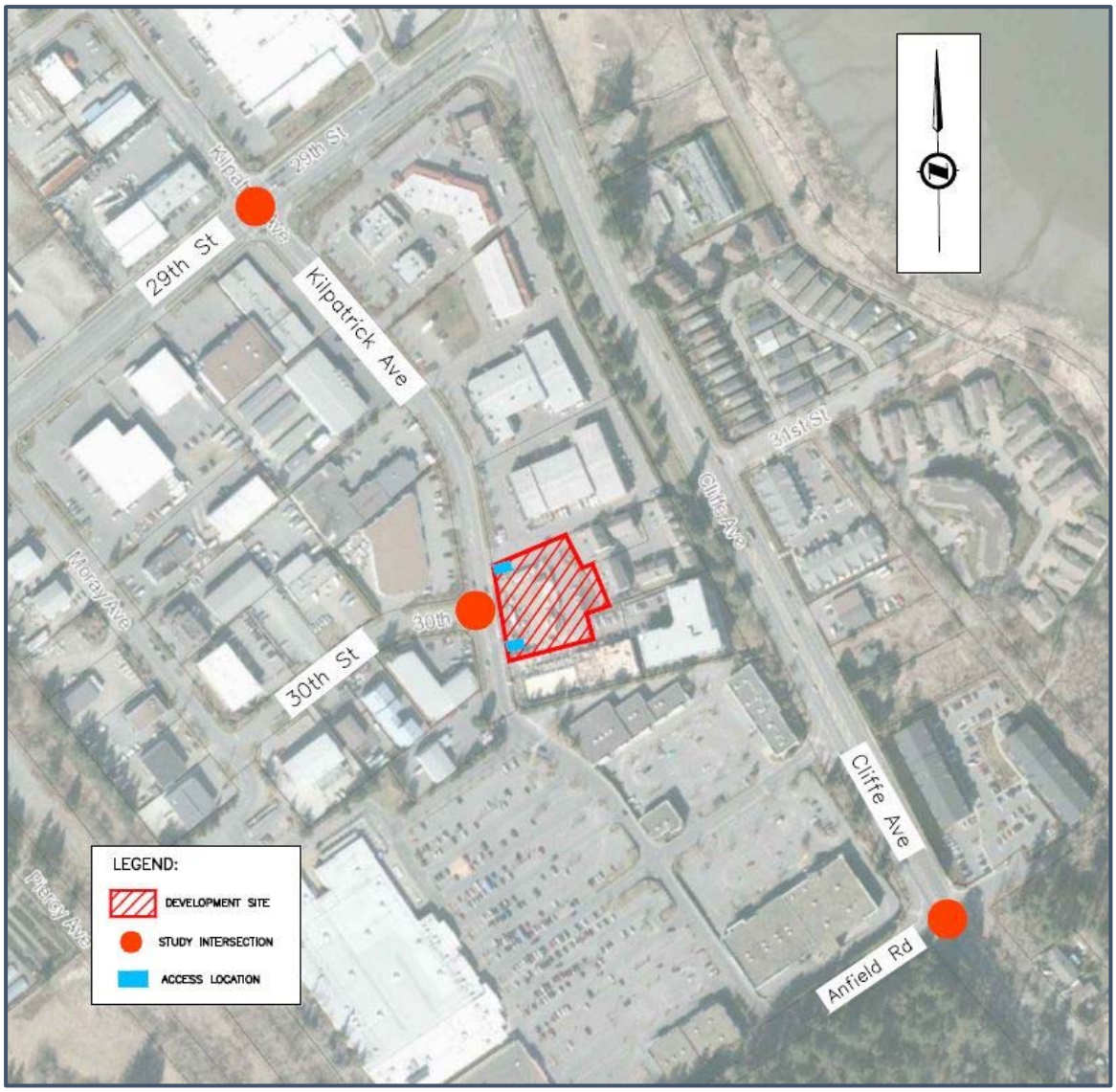

Figure 1: Study Area and Site Location

2.0 EXISTING CONDITIONS

2.1 LAND USE

The proposed development site (3040 Kilpatrick Avenue) is currently undeveloped and the existing zoning on the site is CD-26 (Comprehensive Development 26). To the south of the proposed site (3070 & 3080 Kilpatrick Avenue) two apartment buildings have

been constructed as a part of this overall project. The surrounding area of the development is mostly commercial and industrial along Kilpatrick Avenue. There is a shopping mall including Walmart and Best Buy to the south.

2.2 ROAD NETWORK

The proposed development is located on the east side of Kilpatrick Avenue near the SmartCentres Courtenay mall. 29th Street is under the jurisdiction of the Ministry of Transportation and Infrastructure. Cliffe Avenue, Kilpatrick Avenue, 30th Street, and Anfield Road are under the jurisdiction of the City of Courtenay. All roads within the study area have a maximum speed limit of 50km/h. A description of all relevant roads in the area is provided below.

29th Street (Comox Valley Parkway) is a four-lane highway which runs east / west and provides connectivity from Highway 19 to Cliffe Avenue (Highway 19A).

Cliffe Avenue is an arterial road (south of 29th Street) which leads to the downtown core of Courtenay.

Kilpatrick Avenue runs through the commercial area parallel to Cliffe Avenue and is an undivided two lane collector road with a two-way left turn lane.

30th Street is a local road with low traffic volumes and intersects Kilpatrick Avenue within close proximity of the development site. Kilpatrick Avenue becomes the access to the shopping mall after passing the proposed development site.

Anfield Road is another access road to the mall and connecting to Cliffe Avenue via a signal.

The intersection of Kilpatrick Avenue / 29th Street is signalized with a left turn lane for all four (4) approaches. The intersection of Cliffe Avenue / Anfield Road is also signalized. At the intersection, the southbound right turn is channelized with a free movement and

there is a raised centre median on the north leg of Cliffe Avenue. The intersection of Kilpatrick Avenue / 30th Street is stop controlled.

2.3 TRAFFIC VOLUMES

Traffic counts were undertaken during the PM peak hour on February 2, 2021 at three locations: 29th Street, 30th Street and the development driveway on Kilpatrick Avenue. It should be noted that 2021 counts were undertaken during the COVID-19 pandemic which has likely resulted in a reduction in traffic volumes. At the time of the count, the province of BC was under a provincial health order to have individuals limit contact with others outside of their immediate family. The count volumes have been adjusted to account for impacts by the COVID-19 pandemic as described below.

Based on the 2016 counts and MoTI's traffic data, 2021 background volumes for the opening day analysis were determined with a COVID-19 factor of 1.15 (15% increase from measured 2021 existing volumes). There was no volume increase on Comox Valley Parkway (29th Street) between the MoTI's 2015 and 2018 counts.

Traffic volumes for Cliffe Avenue / Anfield Road were collected from the original traffic study conducted in 2016. The Cliffe Avenue / Anfield Road intersection volumes were adjusted to 2021 by means of a 1.0% annual growth rate which is based on reviewing the MoTI's uniform traffic volume segment data (UTVS No: 637; growth factors: 1 year 1.1%, 3 year 2.0%, and 10 year 0.7%). See **Figure 2** for 2021 background volumes anticipated on opening day.

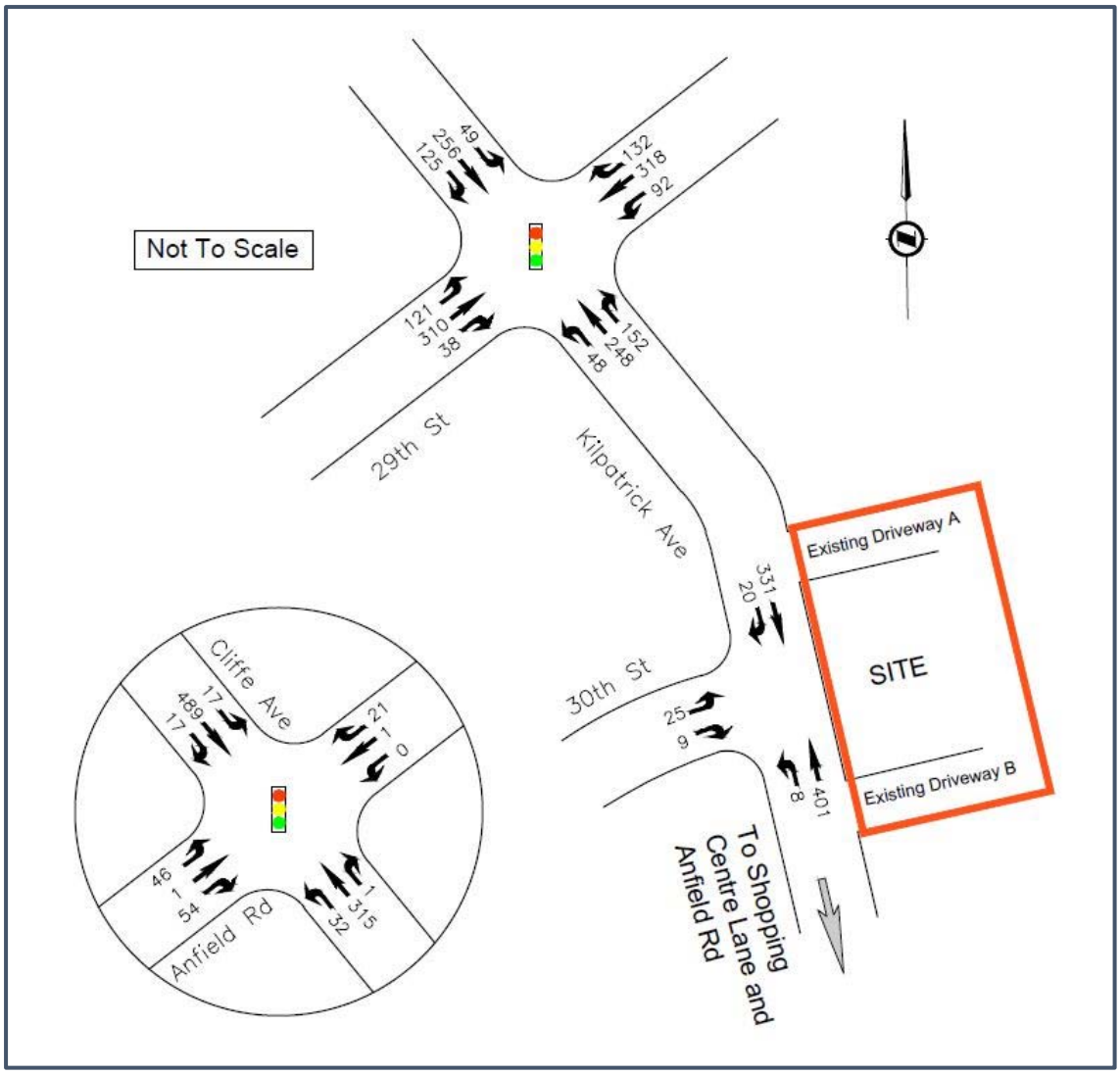

Figure 2: 2021 Opening Day Background Volumes (Adjusted)

2.4 TRAFFIC MODELLING – BACKGROUND INFORMATION

Analysis of the traffic conditions at the intersections within the study area were undertaken using Synchro software (for signalized and stop-controlled intersections).

Synchro / SimTraffic is a two-part traffic modelling software that provides analysis of traffic conditions based on traffic control, geometry, volumes and traffic operations.

Synchro software (Synchro 9/10) has been used since it has the ability to provide analysis using the Highway Capacity Manual (2010) methodology, while SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly "seeding" or positioning vehicles travelling throughout the network. These measures of effectiveness include level of service (LOS), delay and 95th percentile queue length (in vehicles, for 7.5m vehicle).

The delays and type of traffic control are inputs to determine the level of service. The level of services are broken down into six letter grades with LOS A being excellent operations and LOS F being unstable / failure operations. Level of service C is generally considered to be an acceptable LOS by most municipalities. Level of service D is generally considered to be on the threshold between acceptable and unacceptable operations. A description of level of service and Synchro is provided in **Appendix A**.

2.5 2021 BACKGROUND TRAFFIC CONDITIONS

The background (existing) PM traffic conditions were analyzed at the three study intersections. At Kilpatrick Avenue / 29th Street, all movements operate at a LOS C or better. The estimated 95th queues for the eastbound and northbound left movements exceed the existing storage lengths. The intersection of Cliffe Avenue / Anfield Road operates at a LOS A/B for all movements. At Kilpatrick Avenue / 29th Street, the eastbound movement with stop control operates at a LOS C while all other movements at a LOS A.

3.0 POST DEVELOPMENT

3.1 PROPOSED LAND USE

The proposed development will add a 41-unit multi-family residential building (5-storey). See **Figure 3** for the site plan and access.

3.2 SITE ACCESS

The site has two existing driveways on Kilpatrick Avenue. The north driveway is located 20m north of 30th Street and the south driveway is 25m south of 30th Street. As the proposed underground parking access is located at the north driveway, it is expected most of the site trips will use the north driveway.

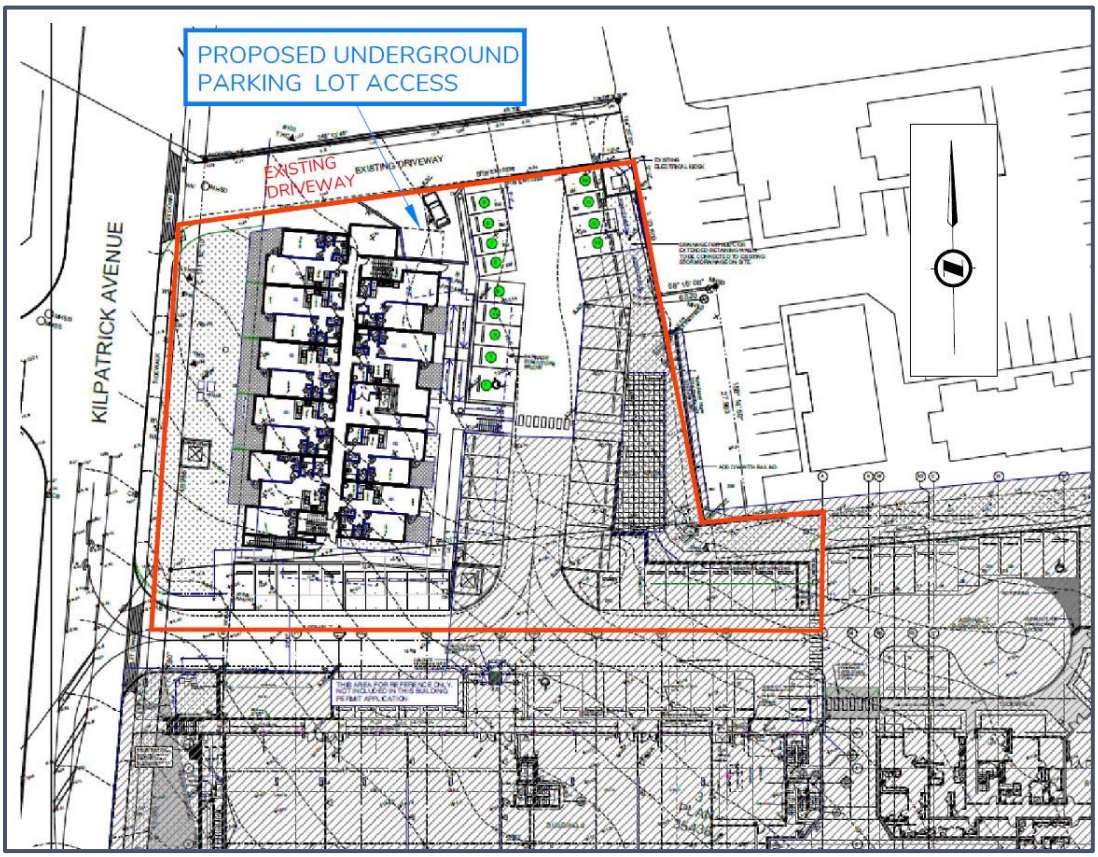

Figure 3: Site Plan and Access

3.3 TRIP GENERATION

PM peak hour site trips were estimated from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual (10th Edition)*. The *Trip Generation Manual* provides trip rates for a wide variety of land uses gathered from actual sites across North America over the past 40 years. **Table 1** summarizes the PM trip generations for the proposed land uses. The development will generate 18 trips (11 in; 7 out) during the PM peak hour.

TABLE 1: PM PEAK HOUR TRIP GENERATION

ITE Code	Land Use	Quantities	Trip Rate	Total Trips	Trips In	Trips Out
221	Multi-Family Housing (Mid-Rise)	41 units	0.44 trips / unit	18	11	7

3.4 TRIP ASSIGNMENT

The trip assignment was based on existing trip distributions for traffic in the area and key destinations / origins. A low percentage of the site trips would use the Cliffe Avenue / Anfiled Road intersection. The following summarizes the distribution percentages of the site trips at the study intersections. The resulted trip assignment for the PM peak hour is shown in **Figure 4**.

Distribution Percentages of Site Trips:

- 50% of site trips from / to Kilpatrick Avenue North
- 30% of site trips from / to 29th Street East
- 10% of site trips from / to 29th Street West
- 10% of site trips from / to Cliffe Avenue South via Anfield Road

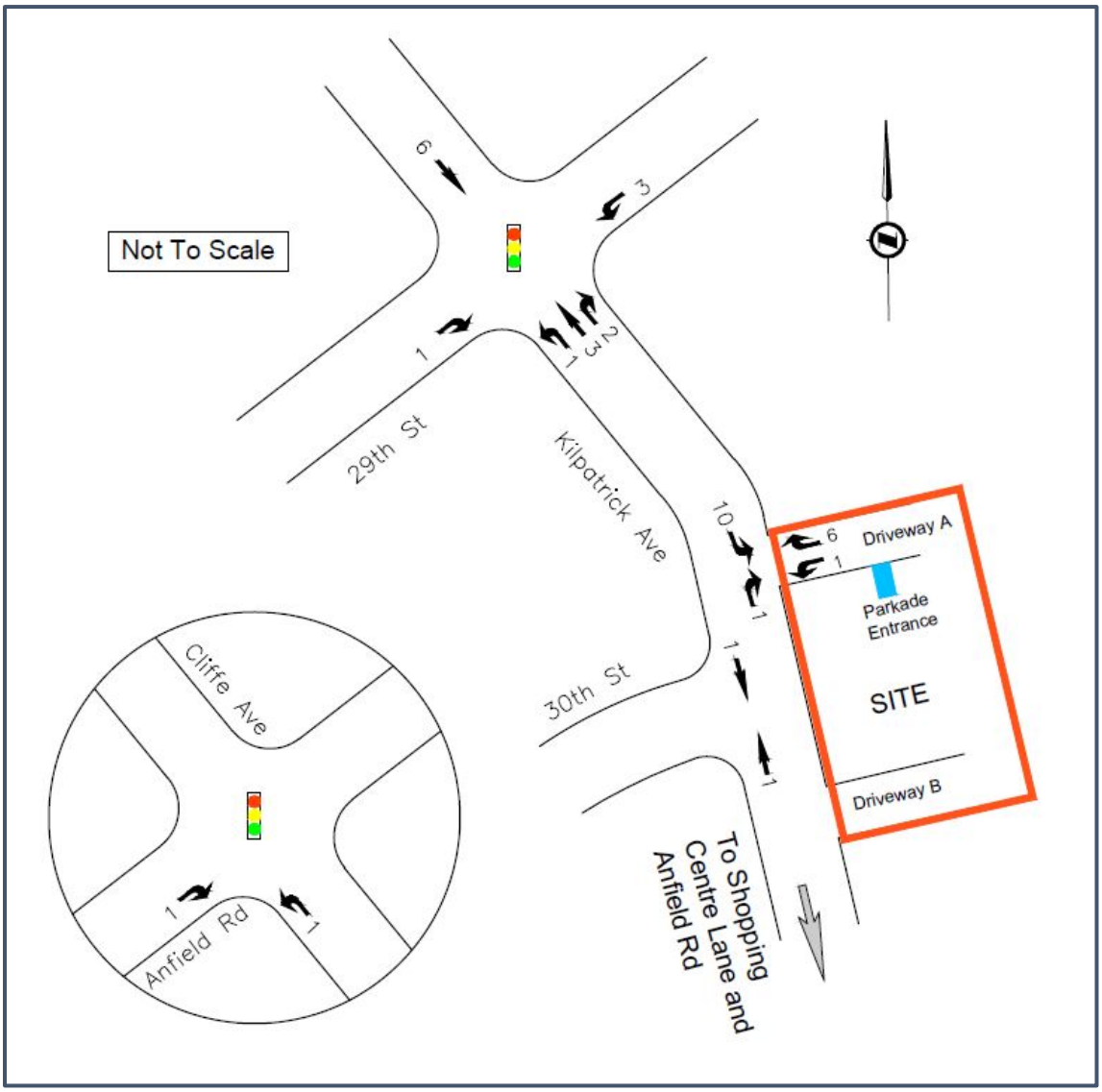

Figure 4: Trip Assignment – PM Peak Hour

3.5 OPENING DAY TRAFFIC CONDITIONS

The opening day post development conditions were analyzed by adding the development trips to background (existing) traffic volumes. The development does not impact traffic operations at the intersection of Kilpatrick Avenue / 29th Street. In the PM peak hour with the development, all movements will continue to operate at the same levels of service (LOS C or better) as background conditions. Additional delays by the

development will be a maximum of less than a half second for all movements. Additional queue lengths by the development will be just 0.2m extended on average at all four left turn lanes and no increase in queue length is anticipated for any of the through lanes in the PM peak hour.

The development does not impact traffic operations at the intersection of Cliffe Avenue / Anfiled Road. The intersection will continue to operate at a LOS A/B for all movements with the development. In the PM peak hour, there will be no additional delays and queues due to the development.

At Kilpatrick Avenue / 30th Street, the development will not impact traffic operations with almost no additional delays and queues for all movements. No capacity issues were found at the three study intersections.

At the site access on Kilpatrick Avenue, the stop controlled westbound (exiting) movement will operate at a LOS C with the development. There is a two-way left turn lane provided on Kilpatrick Avenue which allows for left turn access to the development frontage road.

See **Table 2** for the results of the analysis. See **Figure 5** for the Opening Day PM peak hour post development volumes.

TABLE 2: OPENING DAY PM PEAK HOUR CONDITIONS

INTERSECTION	MOVEMENT	Background			Post Development		
		LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)
KILPATRICK AVE / 29TH ST (SIGNALIZED)	EBL	C	23.6	35.7 (30)	C	23.6	33.6 (30)
	EBTR	B	13.7	44.8	B	13.7	39.2
	WBL	B	18.9	27.1 (55)	B	19.2	28.1 (55)
	WBTR	B	11.4	40.0	B	11.4	39.8
	NBL	A	9.8	24.4 (20)	A	9.9	25.4 (20)
	NBTR	B	11.3	57.9	B	11.5	57.5
	SBL	B	10.5	20.4 (20)	B	10.6	21.0 (20)
	SBTR	B	11.1	50.4	B	11.2	46.9
CLIFFE AVE / ANFIELD RD (SIGNALIZED)	EBL	B	10.5	16.3	B	10.5	16.5
	EBTR	A	4.2	16.0	A	4.2	14.5
	WBLT	A	9.0	1.3	A	9.0	1.5
	WBR	A	4.4	11.2	A	4.4	10.5
	NBL	A	9.7	14.8 (40)	A	9.8	15.1 (40)
	NBTR	B	10.8	37.7	B	10.8	39.6
	SBL	A	7.8	11.0 (25)	A	7.8	13.4 (25)
	SBT	B	15.7	54.4	B	15.7	51.8
	SBR	A	2.3	0	A	2.3	0
KILPATRICK AVE / 30TH ST	EBLR	C	15.5	13.8	C	15.5	14.3
	NBL	A	8.1	4.4	A	8.2	4.3
	NBT	A	0.0	0.0	A	0.0	0.0
	SBTR	A	0.0	0.0	A	0.0	0.0

*Note: 95th Queues based on SimTraffic results (averaged from five simulation runs); (##) = Existing Storage Length

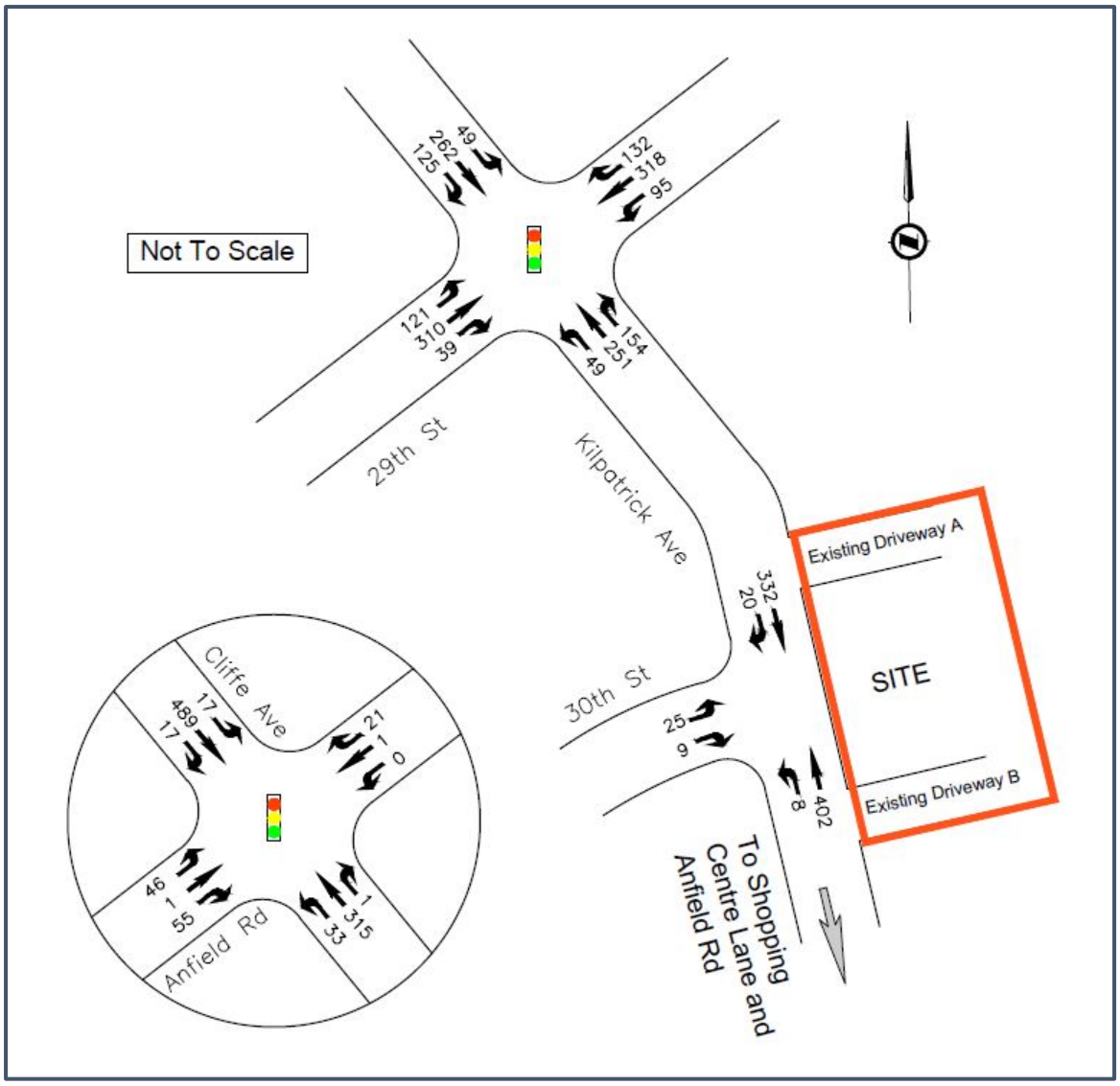

Figure 5: Opening Day Post Development Volumes

4.0 2031 10-YEAR HORIZON TRAFFIC CONDITIONS

For the ten-year horizon analysis, 2031 background volumes were obtained using an annual growth rate of 1.0%, which has been determined based on the MOTI's UTVS data in the area. See **Figure 6** for 2031 PM peak hour background volumes.

4.1 2031 BACKGROUND CONDITIONS

2031 background conditions were analyzed for the three study intersections in the PM peak hour. At Kilpatrick Avenue / 29th Street, all movements will operate at a LOS C or better. The intersection of Cliffe Avenue / Anfield Road will operate at a LOS A/B for all movements. At Kilpatrick Avenue / 29th Street, the eastbound movement with stop control will operate at a LOS C while all other movements remain at a LOS A.

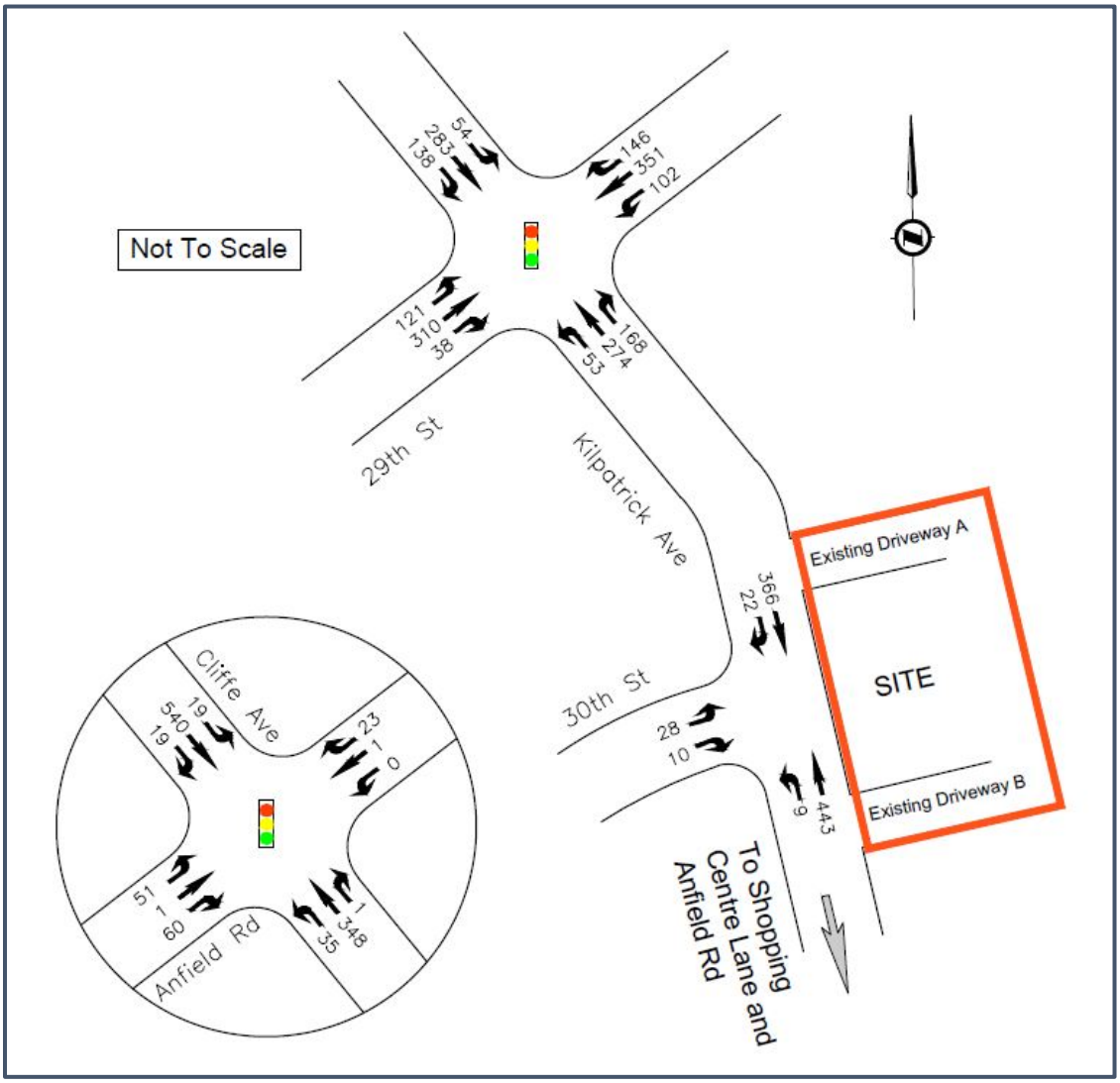

Figure 6: 2031 PM Peak Hour Background Volumes

4.2 2031 POST DEVELOPMENT ANALYSIS RESULTS

2031 post development conditions were analyzed by adding the development trips to 2031 background traffic volumes. The development will not impact traffic operations at the three study intersections. All movements will continue to operate at the same levels of service (LOS C or better) for all movements at the three study intersections in the 2031 PM peak hour with the development.

Additional delays (0.4 seconds or less) and queue lengths estimated by the development would be negligible for all movements at the three study intersections. The development does not trigger the need for any mitigate measures at any of the study intersections. See **Table 3** for the results of the 2031 background and post development analysis. See **Figure 7** for 2031 PM peak hour post development volumes.

TABLE 3: 2031 10-YEAR HORIZON PM PEAK HOUR CONDITIONS

INTERSECTION	MOVEMENT	Background			Post Development		
		LOS	Delay (s)	Queue (m)	LOS	Delay (s)	Queue (m)
KILPATRICK AVE / 29TH ST (SIGNALIZED)	EBL	C	31.3	39.3 (30)	C	31.3	36.6 (30)
	EBTR	B	14.1	50.8	B	14.1	37.9
	WBL	C	21.3	30.2 (55)	C	21.7	32.1 (55)
	WBTR	B	12.2	41.5	B	12.2	43.3
	NBL	B	10.6	27.7 (20)	B	10.7	26.3 (20)
	NBTR	B	12.6	61.8	B	12.8	67.8
	SBL	B	11.6	23.9 (20)	B	11.7	27.0 (20)
	SBTR	B	12.1	53.4	B	12.3	52.2
CLIFFE AVE / ANFIELD RD (SIGNALIZED)	EBL	B	10.6	16.9	B	10.6	15.0
	EBTR	A	4.1	16.1	A	4.1	16.0
	WBLT	A	9.0	-	A	9.0	1.3
	WBR	A	4.3	10.7	A	4.3	10.4
	NBL	B	10.8	17.3 (40)	B	10.9	19.5 (40)
	NBTR	B	11.3	41.9	B	11.3	40.9
	SBL	A	7.9	14.5 (25)	A	7.9	18.1 (25)
	SBT	B	18.2	65.0	B	18.2	63.5
	SBR	A	2.5	0	A	2.5	0
KILPATRICK AVE / 30TH ST	EBLR	C	16.9	14.3	C	16.9	14.6
	NBL	A	8.2	5.2	A	8.2	4.8
	NBT	A	0.0	0.0	A	0.0	0.0
	SBTR	A	0.0	0.0	A	0.0	0.0

*Note: 95th Queues based on SimTraffic results (averaged from five simulation runs); (##) = Existing Storage Length

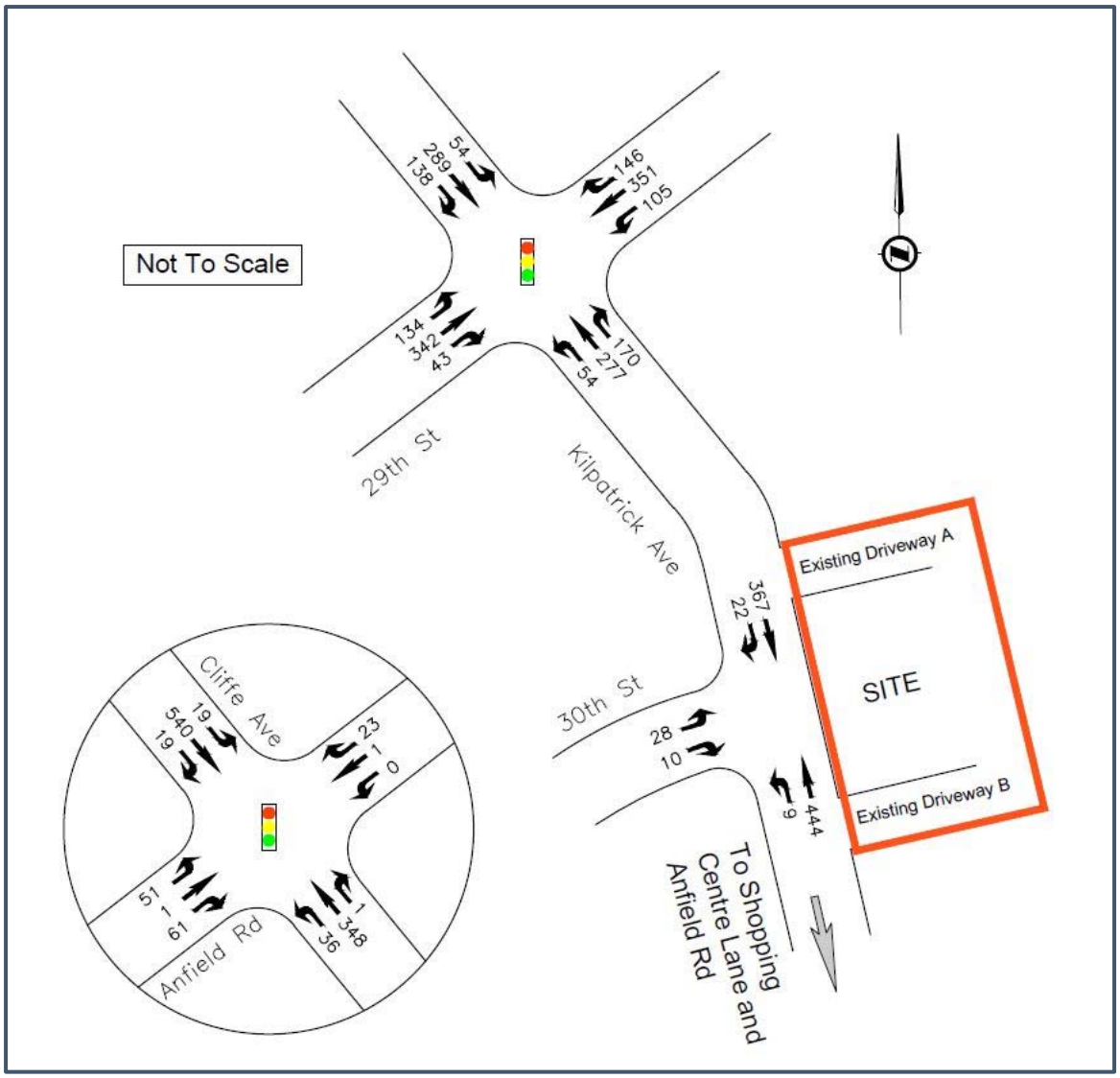

Figure 7: 2031 PM Peak Hour Post Development Volumes

5.0 ACTIVE TRANSPORTATION

5.1 PEDESTRIANS AND CYCLING FACILITIES

The City's OCP provides targets to double the percentages of trips by non-automobile travel modes in the long term. There is currently a sidewalk along the development frontage on Kilpatrick Avenue connecting to the shopping centre area in the southern direction. A pedestrian pathway connection is proposed from the building entrance to the existing sidewalk of Kilpatrick Avenue. Pedestrians are well accommodated for with a sidewalk from the site to the shopping centre and in other directions in the vicinity of the development. There are two marked crosswalks at the east and south of Kilpatrick Avenue / Wal Mart Access. There are currently no bike lanes on Kilpatrick Avenue, and is not designated as a cycling route in the City's Transportation Master Plan. Cyclists share the road with motorists. On-site, a bike storage room and electric vehicle ready parking will be provided.

5.2 TRANSIT

Three bus routes pass in front of the proposed site on Kilpatrick Avenue. Currently, there is a bus stop at Kilpatrick Avenue / 30th Street. Transit routes (#1 and #8) provide service to downtown Courtenay a 20-30min headway during the peak hours. The #2 route provides service to Cumberland via Comox Valley Parkway 10 times per weekday and #20 provides service to Royston (Island Highway and Hayward) 6 times per weekday.

6.0 CONCLUSION

Background volumes for the opening day analysis were collected and adjusted with a 15% increase from measured 2021 volumes to better reflect traffic conditions in a normal, non-pandemic year. The proposed development will generate 18 vehicle trips in the PM peak hour. The development will not affect traffic conditions within study area as there is a low amount of site trips generated during the peak period.

At all three study intersections, all movements will continue to operate at the same levels of service (LOS C or better) with the development in the long term. There will be no queuing issue at the study intersections due to the development. The proposed development will not trigger the need for any mitigation measures at the study intersections.

There is existing sidewalk along the development frontage of Kilpatrick Avenue. A pedestrian pathway connection is proposed from the building entrance to the existing sidewalk of Kilpatrick Avenue.

7.0 RECOMMENDATIONS

The development does not trigger the need for any mitigate measures at any of the study intersections or the site access. However, the City / MoTI should consider left turn lane storage improvements for Kilpatrick Avenue / 29th Street if existing queuing issues become significant in the long term due to background traffic.

APPENDIX A: SYNCHRO INFORMATION

SYNCHRO MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed using Synchro and SimTraffic traffic modeling software. Results were measured in delay, level of service (LOS) and 95th percentile queue length. Synchro is based on the Highway Capacity Manual (HCM) methodology. SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly "seeding" or positioning vehicles travelling throughout the network. The simulation is run five times (five different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

Levels of Service

Traffic operations are typically described in terms of levels of service, which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable / disruptive operations). LOS E/F are generally unacceptable levels of service under normal everyday conditions.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The table below indicates the range of delay for LOS for signalized and unsignalized intersections.

Table A1: LOS Criteria, by Intersection Traffic Control

Level of Service	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	Less than 10	Less than 10
B	10 to 15	11 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	More than 50	More than 80