



EAGLE NEST DEVELOPMENT

Traffic Impact Assessment Update

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1.0 INTRODUCTION

Watt Consulting Group was retained by Invictus Commercial Investment to update the traffic impact assessment for the Eagle Nest development on the northwest corner of Helmcken Road/ Burnside Road West in the Town of View Royal, BC. This update assesses existing traffic conditions, post development traffic conditions for both short and long term horizon years, the proposed site access as well as Transportation Demand Management strategies for the site.

1.1 STUDY AREA

The study area for this project includes the Helmcken Road/ Burnside Road West and Helmcken Road/ Watkiss Way / Chancellor Avenue intersections. Burnside Road West within the study area is a municipal boundary between the Town of View Royal and District of Saanich. **Figure 1** shows the site's location and study area intersections.



Figure 1: Study Area and Site Location

2.0 EXISTING CONDITIONS

2.1 LAND USE

The proposed site currently includes a 15 unit apartment building and three single-family homes. Eagle Creek Village is located approximately 200m west of the site and has become a retail, office and residential hub of the Helmcken neighborhood of View Royal. Eagle Creek Village and its amenities are within a five minute walk from the site. The Victoria General Hospital is located approximately 500m west of the site and is a major employer in View Royal and the Greater Victoria region. Victoria General Hospital is within a ten minute walk from the site.

2.2 ROAD NETWORK

The study area roads include Helmcken Road, Burnside Road West, Watkiss Way and Chancellor Avenue. Helmcken Road is a major road with a combination of raised center median, dedicated left turn lanes and a two way left turn lane that provides access to residential properties between Burnside Road and Watkiss Way / Chancellor Avenue. For analysis purposes, Helmcken Road is considered to run east-west within the study area road network. Burnside Road West and Watkiss Way are major roads and considered to run north-south within the study area road network. Chancellor Avenue is a local road and also considered to run north-south with the study area.

The intersection of Helmcken Rd / Burnside Rd West is a four legged signalized intersection that is operated by the District of Saanich. Dedicated left turn lanes and channelized right turn islands are provided on the Helmcken Road approaches to the intersection. The eastbound left turn movement on Helmcken Road provides protected/permitted left turn signal phasing. The northbound and southbound legs are shared left/through/right lanes.

The intersection of Helmcken Rd / Watkiss Way / Chancellor Ave is also a four legged signalized intersection. Dedicated left turn lanes are provided on all approaches to the intersection and the Helmcken Road westbound approach includes a channelized right turn island. The eastbound and westbound left turn movements on Helmcken Road provide fully protected left turn signal phasing. The southbound left turn movement provides protected/permitted left turn signal phasing.

Helmcken Road and Watkiss Way have a posted 50 km/h speed limit. Burnside Road West (north of Helmcken Road) has an unposted 50 km/h speed limit. Chancellor Avenue and Burnside Road West (south of Helmcken Road) have a posted 30 km/h speed limit.

2.3 TRAFFIC COUNTS

Traffic counts were collected at the intersection of Helmcken Road / Burnside Road West and Helmcken Rd / Watkiss Way / Chancellor Ave on December 10th, 2019 during the AM peak hour (8:00 to 9:00 AM) and PM peak hour (4:00 to 5:00 PM). The count data was then used to analyze existing conditions at the intersections as detailed in section 2.5 below.

At the time of the December 10, 2019 traffic counts, the McKenzie Interchange project was under construction with all traffic controlled by traffic signals. On Dec 20th, 2019 traffic was allowed to free-flow on Highway 1 at McKenzie Avenue; however, key elements of the interchange such as the dual right turn from McKenzie to Highway 1 and the southbound cloverleaf were not completed. On January 20, 2020, at the request of the developer WATT undertook additional AM and PM peak hour traffic counts at each study area intersection. The January 20, 2020 traffic count data suggests that since free flow traffic operations on Highway 1 at McKenzie Avenue was implemented, the segment of Helmcken Road between Watkiss Way / Chancellor Ave and Burnside Road West fronting the site has realized average volume reductions in the AM and PM peak hours of 13% and 9% respectively.

2.4 TRAFFIC MODELLING

Analysis of the traffic conditions at the intersections within the study area were undertaken using Synchro software. 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 10) provides analysis using the Highway Capacity Manual (2010) methodology, while SimTraffic integrates established driver behaviors and characteristics to simulate actual conditions by randomly “seeding” or positioning vehicles travelling throughout the network. The software generates measures of effectiveness that include level of service (LOS), delay and 95th percentile queue length.

Intersections are analyzed to determine the level of service, delays and 95th percentile queue lengths. The levels of service are broken down into six letter grades with LOS A being excellent operations and LOS F indicating failing 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 software is provided in **Appendix A**.

2.5 EXISTING VOLUMES AND CONDITIONS

The existing traffic volumes and lane geometrics were entered into Synchro to determine existing traffic conditions for both study area intersections during the AM and PM peak hours. At the Helmcken Rd / Burnside Rd West signalized intersection, all movements are operating at LOS D or better during the AM peak hour with two exceptions; northbound and southbound movements currently operate at LOS F. During the PM peak hour, all movements operate at LOS D or better except for the northbound movements which also operate at LOS F.

At the Helmcken Rd / Watkiss Way / Chancellor Ave signalized intersection, all movements are operating at LOS D or better during the AM peak hour except for the eastbound (Helmcken to Watkiss) left turn movement that operates at LOS E. During the PM peak hour, all movements operate at LOS D or better.

It is important to note that the Synchro software analyses each intersection in isolation, not as connected nodes of a system that interact with and affect other intersections in the system. However, when the intersections are simulated with SimTraffic as part of a network, the interaction between the intersections, especially westbound queues from the Helmcken Rd / Watkiss Way / Chancellor Ave intersection confirm traffic operations are worse than the Synchro results indicate. Observations in the field also confirm that during the PM peak hour, the westbound movement on Helmcken Road experiences long queues that extend from Watkiss Way / Chancellor Avenue beyond Burnside Road West approximately one kilometer. The northbound movement on Burnside Road West in turn experiences failing conditions due to the westbound queues and limited storage on Helmcken Road for northbound left turning traffic from Burnside Road West. The Burnside Road West northbound left movement is further impacted by opposing southbound right turn traffic on Burnside Road West. However, there is potential for the current McKenzie Interchange project to improve conditions on Helmcken Road and Burnside Road West with the study area. Conditions at each intersection should be reassessed to confirm impacts on traffic when the McKenzie Interchange project is completed. See **Figure 2** for 2019 existing volumes and levels of service.

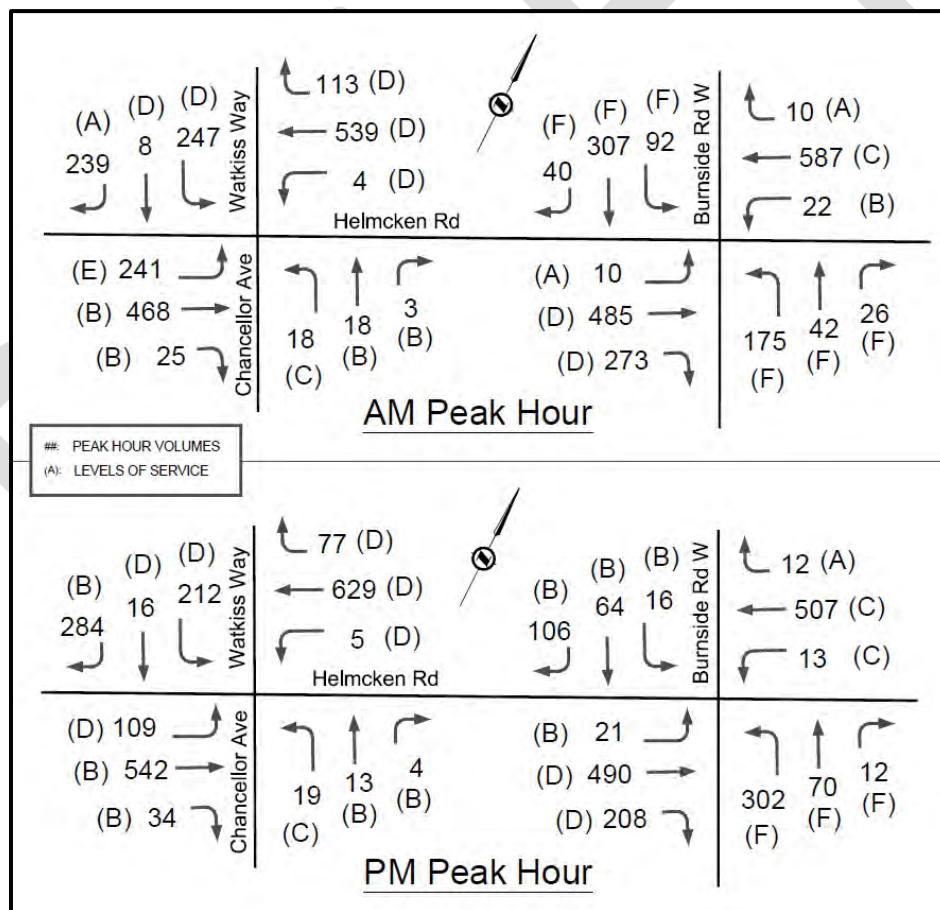


Figure 2: 2018 Existing Volumes and Levels of Service

3.0 BACKGROUND VOLUMES AND CONDITIONS

3.1 BACKGROUND VOLUMES

Background traffic volumes are future traffic volumes that are anticipated as a result of traffic volume increases due to general growth/development in the area over a period of time, exclusive of site development traffic. To estimate study area traffic growth over time at the year of expected buildout (2023) and 10 years beyond buildout (2033), WATT compared traffic volumes at the intersection taken in March 2018 with the recent traffic counts taken in December 2019. The comparison of total traffic volumes at the intersection indicates there has been a 3% annual growth in total traffic volumes at the study area intersections. However, the McKenzie Interchange's potential impact on traffic volumes in the area suggests that a reduced annual traffic growth rate of 2.0% be applied to all 2019 traffic volumes to estimate 2023 and 2033 background traffic volumes at the study area intersections.

3.2 BACKGROUND CONDITIONS

The 2023 and 2033 background traffic volumes were then analyzed to estimate future operations the study area intersections without site generated traffic. During the 2023 Background AM peak hour, all movements at each study area intersection will continue to operate at the same LOS as the 2019 AM peak hour with the following exceptions:

- Helmcken Rd / Watkiss Way / Chancellor Ave eastbound left turn drops from LOS E to LOS F and the westbound through/right turn movement drops from LOS D to LOS F
- Helmcken Rd / Burnside Rd West eastbound through movement drops from LOS D to LOS E

During the 2023 Background PM peak hour, all movements at each study area intersection will continue to operate at the same LOS as the 2019 AM peak hour with the following exceptions:

- Helmcken Rd / Watkiss Way / Chancellor Ave westbound through/right turn movement drops from LOS D to LOS F
- Helmcken Rd / Burnside Rd West southbound movement drops from LOS B to LOS C.

During the 2033 Background AM peak hour, all movements at each study area intersection will continue to operate at the same LOS as the 2023 Background AM peak hour with the following exceptions:

- Helmcken Rd / Watkiss Way / Chancellor Ave southbound left turn drops from LOS D to LOS E and the southbound right turn movement drops from LOS A to LOS B
- Helmcken Rd / Burnside Rd West eastbound through movement drops from LOS E to LOS F

During the 2033 Background PM peak hour, all movements at each study area intersection will continue to operate at the same LOS as the 2023 Background PM peak hour with the following exceptions:

- Helmcken Rd / Watkiss Way / Chancellor Ave southbound right turn movement drops from LOS C to LOS D
- Helmcken Rd / Burnside Rd West eastbound through movement drops from LOS C to LOS D.

All 2023 and 2033 background conditions are provided in **Table 1** and **Table 2** respectively.

TABLE 1: 2023 BACKGROUND CONDITIONS

Intersection	Movement	2023 AM Background			2023 PM Background		
		LOS	Delay (s)	95% Queue (m)	LOS	Delay (s)	95% Queue (m)
Helmcken / Watkiss / Chancellor	NBL	C	24.7	9.0	C	23.6	15.5
	NBTR	B	18.9	11.1	B	15.3	13.1
	SBTL	D	49.5	64.6	D	41.5	63.7
	SBR	A	9.4	44.1	B	16.4	48.9
	EBL	F	87.9	69.0	D	45.9	31.5
	EBTR	B	14.5	63.6	B	13.9	81.4
	WBL	D	46.0	5.2	D	46.4	3.4
	WBTR	F	82.7	381.3	F	87.7	334.4
Helmcken / Burnside	EBL	A	7.6	38.2	B	11.4	54.2
	EBTR	E	61.3	322.8	D	37.7	414.2
	WBL	B	15.3	68.7	C	25.9	53.3
	WBT	C	22.3	512.6	C	26.9	466.7
	WBR	A	0.8	25.5	A	0.4	27.7
	NBLTR	F	443.6	125.9	F	209.1	180.6
	SBLTR	F	161.7	110.7	C	20.5	48.4

TABLE 2: 2033 BACKGROUND CONDITIONS

Intersection	Movement	2033 AM Background			2033 PM Background		
		LOS	Delay (s)	95% Queue (m)	LOS	Delay (s)	95% Queue (m)
Helmcken / Watkiss / Chancellor	NBL	C	27.9	10.9	C	24.3	16.6
	NBTR	B	18.6	13.5	B	15.0	12.3
	SBTL	E	78.8	230.1	D	48.0	216.9
	SBR	B	16.5	111.0	C	25.0	100.4
	EBL	F	157.8	128.6	D	49.3	140.1
	EBTR	B	15.9	334.8	B	18.1	317.7
	WBL	D	46.6	3.9	D	48.0	3.3
	WBTR	F	184.0	330.8	F	215.8	332.1
Helmcken / Burnside	EBL	A	7.9	46.2	B	12.5	66.7
	EBTR	F	154.1	355.7	E	66.9	387.4
	WBL	B	15.8	61.2	D	41.9	86.8
	WBT	C	34.2	413.5	C	33.3	525.3
	WBR	A	1.5	29.6	A	1.3	22.9
	NBLTR	F	728.1	168.8	F	568.2	158.0
	SBLTR	F	276.9	133.5	C	26.6	124.5

4.0 POST DEVELOPMENT CONDITIONS

4.1 PROPOSED LAND USE

The proposed development is 247 units of multi-family housing within four buildings.

4.2 SITE ACCESS

The proposed access will be on Burnside Road West approximately 100m north of Helmcken Road. It is assumed that all site generated traffic will be going to and coming from the Helmcken Rd / Burnside Rd West intersection. **Figure 3** shows the proposed site plan and site access on Burnside Road West.

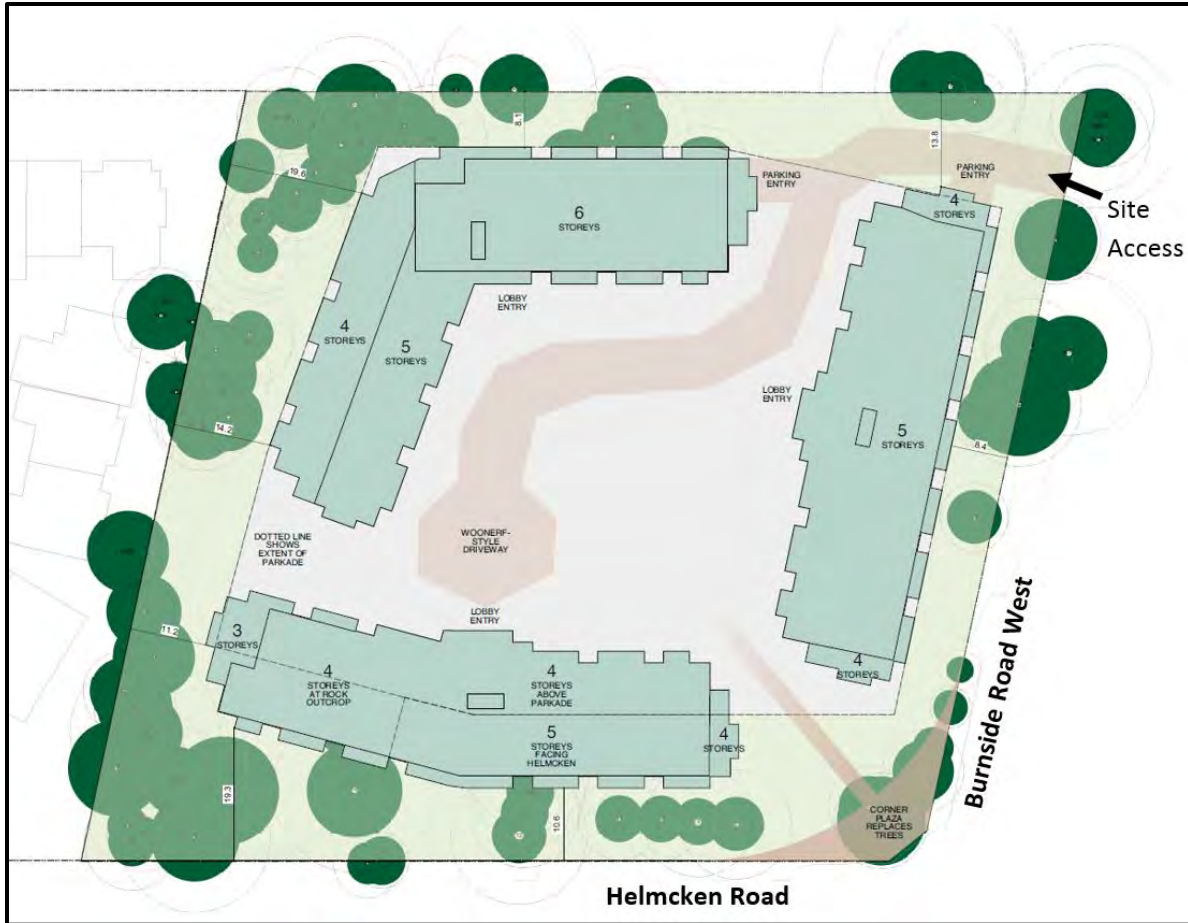


Figure 3: Proposed Site Plan and Access

4.3 TRIP GENERATION

Site trips were estimated using the ITE Trip Generation Manual (10th Edition) for the AM and PM peak hours. The peak hour site trip estimates also account for the existing trips generated by the current land uses at the site. **Table 3** and **Table 4** summarize the net trips for the site.

TABLE 3: AM PEAK HOUR TRIP GENERATION

ITE Code	Land Use	Size	Trip Rate	Total Trips	Trips In	Trips Out
221	Multi-family Housing (Mid-Rise)	247 units	0.36 trips / unit	89	23	66
221	Existing Apartment (Trip Deduction)	15 units	0.36 trips / unit	(-5)	(-1)	(-4)
210	Existing Single-family (Trip Deduction)	2 lots	0.74 trips/ unit	(-1)	(0)	(-1)
Net Trips				83	22	61

TABLE 4: PM PEAK HOUR TRIP GENERATION

ITE Code	Land Use	Size	Trip Rate	Total Trips	Trips In	Trips Out
221	Multi-family Housing (Mid-Rise)	247 units	0.44 trips / unit	109	66	43
221	Existing Apartment (Trip Deduction)	15 units	0.44 trips / unit	(-7)	(-4)	(-3)
210	Existing Single-family (Trip Deduction)	2 lots	0.99 trips/unit	(-2)	(-1)	(-1)
Net Trips				100	61	39

The proposed development will generate 83 new trips in the AM peak hour and 100 new trips in the PM peak hour after the existing site trips are deducted. When distributed evenly over the peak hours, the site will generate one new trip (entering or exiting the site) approximately every 40 seconds during the AM peak hour and every 35 seconds during the PM peak hour. The site generated trip estimates taken from ITE Trip Generation Manual were used directly and without trip modification factors as all site generated trips are considered primary trips and, exclusively residential developments do not generate pass-by trips. Moreover, the amenities that exist at the Eagle Creek Village (grocery store, pharmacy, medical clinic, YMCA gym, cafes and restaurants) which are within a five minute walk from the site may contribute to reducing vehicle trips to/from the site. Accordingly, the trip generation estimates for the site are considered conservative for analysis purposes.

4.4 TRIP ASSIGNMENT

The development trips were assigned to the study intersections and site access based on the distribution of existing trips at the study area intersections. At the Helmcken Rd / Burnside Rd West intersection, a traffic pattern is evident that sees southbound trips on Burnside Road predominantly travel straight through the intersection along Burnside Road in the AM peak hour while in the PM peak hour, northbound trips predominantly turn left onto westbound Helmcken Road. This traffic pattern is representative of the high volume of commuter traffic that travel through this intersection. Site generated trips have been assigned to the Helmcken Rd / Watkiss Way / Chancellor Ave and Helmcken Rd / Burnside Rd intersections as follows:

Helmcken Rd / Burnside Rd Intersection

AM Peak Hour

Trips In

- 55% of entering trips are from Burnside Road West south of Helmcken Rd
- 30% of entering trips are from Helmcken Road west of Burnside Rd West
- 15% of entering trips are from Helmcken Road east of Burnside Rd West

Trips Out

- 68% of exiting trips are to Burnside Road West south of Helmcken Rd

- 15% of exiting trips are to Helmcken Road west of Burnside Rd West
- 17% of exiting trips are to Helmcken Road east of Burnside Rd West

PM Peak Hour

Trips In

- 52% of entering trips are from Burnside Road West south of Helmcken Rd
- 23% of entering trips are from Helmcken Road west of Burnside Rd West
- 25% of entering trips are from Helmcken Road east of Burnside Rd West

Trips Out

- 20% of exiting trips are to Burnside Road West south of Helmcken Rd
- 74% of exiting trips are to Helmcken Road west of Burnside Rd West
- 6% of exiting trips are to Helmcken Road east of Burnside Rd West

Helmcken Rd / Watkiss Way / Chancellor Ave Intersection

AM Peak Hour

Trips In

35% of entering trips from Helmcken Road west of Burnside Rd West are from Watkiss Way

65% of entering trips from Helmcken Road west of Burnside Rd West are from Helmcken Road west of Watkiss Way / Chancellor Ave

Trips Out

20% of exiting trips to Helmcken Road west of Burnside Rd West are to Watkiss Way

80% of exiting trips to Helmcken Road west of Burnside Rd West are to Helmcken Road west of Watkiss Way / Chancellor Ave

PM Peak Hour

Trips In

30% of entering trips from Helmcken Road west of Burnside Rd West are from Watkiss Way

70% of entering trips from Helmcken Road west of Burnside Rd West are from Helmcken Road west of Watkiss Way / Chancellor Ave

Trips Out

20% of exiting trips to Helmcken Road west of Burnside Rd West are to Watkiss Way

80% of exiting trips to Helmcken Road west of Burnside Rd West are to Helmcken Road west of Watkiss Way / Chancellor Ave

Figure 4 shows site trips assigned to the Helmcken Rd / Watkiss Way / Chancellor Ave and Helmcken Rd / Burnside Rd intersections.

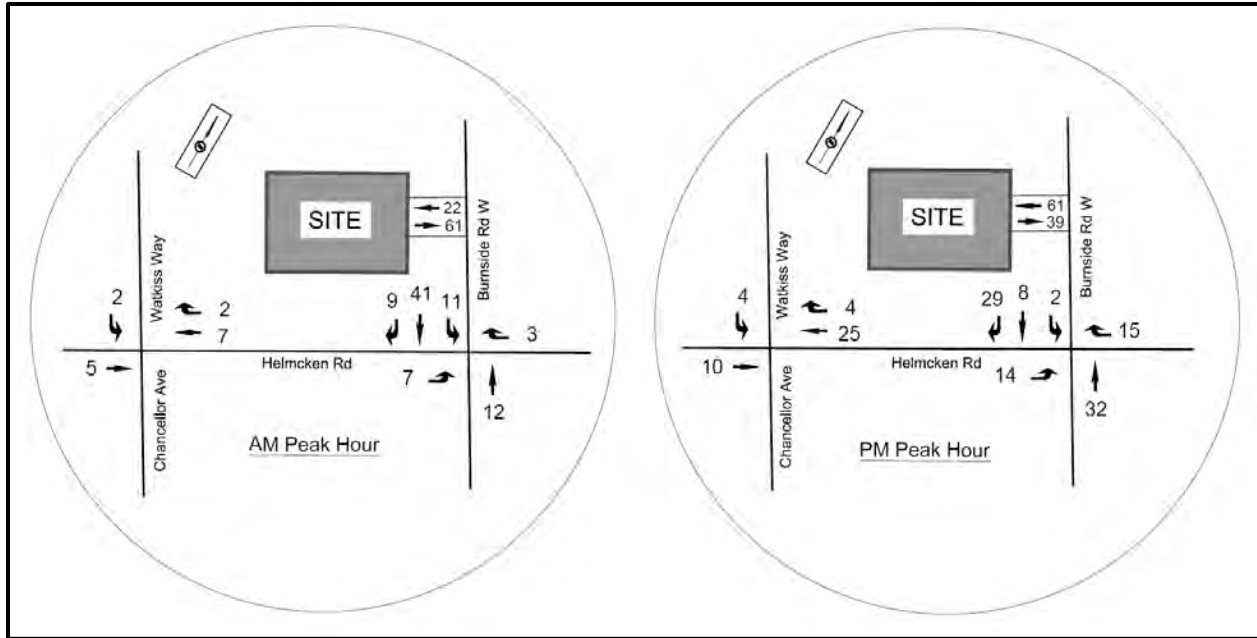


Figure 4: Site Trip Assignment for Peak Hours

4.5 POST DEVELOPMENT CONDITIONS

The AM and PM site generated trips were added to the 2023 and 2033 AM and PM background traffic volumes to determine the AM and PM peak hour post development traffic volumes. The post development traffic volumes were then entered into Synchro to determine the post development traffic conditions at the study area intersections.

4.6 2023 CONDITIONS – OPENING DAY

During the 2023 post development AM and PM peak hours, all movements at each intersection will continue to operate the same levels of service as 2023 background conditions. All movements at each intersection will experience five seconds or less of additional delay during the AM and PM peak hours except for those movements that operate at LOS F under background conditions. Movements with LOS F can experience up to 80 seconds of additional delay under AM post development conditions and up to 100 seconds of additional delay under PM post development conditions. However, even a small increase in volume to an already failing movement can increase delay and/or queuing exponentially.

4.7 2023 CONDITIONS- 10 YEARS POST BUILDOUT

During the 2023 post development AM and PM peak hours, all movements at each intersection will continue to operate the same levels of service as 2023 background conditions with one exception; the westbound through movement at the Helmcken Rd / Burnside Rd intersection will drop from LOS C to LOS D during the AM peak period. All movements at each intersection will experience 10 seconds or less of additional delay during the AM and PM peak hours except for those movements that operate at LOS F under background conditions. Movements with LOS F

can experience up to 80 seconds of additional delay under AM post development conditions and up to 147 seconds of additional delay under PM post development conditions. As noted, small volume increases to an already failing movement can exponentially increase delay and/or queuing.

All 2023 and 2033 post development conditions are provided in **Table 5** and **Table 6** respectively.

TABLE 5: 2023 POST DEVELOPMENT CONDITIONS

Intersection	Movement	2023 AM Post Development			2023 PM Post Development		
		LOS	Delay (s)	95% Queue (m)	LOS	Delay (s)	95% Queue (m)
Helmcken / Watkiss / Chancellor	NBL	C	25.4	10.2	C	23.6	13.0
	NBTR	B	19.3	11.8	B	15.3	12.5
	SBTL	D	52.2	65.5	D	41.7	90.9
	SBR	A	9.6	41.0	B	17.0	77.0
	EBL	F	89.4	51.6	D	46.0	37.5
	EBTR	B	14.2	66.3	B	14.1	67.5
	WBL	D	46.0	15.5	D	46.4	15.0
	WBTR	F	81.5	369.0	F	104.6	378.8
Helmcken / Burnside	EBL	A	8.1	66.6	B	12.9	54.8
	EBTR	E	61.3	322.2	D	37.7	147.6
	WBL	B	17.4	29.7	C	27.6	68.8
	WBT	C	28.0	528.3	C	30.4	524.3
	WBR	A	1.3	17.9	A	4.5	32.5
	NBLTR	F	529.3	203.4	F	292.7	188.1
	SBLTR	F	235.4	101.8	C	22.4	51.9

TABLE 6: 2033 POST DEVELOPMENT CONDITIONS

Intersection	Movement	2033 AM Post Development			2033 PM Post Development		
		LOS	Delay (s)	95% Queue (m)	LOS	Delay (s)	95% Queue (m)
Helmcken / Watkiss / Chancellor	NBL	C	28.0	12.6	C	24.3	11.8
	NBTR	B	18.6	13.7	B	15.0	13.3
	SBTL	E	79.8	231.8	D	49.0	140.3
	SBR	B	16.7	111.3	C	25.2	90.5
	EBL	F	157.8	122.7	D	49.3	130.9
	EBTR	B	15.9	299.3	B	18.2	317.1
	WBL	D	47.4	3.1	D	48.0	23.3
	WBTR	F	188.2	331.4	F	236.1	330.8
Helmcken / Burnside	EBL	A	8.3	54.3	B	14.5	71.7
	EBTR	F	154.1	353.1	E	66.9	400.9
	WBL	B	17.9	42.7	D	41.8	68.5
	WBT	D	49.9	450.2	C	33.9	443.7
	WBR	A	1.9	20.1	A	5.1	23.5
	NBLTR	F	757.4	158.6	F	715.2	156.7
	SBLTR	F	356.2	89.9	C	29.9	91.1

4.8 MITIGATION MEASURES

The analysis indicates that the unstable/ failing movements under existing conditions will worsen under 2023 and 2033 background conditions without site generated traffic. Signal timing changes including signal coordination between the two intersections will not improve the current and future congestion on Helmcken Road and Burnside Road West during the background and post development AM and PM peak hours. Widening of the westbound lanes on Helmcken Road at the Helmcken Rd / Watkiss Way / Chancellor Ave intersection can improve operations on Helmcken Road that can in turn improve operations at the Helmcken Rd / Burnside Rd intersection. However, until the McKenzie Interchange is completed and its impact on traffic operations in the area can be fully assessed, no mitigation measures are recommended at this time.

It is important to highlight that future failing conditions are due to background traffic, not site generated traffic. When site traffic is added to the study area intersections at buildout and 10 years beyond buildout, site traffic has minimal impact on level of service, delay and queuing at both intersections.

4.9 SITE ACCESS

The proposed site access will provide full movement access with stop control on the approach to Burnside Road West. All movements will operate at LOS A/B during the AM and PM peak hours

under 2033 post development conditions. A northbound left turn lane is not warranted on Burnside Road West at the site access with 2033 post development peak hour volumes.

The proposed access location meets TAC's recommended minimum corner clearance requirements of 55m between an access and a signalized intersection for collector roads. There is also sufficient sight distance at the proposed site access for drivers turning left (105m) and right (95m) at the access onto a 50 km/h road.

5.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management (TDM) refers to policies, programs and services that influence whether, why, when, where and how people travel.¹ TDM initiatives typically aim to reduce vehicle trips and parking demand while encouraging alternative travel options such as walking, cycling, public transit and shared rides. The developer may want to consider the following TDM programs to help support a reduction of single-occupant vehicle trips to and from the site.

5.1 BICYCLES AND ELECTRIC BICYCLES

The site is favourably located on the Helmcken Road bike route that provides dedicated bike lanes on both sides of Helmcken Road. In addition, the Galloping Goose Trail is approximately 300m south of the site providing a dedicated and separated multiuse trail connection between View Royal, downtown Victoria and several other Greater Victoria municipalities to the east and west. Burnside Road West is not a bicycle route and there are no bicycle facilities located on Burnside Road West. Bicycle facilities are not required on Burnside Road West as part of the site's development.

As per Town of View Royal Zoning bylaw, the developer will commit to providing on-site bicycle parking to help promote the use of cycling for commuter and shopping trips. As part of a broader strategy to reduce vehicle ownership, the developer should also consider secure bicycle parking spaces to accommodate 50 electric bikes (E-Bike) with an 110V wall outlet for each stall to allow E-Bike users to park and charge their E-Bikes. To further promote cycling use, the developer could provide 10 shared E-Bikes for commuting or recreational use by residents. Shared E-Bikes should be stored in a secure area accessible to residents with a key.

5.1.1 E-BIKE REBATES

According to research completed in Greater Victoria, the cost of an electric bike is the largest barrier preventing residents of the region from purchasing an E-Bike. Other research has confirmed the high purchase price as a barrier, however, one study found that those who were given access to an E-Bike had much higher willingness to pay for one. As part of an overall strategy to encourage more cycling, reduce vehicle use and make E-Bike ownership more attainable for residents, the applicant should consider providing a \$500 rebate toward residents' purchase of an E-Bike.

¹ Definition based on Transport Canada, TDM for Canadian Communities, March 2011

5.2 PEDESTRIAN FACILITIES

Currently there is an asphalt walkway with an extruded asphalt curb separating pedestrians from vehicle traffic along the site's Helmcken Road frontage and no sidewalk is provided along the Burnside Road West frontage. The site will provide new sidewalks on both the Helmcken Road and Burnside Road West frontages in accordance with the Town of View Royal's design standards.

5.3 TRANSIT SERVICES

The site is also favourably located to take advantage of public transit. Victoria Transit routes #22 Hillside Mall / Victoria General and # 39 Westhills / Uvic Exchange currently service the bus stop on the Helmcken Road fronting of the site. The developer has confirmed with BC Transit that improvements to the existing transit stop facility fronting of the site will include a new bus bay when the sidewalk on the Helmcken Road frontage is constructed as part of this development. In addition to this transit improvement, the developer could consider providing one monthly bus pass per unit twice annually to promote transit use by future residents. The provision of bus passes will allow residents to experience transit at no cost and may encourage them to use transit in the future.

BC Transit also currently offers the EcoPASS Program for New Developments, a program that provides Capital Regional District developers with a potential transit-oriented approach to reducing traffic congestion and carbon footprint. Under the EcoPASS Program, the occupants of a new residential, commercial or mixed-use development receive annual bus passes for a pre-determined number of years that are valid for use throughout the Victoria Regional Transit System. Each annual pass has a cost to the developer of \$1,000. The size and value of the TDM program is established by the municipal government, with a minimum required program value of \$5,000. The applicant could consider approaching the District of Saanich and BC Transit to learn more about this program and whether it may be feasible for long-term operations of the site.

In addition to transit passes, all new residents should be provided with a transit information package including information on how to obtain a transit pass, as well as a rider's guide which details scheduling and mapping information.

5.4 CARSHARING

Carsharing and ridesharing services including Modo and Rideshare Victoria (www.poparide.com) currently exist in the Greater Victoria area. Each model offers a potential reduction of on-site parking demand and development related traffic impacts.

Modo is a paid membership carsharing service where members share Modo vehicles. Modo requires a one-time membership purchase with pay-by-use fees for each ride thereafter. Pay-by-use fees vary depending on usage. There are currently no Modo vehicles close to the facility, however the developer has discussed with Modo the potential to provide a Modo vehicle stored

on site or nearby. Should Modo carsharing services be provided at or within close proximity to the site, Modo memberships could be included with the purchase of all units. Promotional material on carsharing and ridesharing programs should also be part of a TDM welcome package.

5.5 TDM INCENTIVES

Incentives and promotions have been valuable in encouraging use of alternative modes of transportation. However, if residents are not aware of the available TDM options, they will likely not consider using them. Information about available TDM programs for the site should be included in the show suite(s) and as part of a welcome package with the sale of all units. Once residents move into the site, on-going contests, promotions and incentives should be used to maintain awareness of the available TDM programs. The use of an annual week long contest similar to a commuter challenge or bike to work week for residents would encourage use of alternative transportation modes that residents may not normally consider or try. Prizes for participation and high use could include gift certificates for local grocery stores and restaurants, YMCA gym passes, BC Transit vouchers or bicycle equipment such as helmets and bike lights.

6.0 CONCLUSIONS

Synchro analysis of existing conditions at the Helmcken Rd / Burnside Rd West signalized intersection indicates northbound and southbound movements on Burnside Road West currently operate at LOS F during the AM peak hour. During the PM peak hour, northbound movements also operate at LOS F.

Existing conditions at the Helmcken Rd / Watkiss Way / Chancellor Ave signalized intersection indicate the eastbound left turn movement (Helmcken to Watkiss) operates at LOS E during the AM peak. During the PM peak hour all movements operate at LOS D or better. However, SimTraffic analysis confirms field observations that during the PM peak hour, the westbound movement on Helmcken Road experiences long queues that extend from Watkiss Way / Chancellor Avenue beyond Burnside Road West (approximately one kilometer). In turn, the northbound movement on Burnside Road West experiences failing conditions and long queues due to the westbound queues on Helmcken Road that provide limited storage for northbound left turning traffic on Burnside Road West.

The proposed development will generate 83 new trips in the AM peak hour and 100 new trips in the PM peak hour. When distributed evenly over the peak hours, the site will generate one new trip (entering or exiting the site) approximately every 40 seconds during the AM peak hour and every 35 seconds during the PM peak hour. Based on the site's proximity to Eagle Creek amenities as well as proximity to alternative modes for commuting, the trip generation estimates for the site are considered conservative.

Future failing conditions are due to background traffic, not site generated traffic. When site traffic is added to the study area intersections at buildout and 10 years beyond buildout, site traffic has a minimal impact on level of service, delay and queuing at both intersections.

Signal timing changes including signal coordination will not improve the current and future congestion on Helmcken Road and Burnside Road West during the AM and PM peak hours. Until the McKenzie Interchange is completed and its impact on traffic operations in the area can be fully assessed, no mitigation measures are recommended.

The proposed site access meets the recommended access spacing from a signalized intersection as well as driver sight distance requirements. A northbound left turn lane is not required on Burnside Road West at the access based on the 2033 post development peak hour volumes.

Sidewalk will be provided on the site's Helmcken Road and Burnside Road West frontages along with improvement to the Helmcken bus stop.

TDM programs and incentives can further help support a reduction of single-occupant vehicle trips to and from the site.

7.0 RECOMMENDATIONS

- Install concrete sidewalks along the development frontages on Helmcken Road and Burnside Road West.
- Install bus bay on the Helmcken Road frontage.
- Consider TDM programs and incentives to help support a reduction of single-occupant vehicle trips to and from the site.

APPENDIX A: SYNCHRO BACKGROUND

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SYNCHRO MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed using Synchro and SimTraffic traffic modelling software. Results were measured in delay, level of service (LOS), 95th percentile queue length and volume to capacity ratio. 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 ten times (ten 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. A LOS C or better is considered acceptable operations, while D is considered to be on the threshold between acceptable and unacceptable operations. Highway operations will typically need to operate at LOS C or better for through movements and LOS E or better for other traffic movements with lower order roads.

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 (LOS)	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80