

3977 Rainbow Street  
**Transportation Impact Study**  
Final

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Prepared for  
Abstract Developments Ltd.

Date  
June 25, 2021

Project No.  
04-20-0114



June 25, 2021  
04-20-0114

Kelsey Waller  
Assistant Development Manager  
Abstract Developments, Ltd.  
301-1106 Cook Street  
Victoria, BC  
V8V 3Z9

Dear Kelsey:

**Re: 3977 Rainbow Street  
Transportation Impact Study**

As requested, Bunt & Associates has prepared a Transportation Impact Assessment (TIS) for the proposed townhouse development at 3977 Rainbow Street in Saanich, BC. The study reviews current and future vehicle operations and assesses any off-site impacts that may arise from the construction of the proposed 25-townhouse development. In addition, the study provides a rationale for the reduced parking supply and notes opportunities for the development to improve the local transportation network.

We trust this TIS will assist the project in advancing through the District of Saanich's planning process and provide information to respond to resident concerns surrounding traffic generated by the new development.

Please do not hesitate to contact us should you have any questions.

Yours truly,  
**Bunt & Associates**

Simon Button, P.Eng., M.Eng., PMP  
Transportation Engineer

Nicolas Moss, EIT  
Transportation Analyst



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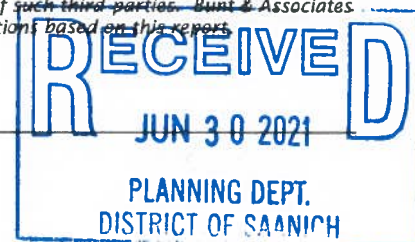
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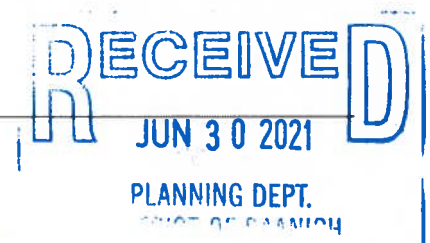


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## 1. INTRODUCTION

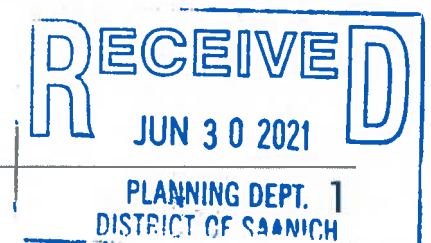
### 1.1 Study Purpose & Objectives

Abstract Developments Inc. is proposing to redevelop the properties at 3977 Rainbow Street, 812 Sevenoaks Road, and 822 Sevenoaks Road in Saanich, BC. **Exhibit 1.1** illustrates the site located north of Swan Lake in an isolated area of the transportation network that has only two access points to the rest of the region via McKenzie Avenue.

The purpose of this study is to evaluate the transportation impacts the proposed development has on the nearby road network and to review the development's parking strategy and determine its suitability. Although a Transportation Impact Study (TIS) is typically not required for this small scale of a development, Abstract was interested in learning how the proposed development fits into the local area from a transportation perspective and what positive impacts can be made to the neighbourhood.

### 1.2 Development Details

The development includes 25 townhouse units, each with three bedrooms. Vehicle access is taken from Sevenoaks Road and each townhouse has an attached garage housing either one or two cars. **Exhibit 1.2** illustrates the proposed site plan. Four visitor parking spaces are provided on-site, and the development is creating 10 public on-street parking spaces: 5 on Rainbow Street and 5 on Sevenoaks Road.



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**Exhibit 1.1  
Site Location**



04-20-0114

3977 Rainbow Street TIS  
May 2020

RECEIVED  
JUN 30 2021  
PLANNING DEPT.  
DISTRICT OF SAANICH

RECEIVED  
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PLANNING DEPT.  
DISTRICT OF SAANICH

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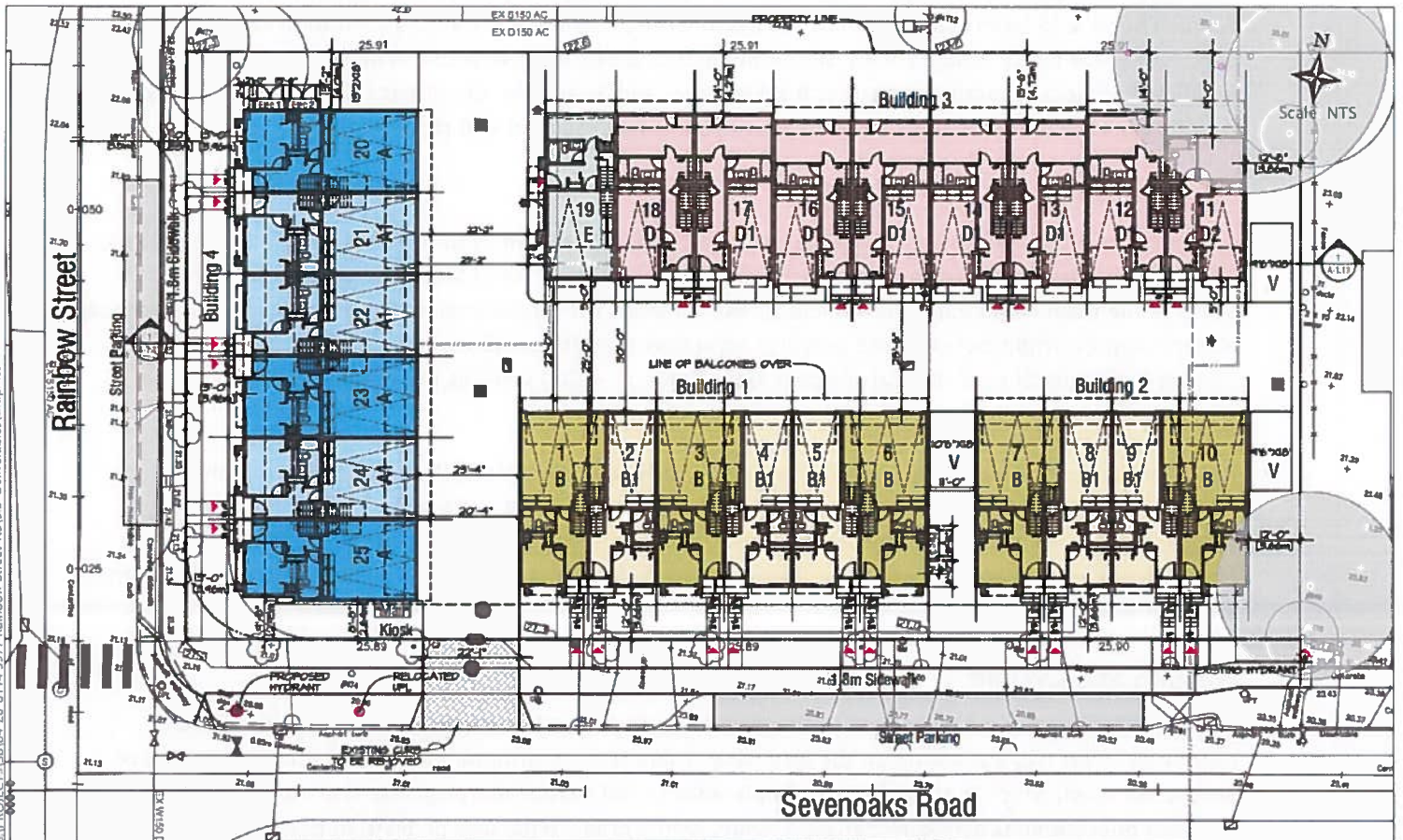


Exhibit 1.2  
Site Plan

3977 Rainbow Street TIS  
June 2021

04-20-0114





## 2.4 Transit

BC Transit Route 51 (Langford/UVic) operates on McKenzie Avenue during weekday peak hours only and Route 16 (UVic/Uptown Express) operates on McKenzie Avenue on weekdays when school is in session. The bus stops in both directions on McKenzie Avenue are west of Nelthorpe Street, less than a 400-metre walk from the development site, and have bus shelters and trash bins.

Routes 70, 71, 72, and 75 operate on the Patricia Bay Highway one block west of the study area, and Route 26, which is a Frequent Route, operates on Saanich Road one block east of the study area. The combination of these routes, which remain within easy walking distance, provide ample transit connection to UVic, Downtown, Uptown, and Swartz Bay.

## 3. DEVELOPMENT PLAN REVIEW

### 3.1 Vehicle Parking Supply Review

Providing the appropriate level of vehicle parking is critical, not enough spaces can cause parking demand to spill onto adjacent streets while over providing vehicle parking can result in wasted resources, unnecessary promotion of vehicle ownership and vehicle dependence.

The District's Zoning Bylaw requires that townhomes provide 2.0 vehicle spaces per unit. The development includes 40 spaces which equates to 1.6 spaces/unit. Of these spaces 36 are for residents (1.4 spaces/unit) and 4 (0.2 spaces/unit) are for visitors.

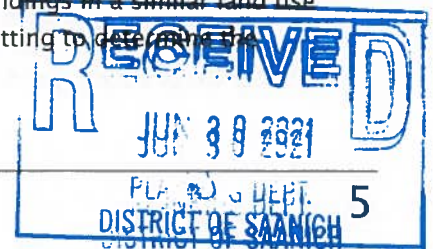
#### 3.1.1 District of Saanich Policies

The District's Active Transportation Plan (ATP) states a target of reducing the number of trips made in Saanich by vehicle from 82% in 2011 to 64% by 2036 and 50% by 2050. The District has also recently declared a climate emergency and has substantial goals of reducing greenhouse gas emissions by 50% below 2007 levels by 2030 and to become a net-zero emission community by 2050.

As such, supplying an appropriate amount of vehicle parking for new developments with these City-wide targets in mind is a key tool in achieving these goals. A reduced parking supply is directly linked to vehicle ownership, which is directly linked to vehicle travel, therefore reducing these will have a positive impact on lowering greenhouse gas emissions.

#### 3.1.2 Anticipated Demand

Conducting vehicle demand observations at townhome sites can be difficult due to the common use of enclosed garages. Therefore, the parking demand at multi-family strata buildings in a similar land use context was assessed in addition to townhome sites in a more suburban setting to determine the suitability of the proposed 1.6 spaces/unit.



**Table 3.1** summarizes parking data from multi-family buildings which are comprised primarily of 1- and 2-bedroom condos. Resident parking demand was observed at midnight and was increased by 5% to account for potentially vacant units and residents who may not have been home at the time. Visitor parking demand was observed in the evening which is the peak time for visitors. The three sites have an average vehicle ownership rate of 0.8 vehicles/unit and an average peak visitor demand of 0.07 vehicles/unit.

**Table 3.1: Multi-family Strata Vehicle Ownership Observations – Peak Demand**

ADDRESS	# OF UNITS	RESIDENTS (VEHICLES/ UNIT)	RESIDENTS SUPPLY (SPACES/ UNIT)	VISITOR (VEHICLES/ UNIT)	VISITOR SUPPLY (SPACES/ UNIT)
1870 Gordon Head Road	90	0.86	1.22	0.15	0.27
1490 Garnet Road	55	0.94	1.27	0.04	0.18
1680 Poplar Street	73	0.73	1.18	0.03	0.11
<b>AVERAGE</b>	-	<b>0.8</b>	-	<b>0.07</b>	-

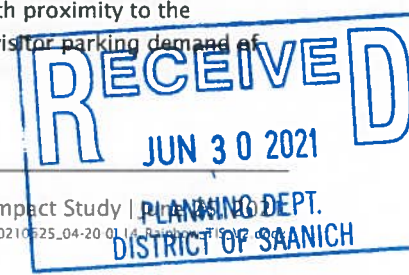
**Table 3.2** summarizes vehicle ownership rate estimates at three townhome buildings, located in a significantly more suburban context in Central Saanich which is anticipated to have a higher demand than on Rainbow Street. The average demand was 1.5 vehicles/unit.

**Table 3.2: Townhome (Strata) Vehicle Ownership Estimates**

ADDRESS	LAND USE	UNITS	VEHICLES/UNIT ESTIMATE
2321 Island View Road	Townhouse - Strata	10	1.4
7675 E Saanich Road	Townhouse - Strata	19	1.8
7701 E Saanich Road	Townhouse - Rental	10	1.2
<b>AVERAGE</b>			<b>1.54</b>

Given the development site’s location, its parking demand is anticipated to be between the multi-family strata sites (0.8 vehicles/unit) and the suburban townhome sites (1.5 vehicles/unit). Therefore, the proposed 1.6 spaces/unit is anticipated to accommodate residents’ demands. The 0.2 spaces/unit of visitor parking is also considered adequate as it is higher than the average peak demand at the three multi-family sites (0.07 vehicles/unit). This is consistent with many visitor parking observations conducted and the Metro Vancouver Residential Apartment Parking Study<sup>1</sup> which found that visitor parking demand never exceeded 0.06 vehicles/unit.

<sup>1</sup> The visitor parking demand results were obtained from suburban sites in Burnaby, Port Coquitlam and Richmond which had varying levels of transit service. The visitor parking demand was not correlated with proximity to the Frequent Transit Network; in fact the site with the worst transit service had the lowest peak visitor parking demand of 0.02 visitor vehicles per dwelling.



The development is also creating 10 public on-street parking spaces. These spaces will provide additional parking opportunities to visitors of this development and the rest of the neighbourhood. These 10 spaces substantially increase the amount of on-street parking in the area. When combined with the parking provided on-site, the total parking supply is anticipated to greatly exceed the development's parking demand.

### 3.2 Vehicle Parking Dimension Review

The townhouse units either contain a single- or double-vehicle garage. The width of the double-vehicle garages falls below the Saanich's minimum parking stall width. As illustrated in **Table 3.3**, the double garages range in width between 5.45 and 5.75 m. Saanich's Zoning Bylaw requires typical parking stalls to be 2.6 m wide with 0.3 m added for stalls adjacent to walls. This results in both parking stalls in a double garage each requiring 2.9 m for a total of 5.8 m width.

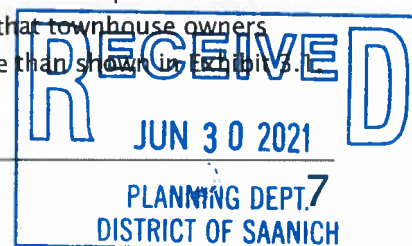
**Table 3.3: Parking Stall Dimension Comparison**

STALL TYPE	PROPOSED	SAANICH	LANGFORD	VICTORIA	VIEW ROYAL
<b>Typical</b>					
<i>Width</i>	N/A	2.6 m	2.6 m	2.6 m	2.6 m
<i>Length</i>	5.5 m	5.5 m	5.5 m	5.1 m	5.5 m
<i>Aisle Width</i>	7.1 m (min.)	6.75 – 7.6 m	6.7 – 7.0 m	7.0 m	6.7 – 7.6 m
<b>Single Garage</b> (Walls on both Sides)	2.85 – 3.25 m	2.9 m	3.0 m	3.0 m	2.9 m
<b>Double Garage</b> (Walls on both Sides)	<u>5.45 – 5.75 m</u>	<u>5.8 m</u>	<u>5.4 m</u>	<u>5.4 m</u>	<u>5.8 m</u>

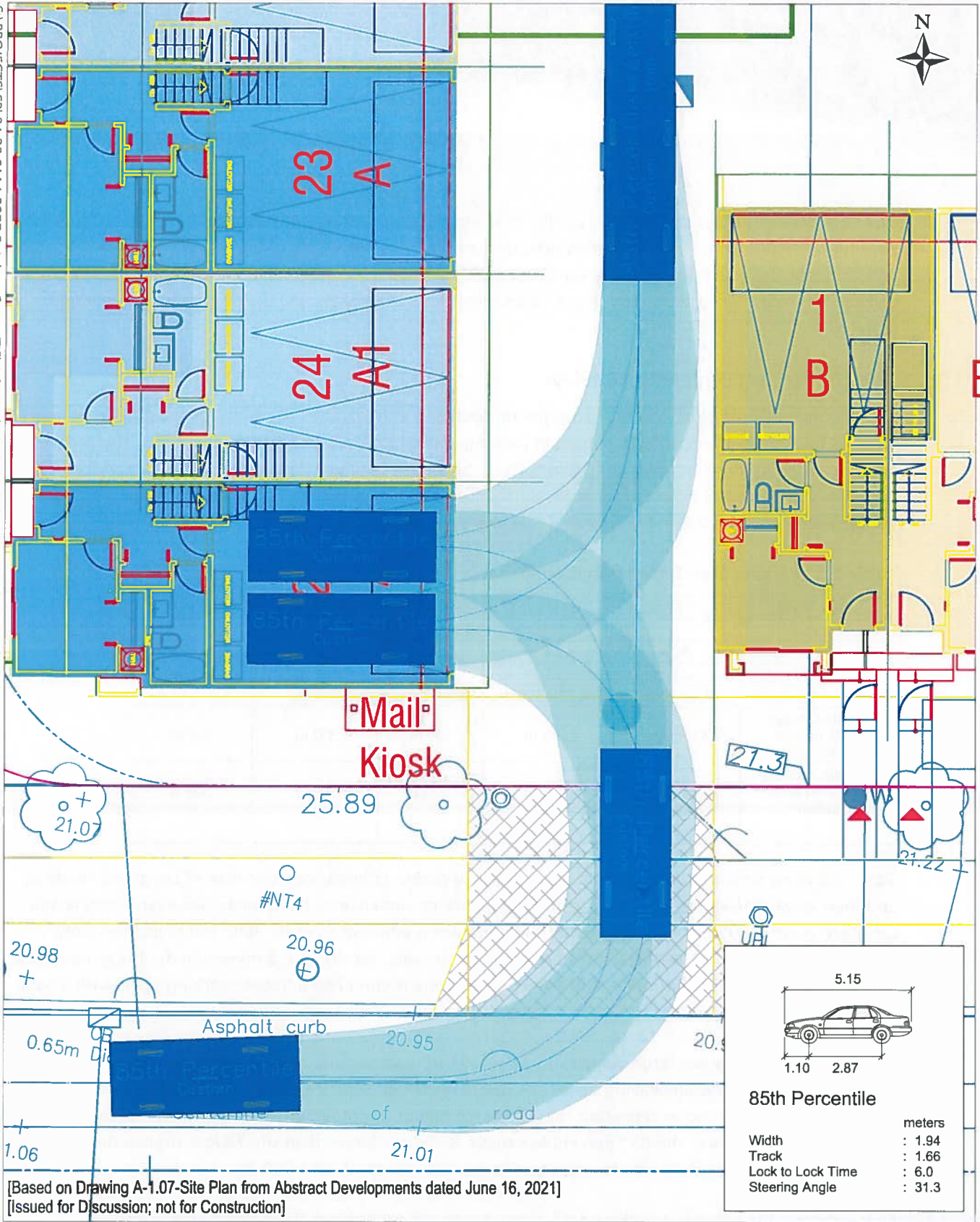
Table 3.3 compares the proposed and Saanich Bylaw parking dimensions to those of Langford, Victoria, and View Royal. View Royal has similar minimum parking dimensions to Saanich, however, Victoria and Langford don't require as significant stall widening when adjacent to walls. Both municipalities only require an additional 0.1 m when stalls are adjacent to walls, resulting in a minimum double garage width of 5.4 m. This indicates that there is precedence for constructing two adjacent parking stalls with a total width of less than the proposed 5.45 – 5.75 m.

**Exhibit 3.1** illustrates two large vehicles (5.15 x 1.94 m) successfully accessing the narrowest double garage (5.45 m wide) while leaving about 0.4 metres between vehicles. While this would require careful parking, the vehicles shown represent the 85<sup>th</sup> percentile of the province's vehicles which equates to a large SUV. For reference, the 85<sup>th</sup> percentile vehicle is slightly larger than the Toyota Highlander 3-row SUV (4.96 x 1.93 m) and slightly smaller than the Toyota Sienna van (5.18 x 2.0 m).

Bunt supports the proposed parking stall sizes due to the precedence from other municipalities and since two large vehicles can access the double garages. In addition, it is anticipated that townhouse owners would likely only have up to one large vehicle which would produce more space than shown in Exhibit 3.1.

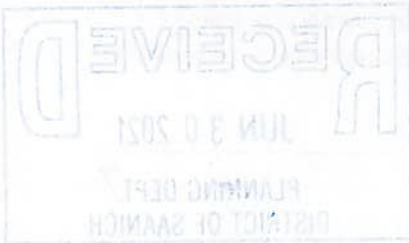


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[Based on Drawing A-1.07-Site Plan from Abstract Developments dated June 16, 2021]  
 [Issued for Discussion; not for Construction]

### Exhibit 3.1 85th Percentile Vehicle Manoeuvres



04-20-0114 June 2021

3977 Rainbow Street  
 Scale 1:150 on Letter Prepared by HS

PLANNING DEPT.  
 DISTRICT OF SAANICH

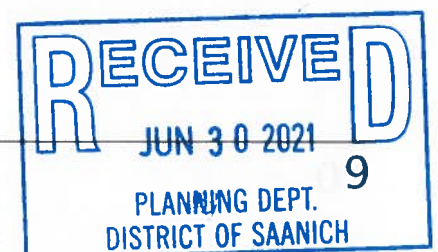
### 3.3 Adjacent Infrastructure Improvements

The development will be filling in a gap in the sidewalk network identified in Saanich's Active Transportation Plan on its Sevenoaks Frontage. This new sidewalk will connect the existing sidewalk on Rainbow Street (to be upgraded by the development) and the existing sidewalk on Sevenoaks Road east of the development site.

The development has also committed to constructing a crosswalk, connecting the new sidewalk with Rainbow Park across Rainbow Street (see Figure 3.1) which is a development requirement. The development is extending the frontage improvements on Sevenoaks Road approximately 100 metres to east as part of the development's Community Amenity Contribution (CAC). To further improve the walking infrastructure and to reduce vehicle speeds, Abstract could consider making the new crosswalk raised and constructing a curb extension at the corner of Rainbow Street and Sevenoaks Road. These pieces of infrastructure will make people walking more visible to people driving and reduce vehicle speeds through the intersection.



Figure 3.1: Proposed Sidewalk and Crosswalk Connecting to Rainbow Park



## 4. VEHICLE OPERATIONS REVIEW

### 4.1 Vehicle Operations Assessment Methodology

The vehicle operations were assessed at the McKenzie Avenue & Nelthorpe Road intersection in the weekday AM and PM peak hours. The analysis was completed for the existing conditions and for the 2028 horizon year (five years after development completion). The 2028 analysis includes the vehicle trips generated by the proposed development and background traffic (i.e. existing traffic plus growth on McKenzie Avenue).

The operation of the study intersection was assessed using the methods outlined in the 2000 Highway Capacity Manual (HCM) using the Synchro 9 analysis software. The traffic operations were assessed using the performance measures of Level of Service (LOS) and volume-to-capacity (v/c) ratio.

The LOS ration is based on average vehicle delay and ranges from "A" to "F" based on the quality of operation at the intersection. LOS "A" represents minimal queuing time conditions while LOS "F" represents an over-capacity condition with considerable congestion and/or queuing time. A queuing time of fewer than 10 seconds receives LOS A whereas queuing times greater than 80 seconds receive LOS F. In downtown and town centre contexts, during peak demand periods, queuing times greater than 80 seconds (LOS F) are common.

The volume-to-capacity (v/c) ratio of an intersection represents the ratio between the demand volume and the available capacity. A v/c ratio of less than 0.85 indicates that there is sufficient capacity to accommodate demands and generally represents reasonable traffic conditions in a suburban setting. A v/c value between 0.85 and 0.95 indicates an intersection is approaching practical capacity; a v/c over 0.95 indicates that traffic demands are close to exceeding the available capacity, resulting in saturated conditions. A v/c ratio over 1.0 indicates a congested intersection where drivers may have to wait through multiple signal cycles. In urban downtown and town centre contexts, during peak demand periods, v/c ratios over 0.90 and even 1.0 are common.

### 4.2 Existing Conditions

Vehicle volume data from 2018 was obtained from a previous study transportation study prepared by Watt Consulting Group for Abstract Developments for the development site. The same volumes have been used in this analysis, although to account for changes in vehicle volumes from 2018 to 2020, a 1% annual growth rate was applied only to through movements on McKenzie Avenue. **Figure 4.1** illustrates the estimated 2020 vehicle volumes for the McKenzie Ave & Nelthorpe St intersection.

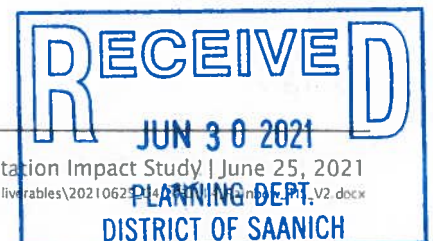
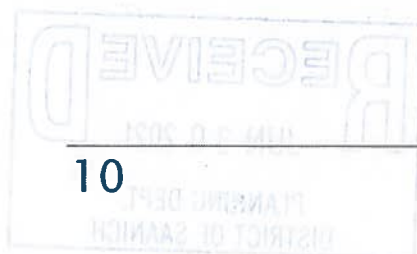
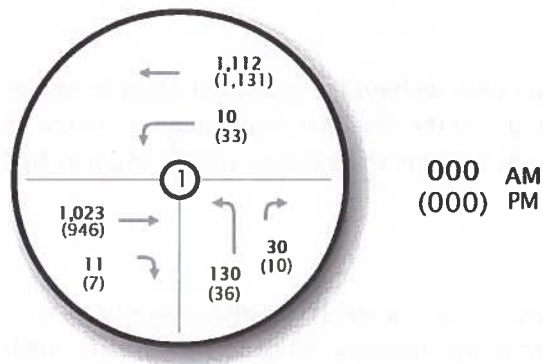


Figure 4.1: Existing 2020 Vehicle Volumes



Northbound traffic from Nelthorpe Street is higher during the AM peak, as both the commuter and school peaks overlap during this time period. As such, there are both residents leaving the neighbourhood and school pick-up/drop-off trips on the previously described U-turn route using the Nelthorpe Street intersection. In the overall PM peak, which occurs after school lets out, less traffic is turning out from Nelthorpe Street.

Table 4.1 indicates that there are no vehicle operations concerns during either of the peak hours and all movements operate within the capacity and have reasonable queuing times. The traffic signal at McKenzie Avenue and Nelthorpe Street is designed to give road users on McKenzie Street priority since it is the primary street with over 90% of the intersection’s vehicle flow. As such, the McKenzie Avenue eastbound and westbound movements operate at LOS A as the average vehicle has minimal queuing time.

The northbound Nelthorpe Street approach operates at LOS D which is common for the minor approach to a major thoroughfare such as McKenzie Street and many urban intersections in general. The analysis estimates that vehicles wait an average of 40 seconds to turn from Nelthorpe Street onto McKenzie Avenue during peak hours. Intersection improvements to reduce vehicle delay are typically never considered unless a movement operates at LOS E or F.

Table 4.1: Existing Vehicle Operations

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
McKenzie Ave & Nelthorpe St <i>(signalized)</i>	OVERALL	A	0.51	-	A	0.47	-
	EB TR	A	0.44	65	A	0.40	50
	WB LT	A	0.50	75	A	0.55	70
	NB LR	D	0.57	55	D	0.15	20



### 4.3 Future Conditions

#### 4.3.1 Background Vehicle Volumes

Background traffic is the volume of vehicles that would exist without the proposed development and considering any increase in vehicles due to other changes in the area that would add cars to the street network. Background vehicle volumes were estimated by growing the existing vehicle volumes by 1% per year.

#### 4.3.2 Development Generated Vehicle Trips

The Institute of Transportation Engineers (ITE) Trip Generation Manual (10<sup>th</sup> Edition) was used to estimate the number of vehicle trips generated from the proposed development. While townhouses fall under ITE 220 "Low-Rise Multifamily Dwelling", the analysis in this report uses the higher trips rates associated with ITE 210 "Detached Single-Family Dwelling" to present conservative (i.e. high) conclusions. **Tables 4.2 and 4.3** compare the trip rates and associated generation for both land use categories.

**Table 4.2: Peak Hour Vehicle Trip Rates**

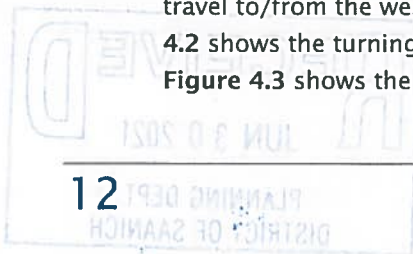
LAND USE	UNITS	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family House (ITE 210)	per dwelling unit	23%	77%	0.74	63%	37%	0.99
Townhouse (ITE 220)	per dwelling unit	25%	75%	0.46	63%	37%	0.56

**Table 4.3: Estimated Peak Hour Site Vehicle Trips**

LAND USE	DENSITY	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family House (ITE 210)	25 dwelling units	5	14	19	16	9	254
Townhouse (ITE 220)	25 dwelling units	3	9	12	9	5	14

Using the ITE single-family house trip rates results in a prediction of 20-25 two-way trips in the AM and PM peak hours, respectively. Spread over the peak hour, this is approximately equal to one additional vehicle on the study area street network every 2-3 minutes. This prediction is likely quite conservative due to the different travel characteristics of detached homes compared to townhouses, and trip generation may be closer to 10-15 vehicles in the peak hour (one additional vehicle every 4-6 minutes).

The new vehicle trips were assigned travel directions based on the existing turning movement counts at Nelthorpe Street and Rainbow Street. Based on these counts, 60% of site-generated traffic was assumed to travel to/from the west on McKenzie Avenue, with the remaining 40% travelling to/from the east. **Figure 4.2** shows the turning movements of the site-generated trips using the Nelthorpe Street intersection, and **Figure 4.3** shows the total forecasted volumes for the 2028 horizon year with the site trips added to the



background traffic. Note that vehicles arriving at the site from the east use Rainbow Street to enter the neighbourhood, and thus to not show up in the analysis at the Nelthorpe intersection.

Figure 4.2: Site Vehicle Trip Forecasts

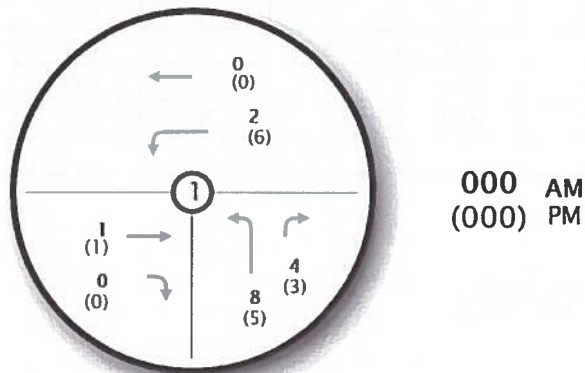
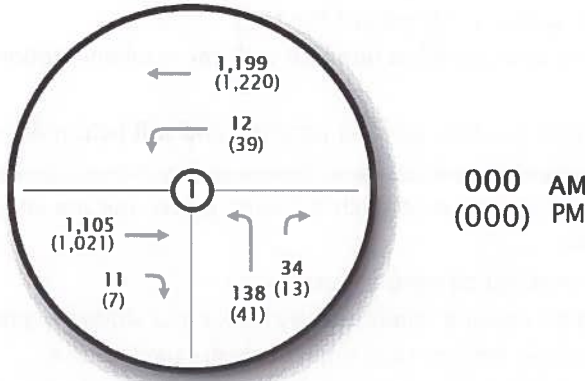


Figure 4.3: Future (2028) Total Vehicle Forecasts



4.3.3 Vehicle Operations Results

Table 4.4 demonstrates the vehicle operations results for the year 2028 with background vehicle growth and the vehicle trips generated by the proposed development. There are no vehicle operational concerns with all movements operating within their capacity. The effect of the additional vehicle trips caused by the proposed development as well as regional vehicle growth has minimal impact on the intersection.

Northbound vehicles from Nelthorpe Street continue to have an average queuing time of 40 seconds, or LOS D during peak hours. This level of queuing time is primarily due to the signal timing favouring vehicle flow on McKenzie Avenue as it is an important regional thoroughfare. As previously stated, this is a common LOS for this context and indicates that the intersection is operating satisfactorily.

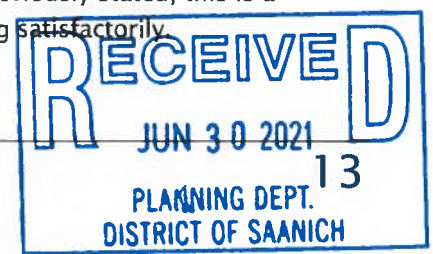


Table 4.4: Future (2028) Total Vehicle Operations

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
McKenzie Ave & Nelthorpe St <i>(signalized)</i>	OVERALL	A	0.56	-	A	0.52	-
	EB TR	A	0.47	75	A	0.43	55
	WB LT	A	0.55	90	A	0.60	55
	NB LR	D	0.60	60	D	0.17	20

## 5. SUMMARY & RECOMMENDATIONS

### 5.1 Summary

- The proposed development includes 25 townhouses, each with a one- or two-car garage. Vehicle access will be from Sevenoaks Road;
- Ample transit options are available within walking distance of the site;
- Good cycling options are also available and are anticipated to improve with the implementation of Saanich's Active Transportation Plan;
- The proposed parking supply is aligned with existing parking patterns and will help reduce vehicle use in the neighbourhood;
- The double-car garages are narrower than required in Saanich's Zoning Bylaw, but are supportable based on precedence and a design review;
- The development will also construct 10 on-street parking spaces;
- The development will improve the local area walking conditions by filling in a sidewalk gap on its Sevenoaks Road frontage as well as extending the frontage improvements beyond the development site. The development has also committed to constructing a crosswalk, connecting Sevenoaks Road to Rainbow Park;
- Depending on assumptions made, the development is anticipated to generate between 10 and 25 vehicle trips per peak hour, i.e. one vehicle every 3-6 minutes;
- The intersection of McKenzie Avenue & Nelthorpe Street currently operates within its capacity and is expected to continue operating within its capacity while considering the proposed development and regional vehicle growth.

### 5.2 Recommendations

- The proposed parking supply and stall dimensions are adequate for the development context;
- Opportunities to reduce vehicle speeds through the Rainbow Street & Sevenoaks Road intersection can be explored (including a raised crosswalk or curb extensions) to create a gateway into the neighbourhood.