CITY OF NANAIMO

Te’tuxwtun Lands Neighbourhood Transportation Study

FINAL REPORT

April 2026

ISL Engineering and Land Services Ltd. is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

At ISL your identity is part of our identity. Diversity, Equity, and Inclusion (DEI) speaks to our core values and provides space for our teams to bring their authentic selves to work. ISL believes DEI creates the best outcomes for our clients while sustaining a happy and thriving work environment that allows for career development opportunities for all staff. ISL is committed to a focused effort on continuous improvement and development of respectful and safe workplace.

Table of Contents

1.0 Study Overview 1

2.0 Proposed Development 3

3.0 Transportation Context 5
- 3.1 Existing Transportation Networks 5
- 3.2 Relevant Plans, Policies, and Studies 10

4.0 Traffic Volume Assessment 16
- 4.1 Existing Traffic Volumes 16
- 4.2 Future Background Traffic Forecasts 19
- 4.3 Site Traffic Trip Generation 20
- 4.4 Future Combined Traffic Forecasts 23
- 4.5 Traffic Monitoring 30

5.0 Traffic Operations Assessment 31
- 5.1 Analysis Methodology 31
- 5.2 Individual Intersection Traffic Operations 32
- 5.3 Overall Traffic Operations Results 49

6.0 Transportation Demand Management (TDM) and Active Modes 53

7.0 Conclusions & Recommendations 56
- 7.1 Conclusions 56
- 7.2 Recommendations 56

APPENDICES

Appendix A NCHRP Internal Capture Worksheet

Appendix B Traffic Operations Analysis Reports

TABLES

Table 2.1: Proposed Land Uses 3

Table 2.2: Proposed Land Uses by Development Area (Watt) 3

Table 3.1: Existing Roadway Features 5

Table 3.2: Existing Intersection Traffic Control 5

Table 3.3: Existing Active Transportation Facilities 8

Table 3.4: Existing Transit Services 8

Table 4.1: Traffic Count Data Summary 16

Table 4.2: Study Period Peak Hours 16

Table 4.3: Base Site Trip Generation Rates by Land Use Type 20

Table 4.4: Base Site Vehicle Trip Generation 21

Table 4.5: Post-Internal Capture Site Vehicle Trip Generation 23

Table 4.6: Site Vehicle Trip Distribution 24

Table 4.7: Site-Generated Traffic Proportion of Total Intersection Volumes – 2050 25
Table 5.1: Performance Measures and Thresholds 31
Table 5.2: Operational Analysis Parameters 31
Table 5.3: Operational Analysis Tools 31
Table 5.4: Existing (Year 2025) Nanaimo Parkway & Jingle Pot Road Operational Analysis Results 32
Table 5.5: Nanaimo Parkway & Jingle Pot Road Existing Configuration Intersection Performance 33
Table 5.6: Existing (Year 2025) Nanaimo Parkway & College Drive / Fifth Street Traffic Operations 33
Table 5.7: Future (100% Build Out / Year 2050) Nanaimo Parkway & College Drive / Fifth Street Traffic Operations 34
Table 5.8: Nanaimo Parkway & College Drive / Fifth Street Existing Configuration Intersection Performance 35
Table 5.9: Existing (Year 2025) Wakesiah Avenue & Third Street Operational Analysis Results 35
Table 5.10: Future (100% Build Out / Year 2050) Wakesiah Avenue & Third Street Operational Analysis Results 36
Table 5.11: Wakesiah Avenue & Third Street Existing Configuration Intersection Performance 37
Table 5.12: Existing (Year 2025) Wakesiah Avenue & Fourth Street Operational Analysis Results 37
Table 5.13: Future (100% Build Out / Year 2050) Wakesiah Avenue & Fourth Street Operational Analysis Results 38
Table 5.14: Wakesiah Avenue & Fourth Street Existing Configuration Intersection Performance 39
Table 5.15: Existing (Year 2025) Wakesiah Avenue & Fifth Street Operational Analysis Results 39
Table 5.16: Future (100% Build Out / Year 2050) Wakesiah Avenue & Fifth Street Operational Analysis Results 40
Table 5.17: Wakesiah Avenue & Fifth Street Existing Configuration Intersection Performance 41
Table 5.18: Existing (Year 2025) Wakesiah Avenue and Nanaimo Lakes Road / Harewood Road Operational Analysis Results 42
Table 5.19: Future (100% Build Out / Year 2050) Wakesiah Avenue and Nanaimo Lakes Road / Harewood Road Operational Analysis Results 43
Table 5.20: Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road Existing Configuration Intersection Performance 44
Table 5.21: Pine Street & Third Street / Fitzwilliam Street Operational Analysis Results 44
Table 5.22: Future (100% Build Out / Year 2050) Pine Street & Third Street / Fitzwilliam Street Operational Analysis Results 45
Table 5.23: Pine Street & Third Street / Fitzwilliam Street Existing Configuration Intersection Performance 46
Table 5.24: Existing (Year 2025) Bruce Avenue & Fifth Street Operational Analysis Results 46
Table 5.25: Future (100% Build Out / Year 2050) Bruce Avenue & Fifth Street Operational Analysis Results 47
Table 5.26: Bruce Avenue & Fifth Street Existing Configuration Intersection Performance 48
Table 5.27: Traffic Operations Results 49
Table 6.1: Recommended Active Transportation and Transit Infrastructure Measures 53
Table 6.2: Supporting Transportation Demand Management (TDM) Measures 55

FIGURES

Figure 1.1: Site Location and Study Area 2
Figure 2.1: Proposed Development Configuration and ID Areas (Watt) 4
Figure 3.1: Existing Transportation Facilities 6
Figure 3.2: Existing Laning and Traffic Control 7
Figure 3.3: Existing Transit Routes (BC Transit) 9
Figure 3.4: VIU Nanaimo Campus Master Plan 11
Figure 3.5: Nanaimo Parkway & Jingle Pot Road South – Option 1 Improvements 13
Figure 3.6: Nanaimo Parkway & Jingle Pot Road South – Option 2 Improvements 14
Figure 3.7: Nanaimo Parkway & College Drive / Fifth Street Improvements 15
Figure 4.1: Existing (Year 2025) Traffic Volumes 18
Figure 4.2: Future (Year 2031) Traffic Forecasts 26
Figure 4.3: Future (Year 2038) Traffic Forecasts 27
Figure 4.4: Future (Year 2050) Traffic Forecasts 28
Figure 4.5: 100% Buildout Site-only Traffic Forecasts 29
Figure 5.1: Nanaimo Parkway and College Drive / Fifth Street Recommended Improvements 34
Figure 5.2: Wakesiah Avenue & Third Street Recommended Improvements 36
Figure 5.3: Wakesiah Avenue & Fourth Street Recommended Improvements 38
Figure 5.4: Wakesiah Avenue & Fifth Street Recommended Improvements 40
Figure 5.5: Wakesiah Avenue & Fifth Street Signal Option 41
Figure 5.6: Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road Recommended Improvements 42
Figure 5.7: Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road Signal Option 43
Figure 5.8: Pine Street & Third Street / Fitzwilliam Street Recommended Improvements 45
Figure 5.9: Bruce Avenue and Fifth Street Recommended Improvements 47
Figure 5.10: Future Laning and Traffic Control 50
Figure 6.1: Recommended Active Transportation and Transit Infrastructure Measures 54

1.0 Study Overview

ISL Engineering (ISL) has been retained by the City of Nanaimo (the City) to complete a Neighbourhood Transportation Study (NTS) for the Te'tuxwtun (Former DND) Lands. This report provides a high-level evaluation of anticipated network-wide transportation impacts associated with the overall development, based on an initial land use concept.

The assessment focuses on broader, long-term transportation considerations to support City planning and does not include detailed analysis of site access locations or operations. Further refinement and site-specific transportation assessments will be undertaken as additional detail is developed, including specific land uses, internal mobility networks, public road access points, and transportation demand management measures.

The development site is located adjacent to the Nanaimo Parkway (Highway 19), primarily between Fifth Street and Nanaimo Lakes Road. The Snuneymuxw First Nation (SFN) is proposing a large-scale, mixed-use development that includes:

- More than 3,000 residential units
- About half a million square feet of commercial retail space
- Over one million square feet of office space
- Additional services and cultural facilities

Given the scale of the proposed development, significant impacts to the surrounding transportation network are anticipated. These impacts were not addressed in previous transportation studies, requiring a comprehensive review of infrastructure needs and close coordination with key stakeholders. The location of the proposed development and the study area are shown in **Figure 1.1**.

This NTS report includes the following sections:

- 1.0 Study Overview – Introduction to the development and study area
- 2.0 Proposed Development – Summary of proposed land uses and site layout
- 3.0 Transportation Context – Overview of existing transportation networks and relevant plans
- 4.0 Traffic Volume Assessment – Methodology and results for peak period traffic volume forecasts
- 5.0 Traffic Operations Assessment – Analysis of traffic performance and proposed improvements
- 6.0 Transportation Demand Management (TDM) and Active Modes – Recommendations for TDM and active modes
- 7.0 Conclusions and Recommendations – Summary of key findings and proposed next steps

ISL submitted a proposed work plan for the NTS on March 25, 2025. The scope of work reflects that plan and incorporates feedback received from the City.

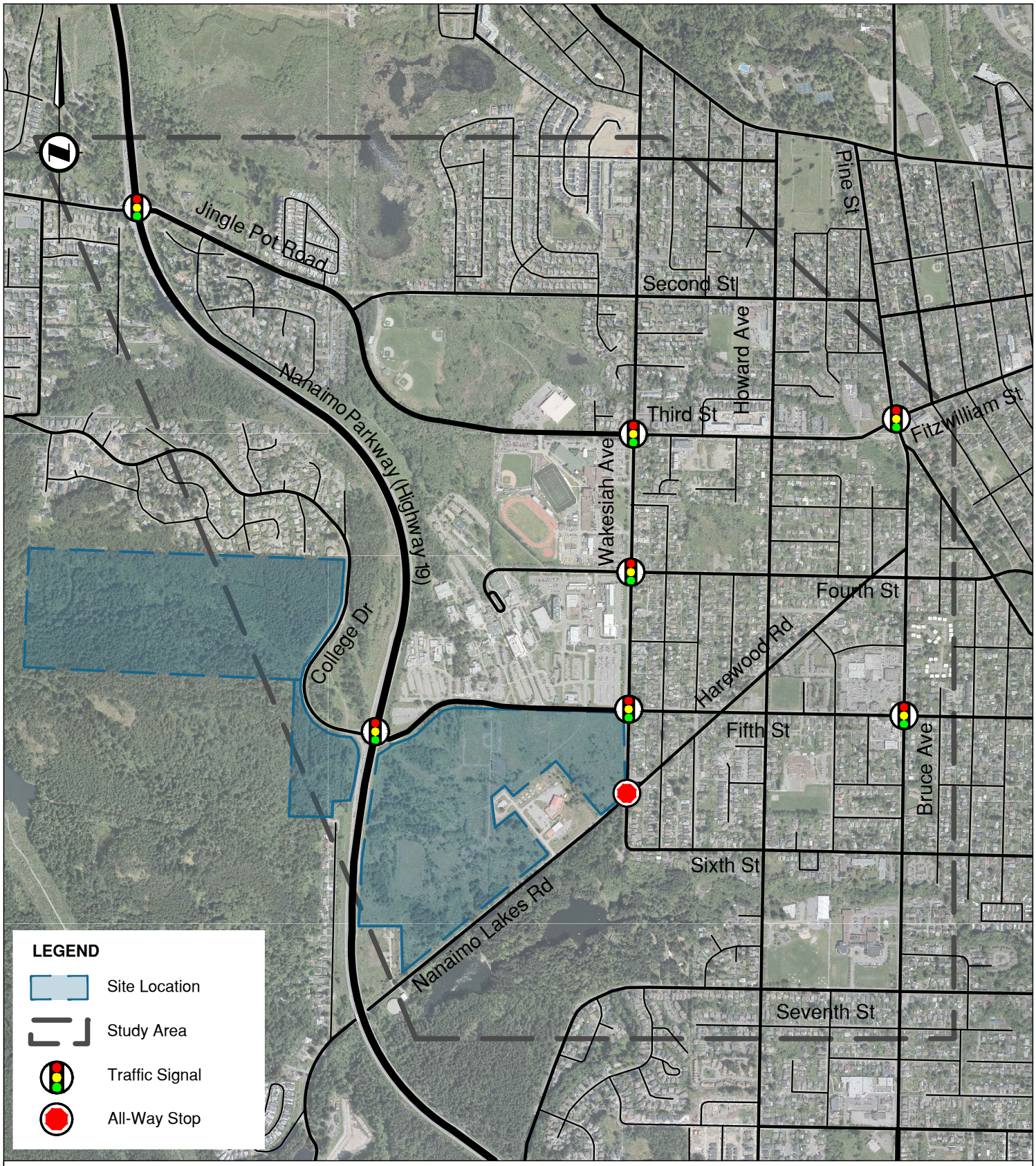


Figure 1.1: Site Location and Study Area

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

2.0 Proposed Development

The proposed Te'tuxwtun Lands development includes a range of land uses, including residential, research and development centre, commercial retail, and others. **Table 2.1** summarizes the proposed land uses based on information provided by Watt Consulting Group (Watt), the transportation consultant for the project. Where applicable, assumptions were made to convert land area into estimates such as number of seats, rooms, and fuel pumps, based on comparable existing land uses.

Table 2.1: Proposed Land Uses

Land Use Class	Type	Density	Total
Residential	Single-family houses	303 units	3,160 units
	Mid-rise multifamily	2,049 units	
	High-rise multifamily	808 units	
Commercial – Retail			487,400 sq ft
Commercial – Other (Sport Stadium, Resort Hotel, Gas Station, etc.)			(see **Table 4.4** for details)
Office	Research and Development Centre	1,085,300 sq ft	1,085,300 sq ft

The proposed development is organized into several distinct areas and phases. **Table 2.2** summarizes the planned development phases, based on information provided by Watt. The overall site configuration and the locations of each identified development area (ID Areas) are shown in **Figure 2.1.**

Table 2.2: Proposed Land Uses by Development Area (Watt)

ID Area	Land Use	Description
A1	Recreation Commercial	Commercial and short-term stay
A2	Low-Medium Density Residential	Low-density housings + Medium-density with Commercial at grade and residential on top
A3	Green Spaces	Spaces for human-nature connections and low-impact recreational activities
A4	Highway Commercial	Entertainment uses including but not limited to a conference centre, high-end hotel, a concept similar to the Washington's Great Wolf Lodge
A5	Highway Commercial	Commercial/Retail use including but not limited to local stores and showrooms, cafes, restaurants, light industrial uses. Gas station + Big Box Store
A6	Culture	TBD as per consultation with Snuneymuxw leadership and community
A7	Innovation	Research, Education, and Business Park
A8	High Density Residential	Residential buildings on stilts with parking on the ground floor. The residential is a combination of studios, 1-3 bedroom condos and apartments for community and student housing
A9	High Density Residential	Residential buildings with 2 floors townhouses and 2 floors parking. The residential is a combination of high-end studios, 1-3 bedroom condos and apartments for community and student housing

ID Area	Land Use	Description
A10	Short-Term Residential	Short-term housing and tourism-related economic development uses
A11	Sports and Recreation	TBD as per consultation with Snuneymuxw leadership and community – Assume 5000 seat stadium, 20L per seat
A12	Low-Medium Density Residential	Mix of ground-oriented multi-unit residential for Snuneymuxw member
A13	Mixed Use	Commercial at the bottom and residential on top. The commercial includes retail, community amenities, everyday essentials, cafes, restaurants, co-working spaces, etc.

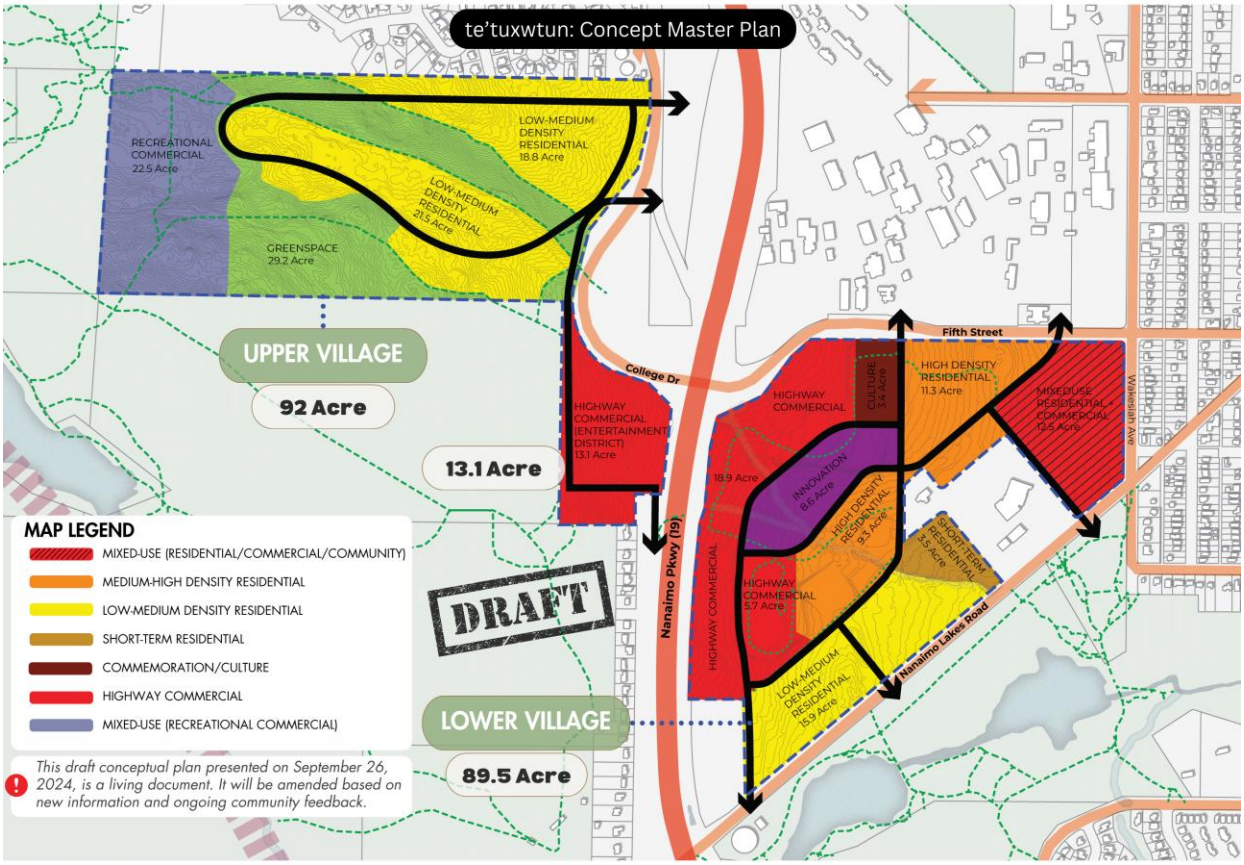


Figure 2.1: Proposed Development Configuration and ID Areas (Watt)

The site plan includes seven vehicle access points: two on College Drive, two on Fifth Street, and three on Nanaimo Lakes Road. Internal circulation roads connect the accesses. Note that the access shown from College Drive to Nanaimo Parkway (southbound) is not part of the current proposal and has not been assumed in the analysis in this report.

3.0 Transportation Context

3.1 Existing Transportation Networks

Table 3.1 summarizes the key characteristics of the study area roadways. The surrounding transportation network is shown in **Figure 3.1**.

Table 3.1: Existing Roadway Features

Road Name	Classification	Through Lanes	Speed Limit	Parking
Nanaimo Parkway (Highway 19)	Highway	2 NB / 2 SB	90 km/h	No parking
Nanaimo Lakes Road	Urban Collector	1 NEB / 1 SWB	50 km/h	Primarily no parking
College Drive	Urban Collector	1 NB / 1 SB	50 km/h	Limited Parallel – west side
Harewood Road	Urban Collector	1 NEB / 1 SWB	50 km/h	No parking
Fifth Street	Mobility Arterial / Collector	1EB / 1WB	50 km/h	Limited Parallel – north side
Wakesiah Avenue	Mobility / Urban Collector	1 NB / 1 SB	50 km/h	Primarily no parking
Fourth Street	Mobility Collector	1 EB / 1 WB	50 km/h	Limited Parallel – both sides
Third Street	Mobility / Urban Arterial & Mobility Collector	1 EB / 1 WB	50 km/h	Primarily no parking
Bruce Avenue	Mobility / Urban Collector	1 NB / 1 SB	50 km/h	Limited Parallel – both sides
Fitzwilliam Street	Mobility Collector	1 EB / 1 WB	50 km/h	No parking
Jingle Pot Road	Urban Arterial / Collector	1 EB / 1 WB	50 km/h	Primarily no parking

As summarized in **Table 3.2**, all study intersections are signalized except for the intersection of Wakesiah Avenue with Nanaimo Lakes Road & Harewood Road, which is controlled by an all-way stop. Laning configuration diagrams for the study area intersections are provided in **Figure 3.2**.

Table 3.2: Existing Intersection Traffic Control

Intersection	Existing Traffic Control
Nanaimo Parkway (Highway 19) & Jingle Pot Road	Signal
Nanaimo Parkway (Highway 19) & College Drive / Fifth Street	Signal
Wakesiah Avenue & Third Street	Signal
Wakesiah Avenue & Fourth Street	Signal
Wakesiah Avenue & Fifth Street	Signal
Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road	All-way stop
Pine Street & Third Street / Fitzwilliam Street	Signal
Bruce Avenue & Fifth Street	Signal

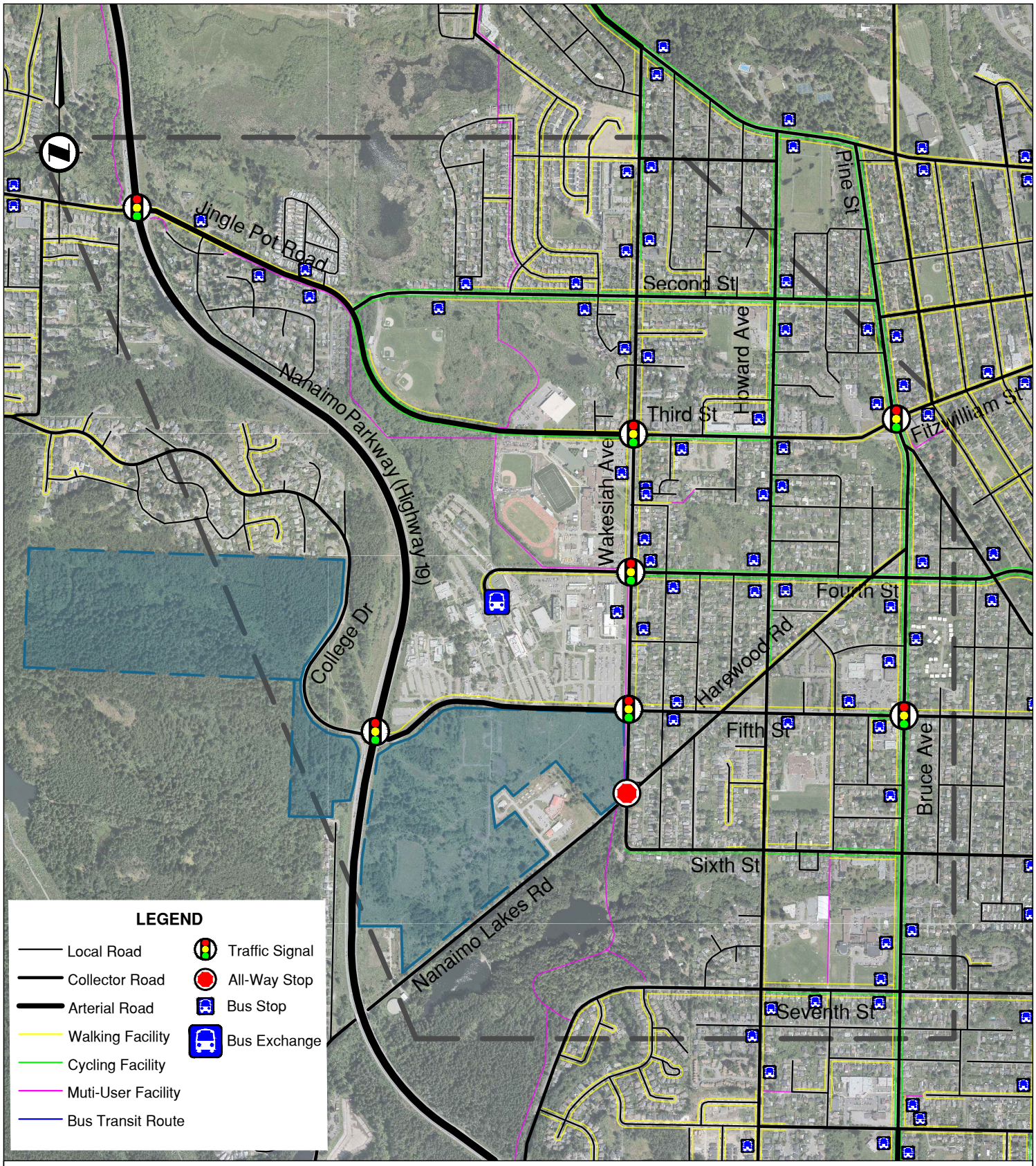


Figure 3.1: Existing Transportation Facilities

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

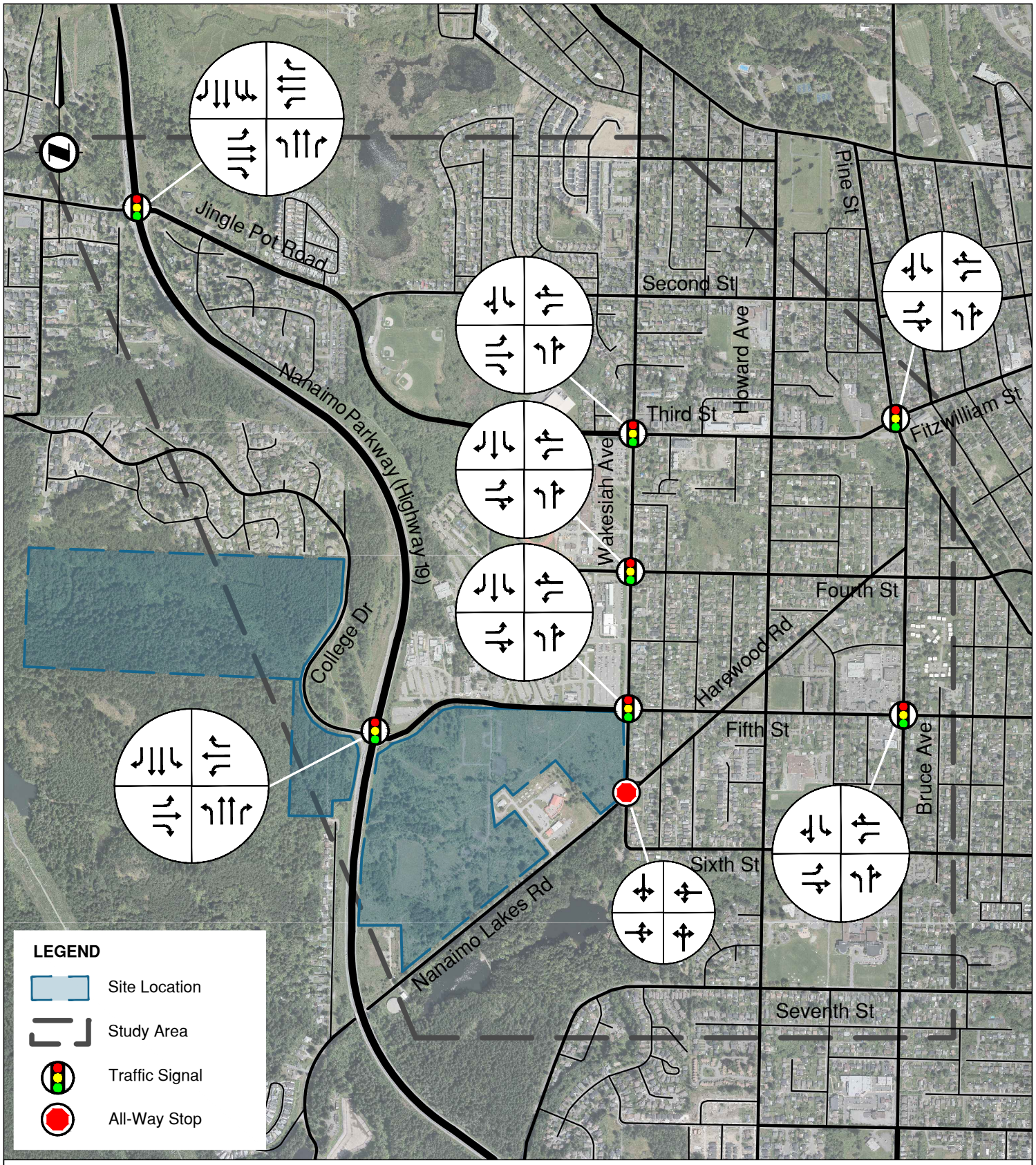


Figure 3.2: Existing Laning and Traffic Control

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

Table 3.3 summarizes the active transportation facilities near the site, as shown in **Figure 3.1**. Pedestrian and cyclist connectivity is minimal, immediately adjacent to the site, with few existing facilities. While the surrounding residential areas offer somewhat better connections, overall network coverage remains limited.

Table 3.3: Existing Active Transportation Facilities

Road Name	Walking Facilities	Cycling Facilities
Nanaimo Parkway (Highway 19)	No walking facilities	No cycling facilities
Nanaimo Lakes Road	No walking facilities	No cycling facilities
College Drive	No walking facilities	No cycling facilities
Fifth Street	Sidewalks – north side	No cycling facilities
Wakesiah Avenue	Sidewalks – both sides	Limited bike lanes and shared routes – both sides
Fourth Street	Sidewalks – south side	Bike lanes – both sides
Third Street	Sidewalks – both sides	*Limited bike lanes – south side
Bruce Avenue	Sidewalks – both sides	Bike lanes – both sides
Fitzwilliam Street	Sidewalks – both sides	No cycling facilities
Jingle Pot Road	Sidewalks – both sides	Bike lanes – both sides

*Construction of additional cycling facility between Howard Avenue and Pine Street is currently underway.

Table 3.4 summarizes the available transit services, and **Figure 3.3** illustrates the existing transit routes and stops. While no transit routes currently run directly adjacent to the Te'tuxwtun Lands, the VIU exchange, serving several transit routes, is within walking distance of much of the site east of Nanaimo Parkway. It is worth noting that transit service is expected to change over the life of the development, as guided by the *Regional District of Nanaimo (RDN) Transit Redevelopment Strategy*.

Table 3.4: Existing Transit Services

Transit Line	Service Type	Direction / Route Terminus
5	Local Transit Network	Downtown Nanaimo
		Fairview
6	Local Transit Network	Downtown Nanaimo
		Harewood
8	Local Transit Network	VIU Exchange
		Cedar
15	Local Transit Network	VIU Exchange
		Woodgrove Centre
15A	Local Transit Network	VIU Exchange
		Woodgrove Centre
40	Frequent Transit Network	Downtown Nanaimo
		Woodgrove Centre

Service types: Per RDN *Transit Future Plan* guidelines.

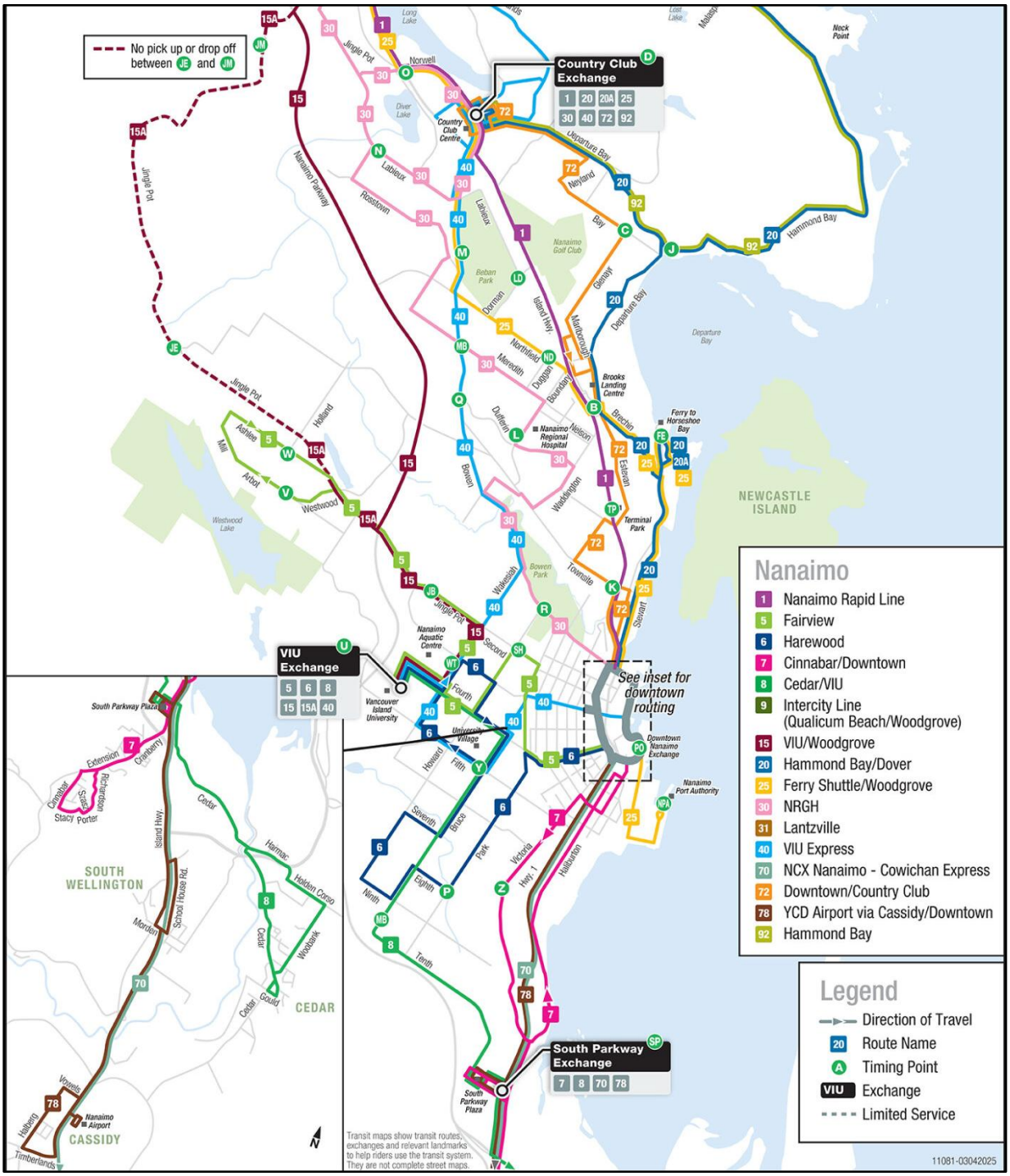


Figure 3.3: Existing Transit Routes (BC Transit)

3.2 Relevant Plans, Policies, and Studies

Harewood Neighbourhood Plan (City of Nanaimo, 2013)

The Harewood Neighbourhood Plan provides detailed policies to support the broader goals and objectives of the City of Nanaimo's Official Community Plan (OCP). These policies focus on creating and maintaining safe modes of transportation with efficient access to business, schools and recreational activities.

- Encourage pedestrian greenways on Bruce Avenue, Fourth Street, Fifth Street and Wakesiah Avenue as development along these routes occur as a method to promote active transportation.
- Consider traffic and pedestrian safety upgrades for intersections at Bruce Avenue and Fifth Street, Fourth Street and Pine Street, and Third Street and Howard Avenue.

Nanaimo Transportation Master Plan (City of Nanaimo, 2014)

The Nanaimo Transportation Master Plan (NTMP) outlines a 25+ year vision to transform Nanaimo's transportation system into a more sustainable, accessible, and multimodal network. It aims to reduce reliance on personal vehicles while improving safety, convenience, and comfort for walking, cycling, and transit. It includes a target to double the sustainable travel mode share from 12 to 24% by 2041. The Plan supports land use patterns that encourage compact, mixed-use development and guides long-term infrastructure investments aligned with the City's growth and environmental goals. The NTMP identifies a wide range of infrastructure upgrades that are relevant to this study:

- Fourth Street Multimodal Corridor Improvements – Redesign corridor to support cycling, walking, and transit between VIU and downtown.
- Bruce / Fifth Intersection Improvements – Improve intersection to address safety concerns and multimodal access. [recently completed]
- VIU Road Network Improvements – Improve roadways and access around Vancouver Island University to support transit and active modes.
- Frequent Transit Network (FTN) – New high-frequency routes connecting Downtown, Woodgrove, VIU, and Country Club every 15 minutes or better during most of the day
- A comprehensive cycling network with bicycle network coverage spaced 400 to 800 metres apart or along major routes, providing access between residential areas, neighbourhood centres, and key connections to major cycling facilities.

City Plan: Nanaimo Reimagined (City of Nanaimo, 2022)

The City Plan, Nanaimo's current OCP, is the City's overarching long-range vision for land use and mobility integration. It builds on the 2014 Transportation Master Plan and emphasizes a multi-modal transportation system that prioritizes walking, rolling, cycling, and transit. The plan supports sustainable transportation networks aligned with anticipated growth in Urban Centres and Corridors, encouraging vibrant, compact, and connected neighbourhoods.

Integrated Action Plan (City of Nanaimo, 2023)

The Integrated Action Plan is an ongoing supporting document to the 2022 City Plan. It outlines the actions that are currently being taken to achieve this plan, as well as upcoming actions the city would like to complete in the short- and long-term future to implement the policies presented in the City Plan.

- Intersection improvements at Bruce Avenue and Fifth Street, Fourth Street and Pine Street, and Third Street and Howard Avenue to support safe and efficient movement of pedestrians, cyclists, vehicles and transit.
- Upgrades to Fifth Street from Wakesiah Avenue to Bruce Avenue to enhance Active Mobility and new traffic signal at Bruce and Fifth.
- Enhance cycling facilities along Fourth Street to connect VIU and Downtown.
- Upgrade pedestrian and cycling facilities on Third Street from Watfield Avenue to Pine Street.
- Long-term improvements to Bowen Road, Wakesiah Avenue and Third Street to accommodate future projected traffic volume increases

Vancouver Island University Nanaimo Campus Master Plan Update (VIU and Stantec, 2017)

Vancouver Island University (VIU) released a 40-year master plan for their Nanaimo Campus for their site, located adjacent to the Te'tuxwtun Lands to the east of Nanaimo Parkway and to the North of Fifth Street. This plan was prepared by Stantec and the University in 2017. **Figure 3.4** depicts the proposed 40-year site plan for the Nanaimo University Campus.

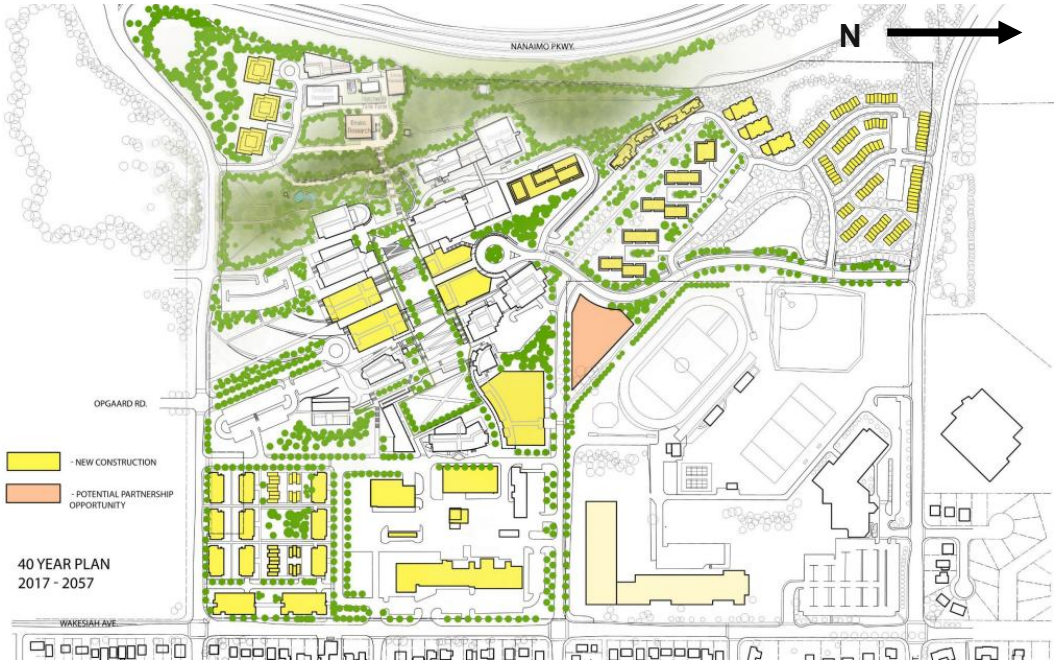


Figure 3.4: VIU Nanaimo Campus Master Plan

The current plan includes expansions to university facilities and additional student housing. One identified opportunity is to introduce higher-density housing along the southern edge of the site on Wakesiah Avenue to improve access and community connection. It is not yet confirmed whether this area will be designated for student housing or endowment lands.

Other key recommendations within the study area include:

- A new vehicle entrance to the University from Third Street
- Redevelopment of existing parking areas for student or other housing, supported by a new parkade
- Enhanced east-west and north-south greenways across the site

Regional District of Nanaimo Transit Redevelopment Strategy (RDN, City of Nanaimo, and BC Transit, 2022)

The Regional District of Nanaimo (RDN) Transit Redevelopment Strategy provides a data-driven assessment of the current transit system and considers projected community changes to develop a five-year action plan. The strategy focuses on improving the effectiveness and efficiency of transit services as a way to increase ridership and better integrate public transit with active transportation networks. The plan identifies several proposed transit routes, including six that pass through the study area for this project.

Within the study area, the plan proposes primary transit routes that would provide higher-frequency service, aiming for 20-minute or better service during weekday peak periods and 30-minute or better service at other times, including evenings and weekends.
Planned improvements include:

- Streamlining existing transit routes to create more direct connections between major destinations such as post-secondary institutions, employment hubs, and healthcare facilities.
- Increasing service frequency during peak travel times to support higher ridership demand.
- Expanding coverage with new or revised routes in under-served neighbourhoods, improving access to transit from residential areas.
- Adjusting schedules and routing to provide more consistent and reliable service throughout the week, including evenings and weekends.
- Integrating neighbourhood-level services that connect outlying communities to primary transit corridors and key destinations.

Nanaimo Parkway and Nanoose Bay Corridor Study (ISL and MOTT, 2021)

The Nanaimo Parkway and Nanoose Bay Corridor Study identified short-, medium-, and long-term infrastructure improvement strategies to accommodate increasing demand along the Nanaimo Parkway and Nanoose Bay corridors. The study proposed improvements at 12 locations, including two within the study area for this project: Jingle Pot Road South and College Drive/Fifth Street.

NANAIMO PARKWAY AND JINGLE POT ROAD SOUTH

Two potential configurations were considered for improving the intersection at Jingle Pot Road and Nanaimo Parkway:

Option 1: Traditional Diamond Interchange
A conventional diamond interchange was proposed, but the required ramp widths to accommodate internal queuing would result in significant property impacts (see **Figure 3.5**).



Figure 3.5: Nanaimo Parkway & Jingle Pot Road South – Option 1 Improvements

Option 2: Diverging Diamond Interchange

An alternative diverging diamond interchange design was proposed to minimize property impacts and better manage high left-turn volumes. This configuration included two signalized intersections allowing two-phase operation, two left-turn lanes, one right-turn lane, and a single northbound off-ramp lane (see **Figure 3.6**).

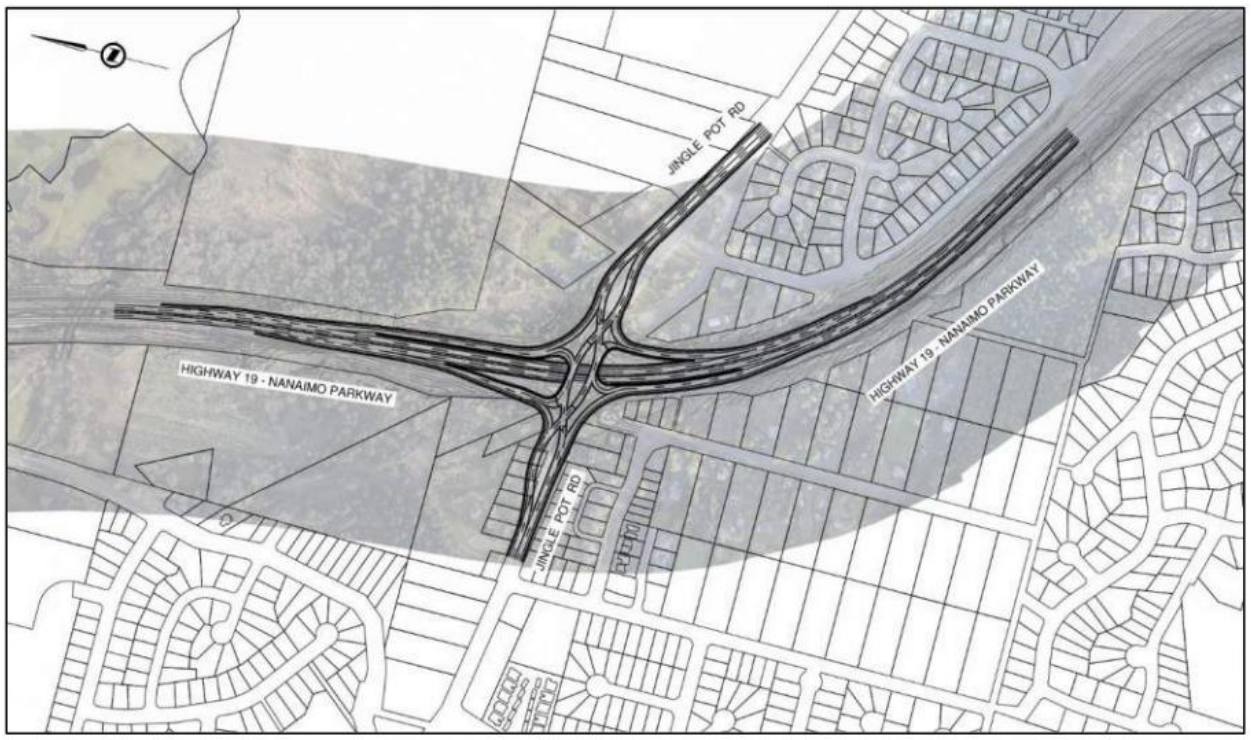


Figure 3.6: Nanaimo Parkway & Jingle Pot Road South – Option 2 Improvements

NANAIMO PARKWAY & COLLEGE DRIVE / FIFTH STREET

For this location, only minor improvements were proposed, as significant capacity issues were not anticipated. Proposed upgrades included adding a double southbound left-turn lane, widening to provide two receiving lanes, and improving access to the channelized right-turn to prevent blockage from westbound traffic (see **Figure 3.7**).

An alternative concept involving right-in/right-out operations with left turns redirected via adjacent interchanges or local roads was also presented. However, this concept was not advanced.



Figure 3.7: Nanaimo Parkway & College Drive / Fifth Street Improvements

4.0 Traffic Volume Assessment

4.1 Existing Traffic Volumes

The City provided the latest traffic data to establish the current traffic volumes within the study area. **Table 4.1** summarizes the data sources used in this study.

Table 4.1: Traffic Count Data Summary

Location	Source	Date (MM-DD-YYYY)	Day	Count Period
Nanaimo Parkway & Jingle Pot Road	MOTT	02-06-2025	Thursday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM
Nanaimo Parkway & College Drive/Fifth Street	MOTT	02-05-2025 02-06-2025 02-11-2025	Wednesday, Thursday, Tuesday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM
Wakesiah Avenue & Third Street	City	04-10-2025	Thursday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM
Wakesiah Avenue & Fourth Street	City	04-10-2025	Thursday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM
Wakesiah Avenue & Fifth Street	City	10-20-2022	Thursday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM
Wakesiah Avenue & Nanaimo Lakes Road/ Harewood Road	City	04-10-2025	Thursday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM
Third Street/Fitzwilliam Street & Bruce Avenue/Pine Street	City	04-01-2025	Tuesday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM
Bruce Avenue & Fifth Street	City	10-18-2022	Tuesday	7:00 AM – 9:00 AM 3:00 PM – 6:00 PM

Table 4.2 outlines the peak hours recorded at these intersections, as well as the overall study area peak hours used for this analysis for the weekday AM and PM peak periods.

Table 4.2: Study Period Peak Hours

Intersection	Study Period Peak Hour	
	AM	PM
Nanaimo Parkway & Jingle Pot Road	7:45 – 8:45	16:15 – 17:15
Nanaimo Parkway & College Drive/Fifth Street	7:30 – 8:30	16:00 – 17:00
Wakesiah Avenue & Third Street	7:45 – 8:45	14:30 – 15:30
Wakesiah Avenue & Fourth Street	7:45 – 8:45	15:15 – 16:15
Wakesiah Avenue & Fifth Street	7:45 – 8:45	16:00 – 17:00
Wakesiah Avenue & Nanaimo Lakes Road/ Harewood Road	8:00 – 9:00	17:15 – 18:15
Third Street/Fitzwilliam Street & Bruce Avenue/Pine Street	8:00 – 9:00	16:15 – 17:15
Bruce Avenue & Fifth Street	8:00 – 9:00	16:15 – 17:15
Overall Study Area Peak Hour	**7:45 – 8:45**	**16:00 – 17:00**

Figure 4.1 illustrates the existing peak hour traffic volumes throughout the study area. An annual traffic growth rate of 2% was applied to estimate consistent 2025 base year volumes.

Traffic volumes were reviewed, and balancing between intersections was performed where necessary to ensure consistency across the network. A higher PM peak eastbound volume was observed along Fifth Street between Nanaimo Parkway and Wakesiah Avenue, where volumes increase by over 450 vehicles per hour, largely transitioning to the eastbound left-turn movement at Fifth Street and Wakesiah Avenue. This increase is likely influenced by activity at the VIU access points, which were not separately counted; as such, additional data collection during Fall 2026 is recommended to confirm and refine these volumes.

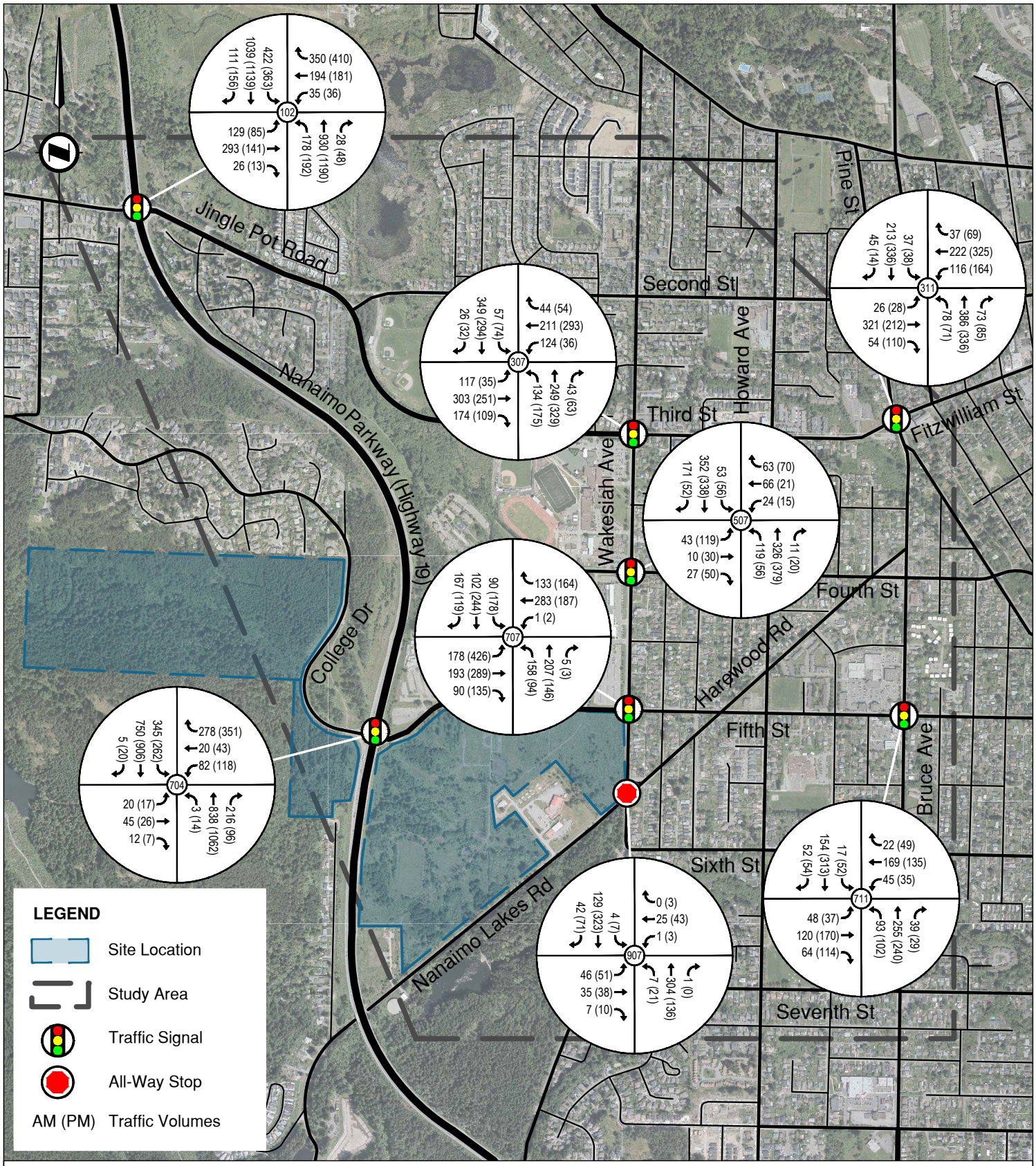


Figure 4.1: Existing (Year 2025) Traffic Volumes

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

4.2 Future Background Traffic Forecasts

A 1% annual background growth rate was assumed to account for general increases in travel demand within the study area. This lower-than-typical rate reflects the scale of proposed development on the Te'tuxwtun lands, which is expected to generate a meaningful share of the area's future traffic growth.

To support efficient traffic operations and better distribute vehicle volumes away from existing network pinch points, the following supporting transportation network measures are recommended:

- **Enhance north–south connectivity** through the Te'tuxwtun Lands site, ideally with a direct link across the VIU Lands. This would help reduce traffic pressure along Wakesiah Avenue.
- **Improve internal road network connectivity** within the southern portion of the VIU Lands site to lessen demand on the eastbound left-turn movement at the Wakesiah Avenue and Fifth Street intersection.
- **Establish a new east–west road connection** extending from Third Avenue through the north side of the VIU Lands to Fourth Avenue. This would relieve traffic demand on Wakesiah Avenue and provide a more direct route to student housing.

These network improvement measures are assumed to be implemented in the long term as part of future development within the southeast portion of the VIU lands, consistent with VIU's planning documents, and are presented as planning-level recommendations. The future-year traffic forecasts assume these connections are in place.

The traffic model accounted for these enhancements through the following diversions of vehicle trips:

- Diversion of approximately **110 AM peak-hour** and **90 PM peak-hour** vehicle trips to a new connection to the VIU Lands from Third Avenue.
- Diversion of approximately **50 AM peak-hour** and **150 PM peak-hour** eastbound left-turning vehicles from the Wakesiah Avenue and Fifth Street intersection to internal routes within the VIU Lands

The assumed re-routing volumes were based on engineering judgment using reasonable routing assumptions, consideration of potential site access opportunities, and anticipated significant congestion along the eastbound approach at the Wakesiah Avenue and Fifth Street intersection, which would incentivize diversion where feasible.

4.3 Site Traffic Trip Generation

4.3.1 Base Site Trip Generation

To forecast inbound and outbound site-generated traffic for this study, The Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition (ITE Manual) trip rates were used. These rates, categorized by land use, are provided in **Table 4.3**.

Table 4.3: Base Site Trip Generation Rates by Land Use Type

Land Use	Trip Rate Type	Land Use Classification [ITE Land Use Code]	Study Period	Trip Rate	Entering	Exiting
Residential	Vehicle Trips per Dwelling Unit (average)	Single-Family Detached Housing [210]	AM	0.70	25%	75%
			PM	0.94	63%	37%
		Multifamily Housing (Mid-Rise) [221]	AM	0.37	23%	77%
			PM	0.39	61%	39%
		Multifamily Housing (High-Rise) [222]	AM	0.27	26%	74%
			PM	0.32	62%	38%
Retail	Vehicle Trips per 1000 sq ft GFA	Strip Retail Plaza [822]	AM	2.36	60%	40%
			PM	6.59	50%	50%
		Free-Standing Discount Superstore [813]	AM	1.86	56%	44%
			PM	4.33	49%	51%
		Shopping Center (>150k) [820]	AM	0.84	62%	38%
			PM	3.40	48%	52%
Recreation	Vehicle Trips per 1000 sq ft GFA	Recreation [Nanaimo-Specific Rate]	AM	-	-	-
			PM	6.86	46%	54%
Lodging	Vehicle trips per room (average)	Resort Hotel [330]	AM	0.32	72%	28%
			PM	0.41	43%	57%
Services	Vehicle Trips per Pump (average)	Gasoline/Service Station [944]	AM	10.28	50%	50%
			PM	13.91	50%	50%
Office	Vehicle Trips per 1000 sq ft GFA	Research and Development Center [760]	AM	1.03	82%	18%
			PM	0.98	16%	84%

The vehicle trip rates are based on a General Urban/Suburban setting as defined by the ITE.

The trip rate value for the recreation land use was estimated based on traffic count survey data collected from a comparable site in Downtown Nanaimo, reflecting a Nanaimo-specific rate.

The determined trip rates were then used to estimate inbound and outbound traffic volumes shown in **Table 4.4.** According to these forecasts, the site is anticipated to generate 3262 AM / 5067 PM peak hour vehicle trips, prior to adjustments based on internal capture which is discussed in **Section 4.3.2**.

Stadium traffic peak hours (A11) were assumed to occur outside the study area peak hours; therefore, no vehicle trips were estimated.

Table 4.4: Base Site Vehicle Trip Generation

ID Area	Land Use Classification	Density	Total (Entering/Exiting) Trips	
			AM	PM
A1	Single-Family Detached Housing	10 Units	7 (2 / 5)	9 (6 / 3)
A2	Multifamily Housing (Mid-Rise) and Strip Retail Plaza	189 Units	70 (16 / 54)	74 (45 / 29)
		153 Units	107 (27 / 80)	144 (91 / 53)
		15060 Sq. Ft	35 (21 / 14)	100 (50 / 50)
A3	Green Spaces	29.2 Acres	-	-
A4	Recreation	53040 Sq. Ft	-	364 (166 / 198)
	Resort Hotel	525 Rooms	168 (121 / 47)	216 (93 / 123)
A5	Free-Standing Discount Superstore	226040 Sq. Ft	420 (235 / 185)	979 (480 / 499)
	Gasoline/Service Station	12 Pumps	124 (62 / 62)	166 (83 / 83)
	Shopping Center	20400 Sq. Ft	18 (11 / 7)	69 (33 / 36)
A6	Culture	N/A	-	-
A7	Research and Development Centre	1085300 Sq. Ft	1118 (917 / 201)	1063 (170 / 893)
A8	Multifamily Housing (Mid-Rise)	750 Units	278 (64 / 214)	292 (178 / 114)
A9	Multifamily Housing (High-Rise)	808 Units	218 (57 / 161)	258 (160 / 98)
A10	Single-Family Detached Housing	40 Units	28 (7 / 21)	38 (24 / 14)
A11	Sports and Recreation	N/A	-	-
A12	Single-Family Detached Housing	100 Units	71 (18 / 53)	94 (59 / 35)
	Multifamily Housing (Mid-Rise)	638 Units	236 (54 / 182)	249 (152 / 97)
A13	Strip Retail Plaza	225900 Sq. Ft	190 (118 / 72)	768 (369 / 399)
	Multifamily Housing (Mid-Rise)	472 Units	174 (40 / 134)	184 (112 / 72)
		TOTAL	**3262 (1770 / 1492)**	**5067 (2271 / 2796)**

4.3.2 Post-Internal Capture Site Trip Generation

The US National Cooperative Highway Research Program (NCHRP) Report 684, *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments* (2011), defines internal trip capture for a development site as the percentage of total trips that are made internally to the development site without using external roads. This is an industry-accepted methodology to assess mixed-use developments.

Internal capture is based on the assumption that vehicle trips generated and attracted by different land uses within a mixed-use development will remain on-site without entering the external road network, referred to as land use synergy. In simple terms, this reflects travel within a highly interactive area containing complementary land uses and convenient internal on- or off-street connections.

The methodology provided in NCHRP Report 684 was used to account for internal capture, mode split, and vehicle occupancy. Essentially, the worksheet converts non-reduced ITE rates (under General Urban/Suburban context or setting) to person trips by accounting for average vehicle occupancy, then re-allocates person trips by mode of transportation, calculates external (entering or exiting the site) and internal (remaining within the site) trips, and provides a breakdown of trips by mode.

Given the diverse mix of land uses proposed on the Te'tuxwtun lands, applying this adjustment was considered appropriate. Following the application of internal capture reductions, the resulting external AM and PM peak hour trips are summarized in **Table 4.5**. After internal trip capture adjustments, the site is anticipated to generate 2666 AM / 3699 PM peak hour external vehicle trips, representing an 18% to 27% reduction compared to the base trip generation values.

The reduced trip rates were determined by dividing the *external trips* by the proposed development density, representing the external trip generation for the site. The completed NCHRP worksheet is provided in **Appendix A**.

The methodology applied the same vehicle trip rate for external trips as that used for the input trip generation, which in this case is based on a General Urban/Suburban land use context. While this assumption is appropriate for the current conditions, it is recognized that future implementation of Transportation Demand Management (TDM) measures, along with enhanced active transportation and transit connections, could further reduce external vehicle trip rates.

No additional mode share adjustments have been applied in this analysis; however, **Section 6.0** discusses potential supporting measures that could influence future travel behaviour and reduce automobile dependency over time. These measures were not directly incorporated into the analysis, as their integration into the site plan is not yet known, and some of the anticipated mode share reductions would depend on off-site improvements that fall outside the scope and control of the development project.

Table 4.5: Post-Internal Capture Site Vehicle Trip Generation

ID Area	Land Use Classification	Density	Total (Entering/Exiting) Trips	
			AM	PM
A1	SF Houses	10 Units	7 (2 / 5)	9 (6 / 3)
A2	Low-Rise Residential with Ground-Floor Commercial	189 Units	70 (16 / 54)	74 (45 / 29)
		153 Units	107 (27 / 80)	144 (91 / 53)
		15060 Sq. Ft	35 (21 / 14)	100 (50 / 50)
A3	Green Spaces	29.2 Acres	-	-
A4	Recreation	53040 Sq. Ft	-	247 (114 / 133)
	Resort Hotel	525 Rooms	118 (107 / 11)	151 (58 / 93)
A5	Big Box Store	226040 Sq. Ft	307 (169 / 138)	667 (348 / 319)
	Gas Station	12 Pumps	124 (62 / 62)	166 (83 / 83)
	Commercial Retail	20400 Sq. Ft	13 (8 / 5)	47 (24 / 23)
A6	Culture	N/A	-	-
A7	Research and Development Centre	1085300 Sq. Ft	875 (746 / 129)	852 (116 / 736)
A8	Mid-Rise Residential	750 Units	241 (56 / 185)	188 (108 / 80)
A9	High-Rise Residential	808 Units	189 (50 / 139)	166 (97 / 69)
A10	SF Residential	40 Units	24 (6 / 18)	25 (15 / 10)
A11	Sports and Recreation	N/A	-	-
A12	SF Residential	100 Units	62 (16 / 46)	61 (36 / 25)
	Mid-Rise Residential	638 Units	204 (47 / 157)	161 (93 / 68)
A13	Commercial Retail	225900 Sq. Ft	139 (85 / 54)	522 (267 / 255)
	Mid-Rise Residential	472 Units	151 (35 / 116)	119 (68 / 51)
		TOTAL	**2666 (1453 / 1213)**	**3699 (1619 / 2080)**

4.4 Future Combined Traffic Forecasts

The vehicle trips generated by the site were forecasted onto the network based on estimates of vehicle trip distribution (where the traffic is going) and traffic assignment (the routes the traffic takes to reach its destination). Future combined traffic volumes represent the anticipated future traffic, factoring in both background traffic growth and the traffic generated by the development site.

Table 4.6 summarizes the estimated vehicle trip distribution for the site. The distribution was estimated using a combination of observed vehicle turning movements at the site access points and the proportion of traffic at vehicle endpoints, while also considering road network connections beyond the study area boundaries. These estimates were adjusted to account for expected changes in travel patterns due to the proposed future modifications to the road network.

Table 4.6: Site Vehicle Trip Distribution

Roadway	Endpoint	AM		PM	
		%In	%Out	%In	%Out
Nanaimo Parkway (Highway 19)	North	21.0%	18.7%	18.7%	18.7%
	South	6.7%	3.7%	4.3%	4.1%
Bruce Street	South	19.4%	12.9%	15.8%	21.9%
Fitzwilliam Street	East	10.4%	13.9%	16.7%	9.2%
Wakesiah Avenue	North	12.0%	13.2%	12.0%	11.5%
Pine Street	North	8.2%	14.5%	11.6%	11.9%
Jingle Pot Road	West	8.4%	7.7%	4.3%	6.2%
Fifth Street	East	6.5%	5.7%	6.6%	6.9%
Fourth Street	East	2.8%	3.1%	4.9%	3.8%
Nanaimo Lakes Road	South	2.4%	2.4%	3.0%	3.7%
Howard Avenue	North	2.2%	4.4%	2.1%	2.2%

Trip assignment across the network was completed using relative travel times and logical routing patterns, reflecting how drivers are expected to select routes under typical peak-hour conditions. While the analysis focused on specific intersections within the defined study area, the assignment process considered all available collector and arterial routes to ensure a realistic representation of how traffic would distribute across the broader network. No new external network connections–such as a potential extension of College Drive to Dogwood Road and Nanaimo Lakes Road–were assumed in the modelling, as these are not identified as planned or likely network changes at this time.

Future combined traffic forecasts incorporate both background traffic growth and site-generated traffic. Forecast years were selected to align with key development build-out milestones:

- **2031** – approximately 25% build-out
- **2038** – approximately 50% build-out
- **2050** – full build-out

It should be noted that the 25% build-out assumption is based on trip generation, rather than floor area, dwelling units, or other development metrics. Using trip generation as the benchmark provides a consistent and performance-based approach for determining the timing of required transportation improvements. This method ensures that infrastructure delivery is aligned with actual travel demand, regardless of which specific land uses or development areas are advanced first within the master plan.

A straight-line growth rate was applied between 2025 and 2050 to interpolate traffic conditions for the interim horizon years.

Figures 4.2 to 4.4 illustrate the future total traffic forecasts for each study year, reflecting the combined effects of future background growth (1% per year from 2025) and development-related trip generation across the study network. **Figure 4.5** illustrates the site-only traffic forecast at full build-out.

Table 4.7 summarizes the total traffic growth between existing (2025) and 2050 conditions and the relative contribution of background growth and development-generated traffic during the AM and PM peak hours at all study area intersections. The “Other (%)” and “Dev. (%)” columns show the share of total growth from each source, and together they add up to 100%.

Accordingly,

- The contribution of development-related traffic is highest at intersections closest to the site, particularly along the Wakesiah Avenue corridor, where development accounts for the majority of total growth.
- The influence of development decreases with distance from the site, with background growth representing a larger share of total growth at intersections along Nanaimo Parkway and other locations farther from the development.
- Overall, development traffic accounts for a significant portion of total growth across the network, with generally higher contributions observed during the PM peak period compared to the AM peak.

Table 4.7: Site-Generated Traffic Proportion of Total Intersection Volumes – 2050

Intersection	AM				PM			
	Growth (veh.)	Growth %	Other (%)	Dev. (%)	Growth (veh.)	Growth %	Other (%)	Dev. (%)
Wakesiah Avenue & Fifth Street	1872	116%	18%	82%	2442	123%	13%	87%
Bruce Avenue & Fifth Street	604	56%	45%	55%	871	65%	39%	61%
Pine Street & Third Street / Fitzwilliam Street	1006	63%	41%	59%	1306	73%	35%	65%
Wakesiah Avenue & Third Street	1042	57%	36%	64%	1172	67%	32%	68%
Wakesiah Avenue & Fourth Street	889	70%	21%	79%	1044	87%	19%	81%
Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road	927	154%	17%	83%	1297	184%	14%	86%
Nanaimo Parkway & College Drive / Fifth Street	1515	58%	43%	57%	2009	69%	37%	63%
Nanaimo Parkway & Jingle Pot Road	1726	46%	54%	46%	1974	50%	50%	50%

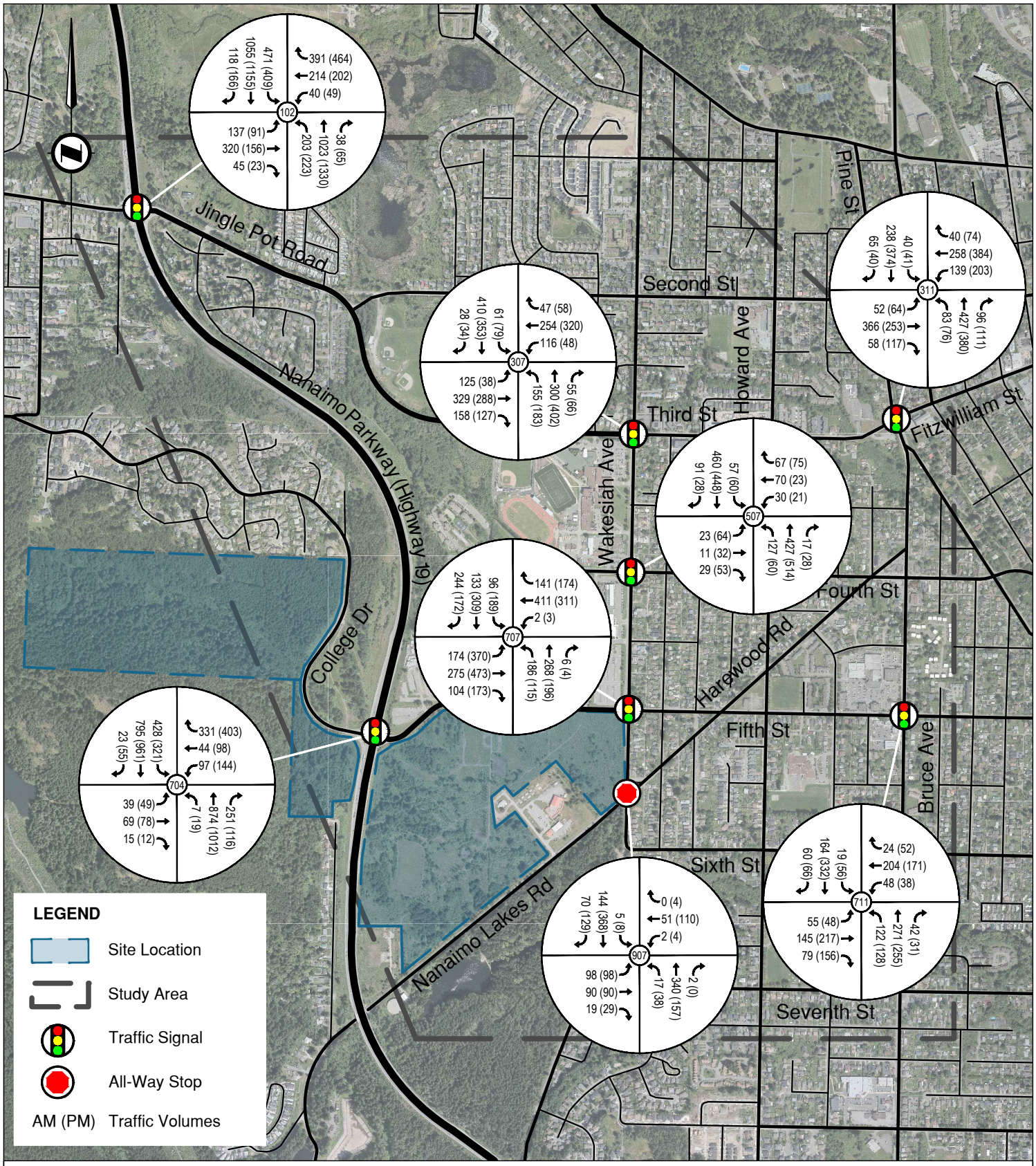


Figure 4.2: Future (Year 2031) Traffic Forecasts

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

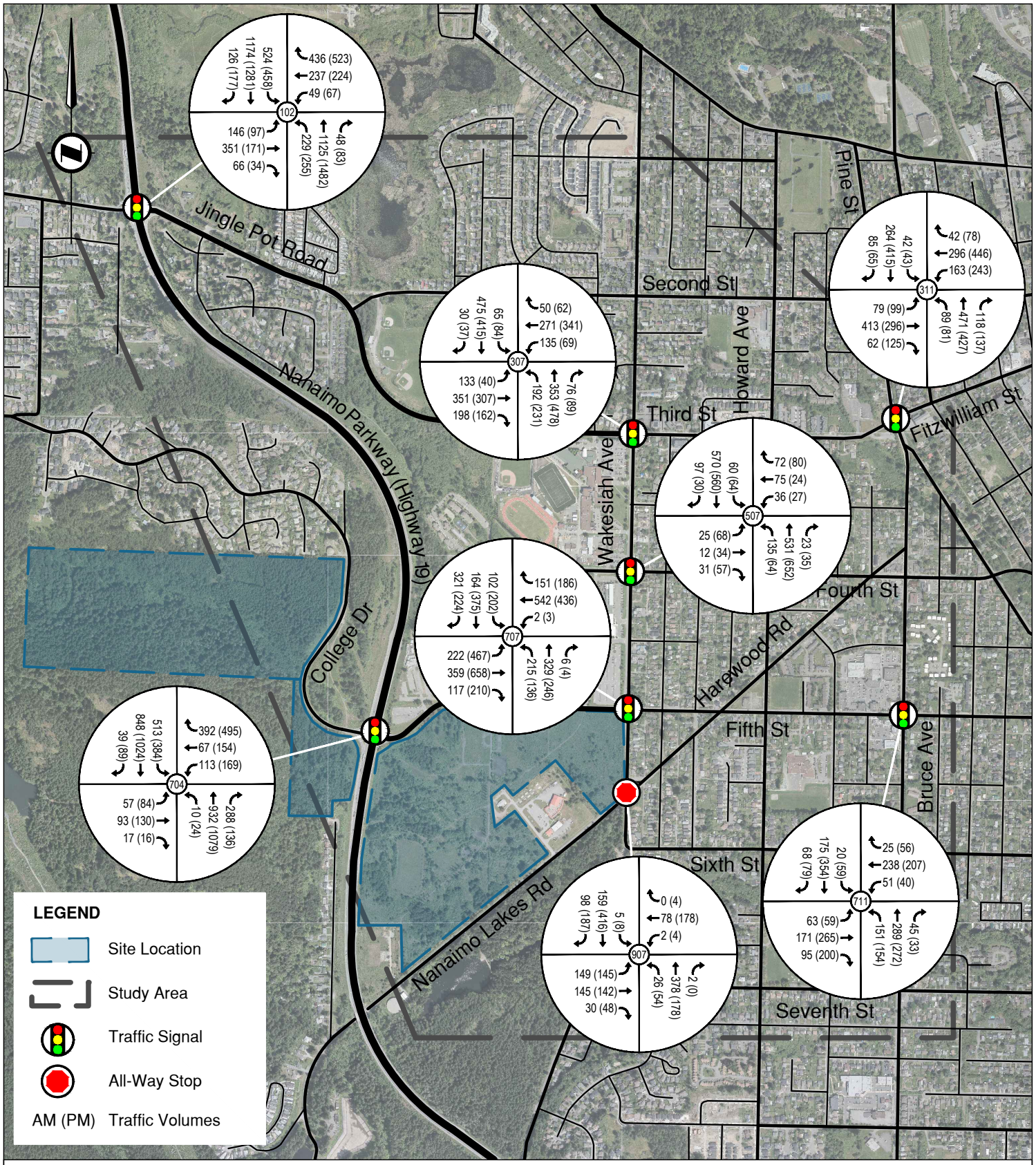


Figure 4.3: Future (Year 2038) Traffic Forecasts

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

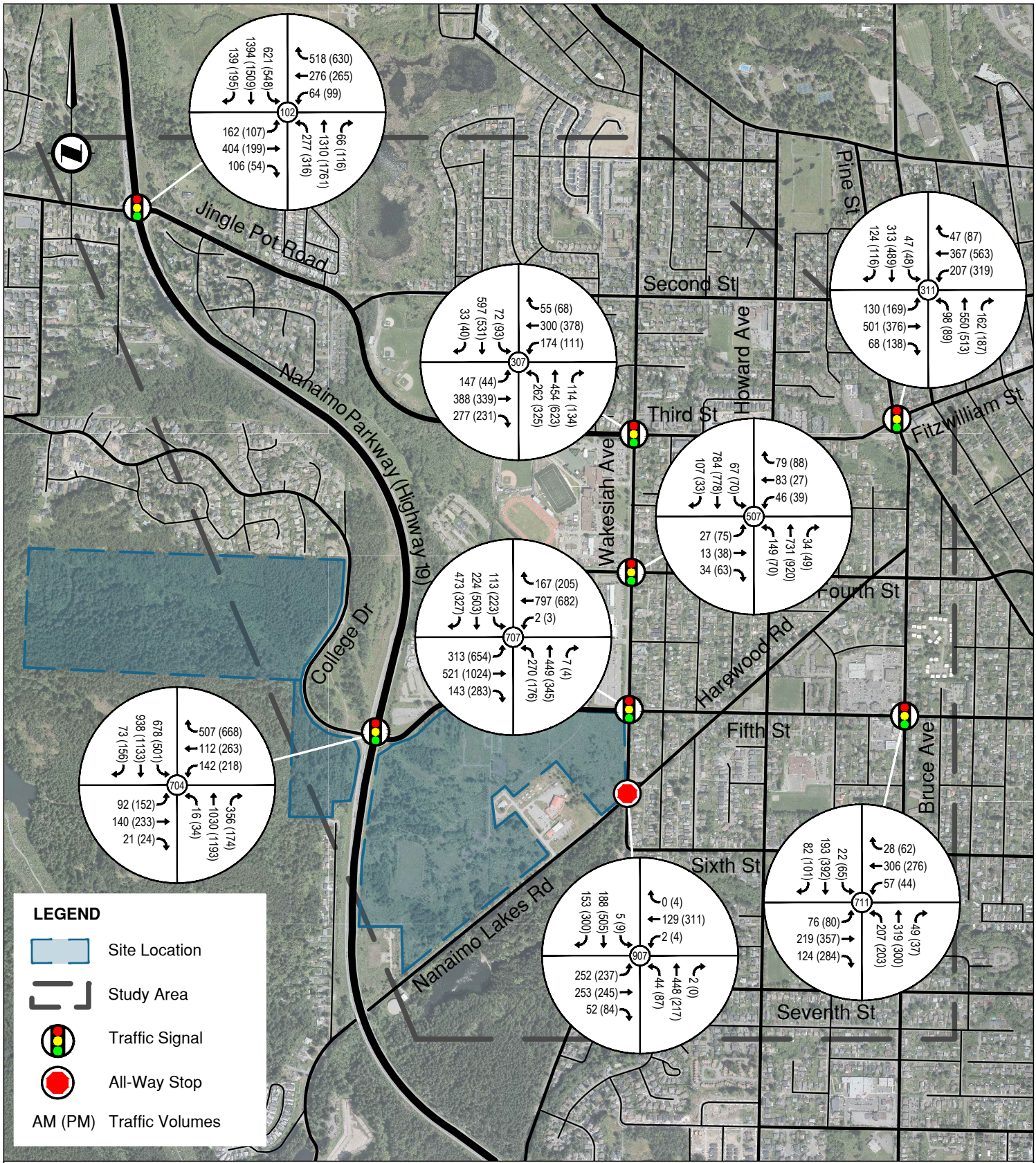


Figure 4.4: Future (Year 2050) Traffic Forecasts

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

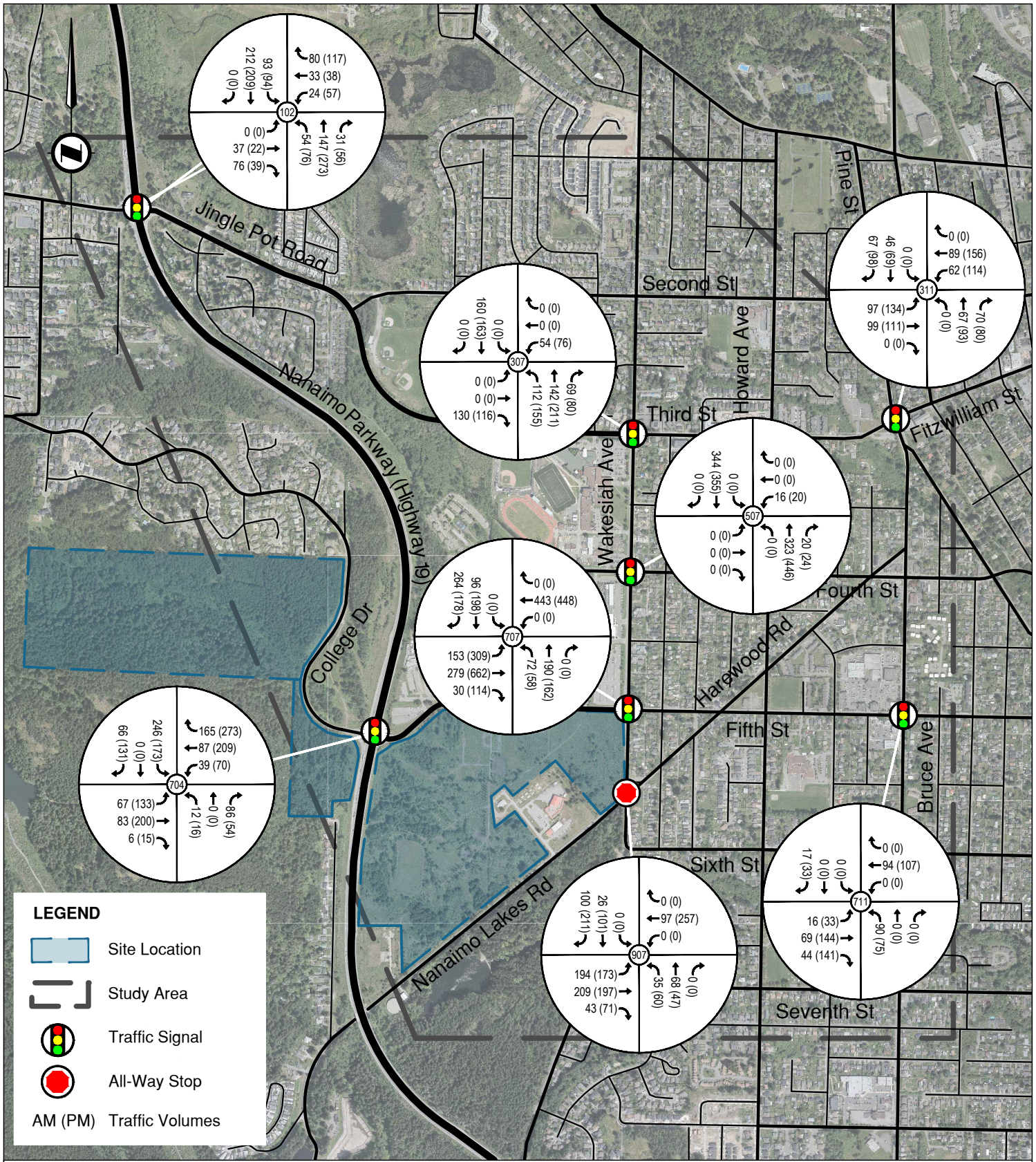


Figure 4.5: 100% Buildout Site-Only Traffic Forecasts

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

4.5 Traffic Monitoring

A traffic monitoring framework is recommended to ensure that transportation improvements are delivered in step with development activity and that actual traffic growth remains consistent with the assumptions established in this study. The intent is to provide a flexible, evidence-based process that allows adjustments as the site evolves, while maintaining a consistent reference to the approved master plan.

Traffic monitoring will occur alongside a transportation study submitted with each major development phase. This process will confirm that site-generated traffic and intersection volumes align with master plan forecasts. The findings will inform refinements to future forecasts and, where appropriate, adjustments to the timing or extent of required transportation improvements.

The Terms of Reference (ToR) for each phase-specific transportation study will be defined collaboratively between the development team and the City of Nanaimo, with input from external agencies (e.g., BC Transit, MoTT) where relevant.

The scope of each phase update may include the following elements:

- **Traffic Data Collection:** Conduct updated turning movement counts at key study intersections and at development site accesses.
- **Trip Generation Review:** Compare observed trip generation rates and mode shares for completed phases to the values and assumptions used in this report.
- **Trip Generation Forecasts:** Forecast site-generated traffic for the proposed development phase based on updated land use information, refined trip generation rates, and observed travel behaviour from earlier phases.
- **Improvement Review:** Confirm whether the transportation improvements identified in this report are required for the next development phase. Any proposed adjustments to the timing, scale, or configuration of improvements must be supported by updated traffic data and analysis demonstrating that network performance and safety objectives will continue to be met.

If the proposed phase generally aligns with the approved master plan, such as maintaining a similar land use mix, access plan, and trip distribution, a concise Transportation Monitoring Memo summarizing the updated data and confirming improvement timing will be sufficient. If the phase differs significantly from the master plan, for example through major changes in land use, density, access, or circulation patterns, a comprehensive transportation study will be required to reassess network performance and confirm or revise improvement triggers.

5.0 Traffic Operations Assessment

5.1 Analysis Methodology

The operational analysis approach used in this study is summarized in **Tables 5.1** to **5.3**.

Table 5.1: Performance Measures and Thresholds

Performance Measure	Description	Performance Threshold
Level of Service (LOS)	A qualitative measure based on the average control delay per vehicle to assess the operational conditions, ranging from A (free flow with minimal delays) to F (breakdown flow with excessive delays).	Highway through movements: D Other individual movements: E Overall intersection: D
Delay	The additional time a vehicle spends traveling through a road network compared to the time it would take under free-flow conditions.	Highway through movements – signalized: 55s Other individual movements – signalized: 80s Other individual movements – roundabout: 80s Other individual movements – unsignalized: 50s Overall intersection – signalized: 55s Overall intersection – roundabout: 55s Overall intersection – unsignalized: 35s
Volume-to-Capacity (V/C) Ratio	A performance metric to assess the level of congestion on a roadway, calculated by dividing the actual traffic volume by the roadway's capacity.	Individual movement: 0.90 Overall intersection: 0.85
95th% Queue	A performance metric to describe the length of a queue that is not exceeded 95% of the time during a given period.	Basic lane: to upstream intersection Auxiliary lane: storage length

Performance measure criteria are met when operational analysis results are less than or equal to the thresholds.

Table 5.2: Operational Analysis Parameters

Analysis Parameter	Source of Parmeter Value
Signal Clearance Intervals	Based on City and MOTT signal timing plans
Heavy Vehicle %	Individual movement heavy vehicle percentages from traffic count data Assumed 5% for highway through movements and 2% for other
Peak Hour Factor (PHF)	Overall intersection PHF from traffic count data capped at 0.95 for highway intersections. Future PHFs were adjusted in relation to forecasted traffic growth[1].
Conflicting Pedestrians	Recorded pedestrian volumes from traffic count data Assumed 5 per leg for highway intersections
Conflicting Cyclists	Recorded cyclist volumes from traffic count data Assumed negligible highway intersections

All other operational parameters use software defaults, which are based on industry standard values.

Table 5.3: Operational Analysis Tools

Traffic Signal	Minor Street Stop Control	All-Way Stop Control	Roundabout
Synchro 11	HCM 6th Edition (Synchro 11)	HCM 6th Edition (Synchro 11)	Sidra Standard (Sidra 8)

[1] Tarko, A.P. and Perez-Cartagena, R. (2005). Variability of a Peak Hour Factor at Intersections. Transportation Research Record: Journal of the Transportation Research Board, No. 1920, pp. 8–16.

5.2 Individual Intersection Traffic Operations

A summary of the traffic operations analysis for each individual intersection under existing conditions for the base year 2025, followed by recommended improvements and the corresponding traffic operations for the Year 2050, is presented in the subsequent sections. The detailed operations analysis reports for each intersection and study horizon are provided in **Appendix B**.

Nanaimo Parkway & Jingle Pot Road

EXISTING OPERATIONS

Table 5.4 provides the traffic operations results at the intersection of Jingle Pot Road and Nanaimo Parkway.

Table 5.4: Existing (Year 2025) Nanaimo Parkway & Jingle Pot Road Operational Analysis Results

Existing 2025	Intersection	Jingle Pot Rd						Nanaimo Parkway					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Prot		Free	pm+pt		Free	Prot		Yield	Prot		Yield
AM Peak													
LOS / Delay	D / 44	F / 87	D / 46	A / 0	C / 35	D / 54	A / 0	E / 79	D / 44	A / 0	E / 65	D / 44	A / 3
V/C Ratio	-	0.81	0.45	0.02	0.19	0.47	0.26	0.82	0.84	0.04	0.84	0.87	0.15
95th% Queue	-	81	52	0	15	38	0	101	191	0	100	217	9
PM Peak													
LOS / Delay	D / 37	F / 91	D / 43	A / 0	C / 33	D / 47	A / 0	E / 71	D / 36	A / 3	E / 65	D / 36	A / 3
V/C Ratio	-	0.75	0.23	0.01	0.14	0.38	0.27	0.78	0.83	0.06	0.82	0.81	0.19
95th% Queue	-	59	25	0	14	31	0	104	227	5	88	215	12

The intersection operates within acceptable operational thresholds, with an overall LOS D during both the AM and PM peak hours. During the AM peak hour, the eastbound left operates at LOS F with a delay of 87 seconds, the 95th% queues reach 81 m exceeding available left turn storage.

During the PM peak hour, the eastbound left movement operates at LOS F with a delay of 91 seconds. All other movements operate within acceptable operational thresholds.

FUTURE TRAFFIC OPERATIONS

Based on our review of future traffic conditions, this intersection will exceed acceptable operational thresholds during the interim years without improvements. To resolve this, one of the two proposed interchange options should be implemented. These interchange options are summarized in **Section 3.2**.

Table 5.5 summarizes whether traffic operation thresholds are met for the current year and 25% (Year 2031) and 50% (Year 2038), and 100% (Year 2050) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.5: Nanaimo Parkway & Jingle Pot Road Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Nanaimo Parkway & Jingle Pot Road	L/Q	L	L/C/Q	L/Q	L/C/Q	L/C/Q	L/C/Q	L/C/Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

An interchange at Nanaimo Parkway / Jingle Pot Road is identified as required based on existing operations and is already planned independent of the Te'tuxwtun development. Given the distance from the study area, the extensive prior planning and evaluation of interchange alternatives, and the further evaluation that would occur as the project advances, it was not considered necessary or within the scope of this study to reassess those interchange options.

Nanaimo Parkway & College Drive / Fifth Street

EXISTING TRAFFIC OPERATIONS

Table 5.6 provides the existing (Year 2025) traffic operations results at the intersection of Nanaimo Parkway and College Drive / Fifth Street.

Table 5.6: Existing (Year 2025) Nanaimo Parkway & College Drive / Fifth Street Traffic Operations

Existing 2025	Intersection	College Drive			Fifth Street			Nanaimo Parkway					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm		Free	Perm		Free	Prot		Yield	Prot		Yield
AM Peak													
LOS / Delay	C / 20	C / 27	C / 28	A / 0	C / 34	C / 27	A / 0	D / 40	C / 30	A / 5	D / 41	A / 9	A / 0
V/C Ratio	-	0.09	0.15	0.01	0.38	0.07	0.19	0.02	0.75	0.34	0.75	0.33	0.00
95th% Queue	-	8	14	0	24	8	0	3	130	17	129	78	0
PM Peak													
LOS / Delay	C / 22	C / 22	C / 22	A / 0	C / 30	C / 23	A / 0	D / 36	C / 32	A / 0	D / 51	B / 12	A / 0
V/C Ratio	-	0.07	0.07	0.00	0.45	0.12	0.23	0.09	0.86	0.15	0.81	0.42	0.02
95th% Queue	-	6	8	0	28	12	0	9	160	0	101	98	0

The intersection meets all performance thresholds during both the AM and PM peak hour, with an overall intersection LOS C. There are no capacity, queuing, or delay issues at this intersection under existing conditions.

FUTURE TRAFFIC OPERATIONS

Based on our review of future traffic conditions, the following improvement measures were recommended to provide acceptable traffic operations at full-build out of the development.

- Additional southbound left-turn lane (as per Nanaimo Parkway Corridor Study)
- Improve access to westbound channelized right-turn (as per Nanaimo Parkway Corridor Study)
- Additional eastbound through lane (not in Nanaimo Parkway Corridor Study)

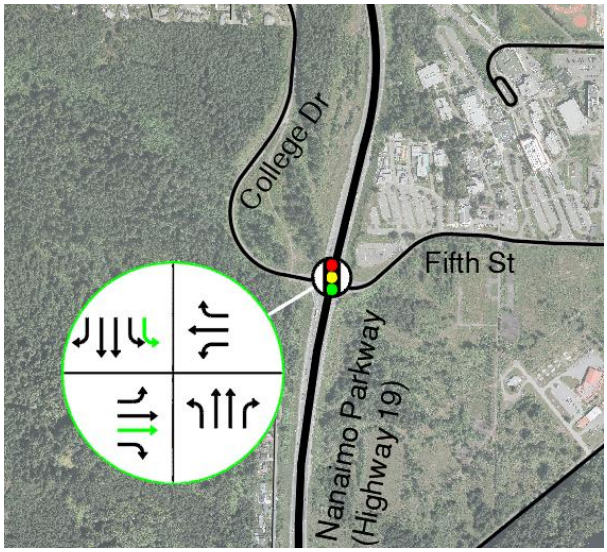


Figure 5.1: Nanaimo Parkway and College Drive / Fifth Street Recommended Improvements

As mentioned in Section 4.4, the potential extension of College Drive to Dogwood Road and Nanaimo Lakes Road was not assumed in the modelling, as these are not identified as planned or likely network changes at this time.

Table 5.7 summarizes the traffic operations at full-build out with these recommended improvements in place.

Table 5.7: Future (100% Build Out / Year 2050) Nanaimo Parkway & College Drive / Fifth Street Traffic Operations

Future 2050	Intersection	College Drive			Fifth Street			Nanaimo Parkway					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm		Free	Perm		Free	Prot		Perm	Prot		Perm
AM Peak													
LOS / Delay	C / 25	D / 38	C / 33	A / 0	D / 48	D / 35	A / 1	D / 49	D / 37	A / 5	D / 47	B / 12	A / 3
V/C Ratio	-	0.41	0.22	0.01	0.65	0.34	0.34	0.15	0.86	0.46	0.86	0.45	0.08
95th% Queue	-	30	20	0	44	33	0	11	170	21	118	99	6
PM Peak													
LOS / Delay	D / 37	E / 73	C / 29	A / 0	E / 58	D / 37	A / 1	D / 54	E / 58	A / 4	E / 77	B / 20	A / 3
V/C Ratio	-	0.87	0.28	0.02	0.82	0.60	0.47	0.32	1.01	0.25	0.98	0.63	0.17
95th% Queue	-	59	29	0	67	69	0	18	214	14	94	130	11

Additional measures to consider include the extension of the eastbound left-turn storage length and the provision of protected-permissive left-turn phase in the east-west directions.

The intersection operates at an overall LOS D or better during the AM and PM peak hours. During the PM peak hours a few turn movements, including northbound through on the highway operate at LOS E; however, the delay is slightly over the acceptable threshold (55 seconds). During the PM peak, the v/c ratio indicates that operations at capacity and exceeding desired thresholds for the northbound through and southbound left-turn movements, and the eastbound left-turn 95th percentile queue exceeds the storage bay length. These results indicate that there may be a need for further upgrades during this long-term planning horizon.

Table 5.8 summarizes whether traffic operation thresholds are met for the current year and 25% (Year 2031) and 50% (Year 2038), and 100% (Year 2050) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.8: Nanaimo Parkway & College Drive / Fifth Street Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Nanaimo Parkway & College Drive / Fifth Street	✓	✓	✓	✓	✓	✓	L/C/Q	L/C/Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

Wakesiah Avenue & Third Street

EXISTING TRAFFIC OPERATIONS

Table 5.9 provides the traffic operations results at the intersection of Wakesiah Avenue and Third Street.

Table 5.9: Existing (Year 2025) Wakesiah Avenue & Third Street Operational Analysis Results

Existing 2025	Intersection	Third Street						Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
AM Peak													
LOS / Delay	C / 31	B / 20	D / 42	A / 7	C / 21	D / 36	D / 36	C / 21	C / 29	C / 29	B / 16	D / 45	D / 45
V/C Ratio	-	0.39	0.76	0.40	0.47	0.65	0.65	0.52	0.56	0.56	0.17	0.84	0.84
95th% Queue	-	25	81	14	26	66	66	27	76	76	13	104	104
PM Peak													
LOS / Delay	C / 27	B / 17	C / 29	A / 4	B / 16	C / 34	C / 34	B / 16	C / 29	C / 29	B / 14	C / 35	C / 35
V/C Ratio	-	0.11	0.51	0.23	0.10	0.70	0.70	0.39	0.63	0.63	0.18	0.69	0.69
95th% Queue	-	10	63	8	10	87	87	32	96	96	15	84	84

The intersection meets all performance thresholds during both the AM and PM peak hour, with an overall intersection LOS C. There are no capacity, queuing, or delay issues at this intersection under existing conditions.

Based on our review of future traffic conditions, the following improvement measures were recommended to provide acceptable traffic operations at full-build out of the development.

- Addition of southbound through lane
- Addition of northbound through lane

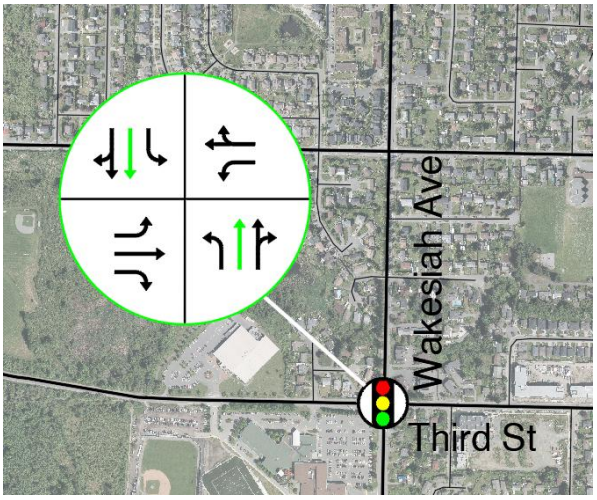


Figure 5.2: Wakesiah Avenue & Third Street Recommended Improvements

Table 5.10 summarizes the traffic operations at full-build out with these recommended improvements in place.

Table 5.10: Future (100% Build Out / Year 2050) Wakesiah Avenue & Third Street Operational Analysis Results

Future 2050	Intersection	Third Street						Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
AM Peak													
LOS / Delay	D / 35	C / 32	D / 53	B / 13	D / 42	D / 40	D / 40	D / 40	C / 24	C / 24	B / 18	D / 40	D / 40
V/C Ratio	-	0.64	0.88	0.54	0.78	0.76	0.76	0.83	0.50	0.50	0.27	0.80	0.80
95th% Queue	-	33	124	34	53	99	99	79	62	62	16	83	83
PM Peak													
LOS / Delay	C / 27	B / 18	C / 33	A / 6	B / 20	D / 36	D / 36	C / 25	C / 24	C / 24	B / 18	C / 33	C / 33
V/C Ratio	-	0.18	0.65	0.40	0.36	0.77	0.77	0.71	0.60	0.60	0.32	0.68	0.68
95th% Queue	-	11	83	16	24	124	124	67	77	77	18	65	65

At full build-out, all movements and the overall intersection operate within acceptable LOS and v/c thresholds. However, the 95th percentile queues for several movements exceed the existing storage bay lengths–particularly the westbound left-turn movement during the AM peak, and the northbound left-turn movement during both the AM and PM peak periods.

Table 5.11 summarizes whether traffic operation thresholds are met for the current year and 25% (Year 2031) and 50% (Year 2038), and 100% (Year 2050) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.11: Wakesiah Avenue & Third Street Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Wakesiah Avenue & Third Street	✓	✓	✓	✓	C/Q	✓	L/C/Q	C/Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

Wakesiah Avenue & Fourth Street

EXISTING TRAFFIC OPERATIONS

Table 5.12 provides the traffic operations results at the intersection of Wakesiah Avenue and Fourth Street.

Table 5.12: Existing (Year 2025) Wakesiah Avenue & Fourth Street Operational Analysis Results

Existing 2025	Intersection	Fourth Street						Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm			Perm			pm+pt			Perm		Perm
AM Peak													
LOS / Delay	B / 12	B / 20	A / 10	A / 10	B / 17	B / 12	B / 12	A / 8	A / 8	A / 8	B / 15	B / 18	A / 4
V/C Ratio	-	0.22	0.12	0.12	0.09	0.33	0.33	0.26	0.32	0.32	0.13	0.47	0.26
95th% Queue	-	12	7	7	7	18	18	16	42	42	13	64	10
PM Peak													
LOS / Delay	B / 12	C / 22	A / 10	A / 10	B / 17	A / 8	A / 8	A / 8	A / 9	A / 9	B / 15	B / 16	A / 1
V/C Ratio	-	0.43	0.21	0.21	0.05	0.23	0.23	0.18	0.40	0.40	0.14	0.42	0.10
95th% Queue	-	26	12	12	5	11	11	9	51	51	13	61	1

The intersection meets all performance thresholds during both the AM and PM peak hour, with an overall intersection LOS B. There are no capacity, queuing, or delay issues at this intersection under existing conditions.

FUTURE TRAFFIC OPERATIONS

Based on our review of future traffic conditions, the following improvement measures were recommended to provide acceptable traffic operations at full-build out of the development.

- Addition of northbound through lane
- Conversion of exclusive southbound right-turn lane to shared through/right

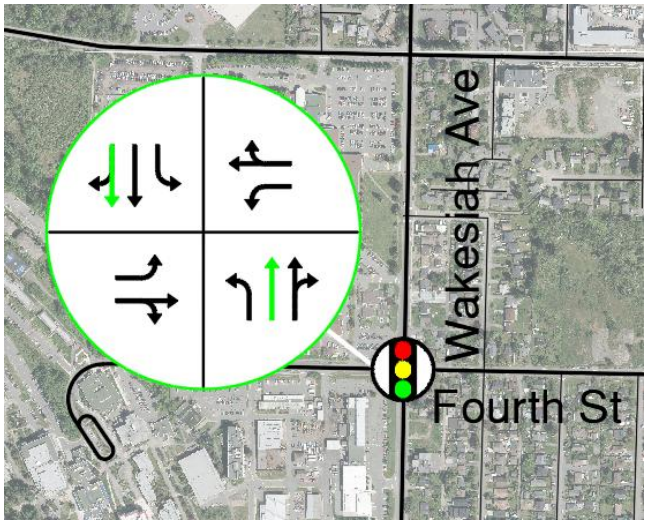


Figure 5.3: Wakesiah Avenue & Fourth Street Recommended Improvements

Table 5.13 summarizes the traffic operations at full-build out with these recommended improvements in place.

Table 5.13: Future (100% Build Out / Year 2050) Wakesiah Avenue & Fourth Street Operational Analysis Results

Future 2050	Intersection	Fourth Street						Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm			Perm			pm+pt			Perm		
AM Peak													
LOS / Delay	B / 13	B / 19	A / 10	A / 10	B / 19	B / 15	B / 15	B / 11	A / 7	A / 7	B / 18	B / 17	B / 17
V/C Ratio	-	0.14	0.15	0.15	0.16	0.40	0.40	0.44	0.36	0.36	0.24	0.57	0.57
95th% Queue	-	8	8	8	12	24	24	19	45	45	17	80	80
PM Peak													
LOS / Delay	B / 13	B / 20	A / 10	A / 10	B / 18	A / 9	A / 9	A / 8	B / 14	B / 14	A / 7	B / 12	B / 12
V/C Ratio	-	0.30	0.27	0.27	0.15	0.30	0.30	0.27	0.56	0.56	0.21	0.47	0.47
95th% Queue	-	16	12	12	9	12	12	10	86	86	10	66	66

At full build out the intersection operates at an overall LOS B during both the AM and PM peak hours and meets all v/c, delay, and queue thresholds.

Table 5.14 summarizes whether traffic operation thresholds are met for the current year and 25% (Year 2031) and 50% (Year 2038), and 100% (Year 2050) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.14: Wakesiah Avenue & Fourth Street Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Wakesiah Avenue & Fourth Street	✓	✓	✓	✓	✓	✓	C/Q	Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

Wakesiah Avenue & Fifth Street

EXISTING TRAFFIC OPERATIONS

Table 5.15 provides the traffic operations results at the intersection of Wakesiah Avenue and Fifth Street.

Table 5.15: Existing (Year 2025) Wakesiah Avenue & Fifth Street Operational Analysis Results

Existing 2025	Intersection	Fifth Street						Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	pm+pt			Perm			Perm			Perm		Perm
AM Peak													
LOS / Delay	C / 28	B / 14	A / 9	A / 9	B / 19	E / 66	E / 66	C / 24	C / 20	C / 20	C / 25	B / 18	A / 5
V/C Ratio	-	0.51	0.35	0.35	0.00	**0.99**	**0.99**	0.46	0.39	0.39	0.42	0.18	0.33
95th% Queue	-	24	31	31	1	109	109	**36**	42	42	24	22	11
PM Peak													
LOS / Delay	C / 23	C / 31	A / 9	A / 9	B / 19	C / 31	C / 31	C / 27	C / 21	C / 21	C / 30	C / 25	A / 6
V/C Ratio	-	0.85	0.43	0.43	0.01	0.78	0.78	0.46	0.35	0.35	0.62	0.55	0.27
95th% Queue	-	**98**	52	52	2	72	72	**23**	30	30	40	48	10

The intersection operates at an overall LOS C during both the AM and PM peak hours. During the AM peak hour, the westbound through-right movement experiences the highest delay at 66 seconds and operates at LOS E. This movement exceeds the v/c ratio threshold, with a v/c ratio of 0.99, and surpasses the 95th percentile queue length threshold, with the queue on Wakesiah Avenue extending to the upstream intersection at Hillcrest Avenue. The 95th percentile queue for the northbound left-turn movement exceeds the storage bay length during both peak hours, and the eastbound left-turn movement exceeds the storage bay length during the PM peak hour.

FUTURE TRAFFIC OPERATIONS

Based on our review of future traffic conditions, the following improvement measures were recommended to provide acceptable traffic operations at full-build out of the development.

- Change from signalized intersection to double lane roundabout
- Addition of eastbound right turn bypass

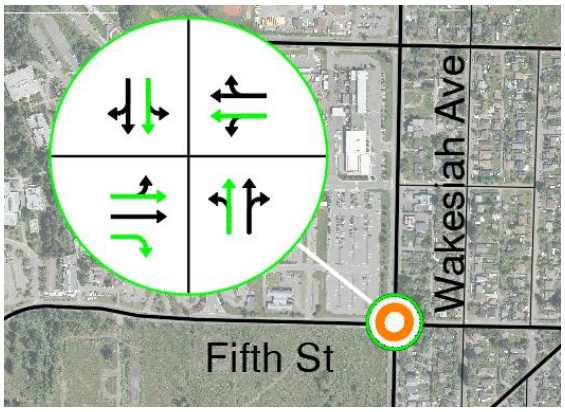


Figure 5.4: Wakesiah Avenue & Fifth Street Recommended Improvements

Table 5.16 summarizes the traffic operations at full-build out with these recommended improvements in place.

Table 5.16: Future (100% Build Out / Year 2050) Wakesiah Avenue & Fifth Street Operational Analysis Results

Future 2050	Intersection	Fifth Street						Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Roundabout			Yield									
AM Peak													
LOS / Delay	A / 5	A / 6	A / 1	A / 1	B / 12	A / 6	A / 6	A / 9	A / 3	A / 3	B / 12	A / 7	A / 6
V/C Ratio		0.39	0.39	0.11	0.66	0.66	0.66	0.46	0.46	0.46	0.60	0.60	0.61
95th% Queue		17	19	4	34	39	39	18	19	19	30	30	35
PM Peak													
LOS / Delay	A / 7	B / 11	A / 4	A / 1	B / 15	A / 9	A / 8	B / 17	A / 10	A / 10	B / 11	A / 5	A / 5
V/C Ratio		0.77	0.77	0.20	0.66	0.66	0.66	0.60	0.60	0.60	0.65	0.65	0.65
95th% Queue		56	61	8	37	43	43	27	33	33	35	39	39

At full build-out the intersection operates at LOS A in the both the AM peak and PM peak; all thresholds are met in both the AM and PM.

A signalized intersection alternative was evaluated. To meet projected 2050 traffic volume demands, significant road widening would be required to achieve acceptable operational performance. **Figure 5.5** provides a snapshot of the Synchro model for the signal option. Compared to the roundabout option, Fifth Street at the development frontage would need to be widened to accommodate six travel lanes, while Wakesiah Avenue would require widening to five lanes south of the intersection and six lanes north of the intersection.

The roundabout remains the preferred configuration and the signalized option is not recommended due to the substantial right-of-way impacts on all intersection corners.



Figure 5.5: Wakesiah Avenue & Fifth Street Signal Option

Table 5.17 summarizes whether traffic operation thresholds are met for the current year and 25% (Year 2031) and 50% (Year 2038), and 100% (Year 2050) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.17: Wakesiah Avenue & Fifth Street Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Nanaimo Parkway & College Drive / Fifth Street	C/Q	Q	C/Q	Q	L/C/Q	L/C/Q	L/C/Q	L/C/Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road

EXISTING TRAFFIC OPERATIONS

Table 5.18 provides the traffic operations results at the intersection of Wakesiah Avenue and Nanaimo Lakes Road / Harewood Road.

Table 5.18: Existing (Year 2025) Wakesiah Avenue and Nanaimo Lakes Road / Harewood Road Operational Analysis Results

Existing 2025	Intersection	Nanaimo Lakes Road / Harewood Road						Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	All-Way Stop	Stop			Stop			Stop			Stop		
AM Peak													
LOS / Delay	B / 10	A / 9	A / 9	A / 9	A / 9	A / 9	A / 9	B / 11	B / 11	B / 11	A / 9	A / 9	A / 9
V/C Ratio	-	0.16	0.16	0.16	0.05	0.05	0.05	0.46	0.46	0.46	0.26	0.26	0.26
95th% Queue	-	3	3	3	1	1	1	15	15	15	6	6	6
PM Peak													
LOS / Delay	B / 12	A / 10	A / 10	A / 10	A / 9	A / 9	A / 9	A / 10	A / 10	A / 10	B / 14	B / 14	B / 14
V/C Ratio	-	0.19	0.19	0.19	0.09	0.09	0.09	0.26	0.26	0.26	0.60	0.60	0.60
95th% Queue	-	4	4	4	2	2	2	6	6	6	24	24	24

The intersection meets all performance thresholds during both the AM and PM peak hour, with an overall intersection LOS B. There are no capacity, queuing, or delay issues at this intersection under existing conditions.

FUTURE TRAFFIC OPERATIONS

Based on our review of future traffic conditions, the following improvement measures were recommended to provide acceptable traffic operations at full-build out of the development.

- Change from all-way stop to single lane roundabout
- Addition of southbound right turn bypass

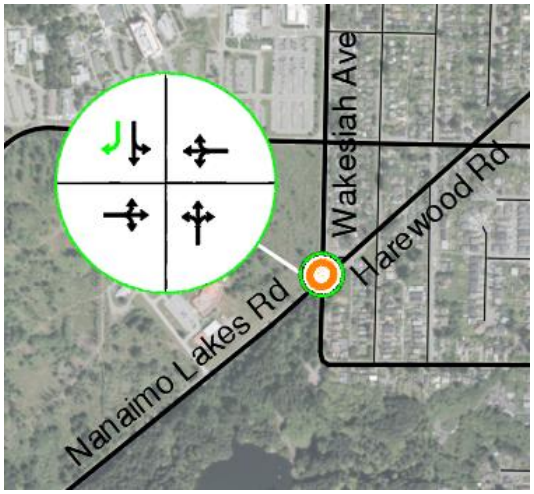


Figure 5.6: Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road Recommended Improvements

Table 5.19 summarizes the traffic operations at full-build out with these recommended improvements in place.

Table 5.19: Future (100% Build Out / Year 2050) Wakesiah Avenue and Nanaimo Lakes Road / Harewood Road Operational Analysis Results

Future 2050	Intersection	Nanaimo Lakes Road			Harewood Road			Wakesiah Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Roundabout												
AM Peak													
LOS / Delay	A / 7	A / 10	A / 5	A / 5	B / 14	A / 9	A / 10	B / 14	A / 8	A / 8	B / 11	A / 4	A / 4
V/C Ratio		0.52	0.52	0.52	0.24	0.24	0.24	0.67	0.67	0.67	0.16	0.16	0.12
95th% Queue		31	31	31	12	12	12	55	55	55	7	7	6
PM Peak													
LOS / Delay	A / 10	C / 22	B / 17	B / 17	A / 13	A / 8	A / 9	A / 10	A / 4	A / 4	B / 13	A / 6	A / 5
V/C Ratio		0.81	0.81	0.81	0.45	0.45	0.45	0.44	0.44	0.44	0.51	0.51	0.30
95th% Queue		92	92	92	26	26	26	25	25	25	31	31	16

At full buildout the intersection operates at LOS A during both peak hours, and all thresholds are met.

A signalized intersection alternative was evaluated. **Figure 5.7** provides a snapshot of the Synchro model for the signalized option. To meet projected 2050 traffic volume demands, the following lane modifications would be required:

- Addition of an eastbound left-turn lane with protected-permissive left-turn phase
- Addition of a northbound left-turn lane
- Separation of shared through/right lane for the southbound approach

While both options meet the acceptable operational thresholds, the roundabout remains the preferred configuration due to its traffic calming measures and enhanced road safety.



Figure 5.7: Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road Signal Option

Table 5.20 summarizes whether traffic operation thresholds are met for the 25% (Year 2031) and 50% (Year 2038) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.20: Wakesiah Avenue & Nanaimo Lakes Road / Harewood Road Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Wakesiah Avenue & Nanaimo Lakes / Harewood Road	✓	✓	✓	C	✓	L/C	L/C	L/C/Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

Pine Street & Third Street / Fitzwilliam Street

EXISTING TRAFFIC OPERATIONS

Table 5.21 provides the traffic operations results at the intersection of Pine Street and Third Street / Fitzwilliam Street

Table 5.21: Pine Street & Third Street / Fitzwilliam Street Operational Analysis Results

Existing 2025	Intersection	Third Street			Fitzwilliam Street			Pine Street					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm			Perm			Perm			Perm		
AM Peak													
LOS / Delay	B / 17	B / 10	B / 17	B / 17	C / 25	B / 13	B / 13	B / 12	C / 20	C / 20	B / 14	B / 12	B / 12
V/C Ratio	-	0.09	0.67	0.67	0.61	0.47	0.47	0.23	0.74	0.74	0.20	0.42	0.42
95th% Queue	-	5	47	47	21	31	31	14	74	74	9	36	36
PM Peak													
LOS / Delay	B / 15	B / 11	B / 12	B / 12	B / 17	B / 15	B / 15	B / 12	B / 17	B / 17	B / 12	B / 14	B / 14
V/C Ratio	-	0.11	0.50	0.50	0.51	0.61	0.61	0.23	0.67	0.67	0.16	0.54	0.54
95th% Queue	-	6	37	37	27	51	51	13	62	62	8	50	50

The intersection meets all performance thresholds during both the AM and PM peak hour, with an overall intersection LOS B. There are no capacity, queuing, or delay issues at this intersection under existing conditions.

Based on our review of future traffic conditions, the following improvement measures were recommended to provide acceptable traffic operations at full-build out of the development.

- Separation of shared through/right lane for all directions
- Addition of a protected-permissive westbound left-turn phase

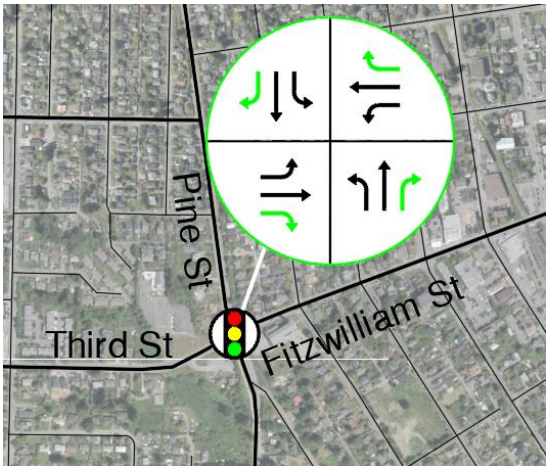


Figure 5.8: Pine Street & Third Street / Fitzwilliam Street Recommended Improvements

Table 5.22 summarizes the traffic operations at full-build out with these recommended improvements in place.

Table 5.22: Future (100% Build Out / Year 2050) Pine Street & Third Street / Fitzwilliam Street Operational Analysis Results

Future 2050	Intersection	Third Street			Fitzwilliam Street			Pine Street					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm		Perm	pm+pt		Perm	Perm		Perm	Perm		Perm
AM Peak													
LOS / Delay	C / 31	C / 24	D / 45	A / 4	E / 59	B / 14	A / 3	C / 22	D / 45	A / 4	D / 37	C / 21	A / 4
V/C Ratio	-	0.47	0.92	0.13	0.94	0.48	0.07	0.42	0.93	0.29	0.50	0.55	0.21
95th% Queue	-	29	118	6	50	53	4	23	127	10	18	56	9
PM Peak													
LOS / Delay	C / 33	D / 43	D / 43	A / 5	D / 38	D / 45	A / 3	C / 24	C / 29	A / 4	C / 28	D / 45	A / 2
V/C Ratio	-	0.79	0.80	0.27	0.84	0.90	0.15	0.48	0.74	0.28	0.29	0.87	0.20
95th% Queue	-	47	108	10	83	159	6	19	113	12	17	139	6

At full build-out, the intersection operates at an overall acceptable LOS C during both the AM and PM peaks, with delays remaining within acceptable limits. However, v/c ratios are exceeded for a few AM peak movements, with the highest value of 0.94 observed for the WBL movement. Additionally, the 95th percentile queue for the WBL movement exceeds the available storage bay length during both the AM and PM peaks.

Although some operational thresholds are still exceeded with the proposed improvements, the recommendations reflect a balance between traffic performance, corridor and multimodal objectives, and implementation feasibility. Minor exceedances were considered acceptable where meeting the thresholds would require disproportionate or undesirable geometric changes.

Table 5.23 summarizes whether traffic operation thresholds are met for the 25% (Year 2031) and 50% (Year 2038) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.23: Pine Street & Third Street / Fitzwilliam Street Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Pine Street & Fitzwilliam Street	✓	✓	Q	Q	C/Q	Q	L/C/Q	L/C/Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

It is important to note that for the year 2031 the intersection experiences all acceptable thresholds, except for the WBL 95th % queue which exceeds the storage bay length by 9m and 12m for the AM and PM respectively.

Bruce Avenue & Fifth Street

EXISTING TRAFFIC OPERATIONS

Table 5.24 provides the traffic operations results at the intersection of Bruce Avenue and Fifth Street.

Table 5.24: Existing (Year 2025) Bruce Avenue & Fifth Street Operational Analysis Results

Existing 2025	Intersection	Fifth Street						Bruce Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm			Perm			Perm			Perm		
AM Peak													
LOS / Delay	B / 15	B / 15	B / 13	B / 13	B / 14	B / 15	B / 15	B / 16	B / 16	B / 16	B / 15	B / 14	B / 14
V/C Ratio	-	0.18	0.36	0.36	0.15	0.36	0.36	0.21	0.40	0.40	0.04	0.30	0.30
95th% Queue	-	12	30	30	11	35	35	21	54	54	6	36	36
PM Peak													
LOS / Delay	B / 17	B / 16	B / 17	B / 17	B / 16	B / 15	B / 15	B / 19	B / 17	B / 17	B / 15	B / 19	B / 19
V/C Ratio	-	0.12	0.53	0.53	0.11	0.34	0.34	0.37	0.44	0.44	0.14	0.60	0.60
95th% Queue	-	10	48	48	10	32	32	23	47	47	12	66	66

The intersection operates at an overall LOS B during both the AM and PM peak hours. The intersection meets all performance thresholds, except the 95th percentile queue for the northbound left-turn movement exceeds the storage bay length during both peak hours. The existing storage length is approximately 15 metres. This is exceeded by approximately one vehicle length which would fit within the taper.

FUTURE TRAFFIC OPERATIONS

Based on our review of future traffic conditions, the following improvement measures were recommended to provide acceptable traffic operations at full-build out of the development.

- Separation of eastbound shared through/right lane

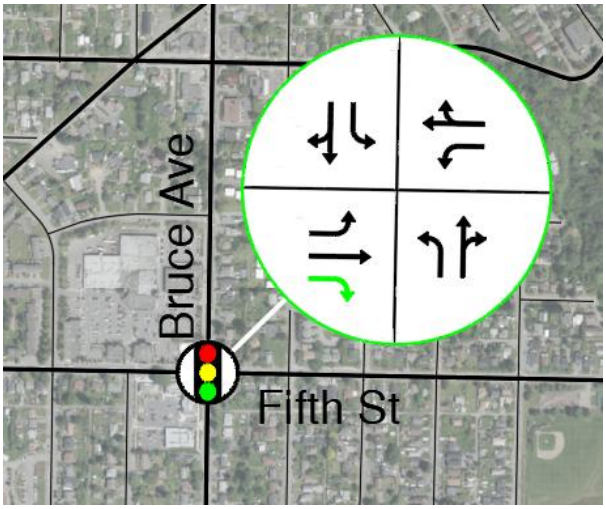


Figure 5.9: Bruce Avenue and Fifth Street Recommended Improvements

Table 5.25 summarizes the traffic operations with the current intersection set up for predicted 2050 volumes.

Table 5.25: Future (100% Build Out / Year 2050) Bruce Avenue & Fifth Street Operational Analysis Results

Future 2050	Intersection	Fifth Street						Bruce Avenue					
Measure	Overall	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control	Signal	Perm		Perm	Perm			Perm			Perm		
AM Peak													
LOS / Delay	B / 19	C / 23	B / 18	A / 5	B / 16	C / 22	C / 22	C / 27	B / 19	B / 19	B / 15	B / 16	B / 16
V/C Ratio	-	0.42	0.42	0.25	0.20	0.64	0.64	0.65	0.61	0.61	0.09	0.49	0.49
95th% Queue	-	20	41	10	14	63	63	56	71	71	7	50	50
PM Peak													
LOS / Delay	C / 23	C / 34	C / 32	A / 6	C / 26	C / 30	C / 30	D / 38	B / 16	B / 16	B / 15	B / 20	B / 20
V/C Ratio	-	0.49	0.72	0.47	0.26	0.69	0.69	0.74	0.42	0.42	0.16	0.63	0.63
95th% Queue	-	24	77	16	14	71	71	65	58	58	15	93	93

As seen in the 2050 results all movements meet acceptable LOS and v/c ratios. However, there are above threshold queues during the AM and PM peak hours for the eastbound and northbound left movements.

Table 5.26 summarizes whether traffic operation thresholds are met for the 25% (Year 2031) and 50% (Year 2038) buildout volumes under the existing intersection configuration. This analysis provides guidance on when improvements may need to be implemented.

Table 5.26: Bruce Avenue & Fifth Street Existing Configuration Intersection Performance

Intersection	2025		2031		2038		2050	
	AM	PM	AM	PM	AM	PM	AM	PM
Bruce Avenue & Fifth Street	Q	Q	Q	Q	Q	Q	Q	C/Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)

Traffic operations for the interim years (2031, and 2038) operate similar to the Year 2025 results, meeting all acceptable thresholds, except for the 95th percentile queues on the NBL movements for AM and PM peaks.

5.3 Overall Traffic Operations Results

Table 5.27 summarizes the traffic operations analysis for the study area, comparing existing conditions with horizon year scenarios (including future background growth and development-related traffic). It presents current and future intersection performance under the existing configurations, as well as full build-out conditions with the recommended improvements. This comparison helps identify when intersection upgrades across the study area should be implemented.

To align infrastructure delivery with actual development activity, specific improvement triggers should be based on trip generation levels rather than fixed timelines. These trip-based triggers should be agreed upon by the development team and the City of Nanaimo to ensure upgrades occur as traffic demand warrants.

Table 5.27: Traffic Operations Results

Intersection	Existing Configuration (Year 2025)		Existing Configuration (Year 2031)		Existing Configuration (Year 2038)		Existing Configuration (Year 2050)		Proposed Configuration (Year 2050)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Nanaimo Parkway & Jingle Pot Road	L/Q	L	L/C/Q	L/Q	L/C/Q	L/C/Q	L/C/Q	L/C/Q	✓ *	✓ *
Nanaimo Parkway & College Drive/Fifth Street	✓	✓	✓	✓	✓	✓	L/C/Q	L/C/Q	✓	L/C/Q
Wakesiah Avenue & Third Street	✓	✓	✓	✓	C/Q	✓	L/C/Q	C/Q	Q	Q
Wakesiah Avenue & Fourth Street	✓	✓	✓	✓	✓	✓	C/Q	Q	✓	✓
Wakesiah Avenue & Fifth Street	C/Q	Q	C/Q	Q	L/CQ	L/C/Q	L/C/Q	L/C/Q	✓	✓
Wakesiah Avenue & Nanaimo Lakes Road/ Harewood Road	✓	✓	✓	C	✓	L/C	L/C	L/C/Q	✓	✓
Third Street/Fitzwilliam Street & Pine Street	✓	✓	Q	Q	C/Q	Q	L/C/Q	L/C/Q	C/Q	Q
Bruce Avenue & Fifth Street	Q	Q	Q	Q	Q	Q	Q	C/Q	Q	Q

✓ indicates minimum traffic performance thresholds are met
L/C/Q Indicates which thresholds are not being met (L=LOS, C=v/c ratio, Q=queues)
*based on 2046 analysis as per Nanaimo Parkway Corridor Study

Figure 5.10 (next page) shows the recommended roadway laning and traffic control upgrades throughout the study area road network.

Under existing configurations most intersections operate within acceptable performance limits. By the 2031 horizon year, half of the intersections exhibit at least one operational deficiency, primarily related to capacity or queueing. By 2038, only two intersections–Nanaimo Parkway & College Drive/Fifth Street and Wakesiah Avenue & Fourth Street–continue to meet minimum performance thresholds. By 2050, all intersections are projected to operate with significant deficiencies, indicating that the existing configuration will not accommodate long-term traffic growth without improvements.

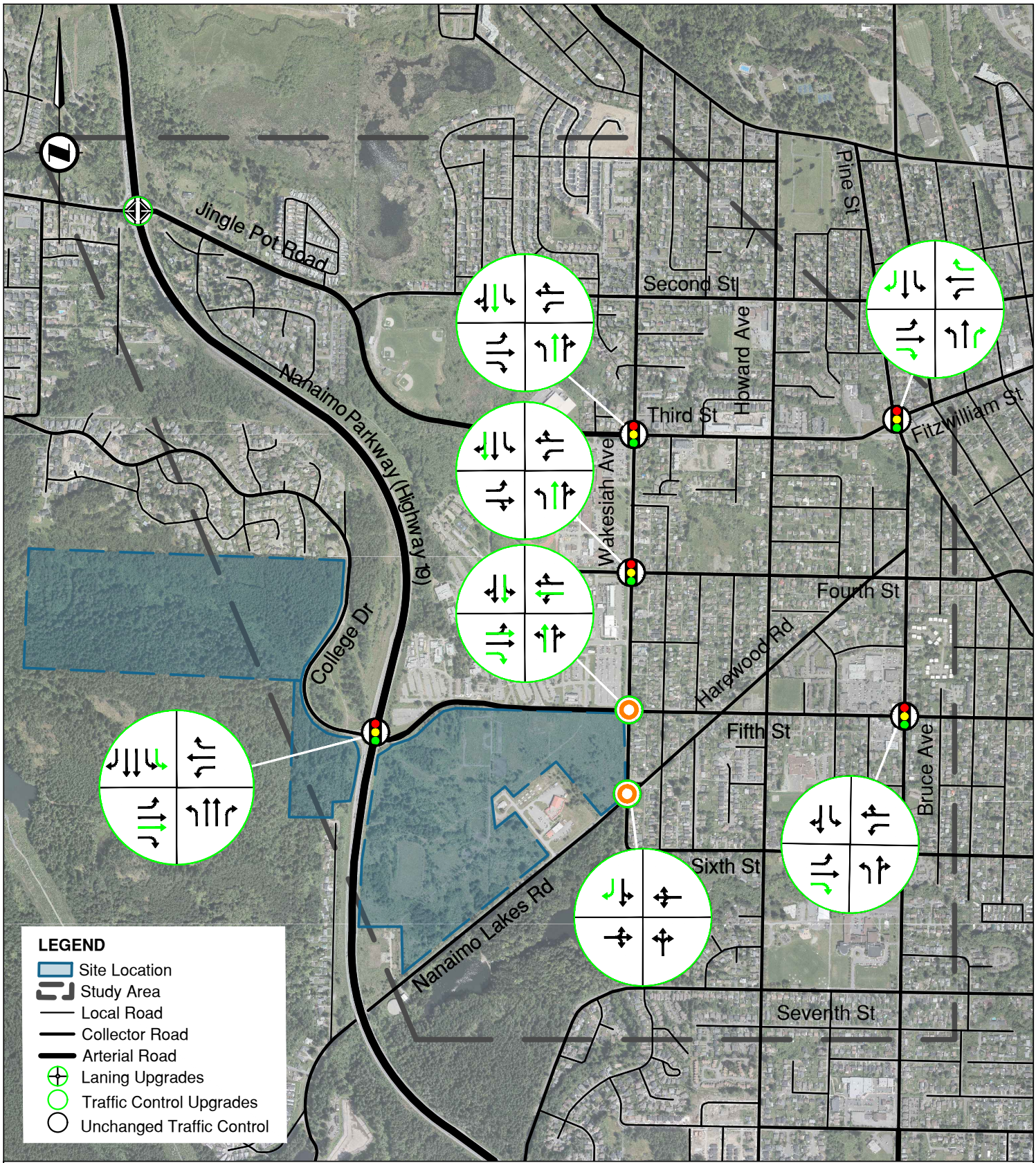


Figure 5.10: Future Laning and Traffic Control

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

The following are key findings identified from the existing conditions and future recommendations analysis:

Existing Traffic Operations (2025 volumes and existing configuration)

Nanaimo Parkway & Jingle Pot Road:

- The eastbound left-turn movement fails during both the AM and PM peak periods, with queue spilling to the through lane during the AM peak.

Wakesiah Avenue & Fifth Street:

- During the AM peak, the westbound through and right-turn movements operate over capacity.
- During the PM peak, the eastbound left-turn queue significantly exceeds the available storage length.
- Minor queue spillbacks were also observed for the northbound left-turn movement during both the AM and PM peak periods.

Bruce Avenue & Fifth Street

- There is a minor overflow of the northbound left turn storage lane during the AM and PM peak periods of approximately 1 vehicle.

All other intersections were found to operate at acceptable levels of service, with capacity and queues within manageable limits.

Future Traffic Operations (2050 Volumes with recommended improvements)

Nanaimo Parkway & College Drive / Fifth Street:

- During the PM peak, the northbound through and southbound left-turn movements operate above capacity (1.01 and 0.98 respectively).
- The eastbound left-turn queue exceeds the storage bay length during the PM peak by approximately 25 metres, or four cars.

Wakesiah Avenue & Third Street:

- During the AM peak, the westbound and northbound left-turn queues exceed available storage bay lengths.
- The northbound left-turn queue also exceeds the storage length during the PM peak.

Wakesiah Avenue & Fifth Street:

- The eastbound left-turn movement operates above capacity threshold during the PM peak (0.95).

Third Street / Fitzwilliam Street & Pine Street:

- During the AM peak, capacity thresholds are exceeded for the eastbound through, westbound left-turn and northbound through movements.
- The westbound left-turn queue exceeds the storage bay length during both the AM and PM peaks by approximately 4 and 11 cars respectively.

Bruce Avenue & Fifth Street

- There is minor overflow of the eastbound left-turn storage length by 1-2 cars during both the AM and PM peaks.
- There is major overflow of the northbound left-turn storage length by 8 and 10 cars during the AM and PM peaks respectively.

All other intersections were found to operate at acceptable levels of service, with capacity and queues within manageable limits.

Note that although some of the desired operational thresholds are exceeded including with the proposed improvements, the recommendations reflect a balance between operational performance, broader corridor and multimodal objectives, and implementation feasibility. In some cases, minor exceedances of performance thresholds were considered acceptable where addressing them would require disproportionate or undesirable geometric changes.

All intersections operate at acceptable levels of service with the proposed improvements with forecasted 2050 volumes. The primary deficiencies that do exist relate to capacities and queuing. The most common issue is queues exceeding available storage bay lengths on turning movements, which in some cases can be addressed through minor improvements.

6.0 Transportation Demand Management (TDM) and Active Modes

Transportation Demand Management (TDM) measures are intended to support travel choice and maximize the use of sustainable transportation modes such as walking, cycling, transit, and car share. These measures complement planned network improvements by reducing reliance on single-occupant vehicles, managing parking demand, and creating conditions that make active and shared modes more attractive and convenient.

For the proposed development, a combination of infrastructure-based improvements, program-based measures, and supporting policies are recommended. Together, these initiatives will enhance multimodal accessibility and help achieve local and regional transportation and climate objectives.

A summary of recommended infrastructure measures is provided in **Table 6.1**, with locations illustrated in **Figure 6.1**. It is recognized that several of the proposed measures extend beyond what can be implemented solely by the development. Accordingly, the intent of this list is to guide coordinated planning and investment among the development team, the City of Nanaimo, the Ministry of Transportation and Transit (MoTT), BC Transit, and other agency partners. In some cases, there may be trade-offs or alternative approaches that should be explored collaboratively between agencies and the project team.

Table 6.1: Recommended Active Transportation and Transit Infrastructure Measures

Measure	Description	Key Benefits / Rationale
Complete Cycling Connection to Downtown	Extend protected cycling facilities along the site frontage on Wakesiah Avenue, Nanaimo Lakes Road, and College Drive. Also enhance existing routes along Albert Street between Kennedy and the downtown core.	Establishes a continuous, all-ages-and-abilities corridor linking the Te'tuxwtun/VIU area to downtown, supporting the City's mode share targets.
Future Active Transportation Crossing of Nanaimo Parkway	Evaluate the feasibility of a new grade-separated or high-quality at-grade crossing connecting College Drive to Fifth Street.	Provides a safe, continuous link for pedestrians and cyclists between portions of the Te'tuxwtun lands west and east of the Nanaimo Parkway, and connects to the broader active transportation network.
Improved Pedestrian Crossings along Fifth Street	Introduce at least two new marked, signalized, or raised pedestrian crossings west of Wakesiah Avenue, aligned with site access points.	Improves permeability and direct connections between the Te'tuxwtun site, VIU campus, and surrounding neighbourhoods.
Relocated or Enhanced VIU Bus Exchange	Relocate the VIU Transit Exchange closer to the Te'tuxwtun site, or provide an enhanced and clearly defined pedestrian route between them.	Expands the site's 400 m transit catchment, improving accessibility and potential transit mode share.

Additional supporting measures that may be considered are summarized in **Table 6.2**. These focus on site-level planning and infrastructure measures, as well as complementary policies and incentive-based programs that encourage the use of active and shared modes.

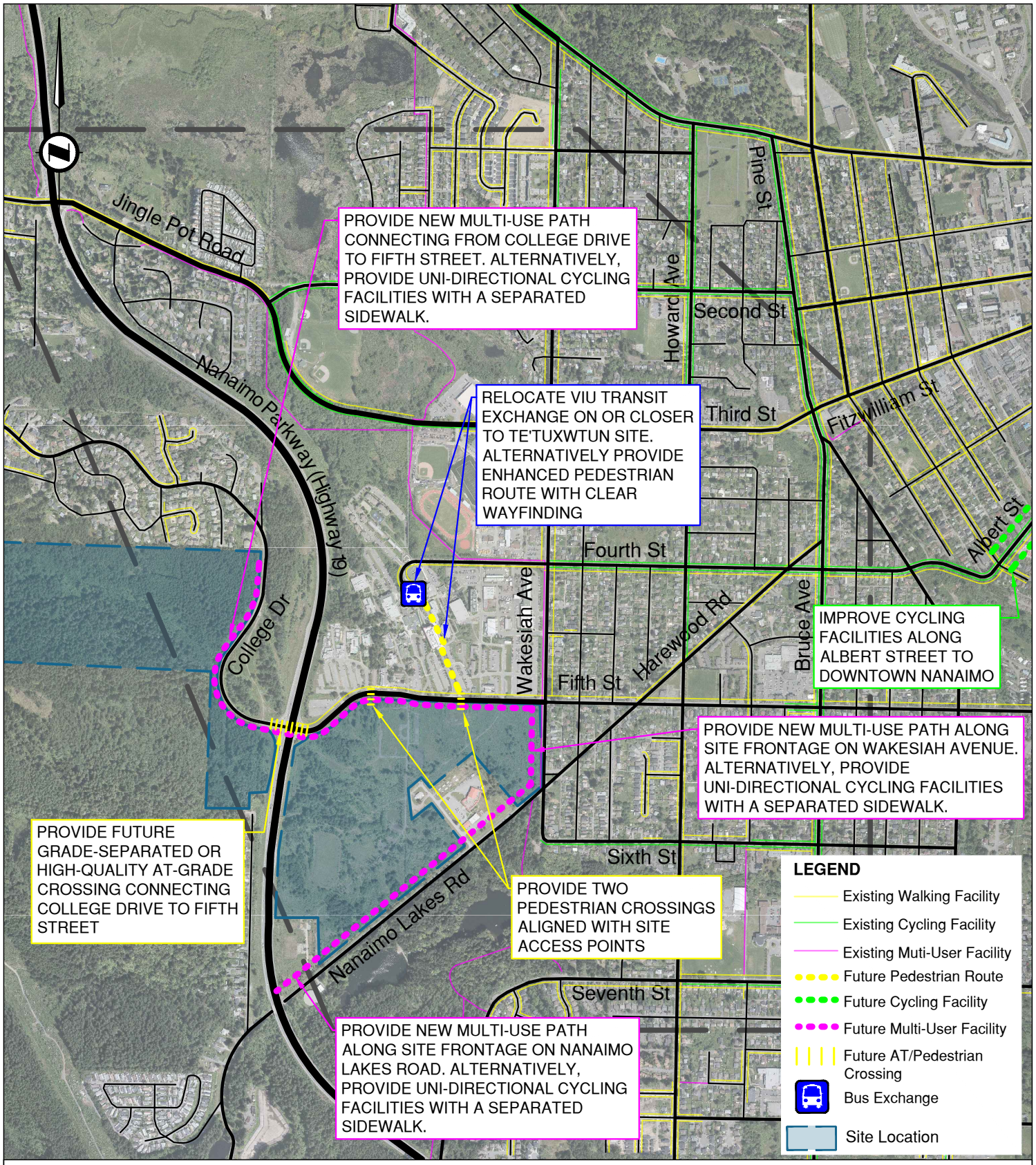


Figure 6.1: Recommended Active Transportation and Transit Infrastructure Measures

PROJECT: TE'TUXWTUN LANDS NEIGHBOURHOOD TRANSPORTATION STUDY
CLIENT: CITY OF NANAIMO
DATE: APRIL 2026

Table 6.2: Supporting Transportation Demand Management (TDM) Measures

Measure	Description	Key Benefits / Rationale
Car Share Integration	Partner with an approved car-share operator to provide dedicated on-site stalls, ideally within visible, publicly accessible mobility-hub areas.	Expands mobility options without requiring private vehicle ownership. Dedicated spaces enhance convenience and visibility of car-share use.
Bike Share Integration	Provide dedicated space or docking areas on-site or adjacent to the development for public or private bike-share systems. Locate within mobility hubs for high visibility, lighting, and safety.	Enables first-/last-mile connections, encourages short local trips, and complements active-mode infrastructure.
Active Travel Amenities	Include secure bicycle parking for all uses, along with end-of-trip facilities (lockers, showers) for employment and institutional uses.	Removes barriers to cycling, supports daily active commuting, and enhances site appeal for sustainable mobility.
Mobility Information Package	Provide residents and employees with customized travel information (transit routes, cycling maps, car-share details, trip-planning apps).	Increases awareness of travel options, reducing default reliance on driving.
Transit Pass Subsidy Program	Offer partially subsidized transit passes to residents (for a defined period upon move-in) or to employees.	Proven to increase transit ridership and reduce auto mode share.
Shared Mobility Membership Incentives	Provide financial incentives or free trial memberships for car-share and bike-share programs during initial occupancy.	Encourages trial and habitual use of shared modes, supporting long-term behaviour change.
Unbundled Residential Parking	Separate the purchase or lease of parking stalls from residential unit prices.	Enables residents to opt out of vehicle ownership and supports efficient use of parking supply.

Trip generation adjustments and mode share assumptions have been applied in the traffic analysis presented in **Section 4.0**. Because integration of these measures into the site plan is not yet confirmed, and several anticipated mode share reductions depend on off-site improvements beyond the development's control, the trip generation forecasts are conservative. Should these TDM measures be implemented, further reductions in vehicle trip generation beyond the modeled forecasts may be realized.

7.0 Conclusions & Recommendations

This section summarizes the key findings of the Neighbourhood Transportation Study (NTS) for the proposed Te'tuxwtun (Former DND) Lands development and outlines the recommended transportation improvements, supporting measures, and next steps.

7.1 Conclusions

- The Te'tuxwtun Lands is a large-scale, mixed-use development that will introduce over 3,000 residential units and more than 1.5 million square feet of commercial and office space, along with a hotel and cultural facilities.
- The site currently has limited active transportation and transit connectivity, including:
  - Minimal pedestrian and cycling facilities along Nanaimo Parkway, College Drive, and Nanaimo Lakes Road.
  - Incomplete active transportation links between the site, Vancouver Island University (VIU), and surrounding neighbourhoods.
  - No direct transit service adjacent to the site; the nearest major hub (VIU Exchange) lies within a 400m walking distance for only a small portion of the development.
- The development is projected to generate approximately 2,700 AM and 3,700 PM external peak-hour vehicle trips at full build-out (2050).
- Most intersections currently operate acceptably (2025); however, existing capacity issues are noted at:
  - **Nanaimo Parkway & Jingle Pot Road:** eastbound left-turn movement (LOS F) and queue exceeding the storage length.
  - **Wakesiah Avenue & Fifth Street:** turning movement queues exceeding available storage lengths.
  - **Bruce Avenue & Fifth Street:** localized queue overflow for the northbound left-turn movement.
- Without improvements, by 2050 all major study intersections will exhibit operational deficiencies (LOS E/F, over-capacity, or excessive queuing).

7.2 Recommendations

Road Network Upgrades

- **Nanaimo Parkway & Jingle Pot Road:** Implement a diverging diamond interchange (DDI) or equivalent.
- **Nanaimo Parkway & College Drive / Fifth Steet:**
  - Provide dual southbound left-turn lanes.
  - Provide an additional eastbound through lane.
  - Extend the westbound channelized right-turn lane.
- **Wakesiah Avenue corridor improvements:**
  - Add northbound and southbound through lanes at Third Steet.
  - Add northbound through lane and shared southbound through/right-turn lane at Fourth Seet.
  - Convert Fifth Steet intersection to a multi-lane roundabout with eastbound right-turn bypass.
  - Convert Nanaimo Lakes Road / Harewood Road to a single-lane roundabout with southbound right-turn bypass.

- **Pine Steet & Third/Fitzwilliam Steet intersection:** Provide separate right-turn lanes on all approaches and provide a protected-permissive westbound left-turn phasing.
- **Bruce Avenue & Fifth Street intersection:** Provide a separate eastbound right turn lane.

Active Transportation and Transit

- Complete a protected cycling link between the site, VIU, and downtown via Wakesiah Avenue, Fourth Street, and Albert Steet.
- Evaluate a grade-separated or enhanced at-grade active-mode crossing of Nanaimo Parkway at or near College Drive / Fifth Steet.
- Install new pedestrian crossings on Fifth Steet west of Wakesiah Avenue at key access points.
- Coordinate with BC Transit to relocate or enhance pedestrian connections to the VIU Transit Exchange for improved access for Te'tuxwtun lands.

Transportation Demand Management (TDM)

- Integrate car-share and bike-share hubs within mixed-use areas.
- Provide secure bicycle parking, showers, and end-of-trip facilities for residents and employees.
- Consider offering transit-pass subsidies and shared-mobility incentives during initial occupancy.
- Consider Unbundling parking costs from residential units to reduce private-vehicle ownership.

Phasing and Monitoring

- Link intersection upgrades to development milestones (25%, 50%, 100% build-out), based on trip generation thresholds.
- Require phase-specific traffic monitoring and update studies to verify site trip generation, confirm network volumes, and review the timing and extent of required improvements.