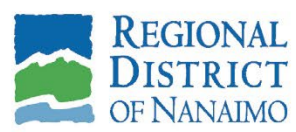


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REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY



FINAL REPORT
February 2022



ACKNOWLEDGEMENTS

The Regional District of Nanaimo respectfully recognizes the Coast Salish Nations whose traditional territory we are on.

In collaboration with our project partners the City of Nanaimo and BC Transit, as well as the project consulting team of Watt Consulting Group, Left Turn Right Turn, DIALOG and Petryna Group, we would also like to thank all the Regional District of Nanaimo Transit staff and passengers and area First Nations and local government elected officials, staff, residents, stakeholders, and community decision makers who provided their feedback and ideas into this process.

In particular, we are grateful to the contributions of the project Working Group members.



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EXECUTIVE SUMMARY

Introduction

The Regional District of Nanaimo (RDN) Transit Redevelopment Strategy (TRS) is a comprehensive and implementable priority plan for improving the RDN's conventional transit services over the next five years.

Informed by detailed analysis of the current system, projected community changes, and transit best practices, the plan seeks how to optimize current services to improve their efficiency and effectiveness. It also outlines how to focus future investment in service and infrastructure to increase ridership, better align mobility with future development and population changes, and integrate transit with active transportation.

The TRS was guided by the RDN Board, elected officials on the RDN Board's Transit Select Committee, and an advisory subcommittee of Board members that was formed to help shape this project. The project was also guided by a staff-level Working Group including project partners the City of Nanaimo and BC Transit, as well as representation by the Ministry of Transportation and Infrastructure (MoTI).

The project also involved other municipal and First Nation organizations, community groups, front line transit staff, transit passengers and the public. The project was led by WATT Consulting Group in partnership with Left Turn Right Turn, DIALOG and the Petryna Group.



Transit Redevelopment Strategy Objectives:

1. **Take stock of what has been accomplished so far** in the transit system, particularly since the completion of the 2014 RDN Transit Future Plan.
2. **Undertake a clear-eyed, data-driven assessment** of the transit system and its community.
3. **Deliver a detailed and attainable year-by-year action plan** to achieve the most effective mobility performance for the RDN.

System Issues and Opportunities

Through analysis and public engagement undertaken for this project, the following key system themes emerged:



The RDN Conventional transit system performs well against similarly sized Canadian transit system peers and carried 3.5 million people in 2019/20 (prior to the impact of COVID-19).

- The system delivers service at a lower cost per hour and trip than its peers and recovers a greater proportion of its costs through passenger revenues.
- However, the system provides less service per capita than its peers, which in turn impacts its ability to provide a higher quality, frequent service. To address this gap, the RDN has already requested future service expansion funding from BC Transit.



Public engagement participants identified the highest priorities for the system to be improving its frequency, ease of connection (both across the region and between routes), and earlier/later service.

- Improving system efficiency and affordability were also key themes, as well as providing transit to currently unserved areas, including Duke Point Ferry Terminal, Coombs and Errington.



Improving the system's ease of use and consistency were the other key opportunities identified through analysis. This includes:

- Using different types of routes and services to serve different passenger needs, with direct and frequent routes serving the highest population corridors and local services potentially operated by smaller vehicles serving lower density neighbourhoods.
- Reducing harder-to-understand duplication and variations between routes.
- Making schedule intervals more consistent between trips, particularly in services operating every 30 or 60 minutes or greater.
- Adjusting the mapping and route numbering of the system to make it easier to understand.

Project Process and Timeline

Undertaken from February 2021 – January 2022, the RDN Transit Redevelopment Strategy built from a series of overarching transportation plans, including the **2014 RDN Transit Future Plan, the 2019 South Nanaimo Local Area Transit Plan**. It also considered area community plans including the City of Nanaimo's REIMAGINE NANAIMO process and the RDN's Social Needs Assessment & Strategy.

The plan included two phases of engagement with local governments and First Nations, transit staff, passengers, the public and stakeholders. The first phase in June-July 2021 sought input on current system issues and future opportunities, while the second phase in October – November 2021 gathered feedback and further ideas on draft proposed system changes and priorities. This feedback was instrumental in shaping the final TRS recommendations.



One Network, Many Layers

Building from the principles of the RDN Transit Future Plan, the TRS uses different types of routes layered together to serve differing passenger needs.

- **Primary Routes** become the highest frequency spine of the system connecting key destinations and corridors in the region. They include:
 - The **1 Nanaimo Rapid Line**: limited stop and highest frequency service (15 minutes or better) along Highway 19A and Highway 1 corridors.
 - The **Frequent Routes 2 VIU Line** and **3 Nanaimo Hospital Line** connect key destinations and corridors with high frequency services.
 - The **Regional Route 9 Intercity** provide reliable and regular connection between Qualicum Beach, Parksville and Nanaimo, with connection points to the District of Lantzville and Electoral Areas E and G.
- **Neighbourhood Routes** provide services to medium- and lower-density residential and employment areas that connect to the Primary Routes at key points.
- **Connector Routes** serve targeted travel needs, such as work and school **commuter routes** and as well as **Interregional services** connecting the RDN to other regions, such as the Cowichan Valley and Comox Valley Regional Districts.

Proposed Network Restructuring and Service Strategies

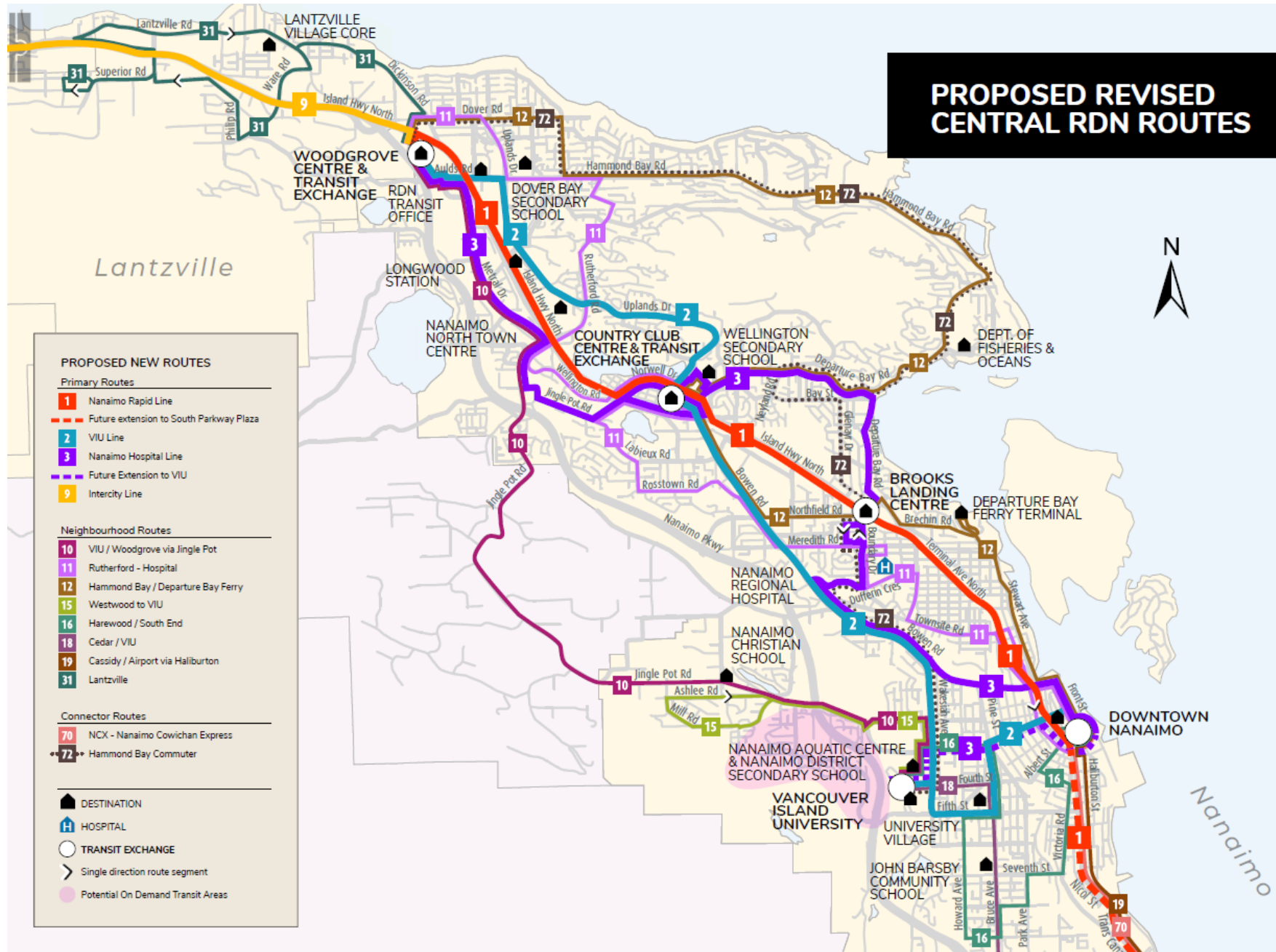
Using the results of the network analysis, project outreach and transit service best practices, the TRS outlines how system routes can be restructured and service and infrastructure added to better connect residents across the region.

The following pages show the key elements of the TRS, including:

- **Proposed route maps showing how the central, south and north segments of the RDN** can be restructured over the next five years to improve directness, simplify routing, and better align service levels with ridership and demand.
- **Recommended infrastructure priorities** to support the service changes, including future stops and alignment for the route 1 Nanaimo Rapid Line, along with priority investments in transit exchanges, Park & Rides, and transit priority measures enhance system speed and reliability.
- **A consolidated summary of recommended service and infrastructure implementation priorities** over the course of the five-year TRS. The summary shows the total resources and vehicles required by year—pending confirmed local and provincial funding—to achieve the goals of the TRS. The year-by-year priorities have been arranged in a logical order to best drive ridership growth. However, the service strategies have been presented in smaller individual initiatives to enable flexibility in responding to changes in community need and/or funding availability.

Further details on each of these elements are provided within the respective sections of the TRS. In addition to service changes and infrastructure improvements, the TRS also proposes new nomenclature for the RDN transit system, one that is intuitive, understood and based on geographic service area of the routes.

PROPOSED REVISED CENTRAL RDN ROUTES



PROPOSED SOUTH RDN ROUTES



PROPOSED NEW ROUTES

Primary Routes

- 1** Nanaimo Rapid Line
- 2** VIU Line
- 3** Nanaimo Hospital Line
- Future extension to South Parkway Plaza
- Future Extension to VIU

Neighbourhood Routes

- 10** VIU / Woodgrove via Jingle Pot
- 11** Rutherford - Hospital
- 12** Hammond Bay / Departure Bay Ferry
- 15** Westwood to VIU
- 16** Harewood / South End
- 17** Cinnabar
- 18** Cedar / VIU
- 19** Cassidy / Airport via Halliburton

Connector Routes

- 70** NCX - Nanaimo Cowichan Express
- 72** Hammond Bay Commuter
- 77** Duke Point Ferry Connector

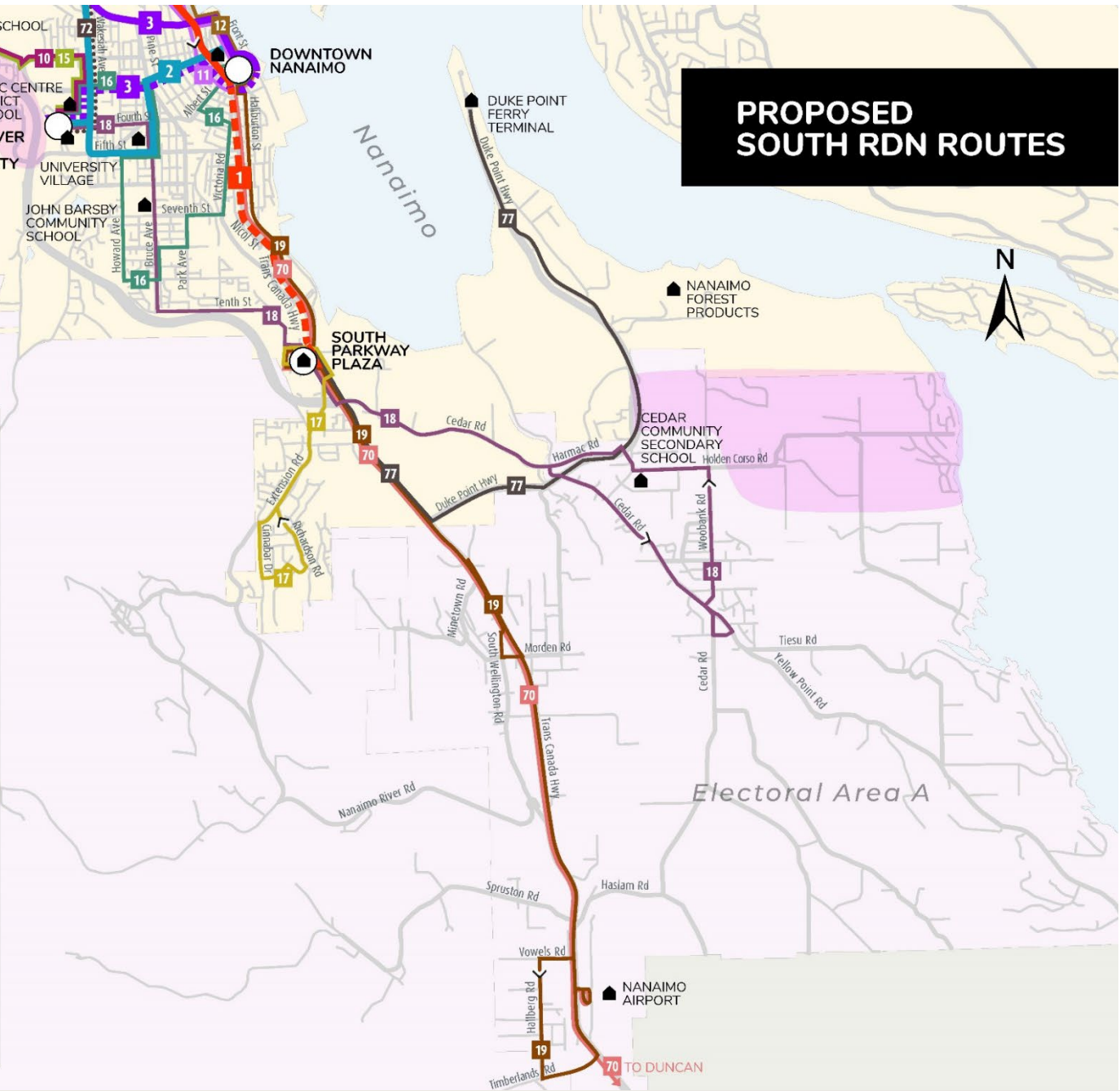
DESTINATION (House icon)

HOSPITAL (Hospital icon)

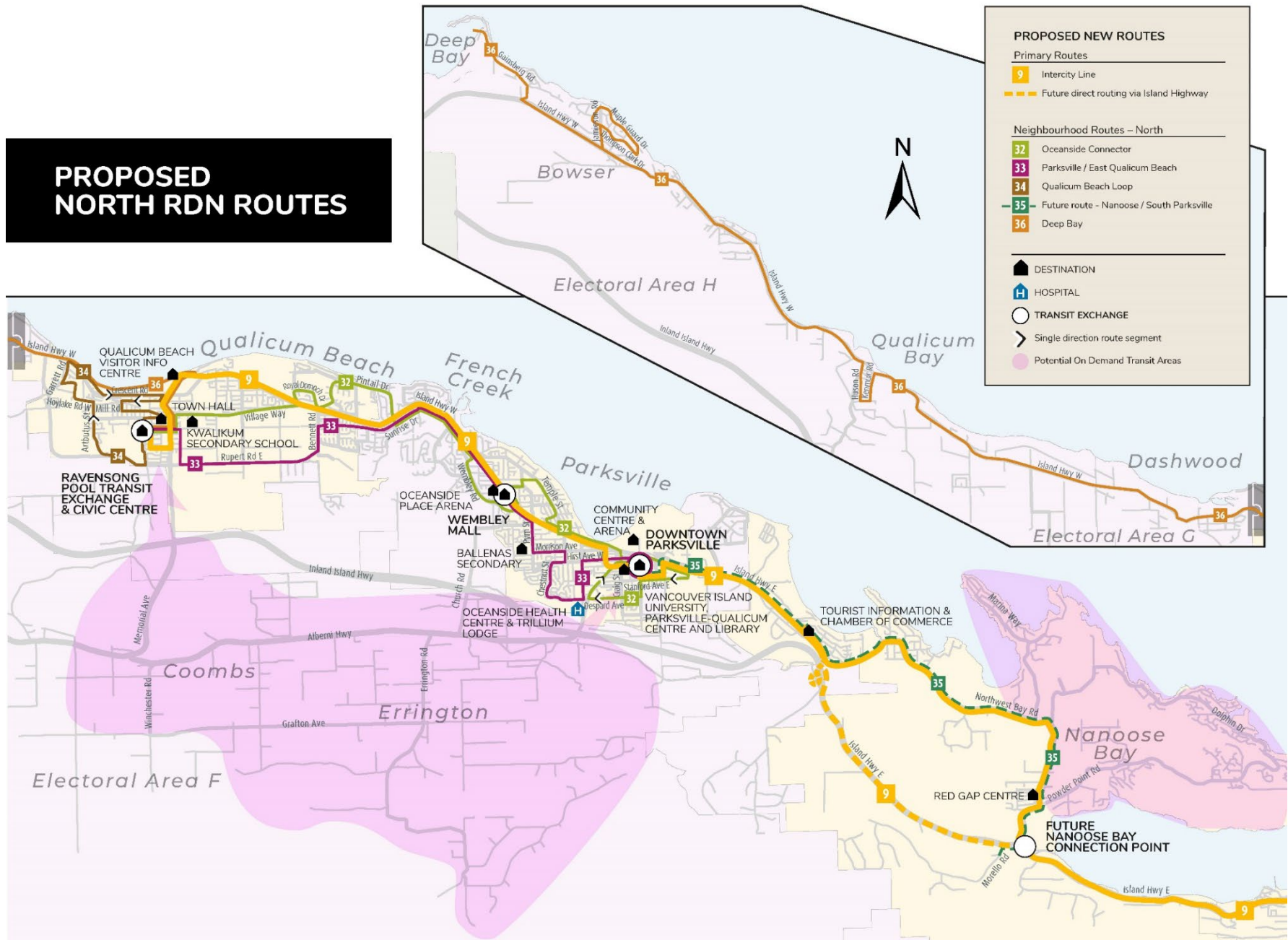
TRANSIT EXCHANGE (Circle icon)

Single direction route segment (Arrow icon)

Potential On Demand Transit Areas (Pink shaded area)



PROPOSED NORTH RDN ROUTES

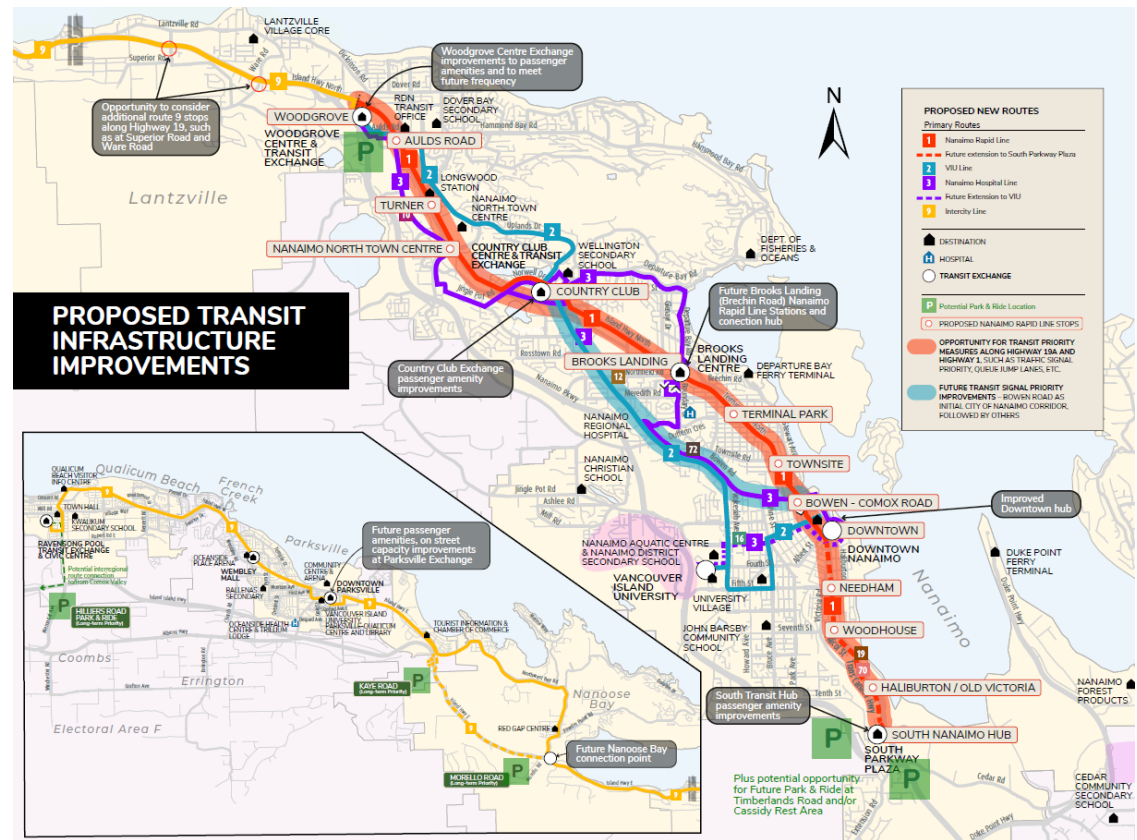


Proposed Infrastructure Priorities

Complementing the proposed system-wide changes to service, several infrastructure improvements are proposed to support the elements of the Transit Redevelopment Strategy as it develops as shown in the following map. These priorities will need to be integrated into the BC Transit Capital Plan and future federal and provincial funding applications. In addition to those on the map, master planning work is now underway to determine options to ensure **future transit operations and maintenance facility capacity**.




Other key infrastructure components include:

- **New transit exchange facilities** or “mobility hubs” to support the network.
- **Development of 1 Nanaimo Rapid Line stops** along the Highway 19A and Highway 1 corridors.
- **Park & Rides** developed as either purpose-built facilities or through partnership with area businesses / community destinations.
- **Passenger infrastructure improvements** to improve shelters, benches, pedestrian accessibility, and connection to other modes of travel such as cycling and Park & Rides.
- **New transit priority measures** to improve transit travel times and address key points of congestion including:
 - **Improved signal timing coordination.**
 - **Traffic signal priority** at key intersections, enabling buses to hold green lights until they pass or shorten red lights.
 - **Queue jump lanes** to enable buses to move past areas of congestion.



REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY – SUMMARY OF PROPOSED STRATEGY PRIORITIES: YEARS 1-2 (PENDING CONFIRMED LOCAL + PROVINCIAL FUNDING)

Each strategy includes associated planning, coordination, and engagement activities that are discussed in detail in **Appendix A**.




Year 1	Year 2
<p> Year's Strategic Objective + Resources</p> <p>Year 1: Rapid Line Preparation –5,000 Annual Service Hours; 4 Heavy Duty Vehicles</p>	<p>Year 2: Phase 1 Rapid Line Implementation & Central RDN Restructuring –20,000 Annual Service Hours; 9 Heavy Duty Vehicles and 6 Medium Duty Vehicles</p>
<p> Recommended Service Strategy Implementations</p> <p>Strategy 1 – Rapid Line Pre-Development – Minor routing adjustments and additional service frequency on the existing route 50 Woodgrove - Downtown to prepare for future evolution of this route into 1 Nanaimo Rapid Line, as well as corresponding schedule adjustments to the 7 Cinnabar to separate its operation from the route 50.</p>	<p>Strategy 2 – Rapid Line Phase 1 Implementation + Central System Restructuring – Introduces the 1 Nanaimo Rapid Line and Frequent routes 2 VIU Line and 3 Nanaimo Hospital Line+ restructure of Central RDN routes</p> <p>Strategy 3 – Route 9 Intercity changes – Renames existing 91 Intercity to route 9 and makes targeted frequency and span improvements</p> <p>Strategy 4 – Lantzville Restructuring + Additional Service – Restructures route 11 to become 31 Lantzville; increases frequency 60 min weekday peaks and Saturday afternoons, 120 min service other times.</p> <p>Strategy 5 – 99 Deep Bay Additional Day of Service - Extends existing Tuesday to Saturday service to Mondays.</p>
<p> Recommended Infrastructure Implementations + Planning</p> <p>Minor stop and signage adjustments for route 50 changes.</p> <p>Operations & Maintenance Facility Master Planning to meet future capacity needs.</p>	<p>1 Nanaimo Rapid Line Phase 1 stops + Implementation of Phase 1 Transit Priority and Signal Improvements + Park & Rides + Planning for future phases.</p>

Looking Ahead Beyond 5 Years

Beyond the service strategies for the Year 1-5 period shown in these summary pages, the full TRS document also outlines improvements for consideration 5+ years from now, including additional service to VIU, new interregional service to the Comox Valley, and the potential extension of on-demand transit to additional areas of the system.

REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY – SUMMARY OF PROPOSED STRATEGY PRIORITIES: YEARS 3-5 (PENDING CONFIRMED LOCAL + PROVINCIAL FUNDING)

Each strategy includes associated planning, coordination, and engagement activities that are discussed in detail in **Appendix A**.

Year 3	Year 4	Year 5
 <p>Year's Strategic Theme + Resources</p> <p>Year 3: Phase 2 Rapid Line Implementation & South RDN Restructuring – 20,000 Annual Service Hours; 8 Heavy Duty Vehicle and 6 Medium Duty Vehicles</p>	<p>Year 4: Evening & Weekend Frequency Improvements + North RDN Restructuring – 20,000 Annual Service Hours; 10 Heavy Duty Vehicles and 4 Medium Duty Vehicles</p>	<p>Year 5: Service Optimization and Extension to New Areas Through Digital On-Demand Transit – 8,100 Annual Service Hours; 1 Heavy Duty Vehicle and 3 Light Duty Vehicles</p>
 <p>Recommended Service Strategy Implementations</p> <p>Strategy 6 – Rapid Line Phase 2 + South Nanaimo Service Restructuring – Extends 1 Nanaimo Rapid Line to the South Transit Hub plus restructures services in south RDN and re-introduces service to Duke Point.</p> <p>Strategy 7 – Rapid & Frequent Line Peak Service Improvements – Adds weekday peak frequency to FTN and RTN routes (15 min frequency) retains select 10 min service on route 2 trips during school-in months.</p> <p>Strategy 8 – Rapid & Frequent Route Midday Service Improvements – Increases frequency of FTN and RTN routes to 20 mins 3 during weekday middays and Saturdays from 10:30am to 6pm.</p> <p>Strategy 9 – Targeted Peak Frequency and Span Improvements – Adds targeted additional frequency to higher ridership local routes and/or increase the span of service for select primary routes.</p>	<p>Strategy 10 & 11 – RTN & FTN routes Evening and weekend Improvements - Extends 20 min service on routes 1, 2 and 3 until 10pm Monday to Saturday. Extends 20 min service on routes 1, 2 and 3 on Sundays and Holidays between noon and 6pm.</p> <p>Strategy 12 & 13 – Route 9 Intercity Improvements – Extends the 30 min frequency service in the weekday morning and afternoon peaks. Extends hourly service to 9pm Monday to Saturday evenings plus all day on Saturdays and on Sundays.</p> <p>Strategy 14 – North Network Service Restructuring + Evening and Sunday Service – Restructures services in the north for improved frequency and directness, service to new areas, PLUS service on Sundays and evenings.</p>	<p>Strategy 15 – Nanoose Bay Service Restructuring and Digital On-Demand Transit – Implements separate 35 Nanoose Bay route to extend on-demand service to unserved areas of Nanoose and streamline 9 Intercity trips to no longer operate via Northwest Bay Road.</p> <p>Strategy 16 – Errington & Coombs Digital On-Demand Transit – Pending Area F participation in the transit function, would extend new on-demand transit service to Errington and Coombs three periods per day Monday to Saturday.</p> <p>Strategy 17 – Service Optimization & Schedule Reliability – Minor service and schedule adjustments as required to further improve system efficiency and effectiveness.</p>
 <p>Recommended Infrastructure Implementations</p> <p>1 Nanaimo Rapid Line Phase 2 stops and enhanced South Transit Hub + Improved Country Club Exchange and nearby road network changes + Phase 2 Transit Priority and Signal Improvements + Park & Rides</p>	<p>Enhanced Downtown Nanaimo Exchange + Expanded Parksville Exchange + Implementation of Phase 3 Transit Priority and Signal Improvements + Park & Rides</p>	<p>Potential Morello Road / Northwest Bay Road connection point + Expanded Woodgrove / Mary Ellen Exchange + Digital On-Demand Transit technology implementation and development of virtual stops as required.</p>

Moving Forward

The RDN Transit Redevelopment Strategy and its key elements were presented to, and approved by, the RDN Transit Select Committee (TSC) on January 27, 2022. The Strategy was subsequently approved by the RDN Board of Directors on February 8, 2022 as the document that will be used to guide future prioritization and investment in the RDN Transit system, pending annual confirmation of available local and provincial funding.

In addition to endorsing and approving the TRS and its year-by-year service expansion and infrastructure priorities, the RDN Transit Select Committee and RDN Board also approved the following directions to move forward on its recommendations:

- That the first priority of a 5,000 annual hour Transit expansion, identified in the Transit Redevelopment Strategy, be approved (subject to approval of the expansion hours from the Province and BC Transit), and applied to implement "Year 1: Rapid Line Preparation" as outlined in the TRS.
- That the Transit Redevelopment Strategy project report and service standards be approved for distribution to member local governments, area First Nations, and adjacent Regional Districts for their information with a request that it also help inform their future community planning, development, and transportation decision-making.

The next steps in the process will involve translating the additional other recommendations of this Transit Redevelopment Strategy into action. This TRS provides the details on how the transit component of the RDN's multimodal network can be improved to build reliability, efficiency and public confidence in transit and help achieve Regional and municipal GHG reduction and climate change goals.



1.0 INTRODUCTION

This Transit Redevelopment Strategy (TRS) is a comprehensive five-year plan that seeks to optimize current services to improve their efficiency and effectiveness. It also outlines how to focus future investment in service and infrastructure to increase ridership, better align mobility with future development and population changes, and integrate transit with active transportation.

The RDN wishes to build reliability, efficiency and public confidence in transit, as multi-modal transportation is essential to achieving Regional and Municipal strategic plans and initiatives including GHG reduction and climate change goals. This plan is designed to increase mode share, frequency, span of service, and service levels throughout the system, as well as address key gaps in service area coverage where feasible. The TRS integrates mobility with land use, and it optimizes resources to address some critical gaps such as a deficiency of transit in marginalized family neighbourhoods

The RDN Transit Redevelopment Strategy builds on the recommendations of the **RDN Transit Future Plan** and is a detailed five-year action plan to effectively improve transit connectivity and convenience resulting in better mobility for RDN residents.



1.1 Project Process and Timeline

The TRS was guided by the RDN Board, elected officials on the RDN Board’s Transit Select Committee, and an advisory subcommittee of Board members that was formed to help shape this project. The project was also guided by a staff-level Working Group including project partners the City of Nanaimo and BC Transit, as well as representation by the Ministry of Transportation and Infrastructure (MoTI). The project also involved other municipal and First Nation organizations, community groups, front line transit staff, transit passengers and the public.

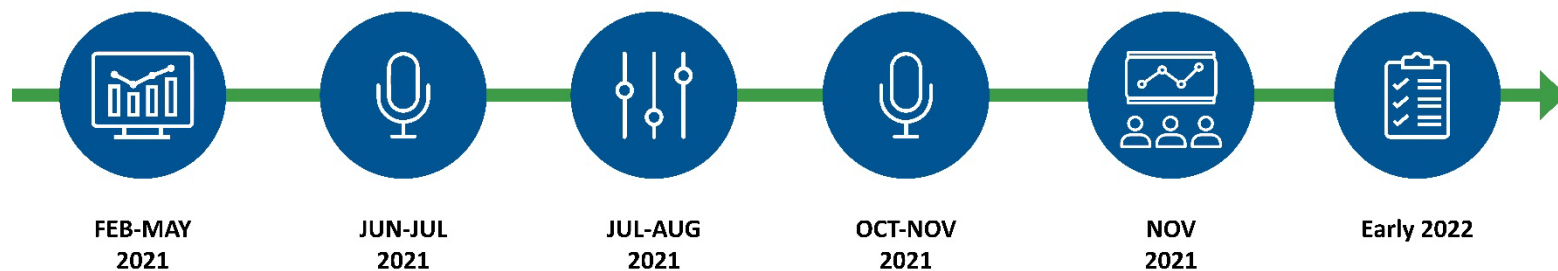
The TRS process allocated time for meaningful and fulsome public engagement —described in more detail in **Section 4.0** on the following pages—and was mindful of other concurrent processes including:

- City of Nanaimo – REIMAGINE NANAIMO process, including updates to its Official Community Plan and creation of an Active and Sustainable Transportation Plan
- RDN - Social Needs Assessment & Strategy

Transit Redevelopment Strategy Objectives

The three main tasks of the TRS were to:

- 1. Take stock of what has been accomplished so far in the transit system**, particularly since the completion of the 2014 RDN Transit Future Plan.
- 2. Undertake a clear-eyed, data-driven assessment of system performance.**
- 3. Deliver a detailed and attainable year-by-year action plan** to achieve the most effective mobility performance for the RDN.



2.0 COMMUNITY CONTEXT

The Regional District of Nanaimo is comprised of:

Four municipalities:

- City of Nanaimo
- District of Lantzville
- City of Parksville
- Town of Qualicum Beach

Seven electoral areas:

- Electoral Area A
Cedar, South Wellington and Cassidy
- Electoral Area B
Gabriola, Decourcy and Mudge Islands
- Electoral Area C
Extension, Nanaimo Lakes, East Wellington/Pleasant Valley
- Electoral Area E
Nanoose Bay
- Electoral Area F
Coombs, Hilliers, Errington
- Electoral Area G
French Creek, San Pareil, Dashwood, Englishman River
- Electoral Area H
Bowser, Qualicum Bay, Horne Lake, Spider Lake

First Nation Territories:

- Snuneymuxw First Nation (Nanaimo I.R. 1, 2, 3 & 4)
- Snaw-Naw-As (Nanoose First Nation)
- Qualicum First Nation

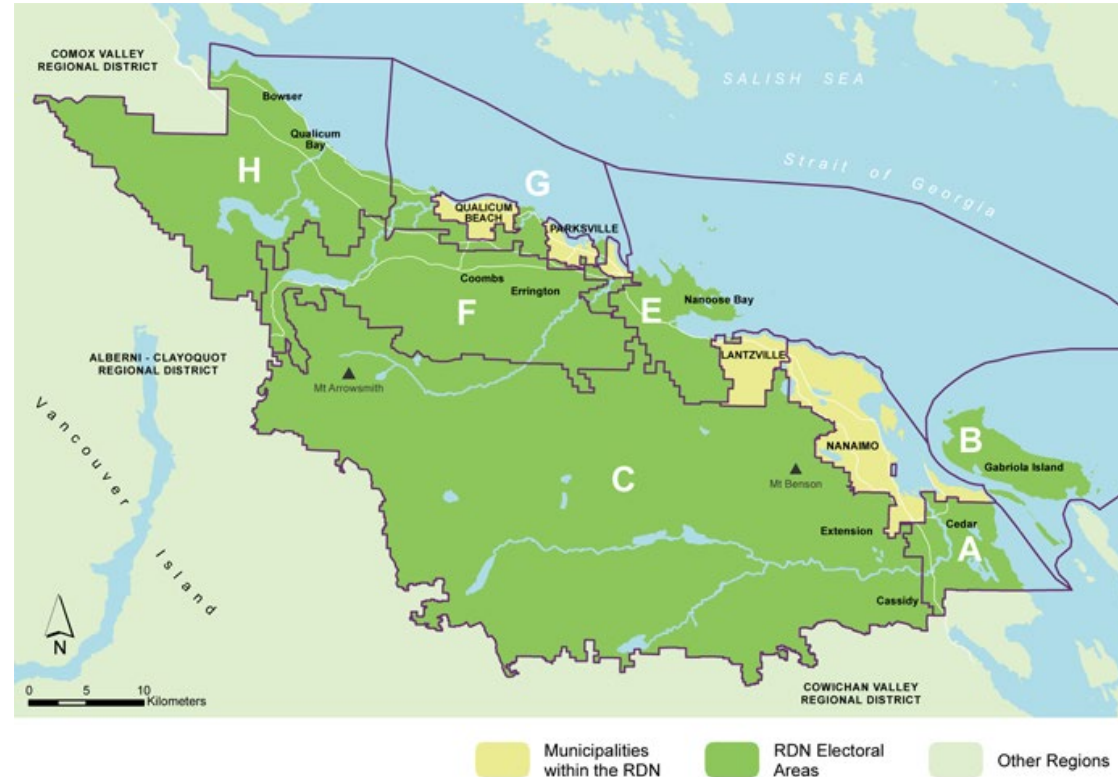


FIGURE 1 MAP OF THE REGIONAL DISTRICT OF NANAIMO

2.1 Community Planning Framework

This section describes how community plans helped to shape the Transit Redevelopment Strategy, in response to the desire to integrate mobility with current and future land use.

Established community policies, plans, and strategies from the RDN and its four member Municipalities provide the framework for transit and guidance on how best to develop service. All the local governments have policies to support sustainability, emission reductions, and climate change. The City of Nanaimo “Reimagine Nanaimo” documents provided a rich data set for understanding priorities within the City, areas of future development and influence on transit and travel patterns as well as opportunities for multi-modal integration. The Town of Parksville, Lantzville and Village of Qualicum Beach OCP’s and Master Transportation Plans, while focused on the unique qualities of their communities, share several common elements for improving mobility and transit services including:

- Focus transit on connecting village centers to urban centers
- Better connection to strengthened multimodal network
- Safety concerns with existing alternate transportation network
- Interest in inter-regional connections (from north to south)
- Improved transit options (frequency and service area)

Key Travel Destinations in the RDN

Key destinations for the RDN include schools, shopping centres, civic recreation facilities, and the commercial centres of each of the four municipalities. Vancouver Island University (VIU), Nanaimo District Secondary School (NDSS), Dover Bay Secondary School, Wellington Secondary School, Woodgrove Centre, Country Club Mall, Nanaimo Ice Centre, Nanaimo Regional Hospital, Downtown Nanaimo, Village Centres of Parksville, Qualicum Beach and Lantzville, Departure Bay Ferry Terminal etc. are among some of the key origins and destinations in the RDN.

2.2 Transit Future Plan Progress and Looking Forward

In 2014, BC Transit and the RDN prepared a Transit Future Plan to complement the updated RDN Regional Growth Strategy which supports local Official Community Plans. The Transit Future Plan also embraces the directions and policies of the BC Provincial Transit Plan and the BC Transit 2030 Strategic Plan. Notably, the RDN Transit Future Plan sets a transit mode share target of five per cent for all trips by 2039, which will require the RDN’s transit ridership to grow from 2.7 million to 13.5 million trips per year.

As a result of the Transit Future Plan, the RDN has sought additional resources for improvements to the system. The total potential expansion hours and vehicles requested by the RDN from BC Transit over the upcoming years has been taken into account in the development of this TRS. The recommendations of the TRS will be used to distribute these hours in the system as expansion resources become available.

Before proceeding with proposals for new services and route changes, the project team looked at the accomplishments to date. As shown in Table 1, many recommendations of the Transit Future plan have been implemented or are underway. This Transit Redevelopment Strategy is an essential step in the continued implementation of the Transit Future Plan for the RDN. For this, the team reviewed the performance of changes made to date and evaluated potential expansion proposals to refine them based on new information and overall relevance.

TABLE 1 TRANSIT FUTURE PLAN RECOMMENDATIONS AND IMPLEMENTATION

Transit Future Plan Short Term Recommendations	Status
Restructure existing routes to establish the Rapid and Frequent Transit corridors and begin to invest in increases to service levels	Underway <i>Route 40 established as FTN 2015, improved in 2019</i>
Restructure transit routes to serve the new Temporary Downtown Nanaimo Transit Exchange	Complete
Enhance service on the Local Transit Network	Underway
Introduce Inter-regional Transit Services to the Cowichan Valley	Underway
The Regional District of Nanaimo and BC Transit will explore service options to connect Electoral Area ‘H’ with the Comox Valley Regional District	Outstanding
Transit Future Plan Medium Term Recommendations	Status
Continue to increase service levels of the Frequent and Rapid Transit Network to meet ridership demands	RTN- Underway FTN- Underway
Enhance service on the Local Transit Network by increasing frequency and span of service	Underway
Explore Inter-regional service to the Comox Valley Regional District	Initiated
Extend the Rapid Transit Network to South Nanaimo to South Parkway Plaza or Sandstone as development occurs Increase service levels to south Nanaimo to meet the minimum standard of 15 minutes from 7:00 am to 7:00 pm seven days a week	Outstanding

2.3 ReImagine Nanaimo Input

REIMAGINE NANAIMO 2020 is a Coordinated Strategic Policy Review and an extensive public engagement process designed to update several key strategic planning policy documents including Nanaimo's 2008 Official Community Plan, and creation of an Active and Sustainable Transportation Plan that will support the 2014 Master Transportation Plan. As the most populated and one of the largest areas within the RDN, future development decisions in Nanaimo will impact regional travel patterns, transit design and ridership.

Concurrently with the RDN TRS public engagement, Nanaimo residents were invited consider alternative scenarios for how the City of Nanaimo could grow - looking at the physical layout and pattern of Nanaimo itself. While the City has not yet finalized its policy, residents indicated support for growth around one of seven identified "Mobility Hubs" defined as areas of concentrated employment, housing, recreation, and shopping interconnected with multi-modal transportation options.

Residents also indicated support for a development scenario that is more centralized in focus: encouraging new growth and higher-density housing within the core bound by Downtown, the Hospital, and Vancouver Island University.

At the same time, Participants were asked to consider where transit improvements are most needed, based on the current community. The largest concentration of transit markers (placed on a map) were around the Downtown area and Harewood related to challenging travel between the neighbourhood and destinations like VIU and Downtown. Other notable locations were areas with steep slopes (e.g., Lost Lake Area) that makes cycling or walking more challenging.

Comments received about transit covered many themes such as:

- Exchanges at each activity hub
- Increased bus frequency
- Extended service hours to support people working nonstandard shifts
- Better connections to transportation links (e.g., Duke Point Ferry, airport, Cruise Ship Terminal)
- Improved links to employment areas (e.g., industrial lands, hospital)

2.4 Demographics and Emerging Transit Market

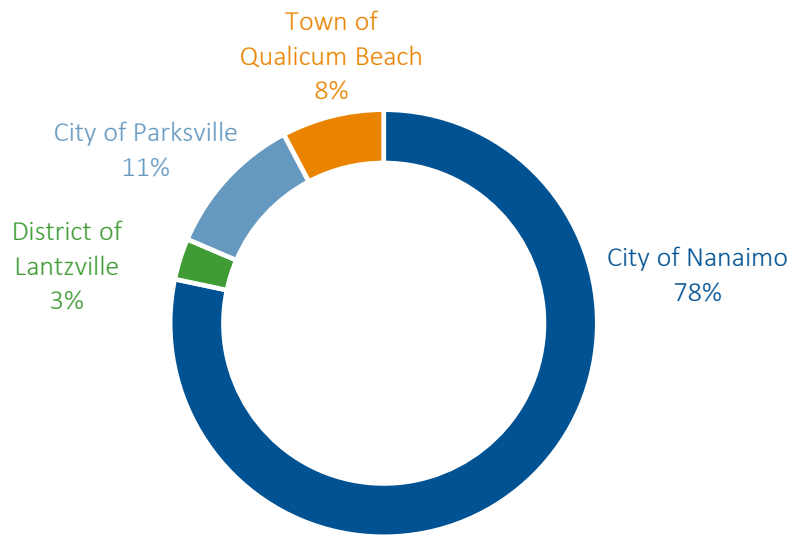


FIGURE 2 REGIONAL DISTRICT OF NANAIMO MUNICIPAL POPULATION (2016)

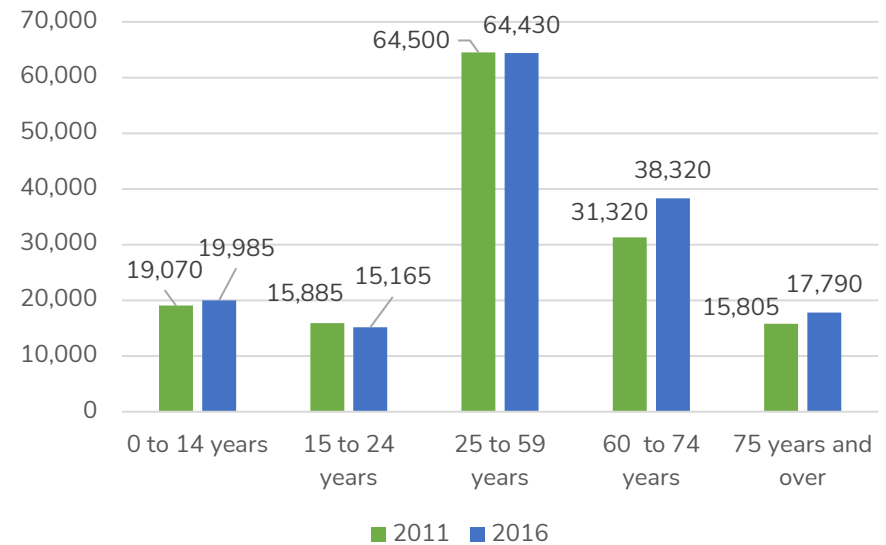


FIGURE 3 REGIONAL DISTRICT OF NANAIMO POPULATION FROM 2011 TO 2016

As of 2016, there are 156,000 people in the RDN, and the growth rate averages approximately **1.4%** annually. The majority of the RDN population is concentrated in urban municipalities at relatively low densities.

This growing population is expected to continue aging, with the higher growth rates occurring among the 75 to 84 and 85+ age groups. These trends are anticipated to spread travel demand throughout the day, as more retirees dominate travel patterns.

Population Trends

15 to 24 years: shrinking

25 to 59 years: stable

60 to 74 years: growing

TABLE 2 POPULATION COMPARISONS

Characteristics	City of Nanaimo			District of Lantzville			City of Parksville			Town of Qualicum Beach			Regional District of Nanaimo		
	2011	2016	% Change	2011	2016	% Change	2011	2016	% Change	2011	2016	% Change	2011	2016	% Change
Total private dwellings	38,800	40,885	5%	1,538	1517	-1%	6,216	6,445	4%	4,536	4,644	2%	70,687	73,622	4%
Total Population	83810	90504	8%	3,601	3,605	0%	11,977	12,514	4%	8,687	8,943	3%	146,574	155,698	6%
Average age of the population	-	44.2	-	-	46.2	-	-	54.5	-	-	60.1	-	-	47.2	-
Population by Age Group															
0 to 14 years	12,010	13,035	9%	460	505	10%	1,275	1,155	-9%	585	555	-5%	19,070	19,985	5%
15 to 24 years	10,360	10,160	-2%	415	360	-13%	940	940	0%	575	520	-10%	15,885	15,165	-5%
25 to 59 years	38,785	40,205	4%	1,710	1,550	-9%	4,140	3,965	-4%	2,490	2,195	-12%	64,500	64,430	0%
60 to 74 years	14,470	18,125	25%	715	875	22%	3,395	3,960	17%	2,945	3,400	15%	31,320	38,320	22%
75 years and over	8,180	8,980	10%	290	315	9%	2,230	2,495	12%	2,095	2,275	9%	15,805	17,790	13%

The larger proportion of **25–59-year-olds** in the City of Nanaimo reflects the desirability of more centralized urban development for working age families. This population group tends to encompass commuters, as well as non-working adults who use transit to access local goods and services, particularly as parents with children or people with a disability.

- Building quality transit at peak commuting times is critical to attracting this market, particularly with messaging about saving on household transportation costs, gaining personal time (reading, email, etc.) or as part of a sustainable lifestyle.
- To attract non-working adults and their families, transit ideally provides consistent schedules throughout the day.



Growth in the **seniors' category aged 60 – 74 years** is indicative of the attractiveness of the RDN for retirees. This population group tends to rely more heavily on automobiles and can be less likely to take transit. However, the growth in this group is a predictor of future accessible transit need.

While the **15 – 24-year-old age** group is shrinking it is none the less especially important for transit in the RDN due to the number school students carried in the system. Since students in general, and international students make up some of the most frequent users of transit, as well as secondary students, local transit that can provide dependable, fast, and frequent service will attract middle and high school students who want more flexibility to travel to extracurricular activities, work and increased independence.

VIU as a potential transit trip generator now and in the future

Currently, Vancouver Island University attracts about 60% of students who graduate from Grade 12 in the VIU catchment area and who go on to post-secondary education.

The COVID-19 pandemic has severely impacted Vancouver Island University: enrollment which had previously been stable at approximately 14,500 students, dropped by 16% over the last two years.

International student enrollment declined by over 40% over the same time period and has become a smaller proportion of the total student population. Looking forward, VIU is anticipating a resurgence in student enrollment as the pandemic eases, and as students, faculty and programming have now adapted to new modes of learning. In addition, VIU anticipates a boost in the numbers of high school learners over the next ten years because more secondary students are expected to graduate in the RDN.

3.0 EXISTING TRANSIT SYSTEM OVERVIEW

3.1 System Basics

The Regional District of Nanaimo (RDN) Transit System began operation in 1969. In 1988, 17 buses provided 47,917 hours of service on 14 routes and carried 921,193 passengers. In 2019/20, the system used 56 buses to provide 130,000 hours of service and carried 3.5 million passengers.

The existing conventional transit system provides fixed-route service in communities in the RDN, the part of Electoral Area E between Nanaimo and Parksville and Electoral Area A (Cedar) and the municipalities of Nanaimo, Parksville, Qualicum Beach, and Lantzville. Funding for the transit system is cost shared between the RDN and BC Transit. Decisions on fares, routes and service levels are made by the RDN Board based on information and planning provided by BC Transit and RDN staff. Transit service is operated by the RDN.

The system consists of nineteen (19) routes, supported by a network of six (6) exchanges and over 800 bus stops. The transit network is focused on downtown Nanaimo, which functions as a hub for both local and regional bus routes. Other hubs in the network include Country Club Centre, Woodgrove Centre and Vancouver Island University. A combination of three different service types are seen in the RDN transit system: Conventional fixed-route service, Community Bus service and handyDART service.

- **Conventional Bus** service is defined as scheduled service to major destinations and residential areas.
- **Community Bus** service is defined as scheduled service for residents in certain areas not served by the fixed-route service.
- **HandyDART** service is defined as door-to-door service for people who cannot use the fixed-route service because of a disability.

In addition to these service types, targeted services (school service or service to the airport/ferry) and regional service is also included.

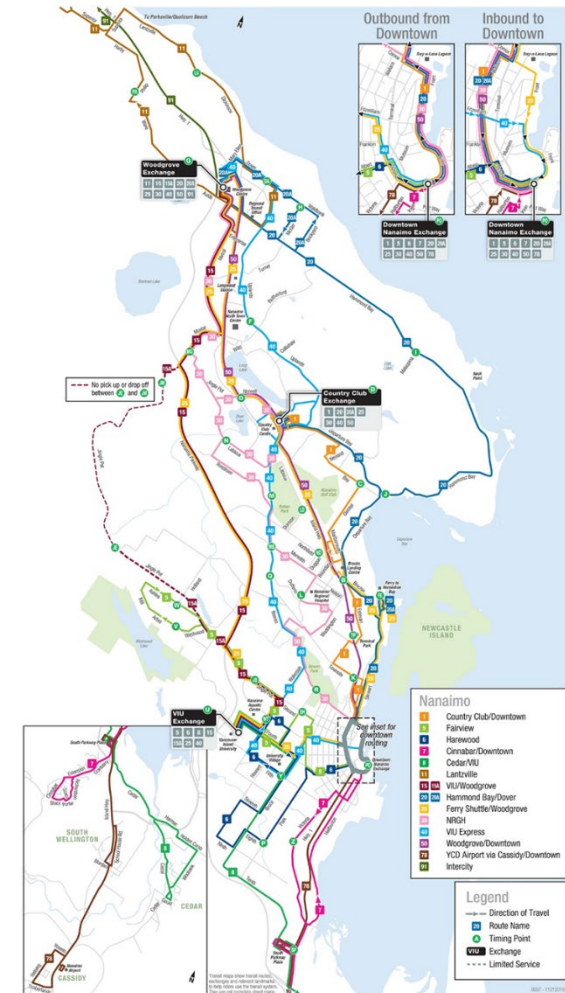


FIGURE 4 EXISTING TRANSIT – NANAIMO AREA

3.2 Historical Trends and Peer Review Analysis

As part of this study, the team undertook a review of system performance, both in comparison with itself over a period of ten years and in comparison, with peer systems in other parts of Canada. See **Appendix B** for a larger summary of this analysis and its outcomes, with highlights presented here.

The analysis indicates the RDN system performs above average in the assessment.

- **The RDN Conventional transit system performs well against its similarly sized Canadian transit system peers** and carried 3.5 million people in 2019/20 (prior to the impact of COVID-19).
- **The system delivers service at a lower cost per hour and trip than its peers** and recovers a greater proportion of its costs through passenger revenues.
- However, **the system provides less service per capita than its peers**, which in turn impacts its ability to provide a higher quality, frequent service. To address this gap, the RDN has already requested future service expansion funding from BC Transit.
- The RDN has set its cost recovery target at 25%; by comparison the Annual Operating Agreement (AOA) cost recovery over a ten-year period, ranges from 35% to 40%, indicating that the system has robust cost recovery and that the target could be increased.
- In comparison to the CUTA average for Group 4 as well as against some of its peers, the system is particularly efficient in the cost/service hour metric in comparison to its peers which could reflect savings from in-house system operations by the RDN.

COVID -19 Impacts on ridership

Transit systems across the world have been negatively impacted by COVID, the RDN was no exception. While ridership was significantly impacted it was interesting to note that the pattern of ridership remained unchanged during COVID, with pronounced morning and afternoon peaks during the weekday and largely midday ridership on Saturday and Sunday.

3.3 System Analysis and Performance Themes

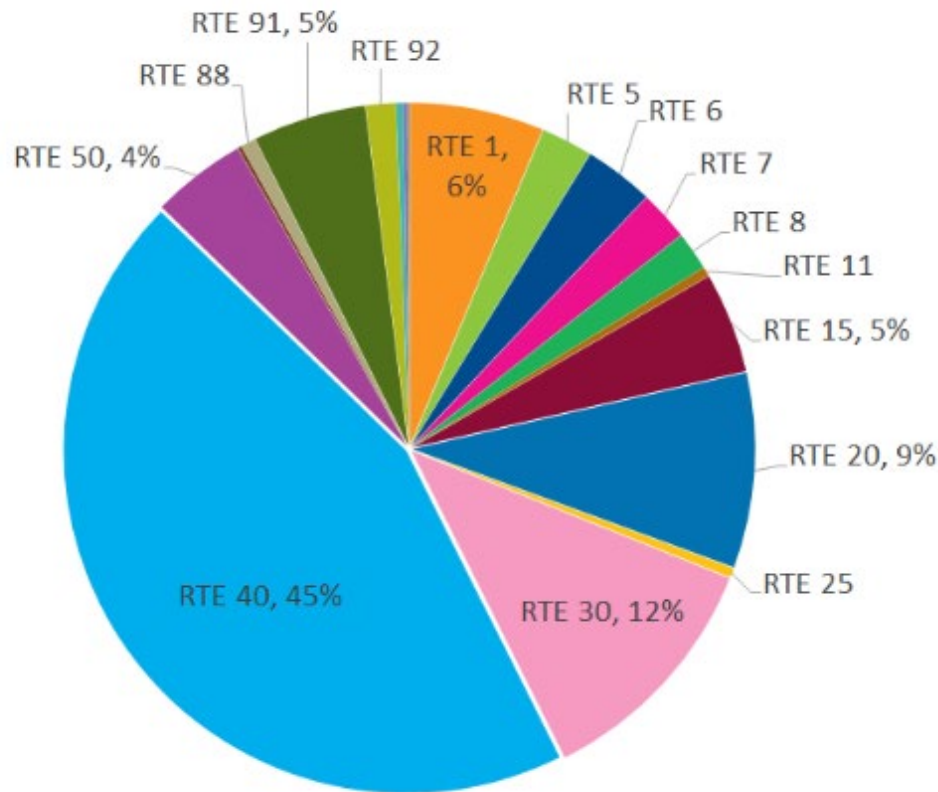


FIGURE 5 PROPORTION OF SYSTEM RIDERSHIP BY ROUTE

Ridership by route analysis (pre-COVID, January to March 2020 data) illustrates that the **route 40 is the most used route in the system**, carrying almost 45% of system ridership. This route also has the highest frequency and number of service hours. High ridership numbers are likely a direct result of the investment in this route.

Routes 30 and 20 are the next tier of frequently used routes in the system, connecting to major destinations like the Nanaimo Regional General Hospital (NRGH) and the Departure Bay Ferry terminal respectively. **In the middle tier, are routes 1, 91, 50 and 15** accounting for about 4 to 5% of the total system ridership. Routes with the lowest ridership are the ones serving north RDN. While low service hours and service levels could be the main reason for the lower ridership on these routes, the dispersed land uses in the north could also be a contributing factor.

During COVID (January to February 2021 data) the usage of the routes remained unchanged, with the route 40 still carrying the most passengers. This is obvious in the maps below (fig 6 and 7) showing pre-COVID and COVID boarding activity of routes in the Central RDN by stop.

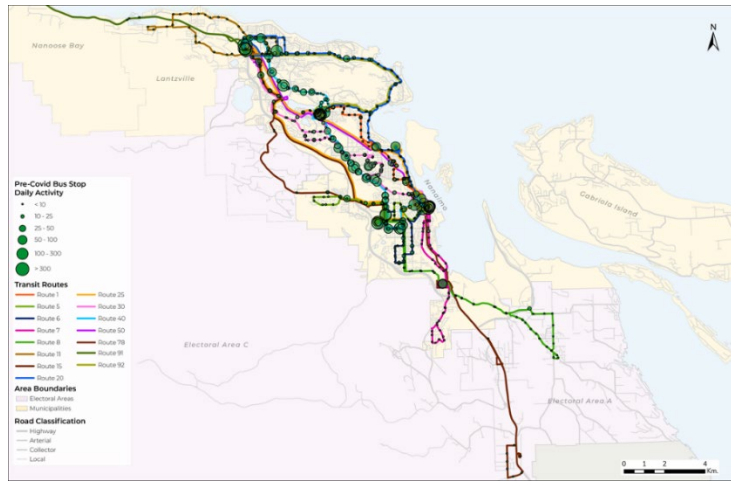


FIGURE 6 PRE-COVID BUS STOP DAILY ACTIVITY

General themes related to route performance that emerge from the mapping and initial analysis are:

- Low service levels for almost all routes on weekends (both span and frequency)
- Major destinations (malls, institutions, major employers) are served by the transit system, however, service levels to these destinations could be improved in the future
- East-west connectivity is poor and reflects the underlying road network
- Redundancy of service in certain corridors makes the overall system less efficient, these resources could be better redistributed within the system.

Data Sources: “Pre-COVID” data shown in the above maps reflects average daily stop activity from January to March 2020, while “During COVID” reflects January to February 2021 data. (Source: BC Transit / System Automated Passenger Counters.)



FIGURE 7 DURING COVID BUS STOP DAILY ACTIVITY

- Need to balance service levels between the proposed Rapid line for the system (**route 50**) and the proposed Frequent line for the system (**route 40**)
- Large gaps in service exist in areas with low density and very dispersed land uses (North RDN, Errington, Coombs, Hammond Bay, north of Dover Road), On-Demand transit could be a solution in these areas
- There is potential for regional connectivity from the South end of the RDN to its northern edges using the **routes 91, 50 and 7**
- **Route 5 and 6**, routes that serve the neighbourhoods around downtown could be straightened out for more direct travel into downtown.

- **Routes 7**, connecting Cinnabar to Downtown Nanaimo, offers connection benefits by operating with the same buses as route 50, but its one-way segments on Halliburton and Victoria Streets are not user-friendly.
- **Route 8**, connecting Cedar to VIU, is interlined with the route 15 and provides a quick connection to VIU as well as to Woodgrove Exchange along the Nanaimo Parkway. The route serves some low-density areas that potentially could be better served by On-Demand transit.
- **Route 11**, serving Lantzville, is the poorest performing route in the system, primarily because it is a large one-way loop. Its routing, frequency, and service span need to be addressed and the District has requested additional service to meet new development
- **Route 15 and 15A** offer a direct connection between the Woodgrove Exchange and VIU, but the risk of this route is that it may also dilute ridership from others that should be the focus of investment, like route 40 and 50.
- **Route 20 and route 20A**, both serve Hammond Bay, but there is little clarity between the two route patterns which creates confusion among users, especially at Country Club Exchange. Brooks Landing is a major connecting point between the Route 1 and Route 20 and it would be helpful to improve this connection point.
- **Route 25** is a very large loop route that provides a transit connection to the Departure Bay Ferry Terminal but is also very inefficient in its use of service hours.
- **Route 30** is long and circuitous and is confusing to understand. More direct, frequent service to the hospital area and its surrounding density that starts earlier and ends later will better support transportation needs of area staff and residents and help drive ridership.
- **Route 40**, while called an Express, does not function like one and has many closely spaced stops. Stop-spacing and directness on this route needs to be improved to make it more attractive and reduce travel times.
- **Route 50** is the fastest and most direct connection from Woodgrove Exchange to downtown Nanaimo. However, low frequency results in low ridership on this route.
- **Route 91** connects the communities of Qualicum Beach, Parksville and Nanoose Bay (as well as touch points to Area G and Lantzville) to Woodgrove Exchange. This route currently operates more like a local service and could be improved if it was designed as more of a regional Express that served the communities at major connection points, on or near the highway to enable a quick and frequent, highway-based connection into Woodgrove Exchange and other transit services.
- **Routes 88, 97, 98 and 99** connect some of the northern most parts of the RDN to the transit system, but service levels are low with no service on Sundays and limited evening service. While routing on some of these routes could be more direct, the major issue is increasing service span and frequency on these routes.

3.4 Initial Issues and Opportunities

As discussed previously, the existing RDN transit system performs relatively well against peers. However, dispersed land use and areas of low density combined with service span and frequency limitations make the transit system less competitive with the car. Some of the issues and opportunities that can be addressed over the next five years to improve the efficiency and effectiveness of the system and attract even more users to an active transportation lifestyle that includes transit are identified below.

Issues



Clarity and Legibility

The system is not easily understood. Figuring out which route connects to which hub and how many connections it takes to get from one point to another is time consuming and requires a thorough study of the Rider's Guide. In a mature transit system, higher order routes would be the most frequent, connecting to main origins and destinations in the most direct routing possible, with local routes connecting to these routes at major exchanges. In the RDN system, the hierarchy of routes is not obvious to the user, making the system less user-friendly and legible.



Naming Conventions/Numbering

The current numbering/route naming convention is not helpful in understanding that there is a hierarchy of routes in the system. The numbering system is not continuous and not intuitive, so one is unable to understand the difference in a route numbered in the seventies versus a route numbered from 1 to 10. Ideally the numbering should indicate the importance of a route (with most frequent and important routes appearing at the top of the list) and also help to convey geographic location, with routes to a similar area numerically grouped together.



Duplication of services

A number of routes in the system duplicate each other along key corridors and thereby reduce the system's efficiency. The existing RDN transit network is predominantly north-south oriented with routes duplicating services in common corridors, such as Terminal Avenue, Island Highway, Highway 19 and Bowen Road. For instance, routes 1 and 20 follow the same corridor on the way into downtown from the ferry terminal, routes 25 and 15 are duplicative along Nanaimo Parkway coming into downtown.



Consistency

The network reflects organic growth over time that may lack a cohesive, holistic approach to address the community's travel needs. Multiple route patterns and a lack of consistency in spans and frequencies of different routes adds to the inconsistency of the system and make it hard to use. For instance, the route 20, has an alternate route that sometimes serves Country Club Centre. While having an alternate routing pattern is unavoidable and sometimes efficient, too much variation can make the system harder to use and understand.



Land Use development patterns

A notable feature of the RDN is the diversity of its communities and contexts. It spans from very rural, less populated areas to smaller communities with historic downtowns, and to a populous urban centre that is intensifying in specific corridors. Meeting the diverse needs of the community means also drawing from many types of transit service tools. Where possible, it also means planning development and the road network wisely since lower-density spread-out development is harder to service efficiently with transit. If development is too spread-out or the road network doesn't offer travel through and between neighbourhoods, transit routes tend to be circuitous and indirect as they move within neighbourhoods or are inaccessible from the neighbourhood if they travel on the main roads. The RDN has many existing neighbourhoods of this nature.

Opportunities



Expansion hours

The RDN has requested several thousands of expansion hours for the upcoming years. All this potential funding is a huge opportunity for system improvements and to address the issues of service span and frequency described above.



Planning initiatives

Several planning studies that identify the importance of considering multimodality and public transit in land use decisions are currently underway. The City of Nanaimo OCP update (ReImagine Nanaimo), the RDN Social Needs Assessment, and multiple community plans from partner jurisdictions all emphasize the need for improved connections and better transit service. These various initiatives all form a supportive framework to plan the future network.



Technological advancements in transit

Transit is being transformed by technological advancements that support mobile fare payment, trip booking, vehicle location services, and creating virtual stops. All this helps to make transit more accessible to a wider range of people, in addition to making it more convenient to use. If one can know how long it is until the next bus arrives or can seamlessly plan travel and pay for service, transit becomes more attractive to a wider range of users. Continuing to adopt thoughtful transit technology is a huge opportunity, not only for improving service but also to market transit in a modern way.



4.0 COMMUNITY INVOLVEMENT

The RDN Transit Redevelopment Strategy is based on an inclusive and collaborative process relying on contributions from a variety of groups and individuals to provide input.

Guidance for engagement was provided by the RDN Transit Redevelopment Strategy Working Group consisted of six members with representation from three distinct organizations including the RDN, City of Nanaimo, and BC Transit. Diverse engagement techniques were deployed to involve the public and stakeholders and to generate and refine recommendations in alignment with the International Association for Public Participation (IAP2) Core Values for Public Participation and the IAP2 Spectrum of Public Participation.

The Transit Redevelopment Strategy process included *two* public engagement phases. The first round is the “Listening” stage. It focused on understanding what the key priorities / issues are with respect to the transit system. The second round was presented all the draft components of the plan for public review and feedback and asks “We heard you, did we get it right?”.

Full engagement results are presented in **Appendix C – What We Heard Engagement Summaries**.



Help shape
the future of
TRANSIT
in the RDN

Provide your feedback on the Transit Redevelopment Strategy by July 16th

<https://www.getinvolved.rdn.ca/trs>



REGIONAL DISTRICT OF NANAIMO CITY OF NANAIMO BC Transit

The key audiences for engagement on the RDN Transit Redevelopment Strategy included the following groups of people:

- Local elected officials.
- Transit system staff.
- Local government and First Nations staff.
- Identified stakeholders, such as well-established community organizations and institutions like VIU.
- Existing transit customers.
- General public / future transit customers.

4.1 Round 1 Internal and External Engagement

Engagement tools on the RDN *Get Involved* website were open from June 14 to July 16, 2021.

RDN Transit staff provided input early in the planning exercise to provide input on front line experience with passenger requests, observations about traffic conditions and overall passenger travel patterns. Many specific routes and areas were identified for improved service levels, and there were also suggestions to have some services start earlier and end later in the day. Also consistent with land development patterns there were suggestions for new services to areas such as Duke Point, Rutherford, and Harewood Mines.

Who We Heard From

A total of **527** people visited the RDN *Get Involved* website during the engagement timeframe. Of these, 295 contributed to the Survey. There were also 43 contributions to the Interactive Map that people used to identify where transit improvements (shelters, bus stops, paving, benches, connection points, etc.) are needed.

Survey respondents primarily live in the City of Nanaimo (72.5%). The next most common areas were the Town of Qualicum Beach (6.0%) and the District of Lantzville (4.3%). The City of Nanaimo, Downtown Nanaimo, and Woodgrove Centre were the most common destinations. This suggests that most respondents use transit to travel within the City of Nanaimo.

Most participants fell into the 25-34 age range (19.0%), followed by 55-64 (17.7%) and 65-74 (16.0%).

Engagement by the numbers...



527 engagement site visitors



295 surveys completed



43 pins added to the map

Engagement in Covid times

The TRS project coincides with a new era in engagement techniques due in part to the ongoing challenges associated with the COVID 19 health and safety protocols. It is worth noting that the project used a range of virtual engagement tools and communications strategies, including the “Get Involved RDN” site, that minimized contact while expanding the reach of the process.

What We Heard

Before the COVID-19 pandemic, transit use by participants was split between frequent (using transit every day to 2-4 days per week, 41.7%) and infrequent (not using transit or only using it one day per month to one day per year, 47.4%).

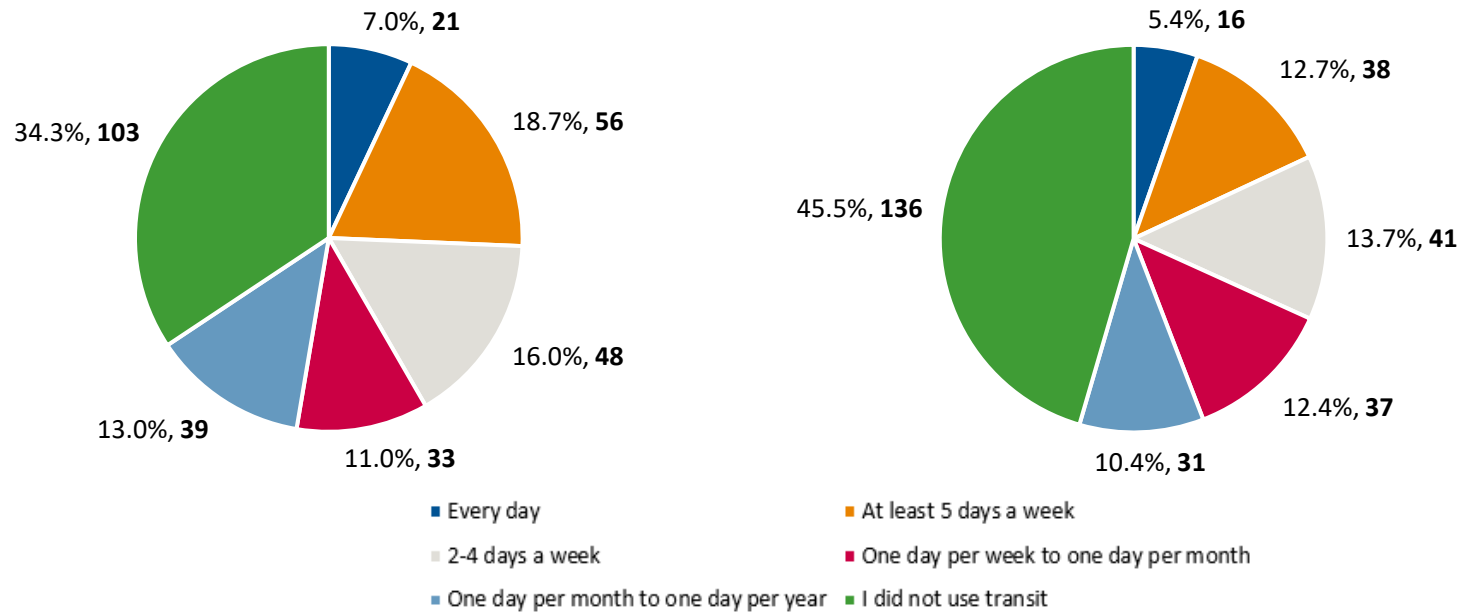


FIGURE 8 RDN TRANSIT USE BEFORE AND DURING COVID-19

Survey respondents indicated they want a transit system that is more **frequent, connected**, and that **spans more hours**.

Many participants recognized the positive aspects of transit and said that they would ride the bus more or start riding the bus if the transit system improved in these areas. **Efficiency** and **affordability** were also key themes.

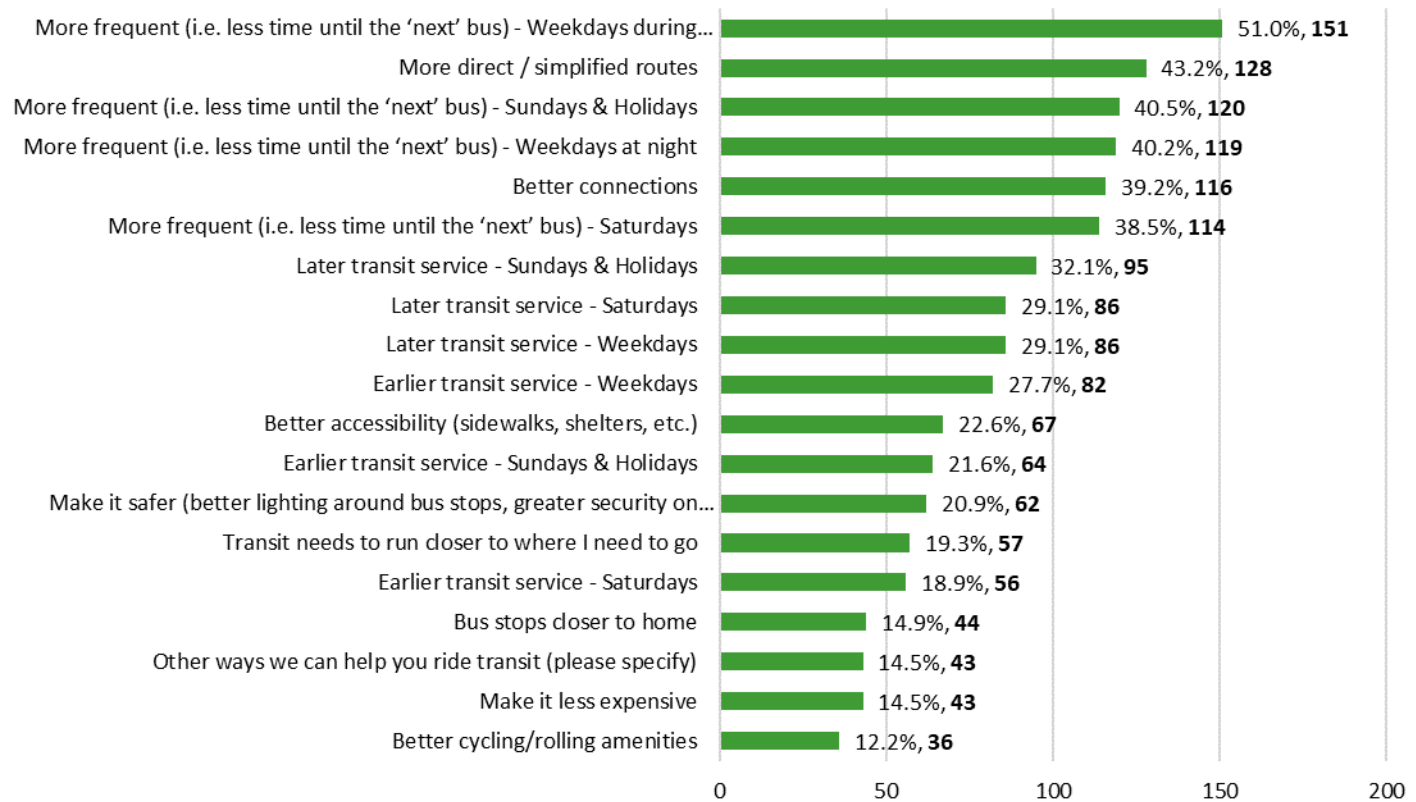


FIGURE 9 CHANGES NEEDED TO IMPROVE RDN TRANSIT

Participants ranked the following five guiding principles from highest to lowest to determine the transit priorities for the next five years:

1. Easy & Efficient to Use.
2. Connected and Integrated.
3. Affordable & Fiscally Responsible.
4. Accessible & Equitable.
5. Environmentally Sustainable.

This ranking lines up well with the survey responses noted in Figure 9.

4.2 Round 2 Internal and External Engagement

This round of engagement included a public survey on the RDN *Get Involved* website that was open from October 14 to November 3, 2021, and five stakeholder workshops held virtually over Microsoft Teams from October 22 to 26, 2021.

In this second round of engagement, the public was asked to provide feedback on:

- **Proposed Primary Network routes**, their destinations, phasing, and general proposed frequencies. These routes include the proposed route 1 Nanaimo Rapid Line, route 2 VIU Line, route 3 Nanaimo Hospital Line and the 9 Intercity Line.
- **The proposed route structures for the larger transit system**, including information and mapping presented by geographic area for the Central RDN, South RDN and North RDN.
- **Proposed infrastructure improvements**, including proposed 1 Nanaimo Rapid Line stops, transit signal priority locations and other transit priority measures, potential Park & Ride locations and other potential terminus / mobility hub improvement priorities identified to support the proposed restructured network.

Engagement by the numbers...



813 engagement
site visitors



248 surveys
completed



16 stakeholder
workshop participants

Who We Heard From

813 people visited the RDN *Get Involved* website during the engagement timeframe.

Of these, 248 contributed to the survey. Survey respondents primarily live in the City of Nanaimo (71.7%). The next most common areas were Electoral Area B (7.8%) and Electoral Area F (4.1%). Most participants fell into the 35-44 age range (23.4%), followed by 45-54

(18.9%) and 55-64 (16.4%). The smallest age categories were 75+ (3.7%) and 17 and under (4.1%).

Additionally, **16 people** representing **12 stakeholder organizations** participated in the workshops held virtually on Microsoft Teams. The workshops updated key local organizations on the project and gathered their detailed feedback on draft proposed new routes and priorities for improvements to the overall system, including service levels and infrastructure.

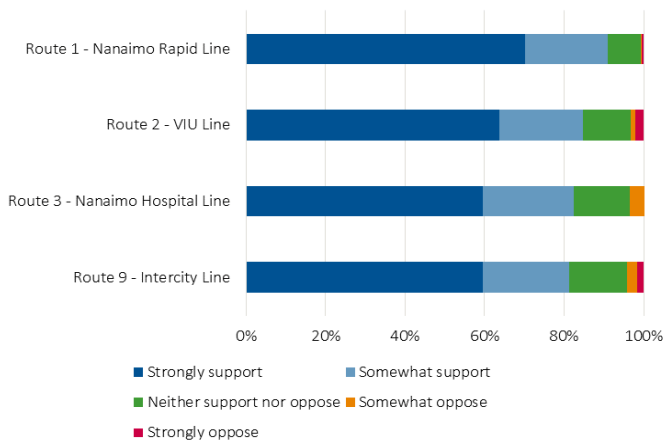
What we Heard

Primary Routes

Participants were able to view maps of each proposed route and were asked about their level of support for each one. Primary routes include:

- **Route 1** Nanaimo Rapid Line
- **Route 2** VIU Line
- **Route 3** Nanaimo Hospital Line
- **Route 9** Intercity Line





The level of support for each primary route is summarized in Figure 10. **Of the primary routes, level of support was highest for Route 1 (70.2% of respondents strongly support and less than 1% somewhat oppose or strongly oppose).** The next most supported primary route was Route 2 (63.8% strongly support), followed by Route 3 and Route 9 (both with 59.6% strongly support).

Respondents' comments on each of the routes provided additional suggestions about frequency, route design, scheduling considerations and hours of service

FIGURE 10 LEVEL OF SUPPORT FOR PRIMARY ROUTES

Neighbourhood and Connector Routes

Survey participants were also asked about their level of support for proposed changes to the Central RDN and South RDN parts of the transit network, as well as the North RDN / Oceanside area (in the near and medium term). Their responses are summarized in the graph at right.

Changes to the southern part of the transit network had the highest level of support (65% of respondents strongly support and less than 3% somewhat oppose or strongly oppose). Additional comments provided for the neighbourhood and connector routes were reviewed as part of the refinement of the proposals.

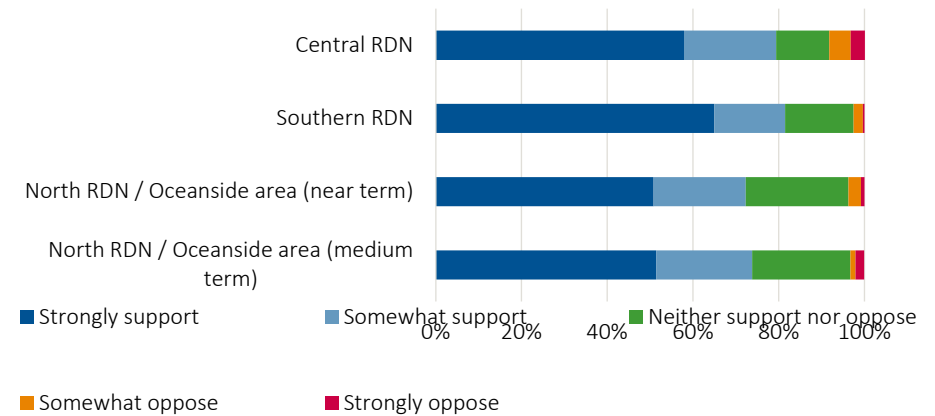


FIGURE 11 LEVEL OF SUPPORT FOR NEIGHBOURHOOD AND CONNECTOR ROUTES

Transit Infrastructure Improvements

Respondents also commented on the proposed infrastructure improvements for the RDN transit network:

- Proposed Nanaimo Rapid Line stops.
- Potential Park & Ride locations at Hilliers Road, Kaye Road, and Morello Road, as well as at Timberlands Road and/or Cassidy Rest Area.
- Opportunities for transit priority measures and signal priority improvements.
- Potential for additional Route 9 stops along Highway 19, such as at Superior Road and Ware Road.
- Transit exchange / connection hub improvements (including improved passenger amenities) as well as future locations.

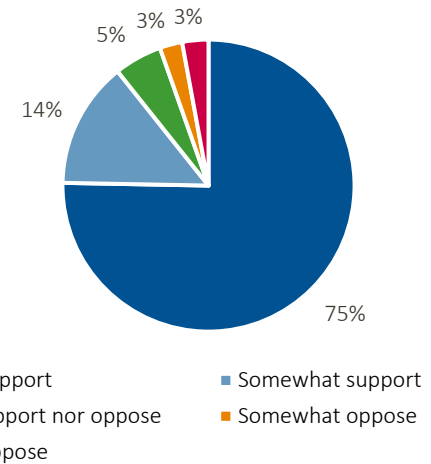


FIGURE 12 LEVEL OF SUPPORT FOR INFRASTRUCTURE IMPROVEMENTS

Most respondents either strongly support (75%) or somewhat support (14%) the proposed transit infrastructure improvements. Several participants provided additional comments about how to improve transit infrastructure in the RDN. Feedback included the following:

- Opposition to the proposed downtown exchange location.
- Need for three-bike capacity bike racks on buses.
- Need for more benches and shelters (ideally weatherproof shelters) and better lighting at bus stops.
- Need for better pedestrian infrastructure, including crosswalks, to access bus stops.

All of the public responses were documented in a summary “What We Heard” report (**Appendix C**) and were reviewed in depth by the Transit Working Group to refine the transit routes and frequency proposals.

5.0 SUMMARY OF KEY NETWORK OPPORTUNITIES

Using the results of the network analysis, the outreach undertaken for this project and relevant transit service principles, the following summarizes some of the key opportunities that have been considered in developing the network recommendations for the Transit Redevelopment Strategy (TRS).

- **One network many layers:** The TRS supports the multiple layer recommendation from the Transit Future Plan, which seeks to develop distinct route type layers within the system. Rather than “one-size-fits-all,” this approach would implement different types of routes, with some routes serving major corridors and destinations which residents would be more willing to walk to due to their frequency and directness, while other complementing routes retained some coverage within neighbourhoods and could potentially be served with smaller vehicles.
- **Make it legible and easy to understand:** Renumbering and renaming routes to reflect the hierarchy of the system would help make the system easier to use for new riders and would also clearly show service levels. The big opportunity here is to convert the existing routing and nomenclature of the system into a logical numerical system based on geography. An example is the RTN and FTN routes, currently they are numbered 50 and 40 respectively with no indication that these are the important routes in the system. If they were numbered 1 and 2 instead, there is a hierarchy to that numbering that reflects the importance of the routes in the entire system.

Transit Service Design Principles

Service design strategies are based on the following principles:

- Where feasible, use routes that are direct and offer two-way service as these are usually easier to understand and attract higher ridership, particularly for the higher order Primary network that will include Rapid, Frequent and Regional routes.
- Rather than treating all areas equally, focus highest levels of service on corridors that have higher density and major destinations.
- If specific passengers or destinations require closer access to transit, consider doing so on a different layer of service (e.g. Neighbourhood or Connector routes) or by time of day (e.g. during the non-commuting period). Different styles of service such as on-demand transit may also be used in these cases.
- Where possible, avoid abrupt changes to the existing transit network that do not result in service quality gain. For instance, this may mean feathering in substantial changes over a series of improvements.

- **Putting Mobility Where the Action Is:** Serve areas of high demand to make the service consistent and dependable. This will involve several strategies including moving to more regular or “clockface” intervals between trips, increasing frequency and service span in areas/corridors of high demand and then in areas with lower transit demand. For example:
 - Currently the schedule does not follow regular clockface schedule intervals and so routes run at 40 minute or 70 minute frequencies that are harder for passengers to plan around and use. On the other hand, if routes ran every 15, 30 or 60 minutes, not only would it be easy to remember, it would also be easy to expect when the next bus was arriving.
 - Another example of “putting mobility where the action is” is to increase the frequency and service span of the proposed corridors of the Primary network: Rapid, Frequent and Regional Lines. These corridors connect key origins and destinations in the system and should have the most frequent service to ensure that most of the riders are benefitted by redirecting resource to these corridors.

- **Use Resources Wisely:** The opportunity here is to enhance the efficiency of the system by reducing duplication of services in the network. There is a substantial amount of the duplication in the existing network: Nanaimo Parkway, Highway 19A, Stewart Avenue, Terminal Avenue are examples of corridors that have more than route serving them. A good network spreads it resources so that there is a balance of coverage and efficiency in the distribution of available resources.



6.0 NETWORK STRATEGY

Building from the 2014 Regional District of Nanaimo Transit Future Plan, analysis and engagement, the following sections outline the core elements of the RDN Transit Redevelopment Strategy. The strategy reflects land use development and logical progression of transit service frequency and quality improvements for the time horizon covering five years from the present. The strategy is made up of “layers” of different types of service that work together to serve the diverse travel needs of the region most effectively.

Key elements of the Network Strategy are presented as follows in the remaining sections of this document:

- **Section 6.1 Service Layers** which outlines a revised set of service and route types in the system to better reflect the hierarchy of routes that can best drive ridership improvements and which will better enable service to be fine-tuned to ridership demand over the term of the Strategy.
- **Section 6.2 Recommended Service Strategies** outlines the service improvements that the system can undertake to develop the system routes and schedules to improve service quality and grow ridership over the course of this five-year plan. These strategies include realigning and reinvesting existing services, as well as adding further service.
- **Section 6.3 Longer Term Strategies: 5+ Years** describes further improvements for consideration in the time period immediately beyond the five years that are the focus of this plan.
- **Section 6.4 Service Strategy Estimated Impacts** presents the financial and performance estimates for the recommended service strategies presented in Section 6.2, including high level cost and ridership projections.

Finally, the remaining sections of the plan outline the supporting capital and infrastructure investment required to give transit the space and place it needs to stay reliable and maximize ridership, plus other supporting strategies (**Section 8**), summarizes how service and infrastructure improvements relate over time (**Section 9**) and then outlines the next steps recommended to implement the RDN Transit Redevelopment Strategy (**Section 10**).

6.1 Service Layers

The future restructured network recommended for RDN Transit builds on a revised set of service “layers” and types. These layers of different transit types work together to serve the diverse needs of the region most effectively and to better match service levels and investment with future population density and demand.

The recommended layers are outlined in Table 3 on the next page, with the Primary routes (Rapid, Frequent, and Regional Lines) acting as a “spine” for the system and offering the most frequent and direct services. By defining what appears to be the most important corridors for transit now, future development and road network improvement decisions can be made to reinforce them where possible.

While ultimately the growth and timing of transit system improvements may vary from what is presented in this Transit Redevelopment Strategy, paying attention to the hierarchy of service layers and consistently aligning short term action as much as possible with the longer-term vision for the network will enable the system to grow efficiently.

Service Types Referenced

The Service Layers table on the following page references different styles of service, including:

- **Fixed Route** delivers service to bus stops using a defined route and schedule. The existing conventional portion of the RDN transit system uses this style of service.
- **On-Demand** services contain an element of operating by passenger request. Traditionally operated through trips that must be pre-booked via phone to dispatch, many other transit systems have now transitioned to “**Digital On-Demand**” services that can be dynamically booked by customers using a smart phone or computer, as well as called in via phone. Service types may include:
 - **Fully on demand service** that has no defined route or schedule, but which operates purely by passenger request. Existing non-digital examples of this have included the RDN’s handyDART service or typical taxi service. In some cases, “trip windows” will be defined to group together trips serving a specific destination by time of day or day of the week.
 - **Deviated services** that primarily operate as fixed route, but which have extra time built into the schedule to enable transit vehicles to deviate off-route to serve passenger homes or a destination by request.
 - **Flex Route** means that transit vehicles will arrive and leave a defined terminus on a schedule to provide On Demand service to points within a defined pick up/drop off zone or neighbourhood.

TABLE 3 RECOMMENDED REVISED REGIONAL DISTRICT OF NANAIMO TRANSIT NETWORK SERVICE LAYERS

Service	Definition	Service Types
Primary Routes – These routes act as the highest frequency spine of the system connecting the region’s key destinations and corridors:		
Rapid	Limited stop and highest frequency service (every 15 minutes or better) connecting key destinations and population centres along the City of Nanaimo’s Highway 19A and Highway 1 corridors.	<ul style="list-style-type: none"> Fixed Route limited stop service that may use standard or higher capacity vehicles.
Frequent	High frequency services (every 15 minutes or better) on key corridors with regular stop spacing that provide connection to Rapid Bus and major neighbourhoods and destinations.	<ul style="list-style-type: none"> Fixed Route using primarily standard transit vehicles, with the option to use higher capacity vehicles as service evolves.
Regional	Reliable and regular services (at least 30 minutes at peak commute times) connecting key population centres within the region, including the Town of Qualicum Beach, City of Parksville and the City of Nanaimo, as well as connection points to the District of Lantzville and Electoral Areas E and G.	<ul style="list-style-type: none"> Fixed Route using primarily standard transit vehicles, with the option to use higher capacity vehicles as service evolves.
Neighbourhood Routes - Services to medium- and lower-density residential and employment areas that connect to the Primary Routes at key points.		
Local Network – Ridership Based	Fairly direct services that connect medium density neighbourhoods and destinations to the Primary routes and which may also offer resilience to Primary network.	<ul style="list-style-type: none"> Fixed Route using standard transit vehicles
Local Network – Coverage Based	Services to lower density residential and industrial areas with a focus on connecting to the Primary network.	<ul style="list-style-type: none"> Fixed Route using smaller vehicles. Digital On-Demand services
Connector Routes – Routes serving targeted commuter and interregional travel needs.		
Targeted Services	Service targeted for specific users and markets, such as school and work commuters and targeted connection to transportation hubs, such as Duke Point Ferry.	<ul style="list-style-type: none"> Fixed Route. Digital On-Demand services.
Interregional	Services connecting the RDN to other regions, such as the Cowichan Valley and Comox Valley Regional Districts and Systems.	<ul style="list-style-type: none"> Fixed Route.
handyDART – Specialized services for registered eligible users.		
handyDART	On demand service to and from accessible building entrances for citizens who cannot use the conventional portion of the transit system because of a disability or physical need.	<ul style="list-style-type: none"> On-Demand services that may also be complemented by taxi programs.

6.2 Recommended Service Strategies

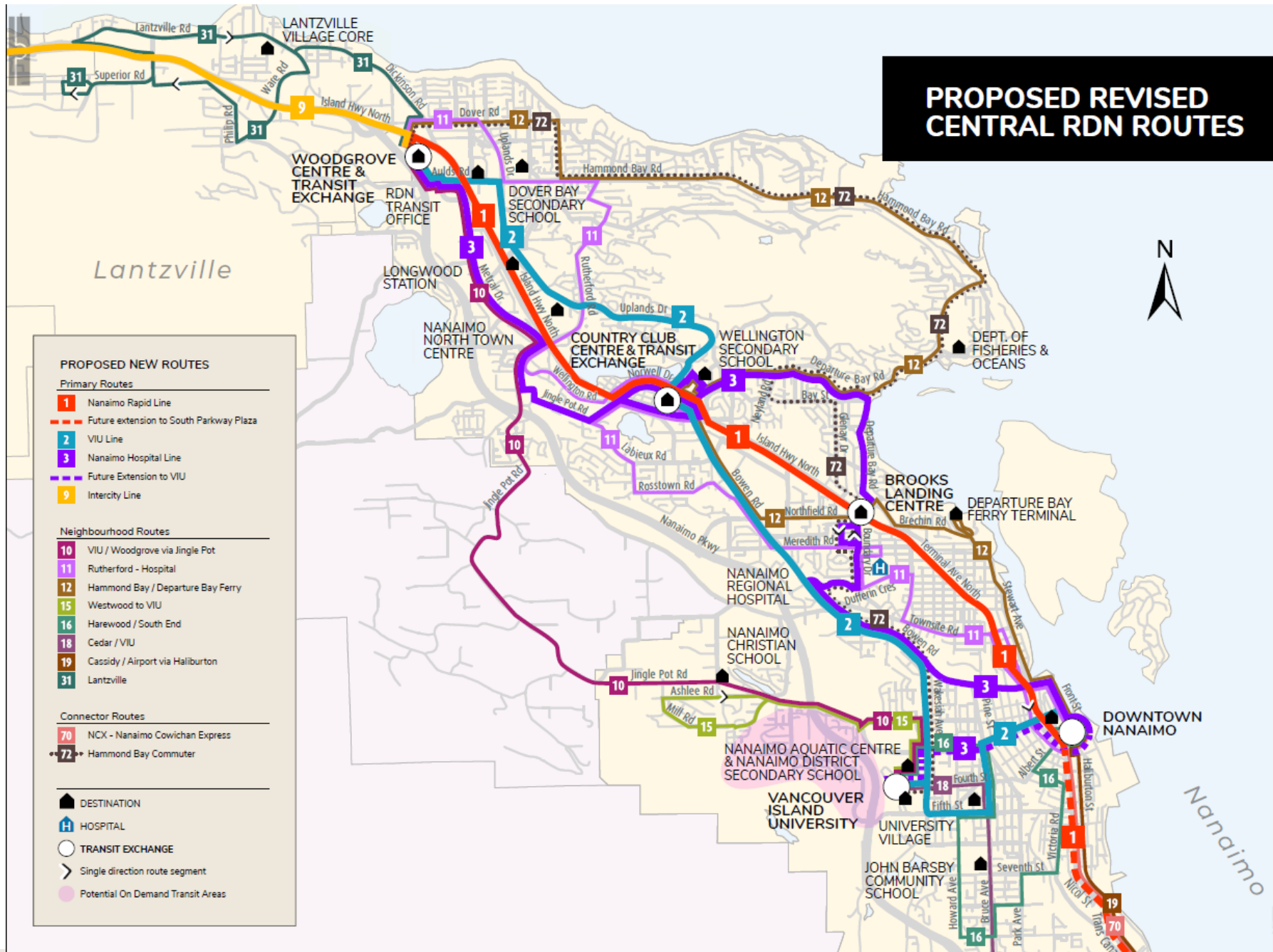
This section presents the individual transit service improvement strategies (“service strategies”) that are recommended for implementation over the course of the five-year Transit Redevelopment Strategy plan horizon. The service strategies have been developed to evolve the system in a logical order to best improve ridership and service quality.

The phasing of individual service strategies also takes into account timing to develop new or enhanced transit infrastructure that may be required. More details on the infrastructure requirements are presented in **Section 7.0**, while the summaries presented in **Section 9.0** and **Appendix A** show how service and infrastructure implementations are linked together. See **Appendix D** for detailed service frequency and span information by route over the TRS timeframe, plus sample travel times.

It should be underscored that this Transit Redevelopment Strategy is flexible. In particular, development of certain areas may happen differently than what is expected. Likewise, while the expansion service hours and vehicles shown for Years 1-3 reflect what the RDN had requested from BC Transit, actual local and provincial funding availability may vary. Therefore, the service improvement options have been broken into smaller service strategies so that they can be moved between years and adjusted as required to adapt to changes in development timing and funding.

Year 1	
Additional Resources	Recommended Service Strategy Implementations
5,000 Annual Service Hours 4 Heavy Duty Vehicles	Service Strategy 1 – Rapid Line Pre-Development – Minor routing adjustments and additional service frequency on the existing route 50 Woodgrove - Downtown to prepare for future evolution of this route into 1 Nanaimo Rapid Line, as well as corresponding schedule adjustments to the 7 Cinnabar to separate its operation from the route 50. Additionally: <ul style="list-style-type: none"> • Service on route 50 would increase to 20-minute frequencies at peak weekday times. • Schedules for both routes at other times would be similar to their existing 30- or 60-minute frequencies but would now offer more consistent intervals between trips.

PROPOSED REVISED CENTRAL RDN ROUTES



In Focus: Primary Routes 1, 2 and 3

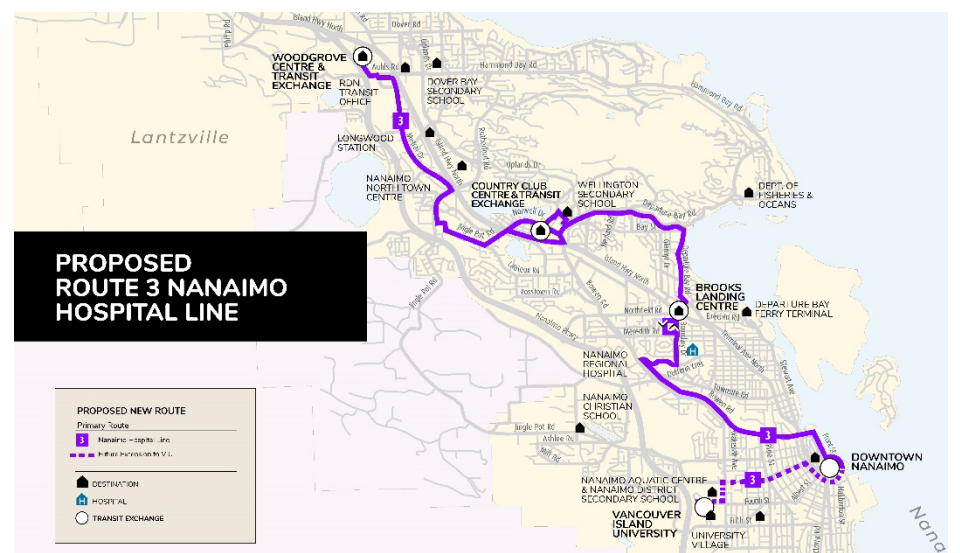
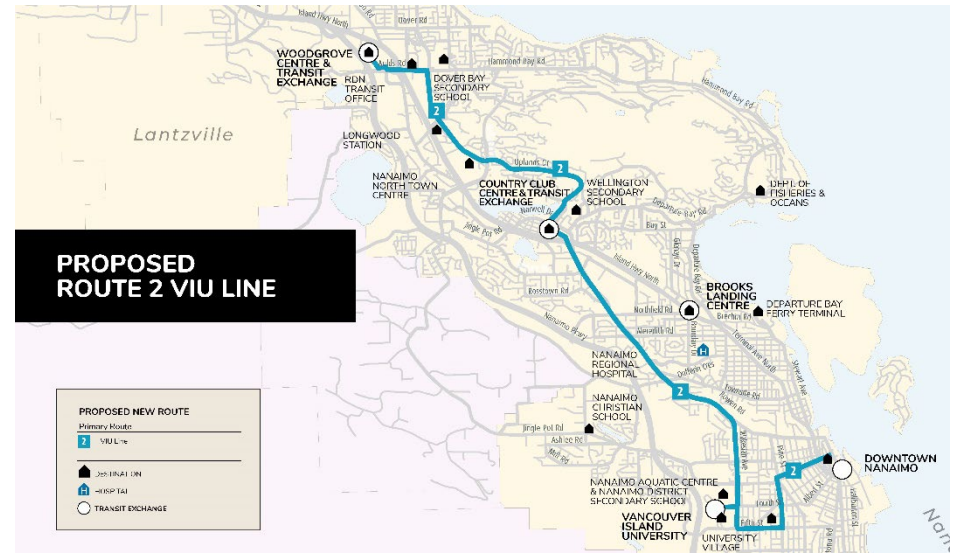
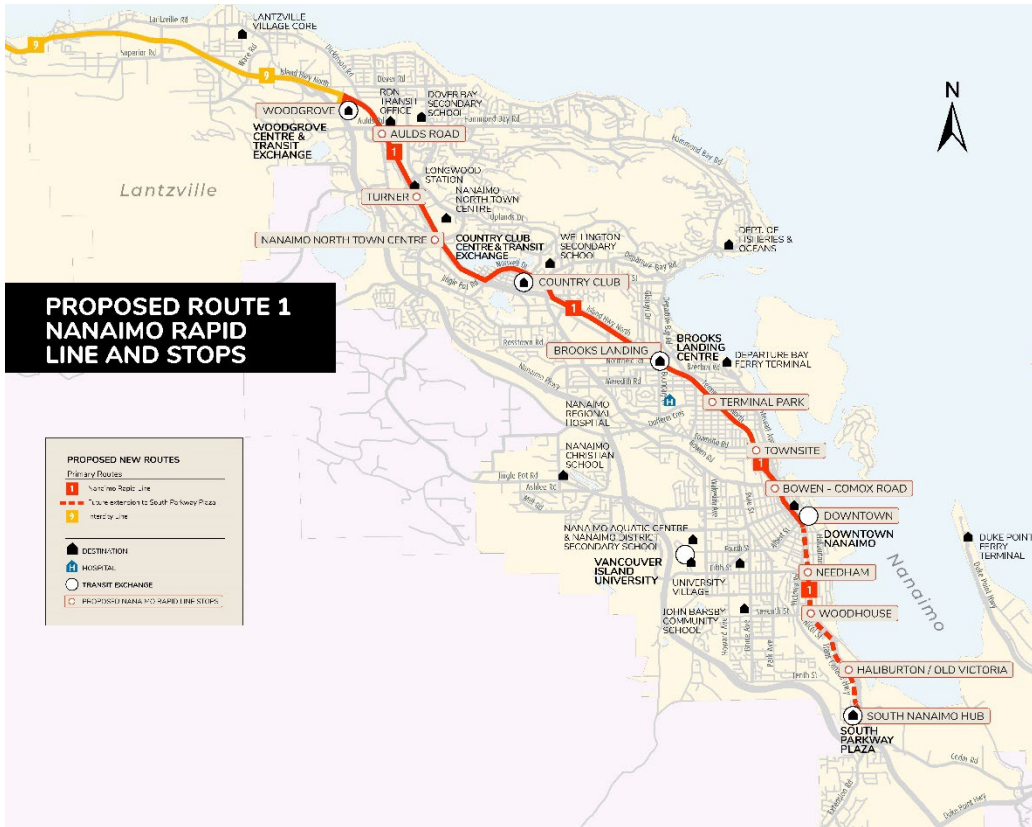


TABLE 5 YEAR 2: SERVICE IMPROVEMENTS

Year 2	
Additional Resources	Recommended Service Strategy Implementations
<p>16,100 Annual Service Hours 7 Heavy Duty Vehicles 6 Medium Duty Vehicles</p>	<p>Service Strategy 2 – Rapid Line Phase 1 Implementation + Central System Restructuring – This strategy undertakes the fundamental restructuring of all central RDN routes and introduces the new Primary routes, including the 1 Nanaimo Rapid Line. It also provides completely reschedules the system to make the intervals between trips more consistent, refreshes customer information materials and renumbers the system more intuitively so that the most frequent and important routes are listed first. Service changes include:</p> <ul style="list-style-type: none"> • Primary routes operating at 20 minutes or better during weekday peak periods and 30 minutes at all other times, including Sundays and evenings. These routes include: <ul style="list-style-type: none"> ○ 1 Nanaimo Rapid Line evolving from the route 50 to operate in its Phase 1 between Woodgrove Centre and downtown Nanaimo along Highways 19 and 1. ○ 2 VIU Line that would streamline the existing route 40 and offer additional 10 minute peak service during school-in months. ○ 3 Nanaimo Hospital Line serving the Metral Drive and Hospital areas between Woodgrove and Downtown, as well as underserved areas of Departure Bay Road. • A new 72 Hammond Bay Commuter route offers additional direct connection at weekday peak times between the City’s northeast and Hospital, NDSS and VIU. • Restructured Neighbourhood routes operating at similar frequencies to existing services: <ul style="list-style-type: none"> ○ 10 VIU / Woodgrove via Jingle Pot that would continue to serve west areas of the City, plus maintain another connection option to NDSS and VIU from the north RDN. ○ 11 Rutherford - Hospital providing new service to the Rutherford Road / Nanaimo North Town Centre areas plus the Wellington Road, Rosstown Road, NRGH and Townsite Road areas.

Year 2: Continued

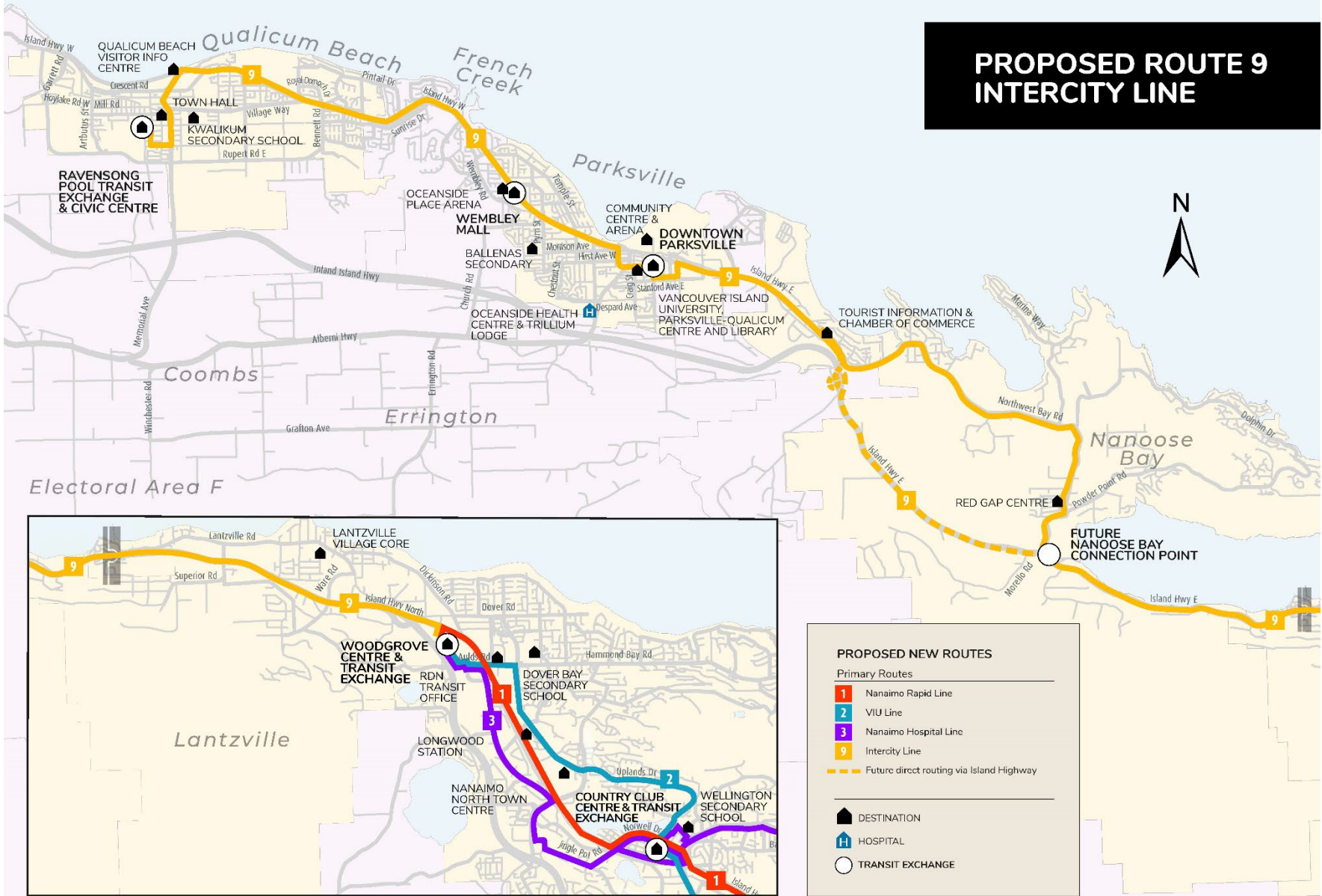
Additional Resources

Recommended Service Strategy Implementations

Service Strategy 2 Continued – Rapid Line Phase 1 Implementation + Central System Restructuring

- **12 Hammond Bay / Departure Bay Ferry** that would continue to operate between the Hammond Bay area, the Departure Bay Ferry and downtown. The service would also route consistently via Country Club Mall, Bowen Road and Meredith Road to offer improved crosstown travel between east and west Nanaimo, direct access to the NRGH area, and improved connection opportunities at downtown, Brooks Landing and Country Club mall for Departure Bay Ferry passengers.
- **15 Westwood to VIU** serving the Westwood Lake area with connections to downtown and other destinations at VIU, with the opportunity to extend this route in future to provide on-demand transit to the College Heights area.
- **16 Harewood / South End** revises the existing route 6 to also serve Victoria Road in both directions and making the route more direct within the Harewood area.
- **18 Cedar / VIU** retains the current routing of the existing route 8 but would also have its schedules updated to operate on a more consistent basis to help facilitate connections with other routes at VIU.

PROPOSED ROUTE 9 INTERCITY LINE



Year 2: Continued

Additional Resources	Recommended Service Strategy Implementations
<p>2,700 Annual Service Hours 1 Heavy Duty Vehicle</p>	<p>Service Strategy 3 – Route 9 Intercity Schedule Adjustments and Targeted Frequency Increases</p> <p>❖ Renames existing 91 Intercity to route 9 as the key Regional route within the Primary route network, where it would continue to connect Qualicum Beach, neighbourhoods within Electoral Areas G and Parksville to the rest of the network at Woodgrove Centre. A portion of trips would continue to serve Nanoose Bay as well as developing stops on Highway 19 in Lantzville. This option also makes targeted service adjustments to:</p> <ul style="list-style-type: none"> • Connect most route 9 trips to 1 Nanaimo Rapid Line services at Woodgrove Centre without the need to physically transfer buses. • Make service more consistent throughout day. This includes 30–60-minute service during weekday peak times and 60 minute service during weekday middays and Saturdays between 11:00am and 6:00pm. • Service on Sundays and evenings would continue to operate every 120 minutes for the time being but would extend longer into the evening to meet a priority request from passengers. • Service would also start earlier in the morning to facilitate commuter travel.
<p>1,000 Annual Service Hours 1 Heavy Duty Vehicle</p>	<p>Service Strategy 4 – Lantzville Restructuring + Additional Service – Restructures the Lantzville route to become the 31 Lantzville, focussing it on higher ridership and densifying areas of the community and also extending service north to the Snaw-Naw-As area. Increases frequency to consistent 60-minute service during weekday peak periods and afternoons and Saturday afternoons. Service is 120 minutes at other times but extends later into evenings.</p>
<p>200 Annual Service Hours 0 Vehicles</p>	<p>Service Strategy 5 – 99 Deep Bay Additional Day of Service – Currently the 99 Deep Bay only operates Tuesday to Saturday. This change would extend service to also operate on Mondays to make it more consistent and build regular weekday ridership.</p>

PROPOSED SOUTH RDN ROUTES

PROPOSED NEW ROUTES

Primary Routes

- 1** Nanaimo Rapid Line
- 2** Future extension to South Parkway Plaza
- 2** VIU Line
- 3** Nanaimo Hospital Line
- 3** Future Extension to VIU

Neighbourhood Routes

- 10** VIU / Woodgrove via Jingle Pot
- 11** Rutherford - Hospital
- 12** Hammond Bay / Departure Bay Ferry
- 15** Westwood to VIU
- 16** Harewood / South End
- 17** Cinnabar
- 18** Cedar / VIU
- 19** Cassidy / Airport via Haliburton

Connector Routes

- 70** NCX - Nanaimo Cowichan Express
- 72** Hammond Bay Commuter
- 77** Duke Point Ferry Connector

DESTINATION (House icon)

HOSPITAL (Hospital icon)

TRANSIT EXCHANGE (Circle icon)

Single direction route segment (Arrow icon)

Potential On Demand Transit Areas (Pink shaded area)

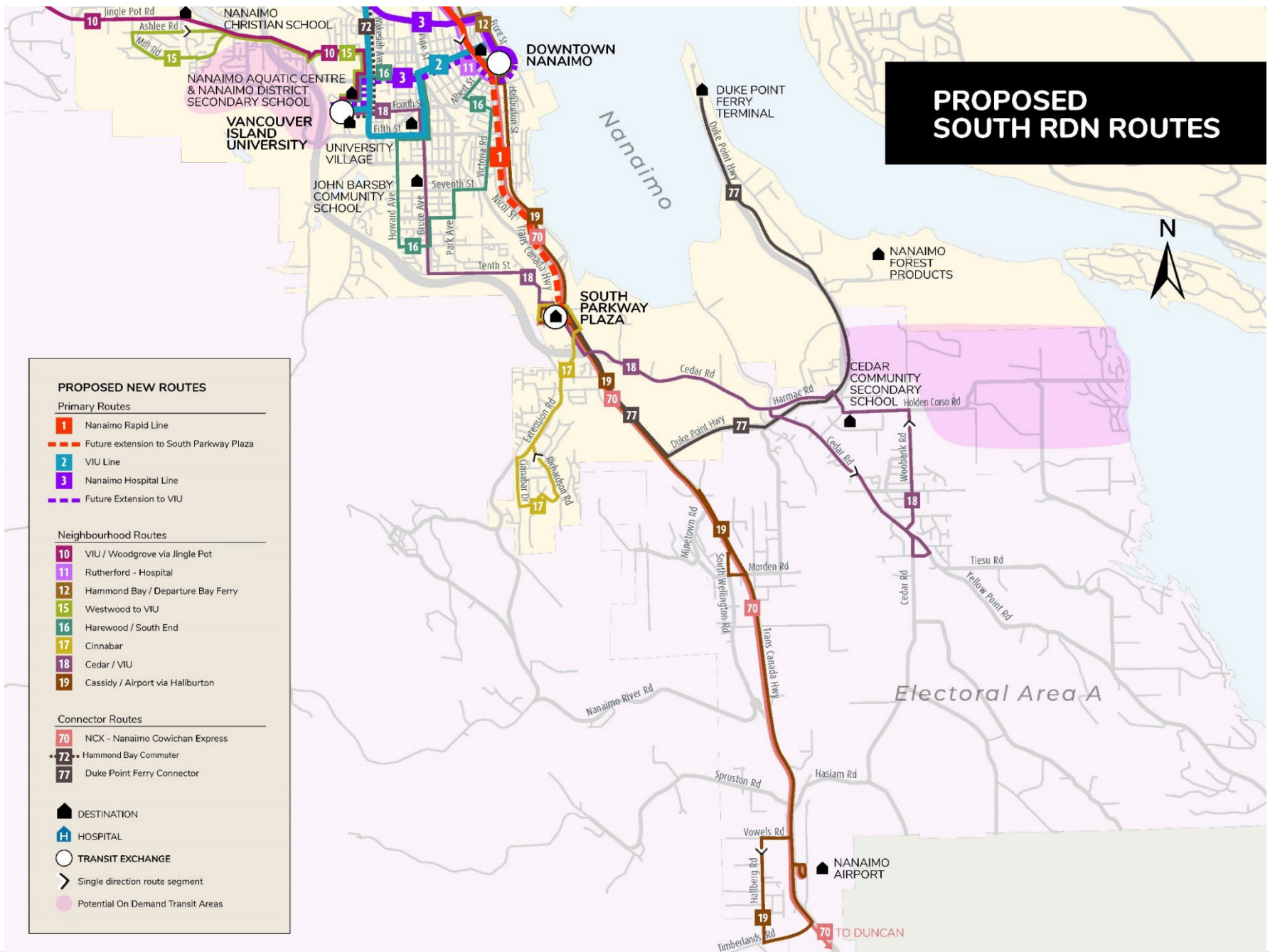


TABLE 6 YEAR 3: SERVICE IMPROVEMENTS

Year 3	
Additional Resources	Recommended Service Strategy Implementations
<p>1,400 Annual Service Hours 3 Medium Duty Vehicles</p>	<p>Service Strategy 6 – Rapid Line Phase 2 + South Nanaimo Service Restructuring – The proposed changes to service in the southern part of the transit network build off this Strategy’s “Phase 2” extension of the route 1 Nanaimo Rapid Line from downtown Nanaimo to an expanded South Nanaimo Transit Hub at South Parkway Plaza. With the extension the route, the 1 Nanaimo Rapid Line would continue to operate at the same frequencies as shown in Service Strategy 2, enabling direct travel all the way from Woodgrove Centre to the South Nanaimo Hub every 20 minutes at peak commuter times.</p> <p>These changes also build around the new route 70 NCX - Nanaimo Cowichan Express which is slated to be added in 2022 and operate between Nanaimo and Duncan.</p> <p>Other aspects of the proposed south Nanaimo restructuring include:</p> <ul style="list-style-type: none"> • 17 Cinnabar would evolve from the existing route 7 but would now terminate at the South Nanaimo Hub and connect to the routes 1 and 18, thereby enabling it to extend 30-minute service across more of the weekday peak periods and at other times. • 19 Cassidy / Airport via Haliburton would build from the existing route 78 and be adjusted to offer service in both directions along the Haliburton Street corridor as well as additional trips on weekdays and new service on Saturdays and Sundays. • 77 Duke Point Ferry Connector would reinstate service to the ferry terminal as well as industrial employers in the Maughan Road area, with connections to other routes at the South Nanaimo Hub and trips every 2.5 hrs Monday – Sunday to align with the ferry. • 18 Cedar / VIU would have further minor scheduling adjustments as necessary to ensure connection between the various routes now serving the South Transit Hub.

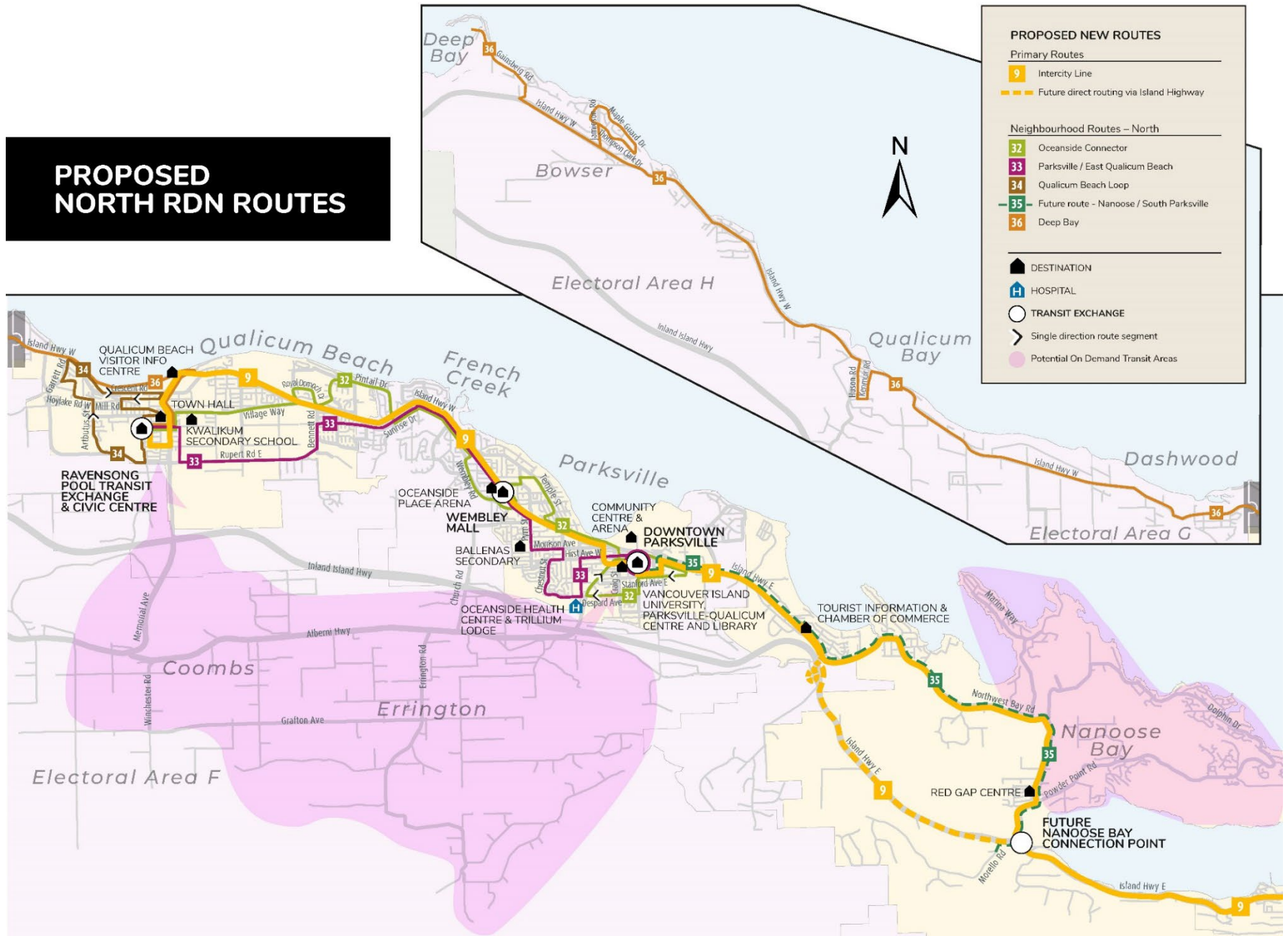
Year 3: Continued

Additional Resources	Recommended Service Strategy Implementations
<p>6,700 Annual Service Hours 7 Heavy Duty Vehicles</p>	<p>Service Strategy 7 – Rapid & Frequent Line Peak Service Improvements – Adds further service to the Primary routes 1 Nanaimo Rapid Line, 2 VIU Line and 3 Nanaimo Hospital Line to increase frequencies to every 15 minutes or better during weekday peak periods. The route 2 VIU Line would also still retain 10-minute service during highest ridership times of the morning and afternoon peak periods during school-in months.</p>
<p>10,400 Annual Service Hours 2 Medium Duty Vehicles</p>	<p>Service Strategy 8 – Rapid & Frequent Route Midday Service Improvements – Ideally implemented in tandem with Service Strategy 7, this strategy further increases frequency on Primary Routes 1, 2 and 3 to operate every 20 minutes during weekday middays (i.e. from 9:00am to 3:00pm between the peak periods) and on Saturday from 10:30am to 6:00pm. This would mean that these Primary routes would offer 20 minutes or better service all day on weekdays and at the highest ridership times of the day on Saturdays.</p>
<p>1,500 Annual Service Hours 1 Heavy Duty Vehicle 1 Medium Duty Vehicle</p>	<p>Service Strategy 9 – Targeted Peak Frequency and Span Improvements – To support the peak period improvements on the Primary routes implemented in Service Strategy 7, this strategy creates provision to add targeted additional frequency to higher ridership local routes and/or increase the span of service for select primary routes. These routes and trips would be confirmed through on-going monitoring of the service implemented during Year 2.</p>

TABLE 7 YEAR 4: SERVICE IMPROVEMENTS

Year 4	
Additional Resources	Recommended Service Strategy Implementations
<p>6,100 Annual Service Hours 4 Heavy Duty Vehicles</p>	<p>Service Strategy 10 – Rapid & Frequent Route Evening Improvements – Building onto the frequency improvements implemented for the Primary routes during highest ridership times Monday to Saturday in Year 3, this Strategy would further increase the utility and attractiveness of routes 1, 2 and 3 by extending 20-minute service until 10:00pm Monday to Saturday.</p>
<p>1,800 Annual Service Hours 1 Heavy Duty Vehicle</p>	<p>Service Strategy 11 – Rapid & Frequent Route Sunday & Holiday Improvements – Similar to Service Strategy 10, this Strategy extends 20-minute service on routes 1, 2 and 3 during highest ridership times on Sundays and Holidays between noon and 6pm. Service at other times on Sundays and Holidays would remain at 30 minutes.</p>
<p>2,000 Annual Service Hours 4 Heavy Duty Vehicles</p>	<p>Service Strategy 12 – Route 9 Intercity Additional Commuter Improvements – To continue to build the Regional portion of the Primary route network, this Strategy extends the 30-minute frequency service on the 9 Intercity route operating between Qualicum Beach, Parksville and Woodgrove Centre across a larger period in the weekday morning and afternoon peaks.</p>
<p>1,800 Annual Service Hours 1 Heavy Duty Vehicle</p>	<p>Service Strategy 13 – Route 9 Intercity Evening and Weekend Improvements – Similar to the evening and Sunday improvements proposed for other Primary routes in Service Strategies 10 and 11, this would increase 9 Intercity frequencies. It would extend 60-minute service to 9:00pm Monday to Saturday evenings plus all day on Saturdays and on Sundays between 11:00am and 6:00pm on this route.</p>

PROPOSED NORTH RDN ROUTES

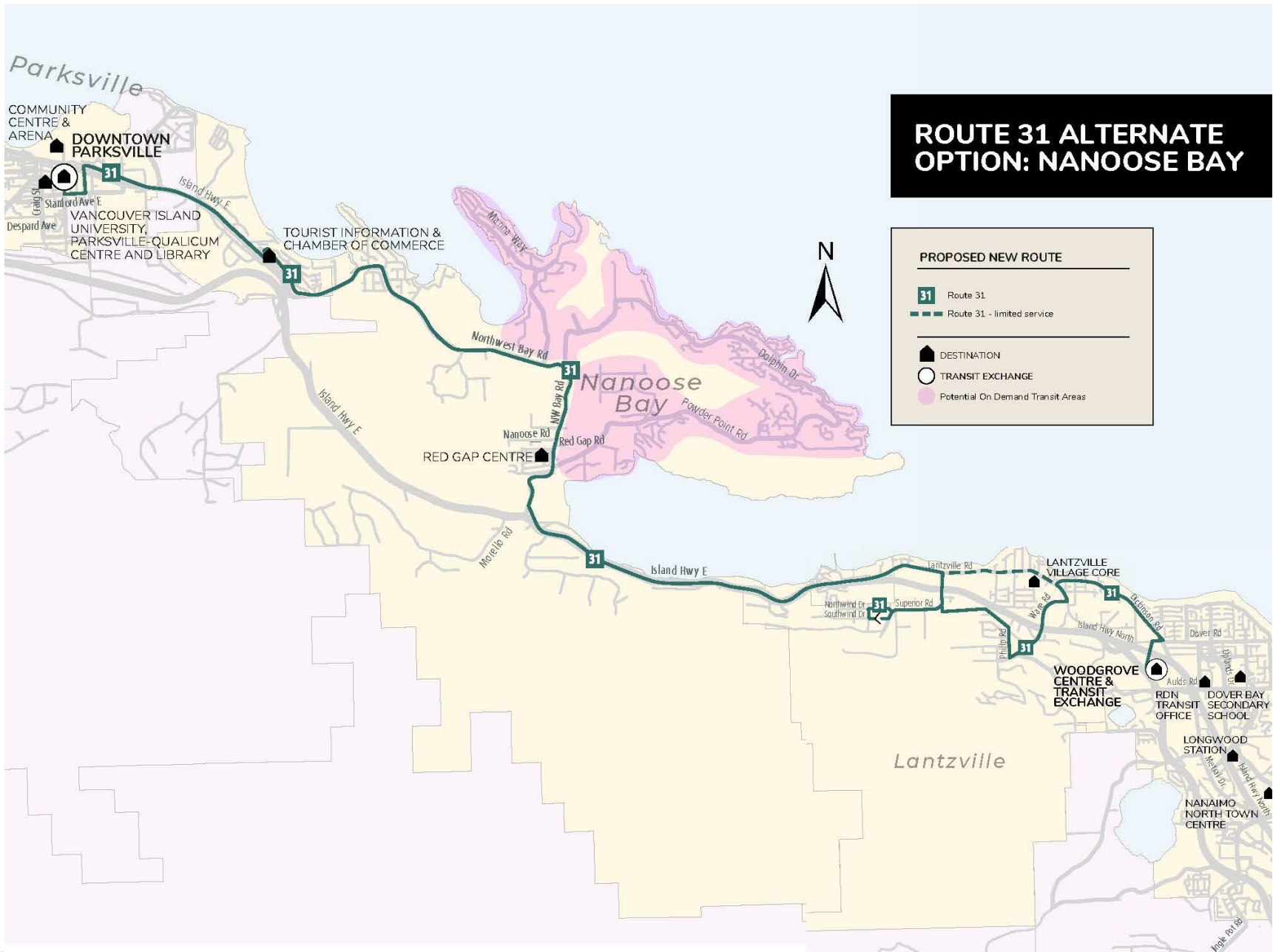


Year 4: Continued

Additional Resources	Recommended Service Strategy Implementations
<p>8,300 Annual Service Hours 4 Medium Duty Vehicles</p>	<p>Service Strategy 14 – North Network Service Restructuring + Evening and Sunday Service – Substantially restructures services in the north RDN / Oceanside area to create a new network, improved frequency and directness, service to new areas, PLUS new service on Sundays and evenings.</p> <ul style="list-style-type: none"> • The 32 Oceanside Connector and the 33 Parkville – East Qualicum Beach would evolve from existing routes 88 and 97 to create two new linear routes that better treat the Oceanside area as the connected travel region that it has become. <ul style="list-style-type: none"> ○ These routes would operate in both directions and more directly serve areas of higher population and employment in Qualicum Beach, Electoral Area G and Parkville. ○ Both routes would also serve the key Oceanside destinations of Ravensong Pool, downtown Qualicum Beach, the Sunrise Drive area, Wembley Mall and downtown Parkville; their schedules would be offset to offer service approximately every half hour between these key points. ○ Route 32 would also serve new areas in south Parkville, Despard Avenue and Highway 4A. • 34 Qualicum Beach Loop would streamline the existing route 98 to serve higher ridership destinations in the northern portion of Qualicum Beach. • Service on new routes 32, 33 and 34 would also extend further into the evening Monday to Saturday and would now also offer services on Sundays and Holidays. • 36 Deep Bay would evolve from the existing route 99, add an additional trip per day Monday to Saturday, and now offer two trips per day on Sundays and Holidays. It also offers the potential to pilot the digital on-demand transit recommended in the following year for other routes. This would increase coverage to on-demand zones off the corridor while streamlining the main route. <p>Finally, the changes outlined for the Oceanside area increase the associated resources such that it would be feasible to explore further future conversion of services to digital on-demand operation pending review of the results of the north RDN network restructuring proposed here as a first step.</p>

TABLE 8 YEAR 5: SERVICE IMPROVEMENTS

Year 5	
Additional Resources	Recommended Service Strategy Implementations
<p>2,800 Annual Service Hours 2 Light Duty Vehicles</p>	<p>Service Strategy 15 – Nanoose Bay Service Restructuring and Digital On-Demand Transit – This strategy creates a separate 35 Nanoose Bay route that would now operate between the Parksville Exchange and a new connection point in the vicinity of Highway 19 and Morello Road / Northwest Bay Road. Service would be 60 minutes at peak times and every 60-120 minutes at other times depending on ridership levels. The rationale for the restructuring is to:</p> <ul style="list-style-type: none"> • Enable the extension of digital on-demand service to currently unserved and lower population areas of Nanoose Bay, such as the Dolphin Beach and Fairwinds areas. • Streamline 9 Intercity trips to no longer operate via Northwest Bay Road making that service more direct and attractive to the majority of passengers who are travelling between Qualicum Beach, Parksville and connections to the rest of the system at Woodgrove Centre. <p>35 Nanoose Bay passengers would be able to transfer to/from the 9 Intercity at the Morello Road / Northwest Bay connection point.</p> <p>Alternatively and as shown on the map on the following page, rather than a new route 35 and pending future review of ridership in the 31 Lantzville area, there may be an opportunity to use the same resources shown here to add to and adjust the 31 Lantzville routing to operate in a more linear path and extend that route north through Nanoose Bay along Northwest Bay Road to Parksville. Doing so would enable service in both the Lantzville and Nanoose areas to be operated by smaller vehicles, make Lantzville trips more direct, enable direct connection from Nanoose Bay and Lantzville to both Woodgrove and Parksville, and would also offer further frequency between Parksville and other transit connections at Woodgrove Centre.</p>



Year 5: Continued

Additional Resources	Recommended Service Strategy Implementations
<p>2,000 Annual Service Hours 1 Light Duty Vehicle</p>	<p>Service Strategy 16 – Errington & Coombs Digital On-Demand Transit – Pending Electoral Area F participation in the transit function, this strategy would extend new digital on-demand transit service to Errington and Coombs three periods per day (e.g. 7:00am-9:00am, midday, and 3:00pm-5:00pm) Monday to Saturday. Service would connect to other transit in either Qualicum Beach or Parksville and may also potentially enable extension of service in a cost-effective way to currently unserved areas of Electoral Area G.</p>
<p>3,300 Annual Service Hours 1 Heavy Duty Vehicle</p>	<p>Service Strategy 17 – Service Optimization & Schedule Reliability – This final strategy recognizes that much change will have been implemented in the transit system over the previous four years. This package provides resources to enable minor service and schedule adjustments as required to further improve system efficiency and effectiveness. It also affords the system “breathing room” to focus on developing the service and infrastructure strategies for the subsequent five-year period.</p>

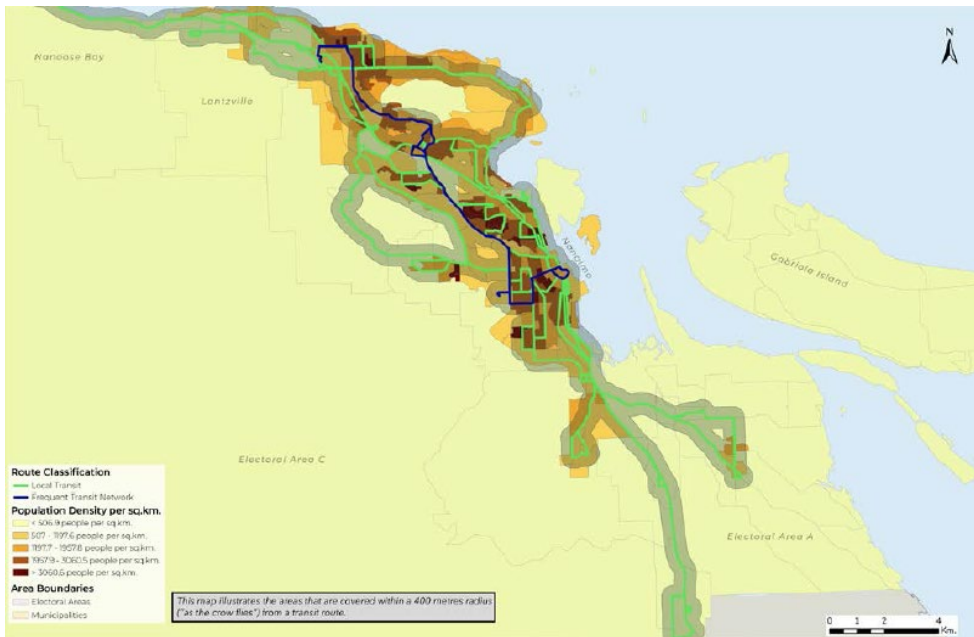
Ridership and Service Trade Offs

Making service better for the whole region—and reshaping the system to attract future riders and better align with development—has trade offs. System restructuring will affect everyone in different ways, with many people positively impacted by the new network but potentially some riders now requiring a transfer or a longer walk or travel time. **Appendix D** provides some sample estimated travel times to illustrate these trade offs. The following also provides more background on two example areas.

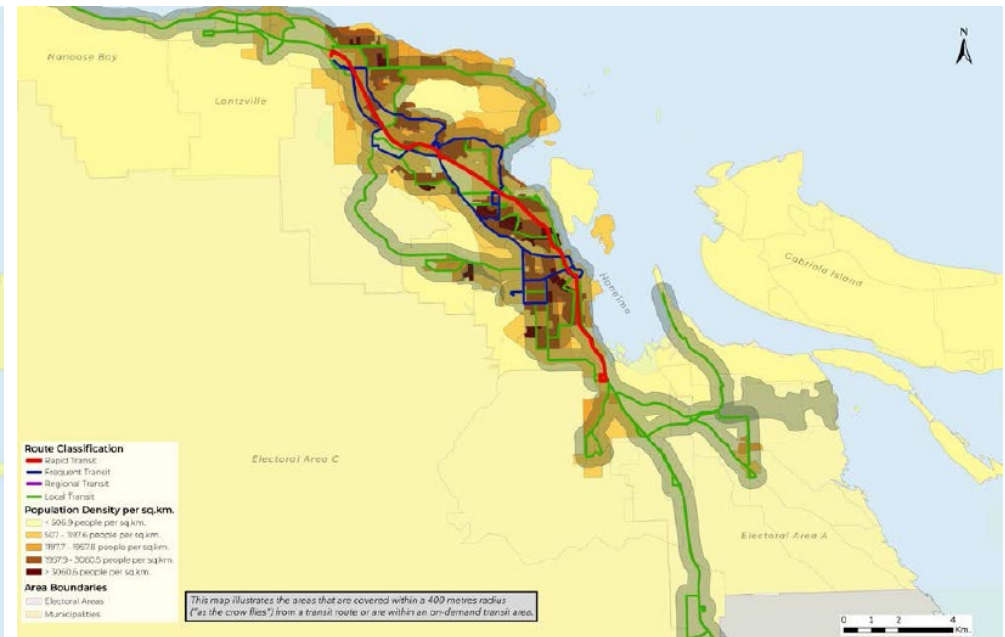
- **Nanoose Bay** – In the RDN’s current system, Nanoose Bay has been receiving service by the 91 Intercity route via an extension along Northwest Bay Road. While this works well for existing Nanoose Bay customers, it is not optimal for the system as a whole due to lower ridership in the Nanoose Bay area and scheduling impacts.
 - **Lower Ridership:** Pre-COVID ridership data from January to March 2020 showed that on average 27 people per day used the stops on Northwest Bay Road, compared to 357 per day using stops in Parksville, Qualicum Beach and other route 91 areas north of Nanoose Bay. This means that approximately 93% of the route’s ridership is being inconvenienced with longer travel times (7-8 minutes per direction) to pick up or drop off the 7% who use stops on Northwest Bay Road, which on a number of trips were just for 0-2 people.
 - **Scheduling Impacts:** The additional time required to serve Nanoose Bay on the 91 Intercity also increases the total cycle time for the route (round trip time plus recovery time) beyond 120 minutes, meaning that it disproportionately requires more buses to serve and is less efficient. Unhooking Nanoose Bay service from the 91 Intercity would also enable smaller vehicles to serve the less densely populated area plus extend transit into the area’s currently unserved neighbourhoods.
- **Hammond Bay** – Based on historical evolution of the system, service to the key regional destination of the Departure Bay Ferry Terminal was attached to the 20 Hammond Bay route, which originally also served both the Country Club Mall and Downtown Nanaimo transit exchanges.
 - This original routing had positive impacts since it enabled ferry passengers to easily connect in both directions to major transit hubs.
 - However, this route was evolved over time to eliminate connection to Country Club Mall except for a limited number of weekday commuter trips. This routing change gave Hammond Bay area residents a very fast and direct connection between their neighbourhood and the ferry terminal / downtown but negatively impacted all other passengers in the north portions of the City and RDN who would otherwise have used the Country Club Exchange to connect to the ferry. The routing variation was also confusing and made it harder for Hammond Bay residents to get to the Country Club connection point in a consistent way.
 - The proposed restructuring and new route 12 Hammond Bay maintains no-transfer-required service between Hammond Bay, the ferry terminal and downtown but also reintroduces the connection to Country Club Mall. Doing so will mean that some existing Hammond Bay riders will have a longer travel time with the trade off that now a much larger proportion of the system will have easier access to the ferry (including future higher density areas of Bowen Road) and that routing to Country Club will be more consistent and easier to understand.

Service Accessibility Comparison: Proposed vs. Existing Routing – South & Central RDN

The following maps compare coverage within 400m of a transit service in different areas of the RDN based on existing transit and the routes and Digital On-Demand services proposed by the TRS over its five year time horizon. In the South RDN, the changes to the transit network improves transit accessibility to the Duke Point Ferry Terminal and neighbouring landuses. Overall accessibility in the Central RDN is similar to the existing network, but proposed improvements in frequency and span will make the service more attractive.



Accessibility within 400m of **existing** Central/South RDN network



Accessibility within 400m of **proposed** Central/South RDN network

Service Accessibility Comparison: Proposed vs Existing Routing in North RDN

The proposed network increases transit coverage in most areas in the RDN, notably, in the community of Nanoose Bay and Area F in North RDN. Digital On-Demand Transit service is proposed in both areas, thereby increasing the overall transit accessibility of their residents.



Accessibility within 400m of **existing** North RDN network



Accessibility within 400m of **proposed** North RDN network

6.3 Longer Term Strategies: 5+ Years

As the system continues to evolve and develop, the following additional service strategies are recommended for further consideration beyond the five years that are the focus of this plan:

- **Extension of Further Service to VIU Along the Third Street Corridor** – To meet increasing development along the City of Nanaimo’s Third Street area, this option introduces service in that corridor operating between Downtown, NDSS and VIU. This enhancement could be accomplished by extending the 3 Nanaimo Hospital Line along Fitzwilliam Street, Third Street and Wakesiah Avenue (as shown in the Proposed Central Nanaimo Routes map) and thereby shifting the 2 VIU Line at that time to a more direct path from the University Village area to Downtown via Fourth Street and Albert Street. Alternatively, a separate route could be implemented to serve the Third Street corridor.
- **New Interregional Connection to Comox Valley** – Pending continued exploration with the Comox Valley Regional District, would introduce new connecting service to Courtenay and other CVRD destinations from the RDN.
- **Consideration of Further Digital On-Demand Transit in the Oceanside Area** – As mentioned in **Service Strategy 14**, the changes proposed for the North RDN are expected to serve the evolving transit needs in that area and also bring transit resources up to a level where they can offer a reasonable level of service to residents. That resource level will also be high enough that Digital On-Demand Transit (DODT) service could be feasible in more areas of Qualicum Beach, Parksville and Electoral Area G if routes are still not performing well after their first 1-2 years of operation. By Year 6, the system would also have had time to learn from the implementation of the proposed Digital On-Demand Transit in other system areas such as Nanoose Bay and Deep Bay (plus potentially Errington and Coombs) in Year 5. Therefore, it is recommended that a detailed performance assessment of the north RDN restructuring take place after its first year of operation and a reallocation of service to digital on-demand transit be considered if warranted.
- **Extension of DODT to Additional Areas of the Region** – Similarly, once the system has experience with DODT, additional currently un-served areas that could be considered for on-demand expansion include:
 - **University Heights area** of the City of Nanaimo.
 - **Additional lower density neighbourhoods within the Cedar area**, including potentially service to or adjacent to areas of the Snuneymuxw First Nation depending on further discussion with the Nation.
 - **Lower density areas of the District of Lantzville** that are without service.

6.4 Service Strategy Estimated Impacts

The following table presents the financial and performance estimates for service strategies presented in **Section 6.2**.

Estimated additional annual operating costs, vehicle requirements and anticipated ridership and revenue are presented for each service strategy. See also their corresponding infrastructure requirements by projected year in **Section 7.0**.

- **Costs estimates shown are in addition to the existing transit system budget.** However, the service strategies also take into account reallocation of existing system resources and vehicles, where feasible.
- **Estimated costs** shown are high level and based on initial expansion estimates for Years 1 and 2 were provided by BC Transit's expansion process in 2021/22. Actual costs may vary depending on year of implementation and finalization of operating details at that time. Costs estimates shown include direct requirements like operator staffing and lease fees, but not additional support staff (dispatch, supervisors, etc.) that may be required over time.
- **Service hour, revenue and ridership estimates** shown are high level estimates based on the service strategies presented and are each conservatively projected.
 - In other words, additional buffer has been built into service hour estimates while the ridership and revenue projections are estimated at lower than what would likely be realized.
 - Ridership and revenue have considered 2021/22 AOA budget performance, pre-COVID 2019 system performance actuals, and typical performance impacts for similar implementations in peer systems.
- **Vehicle estimates** are based on operational requirements and also include a provision for spare vehicles. Actual vehicle requirements may vary at time of implementation based on system fleet standards.
 - Vehicle requirements shown also include additional spares for the base RDN fleet that have been recommended by BC Transit and which are greater than, and not specifically tied to, service strategy needs.
 - The vehicles associated with each service strategy also reflect right-sizing and reallocation of vehicle types between routes. For instance, Medium Duty vehicles would likely be allocated to lower ridership Neighbourhood routes to "bump out" existing Heavy-Duty vehicles to new Primary route services.
 - As per BC Transit's vehicle classification system, all vehicles are accessible. "Heavy Duty" refers to a standard-size 12.5m (40 ft) CNG bus, "Medium Duty" refers to a 9.14m (30 ft) CNG bus, and "Light Duty" refers to a 6.73m - 8.08m (approximately 22-24 ft) small bus or van.

Regional District of Nanaimo Transit Redevelopment Strategy
Summary of Service Strategy High Level Estimated Annual Impacts

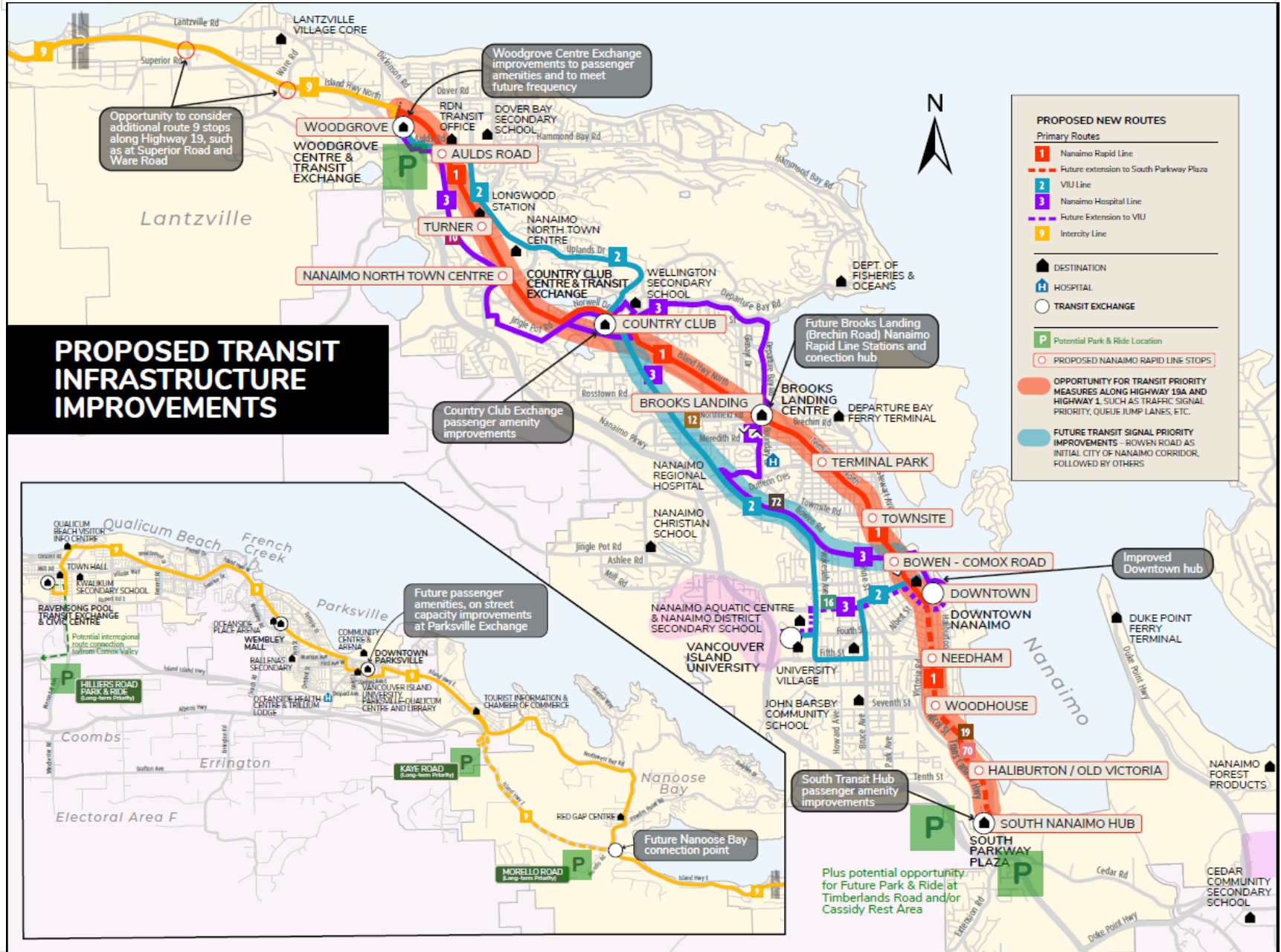
Service Strategies	Vehicles**			Estimated Annual Service Hours	Estimated Annual Rides	Estimated Annual Costs*	Estimated Annual Revenue	Estimated Annual Net RDN Costs
	Heavy Duty	Medium Duty	Light Duty					
Recommended Priorities for Year 1								
Service Strategy 1 - Rapid Line Pre-Development on Route 50	4			5,000	73,000	\$683,000	\$80,000	\$340,000
Service Strategies - Year Projected Total:								
	4			5,000	73,000	\$683,000	\$80,000	\$340,000
Recommended Priorities for Year 2								
Service Strategy 2 - Rapid Line Phase 1 (Woodgrove-Downtown) + Central System Restructuring	7	6		16,100	321,000	\$2,544,000	\$352,000	\$1,181,000
Service Strategy 3 - Route 9 Intercity Schedule Adjustments and Targeted Frequency Increases	1			2,700	40,000	\$389,000	\$44,000	\$177,000
Service Strategy 4 - Lantzville Restructuring + Additional Service	1			1,000	10,000	\$169,000	\$11,000	\$93,000
Service Strategy 5 - Additional Day of Service on 99 Deep Bay				200	1,000	\$21,000	\$1,000	\$10,000
Service Strategies - Year Projected Total:								
	9	6	0	20,000	371,000	\$3,102,000	\$407,000	\$1,451,000
Recommended Priorities for Year 3								
Service Strategy 6 - Rapid Line Phase 2 (Downtown - South Hub) + South RDN Service Restructuring		3		1,400	19,000	\$269,000	\$21,000	\$162,000
Service Strategy 7 - Rapid & Frequent Route Peak Service Improvements	7			6,700	161,000	\$1,110,000	\$177,000	\$513,000
Service Strategy 8 - Rapid & Frequent Route Midday + Saturday Service Improvements		2		10,400	188,000	\$1,459,000	\$206,000	\$598,000
Service Strategy 9 - Targeted Peak Frequency and Span Improvements: Primary + Local Routes	1	1		1,500	27,000	\$259,000	\$30,000	\$135,000
Service Strategies - Year Projected Total:								
	8	6	0	20,000	395,000	\$3,097,000	\$434,000	\$1,408,000
Recommended Priorities for Year 4								
Service Strategy 10 - Rapid & Frequent Route Evening Improvements	4			6,100	49,000	\$817,000	\$54,000	\$436,000
Service Strategy 11 - Rapid & Frequent Route Sunday and Holidays Improvements	1			1,800	18,000	\$276,000	\$20,000	\$141,000
Service Strategy 12 - Route 9 Intercity Additional Commuter Improvements	4			2,000	20,000	\$390,000	\$22,000	\$242,000
Service Strategy 13 - Route 9 Intercity Evening and Weekend Improvements	1			1,800	14,000	\$271,000	\$15,000	\$143,000
Service Strategy 14 - North Network Service Restructuring + Evening & Weekend Improvements		4		8,300	42,000	\$1,231,000	\$46,000	\$663,000
Service Strategies - Year Projected Total:								
	10	4	0	20,000	143,000	\$2,985,000	\$157,000	\$1,625,000
Recommended Priorities for Year 5								
Service Strategy 15 - Nanoose Bay Service Restructuring and On-Demand Transit			2	2,800	14,000	\$379,000	\$18,000	\$207,000
Service Strategy 16 - Errington & Coombs On-Demand Transit (Pending Elec. Area F Participation)			1	2,000	10,000	\$290,000	\$11,000	\$155,000
Service Strategy 17 - Service Optimization & Schedule Reliability	1			3,300	7,000	\$477,000	\$8,000	\$260,000
Service Strategies - Year Projected Total:								
	1	0	3	8,100	31,000	\$1,146,000	\$37,000	\$622,000

Notes:

* Estimated costs shown are high level and based on initial expansion estimates provided for Years 1 -2 by BC Transit's expansion process. Actual costs may vary depending on year of implementation and finalization of operating details at that time. Costs estimates shown take into account direct requirements like operator staffing and lease fees, but not additional support staff (dispatch, supervisors, etc.) that may be required over time.

** Vehicle requirements shown include spares, including additional spares recommended for the RDN fleet by BC Transit and which are not specifically tied to the Service Strategy needs. Vehicles shown also reflect right-sizing and reallocation of vehicle types between routes. Actual vehicle requirements may vary at time of implementation based on system fleet standards. All vehicles shown would be accessible; "Heavy Duty" = standard-size 12.5m (40 ft) CNG bus, "Medium Duty" = 9.14m (30 ft) CNG bus, "Light Duty" = 6.73 - 8.08m (Approx. 22-24 ft) small bus or accessible van.

FIGURE 13 PROPOSED TRANSIT INFRASTRUCTURE IMPROVEMENTS



7.0 CAPITAL AND INFRASTRUCTURE DETAILS

Complementing the system-wide changes to service proposed in **Section 6.2**, several infrastructure improvements are proposed to support the elements of the Transit Redevelopment Strategy as it develops.

The map in **Figure 13** illustrates the system-wide infrastructure improvements needed to implement the service strategies identified. This section provides further detail on the improvements by corridor and by type, with further details provided in **Appendix E**.

It is acknowledged that the most critical infrastructure need in the RDN transit system at this time is expanded Operations & Maintenance Facility capacity. This plan does not go into details about this requirement because planning work for this, led by BC Transit and the RDN, has been initiated. Any future service expansion is contingent on ensuring sufficient facility capacity.

The improvements outlined in this section could take several years to complete. However, the TRS outlines how some of them can be undertaken over the five-year span of this plan, with near-term opportunities identified from Year 1 to Year 3 and medium- to long-term ones identified from Year 3 to Year 5 and beyond.

In laying out these infrastructure priorities, it is understood that workplans, priorities and available funding play key roles in their execution and therefore the actual year they would be completed could vary. It is important to note here, that

the improvements are prioritized in the order of implementation of the service strategies discussed in the Section 6.2 and changes to the order could impact the implementation of the service strategies.

In addition to funding, multi-agency partnerships or agreements are one of the most effective ways of ensuring that the recommendations in this report are implemented. The RDN collaborates with several different municipalities in the region, as well as with BC Transit and the Ministry of Transportation & Infrastructure (MoTI). Each of these agencies has jurisdiction over different parts of the road network and the overall transportation network that impact the transit system.

It is hoped that the recommendations provided in the section provide a strong framework for future partnerships that the RDN can build on, to develop this system, not just over the next five years but over the longer term as well.

The investments discussed in the next few pages are important not just for the development of the transit system but also to improve its reliability and to facilitate mode shift and reduce emissions. If the RDN is to achieve its transit mode share target of 5% by 2039 then transit needs to be competitive with car travel times. Transit signal priority measures, queue jump lanes and/or dedicated transit lanes would help speed up buses and make them a more reliable and attractive travel option.

7.1 The Rapid Transit Corridor

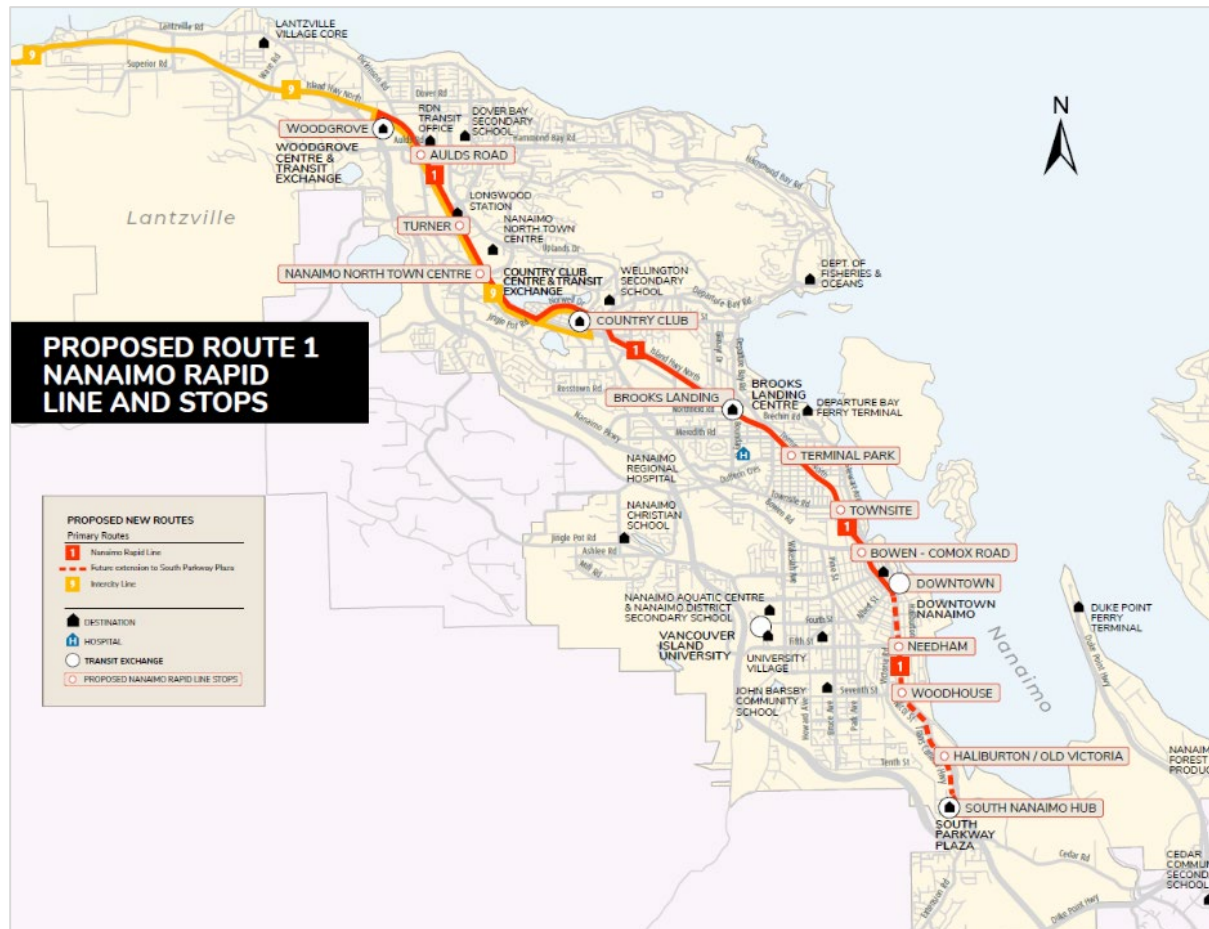


FIGURE 14 PROPOSED ROUTE 1 NANAIMO RAPID LINE AND ITS SUPPORTING INFRASTRUCTURE

The Rapid Transit Corridor as defined in the TRS and the RDN Transit Future Plan, operates along Island Highway (or Highway 19 A) and Highway 1. The corridor starts at Woodgrove Center in the north and ends at the Downtown Nanaimo Exchange in Phase 1 (projected for Year 2) and extends to an enhanced South Nanaimo Transit Hub at South Parkway Plaza in Phase 2 (projected for Year 3). There are approximately fourteen bus stop pairs along the corridor, some of which are existing, while others are proposed.

The 1 Nanaimo Rapid Line as proposed will evolve into the central spine of the system with major destinations along its length, served by high frequency transit service. **For this reason, it is important that infrastructure improvements identified for this corridor are prioritized as TRS recommendations get underway.**

MoTI and the City of Nanaimo (the stretch between Terminal Avenue/Waddington Road and Terminal Avenue/Comox Road) have jurisdiction in this corridor.

Station/stop pairs are proposed at major origins/destinations or at major intersections in the corridor. While many of the Route 1 stops are located directly on the corridor, some of the major station/stop locations like at Woodgrove Centre and Country Club Mall are proposed at locations off the corridor and adjacent to it.

At Woodgrove Centre, the northern most stop and terminus point in the corridor, the assumption is that the Route 1 will drop-off and pick-up at Mary Ellen Drive as well as at the existing exchange in the near-term. In the longer-term, the proposed new exchange location should consider proximity to the Island Highway and convenient transfers between other routes in the system to ensure optimal speed and connectivity of the Route 1.

At Country Club Mall, the Route 1 stop is currently (in the near-term) proposed at the existing exchange on Norwell Drive. However, in the longer-term it is recommended that the exchange activity be moved adjacent to Island Highway. This will improve the speed of not just Route 1, but also, all other routes serving Country Club Exchange. It is to be noted here that the success of the Route 1 depends on seamless transfer activity from other Frequent and Neighbourhood routes also serving this major hub and it is crucial to ensure the ease of connection

that exists currently, continues in the longer-term as well, if the Route 1 stop is moved to Island Highway.

The last southern terminus at **South Parkway Plaza** is a temporary location until a permanent stop is established, possibly in the yet-to-be-developed, 200-plus acre master planned community at Sandstone.

Brooks Landing is a new stop on the corridor that is likely to become a significant connection point between the routes 12, 1 and 3. This location also has been identified as challenging for transit from the point of view of signal timing and the ability to easily turn in and out from the intersection. Future upgrades are highly recommended at this intersection and have been described in detail in **Appendix E**.

The stops on Island Highway at **Aulds Road, Turner Road and Rutherford Road** (North Nanaimo Town Centre stop) all have the potential for queue jumps in the future. In the near-term far side and nearside stops are proposed.

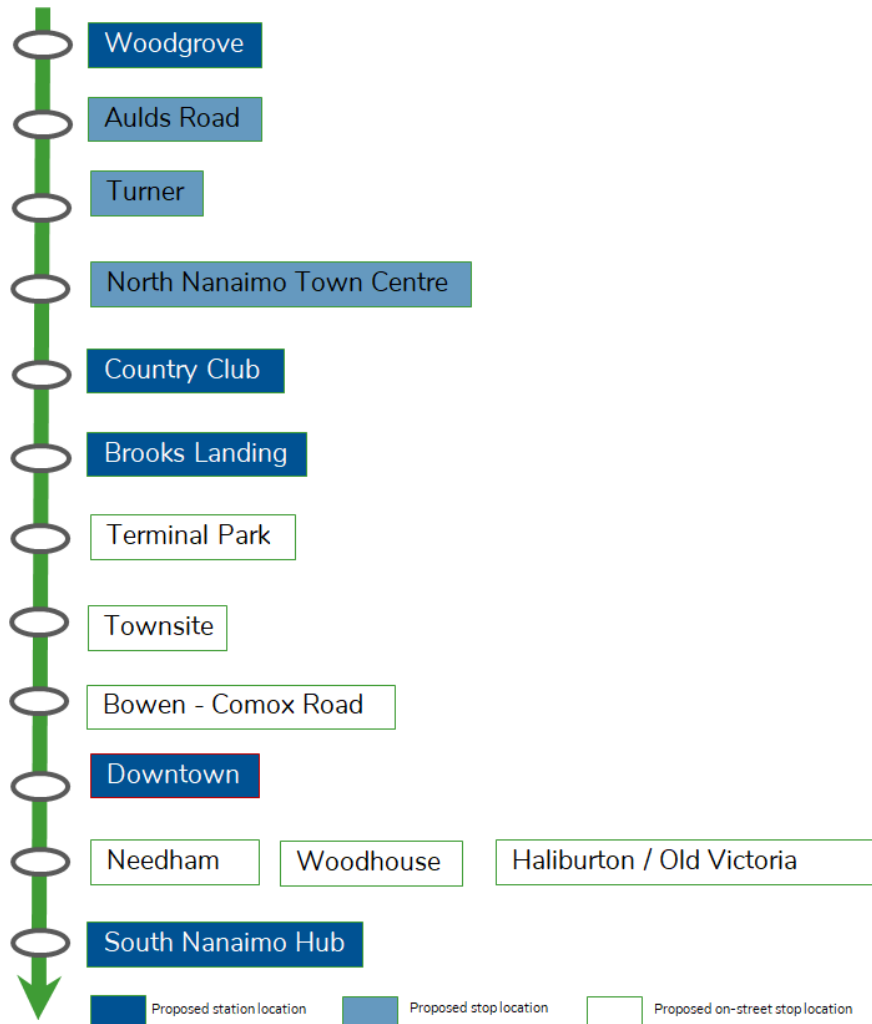


FIGURE 15 PROPOSED STATION AND STOP LOCATIONS

TABLE 9 SUMMARY OF STATION HIGHLIGHTS

Station Pair	Stop Pair	On-Street Stop Pair
<ul style="list-style-type: none"> • Woodgrove Centre • County Club Centre • Downtown Nanaimo • South Nanaimo Hub 	<ul style="list-style-type: none"> • Aulds Road • Turner Road • North Nanaimo Town Centre 	<ul style="list-style-type: none"> • Terminal Park • Townsite • Comox Road • Needham Street • Woodhouse Street • Haliburton Street / Old Victoria Road
<p>Station Pair Highlights:</p> <ul style="list-style-type: none"> • Major stops and transfer points on the corridor • Served by multiple routes • Characterized by larger “RapidBus Style” T5 shelters, signage, lighting, Next Bus signage and any other amenities to improve customer waiting experience 		
<p>Stop Pair Highlights:</p> <ul style="list-style-type: none"> • Minor stops and transfer points on the corridor • Served by a few different routes • Regular sized T4 shelters, signage, lighting, Next Bus signage 		
<p>On-Street Stop Pair Highlights:</p> <ul style="list-style-type: none"> • Minor stops and transfer points on the corridor • Served by one or two routes • Limited space for amenities: smallest T3 shelter suggested, if it is possible to fit a shelter, signage, lighting. 		

In addition to stations and stops along the corridor, traffic signal improvements are suggested at several locations in the corridor based on a technical VISSIM modelling exercise undertaken as part of this study. Table 10 provides details about these suggested improvements.

TABLE 10 SUMMARY OF PROPOSED ROUTE 1 RTN CORRIDOR INFRASTRUCTURE IMPROVEMENTS

Improvement Name	Description
Immediate Term to Support Immediate Network Route Restructuring (Year 1)	
Woodgrove Centre	<ul style="list-style-type: none"> • Routing changed to move NB segments to Island Highway with access to Woodgrove Mall via Island Highway and Mary Ellen Drive. Need stops on Mary Ellen Drive to accommodate passenger boarding and off-loading activity and connections to other North RDN routes (9 and 31) • SB routing through mall, serving existing exchange and turning right on to Island Highway from internal mall road • NB and SB stops on Mary Ellen Drive with space for layover. • Improved bus stop amenities for the Route 1, includes signage, lighting, Next Bus sign and T5 Bus Shelter for both NB and SB travel
Along the corridor	<ul style="list-style-type: none"> • Start removing route 50 signage from intermediate stops between main stops
Immediate Term to Support Immediate Network Route Restructuring (Year 2)	
Woodgrove Centre	<ul style="list-style-type: none"> • Roundabout at Mary Ellen Drive • Exchange relocation plans for Woodgrove Centre, ideally closer to Island Highway • Doubling up of amenities: signage, Next Bus sign and shelter at both stops • Layover on east curb of Mary Ellen Drive after drop-off on west curb

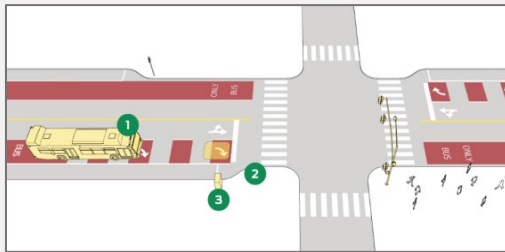
Improvement Name	Description
Country Club Exchange	<ul style="list-style-type: none"> Improved bus stop amenities for the Route 1, includes signage for both NB and SB travel NB stop at north curb of Norwell Drive between Departure Bay Road and Barons Road SB stop at south curb of Norwell Drive between Barons Road and Departure Bay Road Both stops lengthened to accommodate two buses by painting curb
Downtown Exchange	<ul style="list-style-type: none"> Improved bus stop amenities for the Route 1, includes signage, lighting, Next Bus sign and T5 Bus Shelter for both NB and SB travel at existing exchange Create new on-street SB stop at Commercial St. and Terminal Ave, only stop sign, lighting, exact location TBD
New stops along Route 1 corridor	<ul style="list-style-type: none"> Establish on-street stops at Brooks Landing, SB, and NB
Along Highway 1	<ul style="list-style-type: none"> Transit signal priority measures implemented as feasible
Medium Term to Support Immediate Network Route Restructuring	
New stops along Route 1 corridor	<ul style="list-style-type: none"> Establish on-street stops at Aulds Rd and Island Highway, Turner Rd and Island Highway, Rutherford Rd and Island Highway (pad, crosswalk, striping, painting red lane)
	<ul style="list-style-type: none"> New signage at Terminal Park Mall, amenities to include T3 shelter, Next Bus sign
	<ul style="list-style-type: none"> New signage at Terminal and Townsite, amenities to include T3 shelter, Next Bus sign
	<ul style="list-style-type: none"> New signage at Terminal-Comox Rd, amenities to include T3 shelter, Next Bus sign
	<ul style="list-style-type: none"> New stops at Island Highway and Needham, Woodhouse and Haliburton, only bus stop sign

Improvement Name	Description
South Parkway Plaza	<ul style="list-style-type: none"> • SB and NB stop on west curb of Lawlor Road to enable buses to access stop via Twelfth and Lawlor and leave via Tenth and Lawlor, additional bus capacity at this location is needed for Route 1 extension to South Nanaimo • New signage, T5 Shelter, Next Bus sign • Layover location on west curb of Lawlor Road and restroom access agreement
Medium Term to Support Immediate Network Route Restructuring (Year 4)	
Downtown Exchange	<ul style="list-style-type: none"> • Establish NB and SB on-street stops at Commercial Street and Terminal Ave • Route 1 routing through Downtown changes to continue • Potentially implement revised downtown Exchange (depending on City of Nanaimo timing)
	<ul style="list-style-type: none"> • All stops along highway now commissioned and open • Transit Signal Priority functioning (ideal condition)

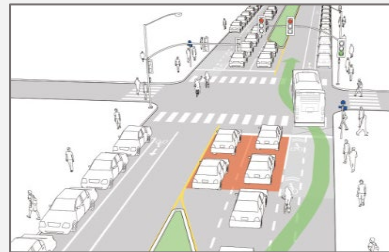
7.2 Transit Priority Measures

Transit priority measures ensure the timely and efficient use of transit resources. In cases where increased ridership and congestion are causing delays or inconsistent schedule adherence, these measures can have a sizable impact on transit system operating costs and customer experience.

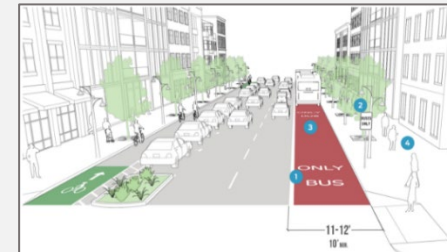
For the TRS, the project team undertook a traffic signal modeling exercise using VISSIM software to determine congestion points along the future 1 Nanaimo Rapid Line corridor and to recommend mitigating measures based on this analysis. The analysis identified that at some signals the delay to both transit and other traffic was equal, while at other transit vehicles were more impacted by signal timing. The results of the analysis are described in more detail in **Appendix E**. A summary of the general recommendations for the RDN system are presented below, while intersection-specific ones can be found in **Appendix E**.



Traffic Signal Priority – On board bus transmitters and traffic signal equipment that provides the ability for transit vehicles approaching intersections to lengthen green lights or shorten red lights to enable them to pass through intersections in a more-timely way.



Queue Jump Lanes – Short lanes leading up to intersections and complementing transit-signals which enable transit vehicles to by-pass areas of congestion leading up to intersections.



Bus Lanes – Separate transit vehicle right-of-way that may also be time-based or shared with High Occupancy Vehicle (HOV) lanes.

FIGURE 16 EXAMPLES OF TRANSIT PRIORITY MEASURES

Similar detailed modelling work is now underway for the Bowen Road corridor and other key Frequent Line intersections within the City of Nanaimo and the results of this work are planned to be compiled in a separate follow up technical memo complementing the TRS.

In the near term, transit priority measures for the RDN should focus on supporting transit in the Rapid Line corridor as suggested in Table 10.

Transit priority should include a combination of treatments and opportunities

As transit evolves within the RDN, in addition to the measures suggested above, other comprehensive upgrades to the signalization systems should be considered. They should also be considered in relation to the implementation of new transit exchanges/Park & Rides and adjacent intersection signals, and over the longer term in conjunction with the evolution of the transit system. These recommendations are described as follows below and on the next page:

Traffic Management and Signalization Recommendations

- **Enter into a Mutual Aid agreement between MoTI and the City of Nanaimo** (and other entities as needed). Such an agreement helps to:
 - Codify existing relationships
 - Explore joint maintenance opportunities
 - Coordinate funding opportunities
 - Create shared vision/plan for signal changes
- **Implement a Central Management System for traffic signals/ITS infrastructure** and develop plan to add intersections to the system, including:
 - Controller upgrades
 - Communication backbone
 - Using existing infrastructure if available
- **Look for minor intersection improvement opportunities**, focusing on critical intersections:
 - Add Transit Signal Priority (TSP) sensors and other related Intelligent Transit System (ITS) infrastructure
 - Add advanced loops during paving or if there is available budget
 - Controller upgrades

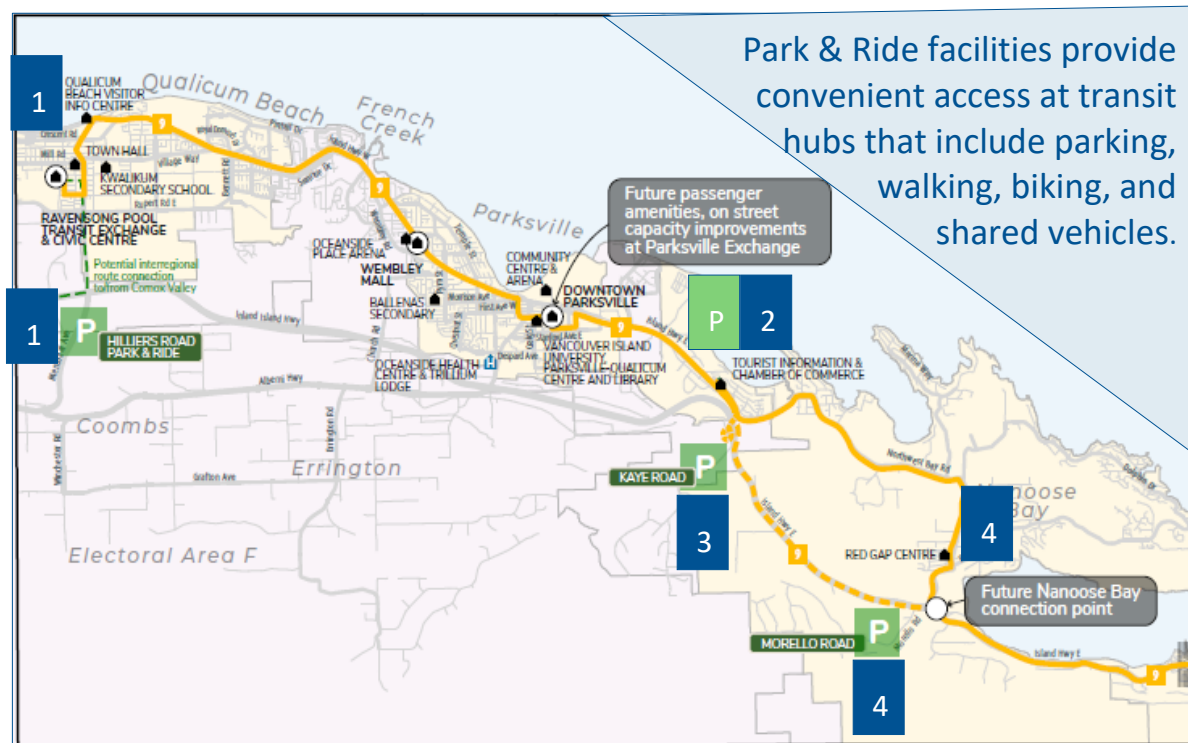
Traffic Management and Signalization Recommendations, Continued

- **Plan for major intersection improvements along the Rapid as well as select Frequent Line Corridors:**
 - Prioritize removal of split phasing
 - Work with MoTI to develop terms
 - General traffic signal upgrades (controllers, communications, etc.)
 - Provide queue jump lanes
 - Explore opportunities to convert signalized intersections into roundabouts, including multilane intersections
- **Increase in-house capacity for the traffic signal system**
 - Hire dedicated signal engineer/staff for on-going maintenance
 - Explore sharing with other entities if cost prohibitive
 - Develop plan for reoccurring corridor updates (every 2-4 years) to adjust signal timing
 - Develop standards for time/density features and implement
 - Feature exists and can significantly increase efficiency
 - Consider creating a new timing sheet or abandoning STS and instead using the controller database printout
 - Utilize ATSPM/detector data streams to test efficacy of timing plans and determine improvements

7.3 Park & Rides

Park & Ride facilities provide people using public transportation with a parking location, drop-off point, or transfer point. A prototypical trip involving Park & Ride begins with the customer leaving his or her origin, driving to the Park & Ride facility, parking, riding public transportation, alighting, and walking to his or her destination. Park & Rides are particularly useful in suburban areas with low density as they make available a convenient connection to the transit system by overcoming the distance barrier.

In the RDN system, the ability to connect to transit could be significantly enhanced by strategically placed Park & Rides in the suburban



communities (Cedar, Cinnabar, Qualicum Beach, Parksville, Electoral Area G and Nanoose Bay) where transit is not easily or conveniently accessible by walking or biking.

This section identifies potential Park & Ride locations for both near- and long-term. Existing easily accessible locations within communities are identified, as well as remnant parcels available within MoTI ROW that could support longer term future express services. Wherever possible, Park & Rides should be located adjacent to or part of other key destinations (grocery store, recreation centre, café, community hub) to make use of them more feasible by accomplishing multiple tasks with the same visit and to encourage safety by providing “eyes on the street” and activity around them.

FIGURE 13 NORTH RDN MAP SHOWING POTENTIAL LOCATIONS FOR PARK & RIDES

Park & Rides may also be established through partnership with other existing uses rather than purpose built, such as an agreement with a shopping centre or recreation centre to set aside a specified number of spaces for Park & Ride use and denoting these with signage.

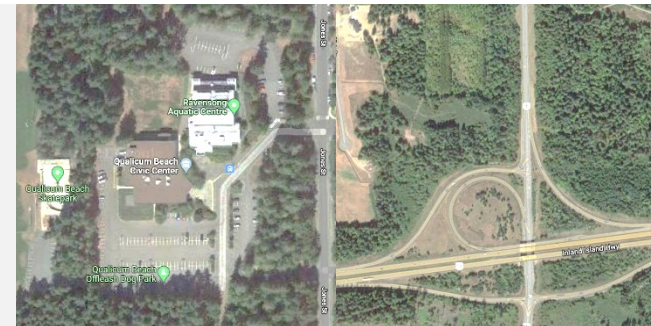
1 Qualicum Beach

Two Park & Ride locations are suggested for Qualicum Beach.

In the near-term the existing Park & Ride at Ravensong Aquatic Centre (1A) would continue to be used.

In the long-term, a remnant parcel (1B) of MoTI land at the intersection of Highway 19 and Highway 4 would be ideal for an additional Park & Ride location. This will facilitate:

- 1) Connections with a proposed interregional connection with Comox Valley Regional District
- 2) Connections with a potential future longer term express version of route 9 that could travel on Highway 19 connecting communities.



1A

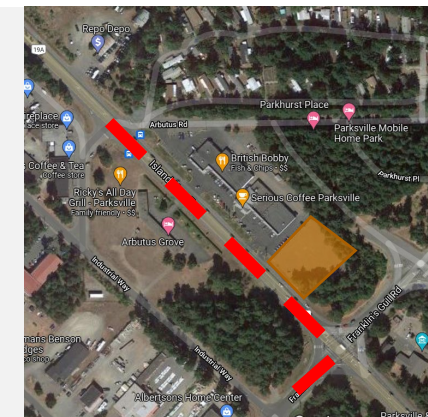
1B

2 Parksville

Two Park & Ride locations are suggested for Parksville.

In the near-term if it is possible to sign an agreement to use the parking lot adjacent to the Serious Coffee (Island Highway at Franklin's Gull Road) as a Park & Ride, this would be an ideal location to access the Route 9 from some of the areas further out in Parksville as well as from Nanoose Bay.

The location has adequate space for a totally separated transit function (shown in yellow) and an existing stop on Island Highway for easy access to the route 9.



3 Parksville

A second Park & Ride location suggested for Parksville:

In the long-term, a remnant parcel of MoTI land at the Highway 19 and **Kaye Road** interchange will support both, Nanoose Bay and Parksville as well as residents in Electoral Area F.



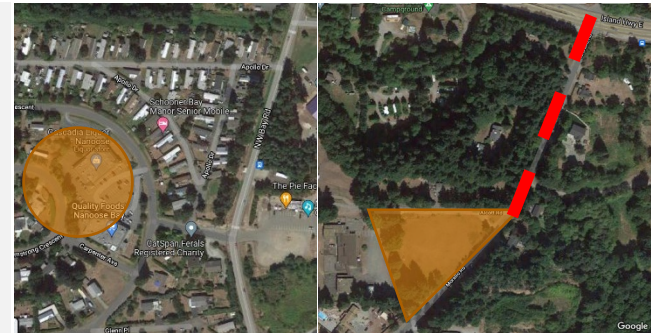
4 Nanoose Bay

Two Park & Ride locations are suggested for Nanoose Bay.

In the near term, The Red Gap Centre, the neighbouring elementary School and the Nanoose Place Community Centre could be ideal locations.

In the medium term, a parcel at the intersection of Morello Road and Alcott Road (shown in yellow) is suggested for a Park & Ride in the Nanoose Bay area.

In both cases, transfers with the Route 9 will occur on Island Highway.

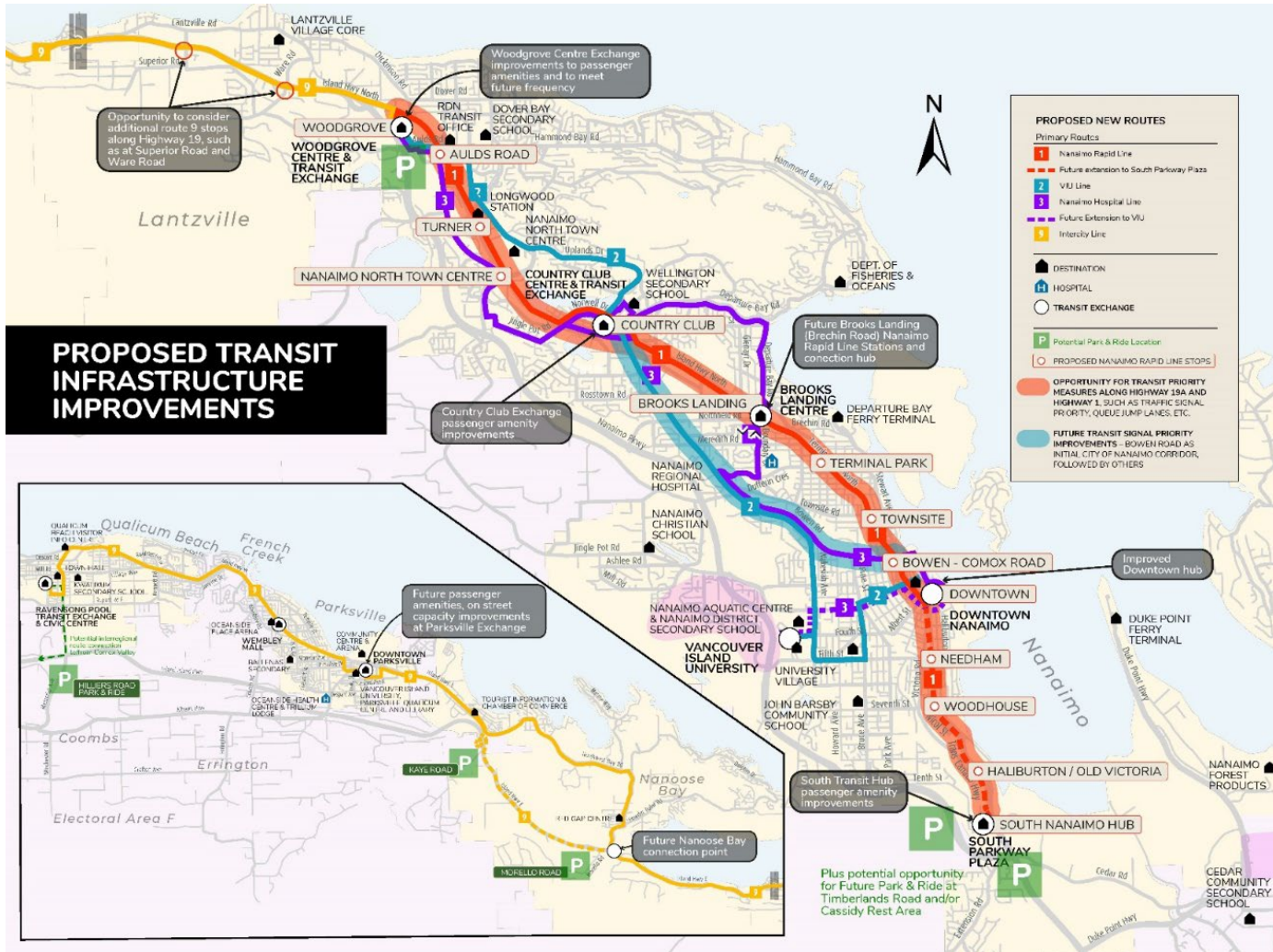


The longer-term Park & Ride locations specific to the North RDN routes will support the growth of a future express version of Route 9 that could primarily use the highway and serve these northern communities at these Park & Ride locations, thereby speeding it up.

Two potential locations could connect the southern RDN better as well. These are:

- **The Cassidy Airport:** this would be an ideal location for connecting to the interregional connection to Cowichan Valley
- **The South Transit Hub:** would be another ideal location for a Park & Ride to enable commuters to connect to the Route 1.

7.4 Transit Exchanges



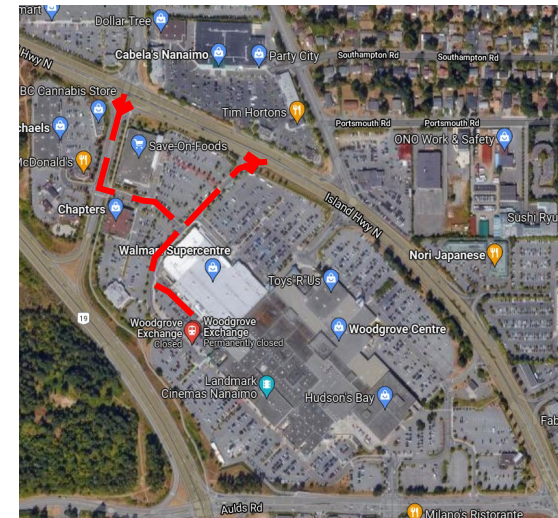
There are currently six exchanges that are part of the transit network. While the TRS does not add more exchanges to the proposed revised network, it recommends upgrades to most of these existing exchanges to ensure smooth transfer activity between routes, enhanced passenger amenities and improved operations of the routes (layovers, driver facilities etc.).

1 Woodgrove Exchange

The RDN is planning a new location for the exchange at Woodgrove Centre.

In the near-term to accommodate the evolution of the route 50 into the 1 Nanaimo Rapid Line, it is recommended that the route use Mary Ellen Drive for drop-off and pick-ups at Woodgrove Exchange. Connections with routes coming in from the north (routes 9, 31 etc.) would also occur here. Also, in the near-term, it is anticipated that the Route 1 will serve the existing exchange to enable connections with other routes (routes 2 and 3 specifically)

In the long-term, a new exchange with improved transit vehicle capacity, passenger amenities, located to enable quick and easy connections between the Regional, Rapid and Frequent Lines is recommended.



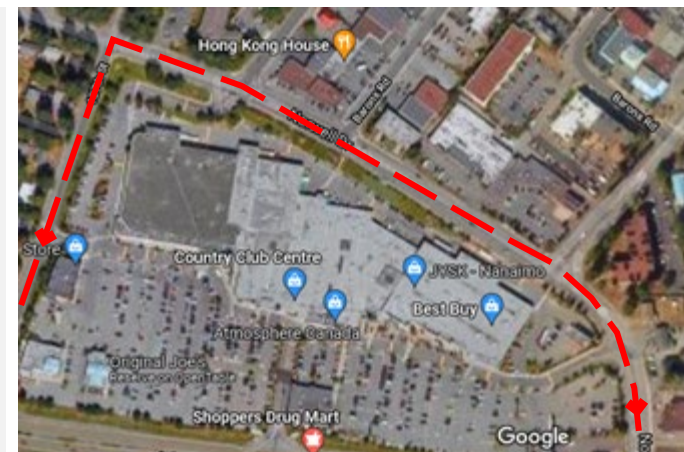
2 Country Club Exchange

The City of Nanaimo in coordination with the RDN is planning upgrades to the exchange at Country Club.

In the near-term it is recommended that two roundabouts at Ross Road and Departure Bay Road/Norwell Drive be explored to see if that configuration could provide more efficient access to the exchange.

It is also recommended that improved passenger amenities and waiting area be created for north- and southbound buses on Norwell Drive.

In the longer-term, it is recommended that opportunities to bring the exchange out to Island Highway be explored.

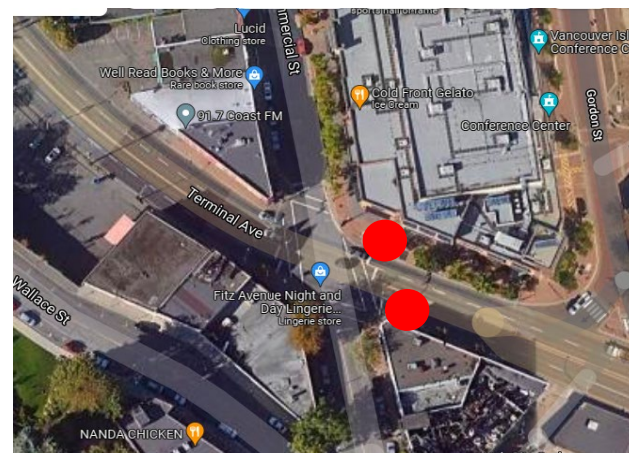


3 Downtown Exchange

A revised location for the Downtown Exchange is currently being explored by the City of Nanaimo for Terminal Avenue at Commercial Street.

In the near-term it is anticipated that the existing exchange will continue to be used as the route 50 evolves into the 1 Nanaimo Rapid Line. Should the exchange transfer to the new proposed location, it is highly recommended that the 1 Nanaimo Rapid Line use on-street stops at the Terminal / Commercial intersection (shown in red).

In the long-term, the new exchange at this location should be designed to accommodate layover, easy connections between Rapid and Frequent Line routes and enhanced passenger amenities and waiting areas.

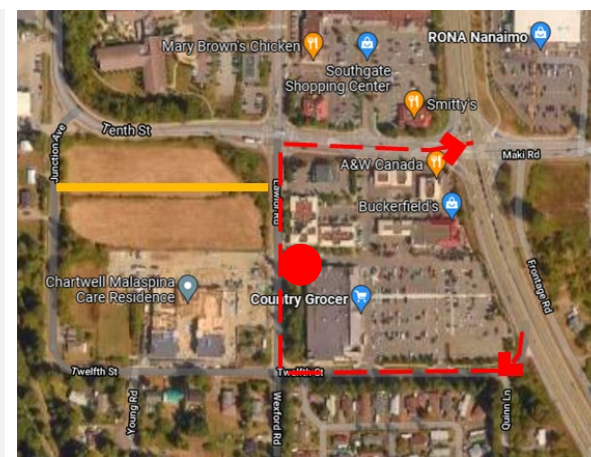


4 South Nanaimo Transit Hub

The South Nanaimo Transit Hub is proposed to evolve from the existing stop location at Tenth Street and Lawlor Road.

In the near-term it is anticipated that this existing stop will continue to be used by the routes in the south RDN. When the 1 Nanaimo Rapid Line extends to the south, additional passenger amenities, waiting space and layover space will be needed at this location. Restroom facilities for the operators will also be needed at end of line. An option to the Tenth and Lawlor location is the use of 11th Street and Junction Avenue (shown in yellow in the adjacent map) when that road is built.

In the long-term, this location could be the permanent location for the South Hub, an alternative is an exchange with Park & Ride facilities in the Sandstone development.



Parksville Exchange

With additional routes proposed in the north RDN portion of the transit network, it is important that the existing exchange in **Parksville**, located at Jensen Avenue between Corfield Street and McCarter Street be expanded to accommodate increased capacity and improved passenger amenities and waiting space.

Brooks Landing, is another location that needs to be mentioned in the context of future infrastructure improvements. Improvements to signalization at this intersection (Departure Bay Road, Brechin Road and Island Highway) have been discussed in **Appendix E**. However, given the potential for the number of routes accessing the stops at this location, this could become an important multi-modal transfer point in the future. Infrastructure improvements to bus stop and stop capacity should be considered at this location whenever MoTI proposes upgrading this intersection.

7.5 Other Infrastructure Improvements

In addition to Park & Rides, transit exchanges, corridor improvements and transit priority measures a few specific intersections need improvements for the proposed changes in the transit network to be implemented. These improvements are discussed in detail in **Appendix E**, however a summary of these locations is provided below:

1) Bowen Road at Buttertubs Drive, Wakesiah Road, Dufferin Crescent

These locations will be transfer points between the two frequent lines, routes 2 and 3. It is important to ensure passenger waiting capacity and amenities are improved at these locations.

2) Departure Bay Road at Hammond Bay Road

This location will be a transfer point between the route 3, 12 and 72, primarily to enable connections to the Departure Bay Ferry terminal. Safe pedestrian crossing, improved passenger waiting, and amenities will be crucial at this location.

3) Northfield Road at Boundary Avenue and Island Highway

At this intersection it is important to ensure safe turn movements of general traffic and transit buses to enable bi-directional travel along these streets, eliminating the need for route 3 to travel southbound on Duggan Road.

8.0 OTHER SUPPORTING MEASURES

Central to the success of any transit system is the provision of effective and convenient transit routes and schedules, as well as sufficient infrastructure and vehicles capacity. The preceding sections of this Strategy have articulated how these components of RDN Transit service can evolve moving forward. However, for the system to achieve longer term, comprehensive success and the goals of the Transit Future Plan, supporting measures related to policy, technology, customer information, marketing and fares also need to be aligned with the long-term strategy. These are presented below as opportunities so that they are captured here and may be considered by the RDN as part of future initiatives.

Performance Monitoring

The implementation of the TRS strategies will be a continuation of the expansion efforts initiated by the completion of the RDN Transit Future Plan. Service implementations cause change and that is never easy on transit users, no matter how beneficial. For this reason, RDN Transit staff and BC Transit should continue to closely monitor the service performance of the system and obtain public input on an ongoing basis. Some of the public input will involve requests for service. Some requests may be minor and may be accommodated while others more complex and could involve additional costs. Proper responses to requests for service will need to be transparent and reflect the transit service standards defined for the RDN Transit System.

Monitoring the Implementation of Restructured Service

The following describes key sources of information and processes that could be used to monitor the success of the implementation of restructured service, as well as act as needed:

- During the implementation period for each new phase of restructuring, creation of a master Issues and Concerns spreadsheet to keep track of all issues arising by route, type (customer information, scheduling, operational, etc.), risk level, proposed solution and any actions taken, as well as items that should be carried forward for consideration in the next phase.
- Customer comments received through the transit phone information line and BC Transit and RDN websites.
- Service comment sheets available for completion by transit operators and other front line staff.
- Existing data sources: Automated Passenger Counter system ridership and schedule adherence information; farebox revenues.

These materials will be used to gauge the success of the service change and determine immediate and longer-term actions necessary to support its success.

Technology

Millennials are by far the most transit-supportive population in decades, environmentally conscious and more technology savvy. Retaining and building on this youth market as they grow older will be key, particularly by continuing to improve the use of technology in transit in addition to service improvements.

Technology is now an integral part of a transit system from scheduling software to dispatch to passenger counts. But transit technology is evolving at a fast pace and lends itself to not just advancements in the operations of a system but also helps improve public perception of transit.

With the adoption of SmartBus and NextBus technology in its fleet, BC Transit and the RDN have modernized the RDN transit system. The next set of advancements coming to the RDN system that will also support this new network are:

- Introduction of UMO, the new contactless payment system being introduced in 30 systems across BC, including the RDN.
- Upgraded fareboxes to support the implementation of UMO.
- Introduction of electric vehicles as part of new fleet that are ordered for the RDN.
- Upgrades to the Scheduling software to easily facilitate the upcoming complex series of service changes support optimizing driver shift work as well as to better enable RDN staff to optimize vehicle and operator assignments, specifically this would involve upgrading HASTUS with the full suite of options.

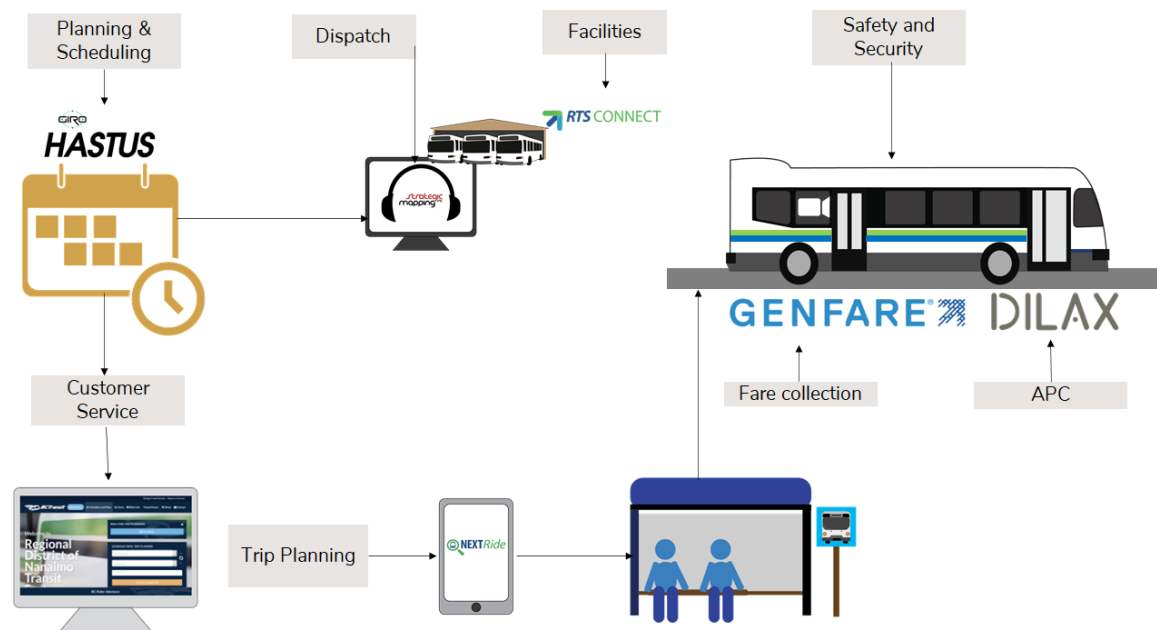


FIGURE 18 USE OF TECHNOLOGY IN TRANSIT

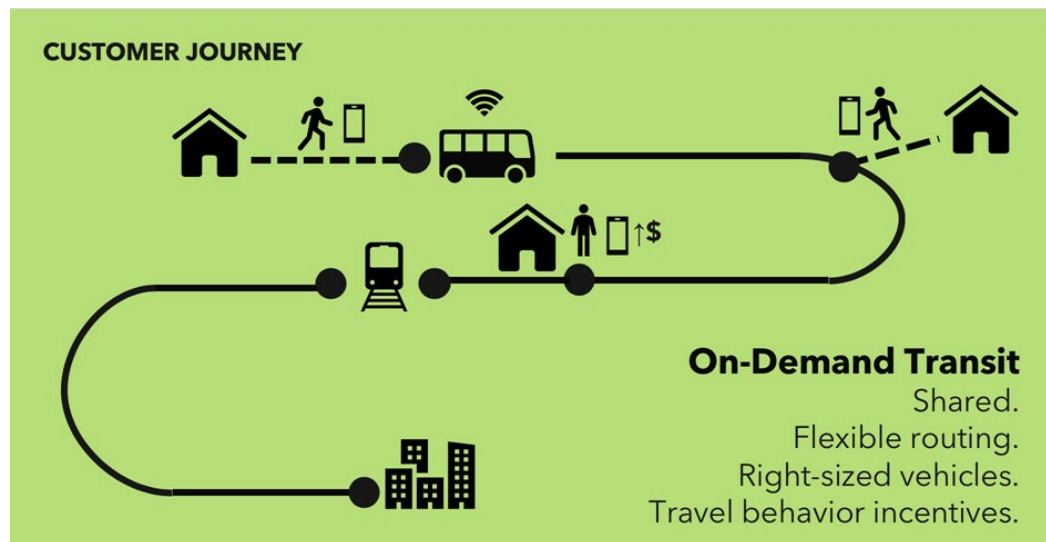
Digital On-Demand Transit

Digital On-Demand Transit (DODT) has gained popularity in the past few years, across the world. Agencies are using this technology in combination with existing fixed route to expand their network and improve customer experience. DODT is yet to be adopted by BC Transit and the RDN.

On-Demand is an IT-enabled private multi-passenger transportation services that serve passengers using dynamically generated routes and may expect passengers to make their way to and from common pick-up or drop-off points.

BC Transit is currently in the process of conducting a feasibility study to determine the applicability of On-Demand technology in BC Transit systems and evaluating the impacts of the adoption of this technology on various areas of its business: fleet, technology, customer perception and Local Government partner agreements.

The RDN transit network could increase its catchment area substantially by adopting On-Demand transit, especially in the lower density, dispersed land use areas like Deep Bay, Qualicum Beach, Parksville, Nanoose Bay and Lantzville and some of the outlying sections of electoral areas (Areas A, F, G, etc.). The TRS has proposed DODT for a few of these areas as part of network improvements.



What is Digital On-Demand Transit?

IT-enabled private multi-passenger transportation services, such as that serve passengers using dynamically generated routes, and may expect passengers to make their way to and from common pick-up or drop-off points. Vehicles can range from large SUVs to vans to shuttle buses.

- No fixed route, shared rides, book trips on an app, dynamic routing
- Uses smaller vehicles (vans/shuttles)
- Trips tend to be short (10/15 minutes)
- Most applicable in low density areas
- Most effective when connecting to an existing transit system (Bus, BRT, rail)

Other Recommended Supporting Activities

Focus on Developing the Primary network: For the recommendations of the TRS to be successfully implemented the development of the primary network is key. The focus of these next steps is improving the frequency and span of the route 1 and then the routes 2 and 3. While service improvements are the primary implementation focus, it is important to simultaneously work on infrastructure improvements, planning, coordination, and engagement. In the case of the primary network these would be the development of station and stops along the Rapid and Frequent Line corridors and community engagement to let people know about the service changes.

Staffing level improvements: Undergoing a major structural transit system change is a complex undertaking at the best of times: if not done thoughtfully and thoroughly, it can present substantial risks to public perception, ridership/revenue and workplace harmony. The implementation of the TRS is a multi-year effort that will need dedicated resources to ensure all the different activities are coordinated not just within the RDN, but also with partner municipalities, BC Transit and MoTI. While it is recommended that a dedicated Implementation Committee of key RDN and partner staff be formed to help oversee this, it is also important that staffing levels at the RDN and/or partner municipalities are commensurate with the effort at hand.

Final outcomes from ReImagine Nanaimo: As the most populated municipality and one of the largest areas within the RDN, future development decisions in Nanaimo will impact regional travel patterns, transit design and ridership. ReImagine Nanaimo, an update to Nanaimo's 2008 Official Community Plan, has been conducted concurrently with the development of the TRS and incorporated into it (and vice versa). As the ReImagine process concludes, it will be important to ensure that the planning processes and recommendations for each continue to align.

Linking land use development plans with transit planning: Targeting population and employment density and building an efficient road network are integral to creating efficient and effective transit. All local and regional land use and transportation plans reviewed for this project support these larger development and road network goals, for example: Sandstone in the City of Nanaimo, the Special Planning Area (SPA) near Ware Road in Lantzville, Parksville's downtown developments, etc. In order to serve these areas effectively, it is imperative that these areas be designed with a road and pedestrian network supportive of transit. Also, wherever possible, future higher-density housing within residential developments should be defined and encouraged on the higher-order transit corridors.

Customer information: The changes recommended in the TRS will be implemented over a period of five years and while the change is incremental, it is never easy for customers. Customer information and system promotion ideas that emerged from the Transit Network Strategy process include:

- Leveraging the Immediate Transit Network Restructuring implementation process to boost the profile of the system in the community and refresh the look and feel of customer information materials.
- Considering other ways that new users may be helped to take transit. In other systems, this has included:
 - Creating a “How to Take Transit” section for new users on the transit system website and in printed materials.
 - More formally setting up a travel training process or role to help orient new users to taking the bus (which can also be done through contract with an outside organization that may already be undertaking similar work with seniors or people with a disability).
 - Outreach to major employers and at special events. Some systems have created a “Transit Ambassador” role that creates a small team of transit operator staff to assist with outreach, while other systems have posted a student work study position.
- Evaluating other technologies to improve customer information and access as they become available.

Branding and Marketing: As a result of the TRS, there are service changes planned for the system that provide branding and marketing opportunities:

- The comprehensive nature of the system changes will necessitate significant updates to all customer information and customer-facing materials, such as route names and numbering, system maps and schedules, bus stop signage, and potentially even the look and feel of some transit vehicles.
- A series of major service and infrastructure implementations provides the opportunity to have more of an ongoing dialogue with customers and the general public, such as through potential further engagement that may accompany implementations, as well as communications about the changes (ads, media releases, social media) and through customer feedback received.
- In particular, the highest order Rapid, Frequent and Regional routes proposed for the system present an opportunity to brand or otherwise highlight those routes and communicate the value that they offer.

Appendix F provides an overview of branding and marketing best practices that have informed the TRS process and recommendations to-date, and which may also be helpful in guiding system implementations, marketing and outreach strategies going forward.

9.0 SUMMARY OF PROPOSED SERVICE AND INFRASTRUCTURE PRIORITIES

The diagrams on the following pages and in the more detailed version presented in **Appendix A** show how the various service strategies and proposed infrastructure initiatives are proposed to be phased and interrelate over the five-year period of this plan to grow service.

In general, the service options follow a suggested sequential order that builds service in a logical progression based on likely market and demand, previously committed funding, or other infrastructure and community development triggers. However, there is some flexibility to move the individual strategies between years to adapt to changes in community development and funding.




Details for all service strategies are provided in **Section 6.0** while **Section 7.0** describes further detail for the infrastructure and technology improvements.

Note that the expanded version of this summary presented in Appendix A also includes further details on the key strategic objectives for each year as well as the planning, coordinating and engagement activities that should be undertaken to support implementations in the subsequent year.



REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY – SUMMARY OF PROPOSED STRATEGY PRIORITIES: YEARS 1-2 (PENDING CONFIRMED LOCAL + PROVINCIAL FUNDING)

Each strategy includes associated planning, coordination, and engagement activities that are discussed in detail in **Appendix A**.




Year 1	Year 2
<p> Year's Strategic Objective + Resources</p> <p>Year 1: Rapid Line Preparation –5,000 Annual Service Hours; 4 Heavy Duty Vehicles</p>	<p>Year 2: Phase 1 Rapid Line Implementation & Central RDN Restructuring –20,000 Annual Service Hours; 9 Heavy Duty Vehicles and 6 Medium Duty Vehicles</p>
<p> Recommended Service Strategy Implementations</p> <p>Strategy 1 – Rapid Line Pre-Development – Minor routing adjustments and additional service frequency on the existing route 50 Woodgrove - Downtown to prepare for future evolution of this route into 1 Nanaimo Rapid Line, as well as corresponding schedule adjustments to the 7 Cinnabar to separate its operation from the route 50.</p>	<p>Strategy 2 – Rapid Line Phase 1 Implementation + Central System Restructuring – Introduces the 1 Nanaimo Rapid Line and Frequent routes 2 VIU Line and 3 Nanaimo Hospital Line+ restructure of Central RDN routes</p> <p>Strategy 3 – Route 9 Intercity changes – Renames existing 91 Intercity to route 9 and makes targeted frequency and span improvements</p> <p>Strategy 4 – Lantzville Restructuring + Additional Service – Restructures route 11 to become 31 Lantzville; increases frequency 60 min weekday peaks and Saturday afternoons, 120 min service other times.</p> <p>Strategy 5 – 99 Deep Bay Additional Day of Service - Extends existing Tuesday to Saturday service to Mondays.</p>
<p> Recommended Infrastructure Implementations + Planning</p> <p>Minor stop and signage adjustments for route 50 changes.</p> <p>Operations & Maintenance Facility Master Planning to meet future capacity needs.</p>	<p>1 Nanaimo Rapid Line Phase 1 stops + Implementation of Phase 1 Transit Priority and Signal Improvements + Park & Rides + Planning for future phases.</p>

Looking Ahead Beyond 5 Years

Beyond the service strategies for the Year 1-5 period shown in these summary pages, the full TRS document also outlines improvements for consideration 5+ years from now, including additional service to VIU, new interregional service to the Comox Valley, and the potential extension of on-demand transit to additional areas of the system.

REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY – SUMMARY OF PROPOSED STRATEGY PRIORITIES: YEARS 3-5 (PENDING CONFIRMED LOCAL + PROVINCIAL FUNDING)

Each strategy includes associated planning, coordination, and engagement activities that are discussed in detail in **Appendix A**.

Year 3	Year 4	Year 5
 <p>Year's Strategic Theme + Resources</p> <p>Year 3: Phase 2 Rapid Line Implementation & South RDN Restructuring – 20,000 Annual Service Hours; 8 Heavy Duty Vehicle and 6 Medium Duty Vehicles</p>	<p>Year 4: Evening & Weekend Frequency Improvements + North RDN Restructuring – 20,000 Annual Service Hours; 10 Heavy Duty Vehicles and 4 Medium Duty Vehicles</p>	<p>Year 5: Service Optimization and Extension to New Areas Through Digital On-Demand Transit – 8,100 Annual Service Hours; 1 Heavy Duty Vehicle and 3 Light Duty Vehicles</p>
 <p>Recommended Service Strategy Implementations</p> <p>Strategy 6 – Rapid Line Phase 2 + South Nanaimo Service Restructuring – Extends 1 Nanaimo Rapid Line to the South Transit Hub plus restructures services in south RDN and re-introduces service to Duke Point.</p> <p>Strategy 7 – Rapid & Frequent Line Peak Service Improvements – Adds weekday peak frequency to FTN and RTN routes (15 min frequency) retains select 10 min service on route 2 trips during school-in months.</p> <p>Strategy 8 – Rapid & Frequent Route Midday Service Improvements – Increases frequency of FTN and RTN routes to 20 mins 3 during weekday middays and Saturdays from 10:30am to 6pm.</p> <p>Strategy 9 – Targeted Peak Frequency and Span Improvements – Adds targeted additional frequency to higher ridership local routes and/or increase the span of service for select primary routes.</p>	<p>Strategy 10 & 11 – RTN & FTN routes Evening and weekend Improvements - Extends 20 min service on routes 1, 2 and 3 until 10pm Monday to Saturday. Extends 20 min service on routes 1, 2 and 3 on Sundays and Holidays between noon and 6pm.</p> <p>Strategy 12 & 13 – Route 9 Intercity Improvements – Extends the 30 min frequency service in the weekday morning and afternoon peaks. Extends hourly service to 9pm Monday to Saturday evenings plus all day on Saturdays and on Sundays.</p> <p>Strategy 14 – North Network Service Restructuring + Evening and Sunday Service – Restructures services in the north for improved frequency and directness, service to new areas, PLUS service on Sundays and evenings.</p>	<p>Strategy 15 – Nanoose Bay Service Restructuring and Digital On-Demand Transit – Implements separate 35 Nanoose Bay route to extend on-demand service to unserved areas of Nanoose and streamline 9 Intercity trips to no longer operate via Northwest Bay Road.</p> <p>Strategy 16 – Errington & Coombs Digital On-Demand Transit – Pending Area F participation in the transit function, would extend new on-demand transit service to Errington and Coombs three periods per day Monday to Saturday.</p> <p>Strategy 17 – Service Optimization & Schedule Reliability – Minor service and schedule adjustments as required to further improve system efficiency and effectiveness.</p>
 <p>Recommended Infrastructure Implementations</p> <p>1 Nanaimo Rapid Line Phase 2 stops and enhanced South Transit Hub + Improved Country Club Exchange and nearby road network changes + Phase 2 Transit Priority and Signal Improvements + Park & Rides</p>	<p>Enhanced Downtown Nanaimo Exchange + Expanded Parksville Exchange + Implementation of Phase 3 Transit Priority and Signal Improvements + Park & Rides</p>	<p>Potential Morello Road / Northwest Bay Road connection point + Expanded Woodgrove / Mary Ellen Exchange + Digital On-Demand Transit technology implementation and development of virtual stops as required.</p>

10.0 MOVING FORWARD: NEXT STEPS

The RDN Transit Redevelopment Strategy and its key elements were presented to, and approved by, the RDN Transit Select Committee (TSC) on January 27, 2022. The Strategy was subsequently approved by the RDN Board of Directors on February 8, 2022 as the document that will be used to guide future prioritization and investment in the RDN Transit system, pending annual confirmation of available local and provincial funding.

In addition to endorsing and approving the TRS and its year-by-year service expansion and infrastructure priorities, the RDN Transit Select Committee and RDN Board also approved the following directions to move forward on its recommendations:

- That the first priority of a 5,000 annual hour Transit expansion, identified in the Transit Redevelopment Strategy, be approved (subject to approval of the expansion hours from the Province and BC Transit), and applied to implement "Year 1: Rapid Line Preparation" as outlined in the TRS.
- That the Transit Redevelopment Strategy project report and service standards be approved for distribution to member local governments, area First Nations, and adjacent Regional Districts for their information with a request that it also help inform their future community planning, development, and transportation decision-making.

The next steps in the process will involve translating the additional other recommendations of this Transit Redevelopment Strategy into action. This TRS provides the details on how the transit component of the RDN's multimodal network can be improved to build reliability, efficiency and public confidence in transit and help achieve Regional and municipal GHG reduction and climate change goals.





APPENDIX A
RDN TRS Summary of Proposed Priorities

REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY – SUMMARY OF PROPOSED PRIORITIES: YEARS 1-2 (PENDING CONFIRMED LOCAL + PROVINCIAL FUNDING)

Year 1

Year 2



Year's Strategic Objective + Resources

Year 1: Rapid Line Preparation – Prepare system and infrastructure for the following year's substantial service restructuring.

- 5,000 Annual Service Hours
- 4 Heavy Duty Vehicles

Year 2: Phase 1 Rapid Line Implementation & Central RDN Restructuring – Implements new network structure and schedules, including Phase 1 Nanaimo Rapid Line (Woodgrove to Downtown), more direct routes, refreshed customer information materials, and higher priority frequency and service span improvements.

- 20,000 Annual Service Hours
- 9 Heavy Duty Vehicles, 6 Medium Duty Vehicles



Recommended Service Strategy Implementations

Strategy 1 - Rapid Line Pre-Development - Minor routing adjustments and additional service frequency on the existing route 50 Woodgrove - Downtown to prepare for future evolution of this route into 1 Nanaimo Rapid Line, as well as corresponding schedule adjustments to the 7 Cinnabar to separate its operation from the route 50.

Strategy 2 - Rapid Line Phase 1 Implementation + Central System Restructuring - Restructures central RDN (City of Nanaimo) routes and introduces the 1 Nanaimo Rapid Line and Frequent routes 2 VIU Line and 3 Nanaimo Hospital Line. Service changes include:

- 20 min or better weekday peak commuter frequencies on routes 1, 2 and 3.
- Improved directness and more consistent scheduling for all other central RDN (City of Nanaimo) neighbourhood routes.
- Additional weekday peak period commuter connection between the City's northeast and Hospital, NDSS and VIU.

Strategy 3 – Route 9 Intercity Schedule Adjustments and Targeted Frequency Increases – Renames existing 91 Intercity to route 9 and makes targeted service adjustments to:

- Connect most route 9 trips to 1 Nanaimo Rapid Line services at Woodgrove Centre without the need to physically transfer buses.
- Increase the span of service in early mornings and evenings.
- Make service more consistent throughout day, including on weekdays 30 min at peak, 60 min in middays.

Strategy 4 - Lantzville Restructuring + Additional Service – Restructures and extends Lantzville route to become 31 Lantzville; increases frequency to consistent 60 min service during weekday peaks and Saturday afternoons, 120 min service other times.

Strategy 5 – 99 Deep Bay Additional Day of Service - Extends existing Tuesday to Saturday service to Mondays.



Recommended Planning, Coordination & Engagement Activities

Planning and design for:

- Transit Facility Master Planning to ensure future Operations & Maintenance capacity.
- Phase 1 Nanaimo Rapid Line Stops (Woodgrove to Downtown), with priority for Brooks Landing / Brechin Road, Aulds Road, Turner Road and Downtown Nanaimo (Terminal at Commercial)
- Enhanced Downtown Nanaimo Transit Exchange to create required capacity for future changes.
- Phase 1 Transit Priority & Signal Improvements.

Park & Ride partnership development to support future phases of restructuring.

Public engagement plus refresh of all information materials to support restructured central RDN network implementation.

Planning and design for:

- Phase 2 Nanaimo Rapid Line Stops (Downtown Nanaimo to South Transit Hub)
- South Transit Hub improvements to create capacity for 2024 south network changes.
- Improved Country Club Exchange and nearby intersection/road network changes to streamline service, create capacity for changes.







Recommended Infrastructure Implementations

Minor stop and signage adjustments as required to support route 50 changes.

Implementation of 1 Nanaimo Rapid Line Phase 1 stops + other stop and signage changes to support Central RDN and Lantzville route restructuring.

Implementation of Phase 1 Transit Priority and Signal Improvements + Park & Rides + Planning for future phases.

REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY – SUMMARY OF PROPOSED PRIORITIES: YEARS 3-5 (PENDING CONFIRMED LOCAL + PROVINCIAL FUNDING)

Year 3	Year 4	Year 5
<p> Year's Strategic Theme + Resources</p> <p>Year 3: Phase 2 Rapid Line Implementation & South RDN Restructuring - Extends 1 Nanaimo Rapid Line south from Downtown Nanaimo to South Nanaimo Transit Hub and implements supporting south RDN structure changes and service to Duke Point. Also continues to build system frequency on key routes.</p> <ul style="list-style-type: none"> • 20,000 Annual Service Hours • 8 Heavy Duty Vehicles, 6 Medium Duty Vehicles 	<p>Year 4: Evening & Weekend Frequency Improvements + North RDN Restructuring – Restructuring of North RDN routes serving Qualicum Beach, Parksville and surrounding areas, plus additional service and frequency improvements across the system with a focus on evenings and weekends.</p> <ul style="list-style-type: none"> • 20,000 Annual Service Hours • 10 Heavy Duty Vehicles, 4 Medium Duty Vehicles 	<p>Year 5: Service Optimization and Extension to New Areas Through On Demand Transit – Potentially implementing on demand transit to new areas, plus a “taking stock” year focused on stabilizing and optimizing services implemented in previous years and planning for the next “sprint” of five years.</p> <ul style="list-style-type: none"> • 8,000 Annual Service Hours • 1 Heavy Duty Vehicle, 3 Light Duty Vehicles
<p> Recommended Service Strategy Implementations</p> <p>Strategy 6 - Rapid Line Phase 2 + South Nanaimo Service Restructuring - Extends 1 Nanaimo Rapid Line from Downtown to the South Transit Hub and its connections to Cedar, plus restructures services in south RDN to improve frequency in the Cinnabar, Airport and Cassidy areas and re-introduces service to Duke Point.</p> <p>Strategy 7 - Rapid & Frequent Line Peak Service Improvements - Adds weekday peak frequency to create 15 min service on routes 1 Nanaimo Rapid Line, 2 VIU Line and 3 Hospital Line, while also still retaining select 10 min service on route 2 trips during school-in months.</p> <p>Strategy 8 - Rapid & Frequent Route Midday Service Improvements – Increases frequency of routes 1, 2 and 3 to operate every 20 minutes during weekday middays and Saturdays from 10:30am to 6pm.</p> <p>Strategy 9 - Targeted Peak Frequency and Span Improvements - Creates provision to add targeted additional frequency to higher ridership local routes and/or increase the span of service for select primary routes.</p>	<p>Strategy 10 - Rapid & Frequent Route Evening Improvements - Extends 20 min service on routes 1, 2 and 3 until 10pm Monday to Saturday.</p> <p>Strategy 11 - Rapid & Frequent Route Sunday & Holiday Improvements - Extends 20 min service on routes 1, 2 and 3 on Sundays and Holidays between noon and 6pm. (Service at other times would be 30 min).</p> <p>Strategy 12 - Route 9 Intercity Additional Commuter Improvements - Extends the 30 min frequency service on this route from Qualicum Beach to Parksville and Woodgrove across a larger period in the weekday morning and afternoon peaks.</p> <p>Strategy 13 - Route 9 Intercity Evening and Weekend Improvements - Extends 60 min service to 9pm Monday to Saturday evenings plus all day on Saturdays and on Sundays between 11am and 6pm on this route.</p> <p>Strategy 14 - North Network Service Restructuring + Evening and Sunday Service - Restructures services in the north to create new network, improved frequency and directness, service to new areas, PLUS new service on Sundays and evenings.</p>	<p>Strategy 15 – Nanoose Bay Service Restructuring and Digital On-Demand Transit – Implements separate 35 Nanoose Bay :</p> <ul style="list-style-type: none"> • Extend on-demand service to unserved areas of Nanoose. • Streamline 9 Intercity trips to no longer operate via Northwest Bay Road. (Connections would be at new transfer point in vicinity of Hwy 19 and Morello / Northwest Bay Road. Alternatively, Nanoose Bay route could join with adjusted 31 Lantzville service to operate directly to Woodgrove). <p>Strategy 16 – Errington & Coombs Digital On-Demand Transit – Pending Area F participation in the transit function, would extend new Digital On-Demand transit service to Errington and Coombs three periods per day Monday to Saturday.</p> <p>Strategy 17 – Service Optimization & Schedule Reliability – Minor service and schedule adjustments as required to further improve system efficiency and effectiveness.</p>
<p> Recommended Planning, Coordination & Engagement Activities</p> <p>Public engagement to support restructuring south network implementation.</p> <p>Planning and design for:</p> <ul style="list-style-type: none"> • Enhanced Parksville Transit Exchange to create capacity required for 2025 north network service changes. 	<p>Public engagement to support restructuring north network implementation, potential future approach to Nanoose Bay, Lantzville, Coombs, Errington.</p> <p>Finalizing agreements with BC Transit for On Demand technology implementation.</p> <p>Planning and design for:</p> <ul style="list-style-type: none"> • Potential Morello Road / Northwest Bay Road connection point and terminus • Expanded Woodgrove / Mary Ellen Exchange. 	<p>Public engagement and analysis for next five-year transit plan.</p>
<p> Recommended Infrastructure Implementations</p> <p>Implementation of:</p> <ul style="list-style-type: none"> • 1 Nanaimo Rapid Line Phase 2 stops and enhanced South Transit Hub + other stop / signage changes required for south RDN route restructuring. • Improved Country Club Exchange and nearby road network changes <p>Implementation of Phase 2 Transit Priority and Signal Improvements + Park & Rides</p>	<p>Implementation of:</p> <ul style="list-style-type: none"> • Enhanced Downtown Nanaimo Exchange • Expanded Parksville Exchange + other stop / signage changes required for north RDN route restructuring. <p>Implementation of Phase 3 Transit Priority and Signal Improvements + Park & Rides</p>	<p>Implementation of:</p> <ul style="list-style-type: none"> • Potential Morello Road / Northwest Bay Road connection point • Expanded Woodgrove / Mary Ellen Exchange. <p>Digital On Demand Transit technology implementation and development of virtual stops as required.</p>

APPENDIX B
RDN TRS SERVICE REVIEW AND ANALYSIS
SUMMARY

1.0 EXISTING TRANSIT SYSTEM OVERVIEW

System Basics

The Regional District of Nanaimo (RDN) Transit System began operation in 1969. In 1988, 17 buses provided 47,917 hours of service on 14 routes and carried 921,193 passengers. In 2019/20, the system used 56 buses to provide 130,000 hours of service and carried 3.5 million passengers.

The existing conventional transit system provides fixed-route service in communities in the RDN, the part of Electoral Area E between Nanaimo and Parksville and Electoral Area A (Cedar) and the municipalities of Nanaimo, Parksville, Qualicum Beach, and Lantzville. Funding for the transit system is cost shared between the RDN and BC Transit. Decisions on fares, routes and service levels are made by the RDN Board based on information and planning provided by BC Transit and RDN staff. Transit service is operated by the RDN.

The system consists of nineteen (19) routes, supported by a network of six (6) exchanges and over 800 bus stops. The transit network is focused on downtown Nanaimo, which functions as a hub for both local and regional bus routes. Other hubs in the network include Country Club Centre, Woodgrove Centre and Vancouver Island University. A combination of three different service types are seen in the RDN transit system: Conventional fixed-route service, Community Bus service and handyDART service.

- **Conventional Bus** service is defined as scheduled service to major destinations and residential areas.
- **Community Bus** service is defined as scheduled service for residents in certain areas not served by the fixed-route service.
- **HandyDART** service is defined as door-to-door service for people who cannot use the fixed-route service because of a disability.

In addition to these service types, targeted services (school service or service to the airport/ ferry) and regional service is also included. A listing and classification of routes is provided below.

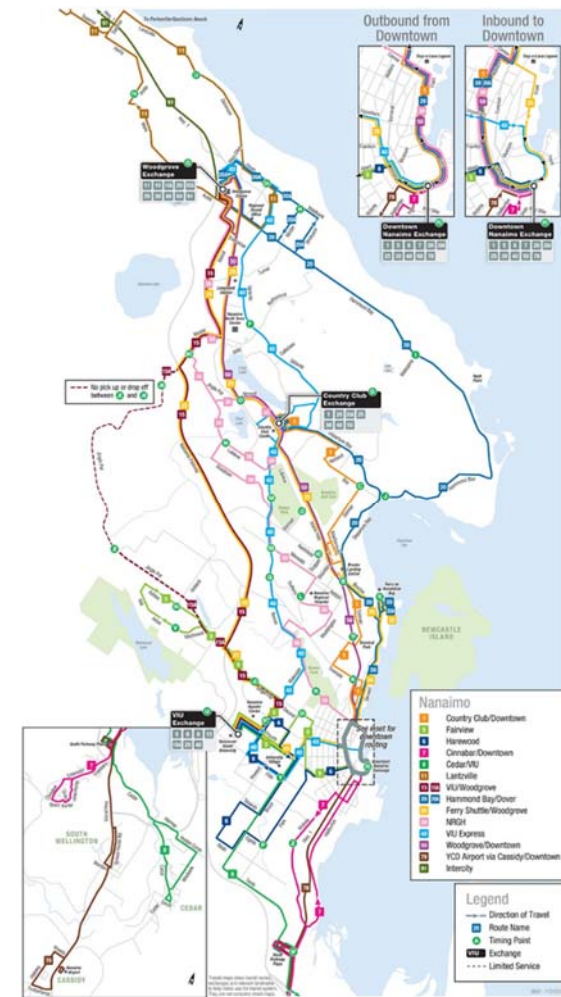


FIGURE 1 MAP OF EXISTING TRANSIT SYSTEM

Historical Trends and Peer Review Analysis

As part of this study, the team undertook a review of system performance, both, in comparison with itself over a period of ten years and in comparison, with peer systems in other parts of Canada. The analysis indicates the RDN system performs above average in the assessment.

Cost recovery

The RDN has set its cost recovery target at 25%, in comparison Annual Operating Agreement (AOA) cost recovery over a ten-year period, ranges from 35% to 40%, indicating that the system has robust cost recovery and that the target could be increased.

Cost per hour

The average cost per hour for the RDN system is \$96.17. The cost per hour for the system has been trending down since 2018. Increased investment in the service and the resulting increase in ridership could be the reason for this decrease in operating costs per service hour. In comparison, similar sized systems in BC have a higher cost/hour, this is discussed further in the peer review section.

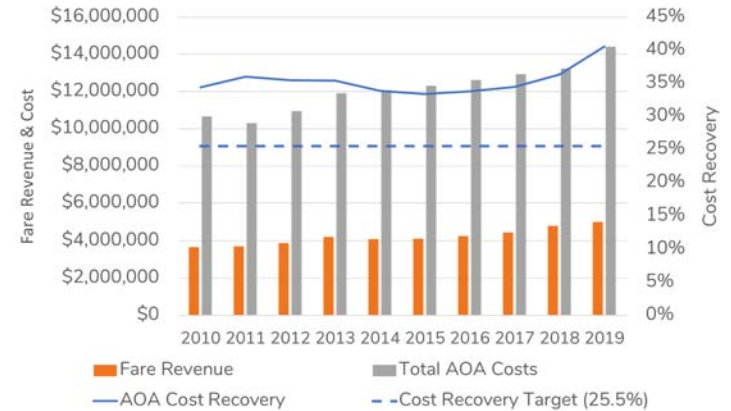


FIGURE 2 REVENUE, COST AND COST RECOVERY

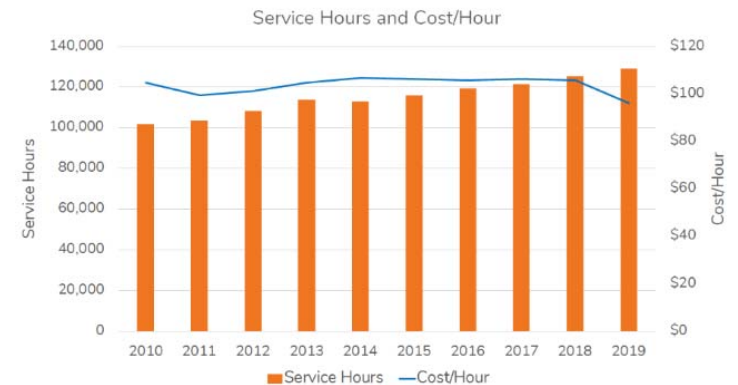


FIGURE 3 SERVICE HOURS AND COST/HOUR

Rides (boardings) per hour

This is one area where the RDN system seems to have not met the system target of 30 rides/ hour and while, performance against this target has been higher in recent years, it remains lower than the target.

Peer Review

Peer systems were determined based on comparable population and system size. Peers were chosen within BC and in provinces across Canada to ensure a comprehensive review. Canadian Urban Transit Association (CUTA) ridership statistics from 2019 was used to complete this comparison. The peers are identified in the table below

TABLE 1 SUMMARY OF PEER REVIEW

	Population	Ridership	Number of Routes	Number of Vehicles
Cowichan Valley, BC	54,631	479,872	14	23
Kamloops, BC	78,969	4,094,111	18	59
Peterborough, ON	81,032	4,588,209	20	56
RDN, BC	114,000*	3,516,300	17	56
Moncton, NB	116,940	2,495,189	20	40
Kingston, ON	122,420	6,939,279	22	79
Barrie, ON	139,424	3,197,444	10	48
Kelowna Regional, BC	146,019	5,939,178	28	88
Central Fraser Valley	156,844	2,932,937	23	45
CUTA Group 4 Average	91,579	2,3258,799	14	43

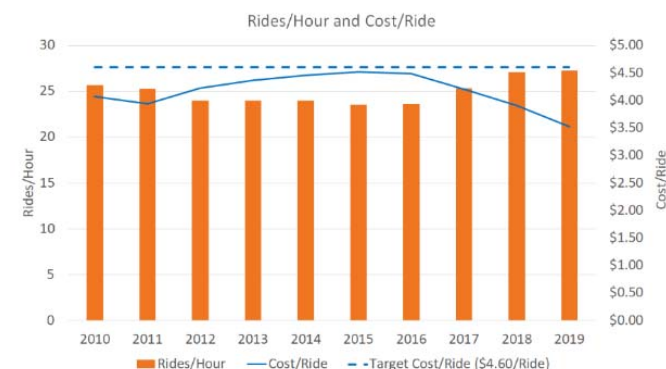
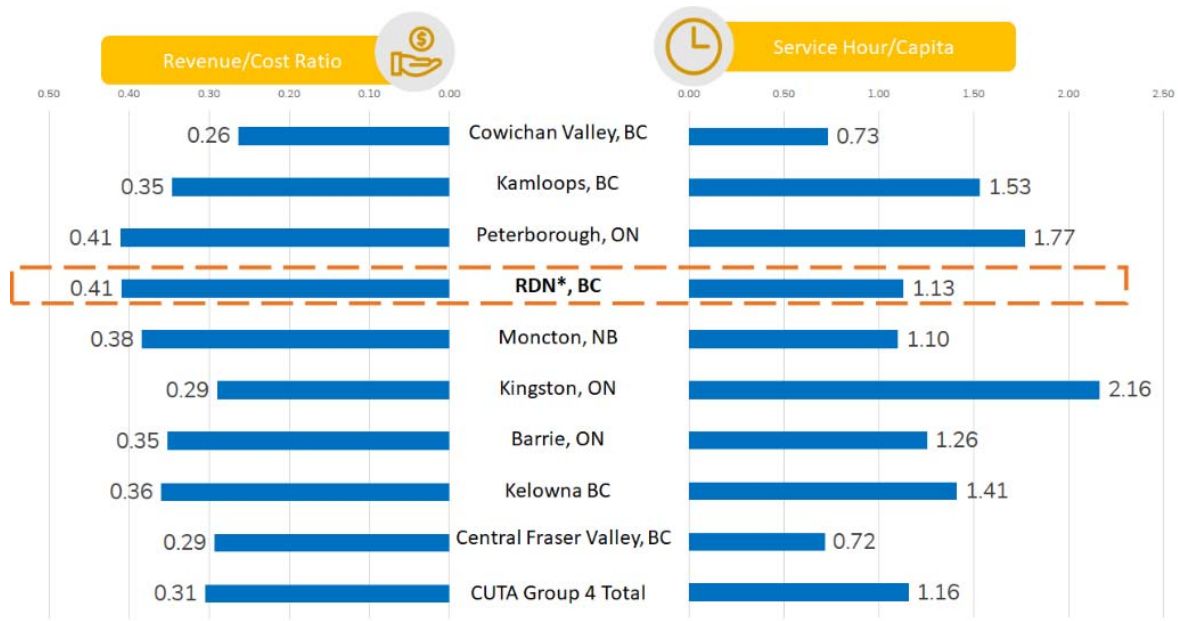


FIGURE 4 RIDES/HOUR AND COST/RIDE



	Average Cost/Trip	Cost/Service Hour
	\$5.97 Barrie, ON	\$111.84 Cowichan Valley, BC \$123.94 CUTA Group 4*
	\$9.34 Cowichan Valley, BC	\$112.57 Kingston, ON
	\$4.20 Central Fraser Valley, BC	\$107.56 Kamloops, BC
	\$4.74 Moncton, NB	\$109.07 Barrie, ON
	\$5.57 CUTA Group 4*	\$109.41 Central Fraser Valley, BC
	\$3.18 Kamloops, BC	\$91.66 Moncton, NB
	\$3.23 Peterborough, ON	\$96.17 RDN, BC
	\$3.52 RDN, BC	\$102.87 Kelowna, BC
	\$3.57 Kelowna BC	\$103.33 Peterborough, ON

*Note: CUTA Group 4 statistics comprise the average of 29 agencies, including Nanaimo and several listed peers

FIGURE 5 RDN SYSTEM PERFORMANCE COMPARISON

The RDN system performs well compared to the CUTA average for Group 4 as well as against some of its peers. It is particularly efficient in the cost/service hour metric in comparison to its peers which could reflect savings from in-house system operations by the RDN.

Ridership: COVID impacts

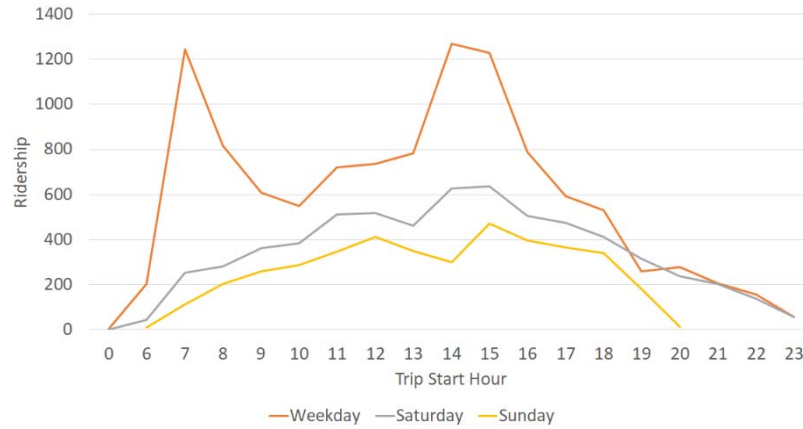


FIGURE 6 SYSTEM RIDERSHIP (PRE-COVID-19) - JAN TO MAR 2020

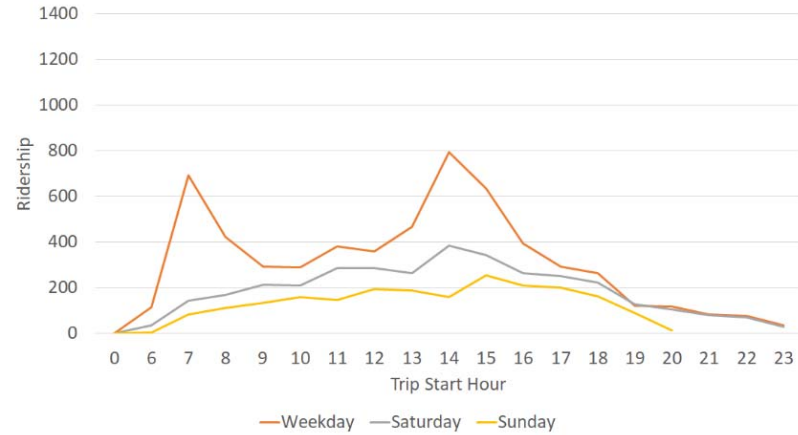


FIGURE 7 SYSTEM RIDERSHIP (COVID-19) - JAN TO FEB 2021

Transit systems across the world have been negatively impacted by COVID, the RDN was no exception. While ridership was significantly impacted it was interesting to note that the pattern of ridership remained unchanged during COVID, with pronounced morning and afternoon peaks during the weekday and largely midday ridership on Saturday and Sunday.

Mapping Outcomes

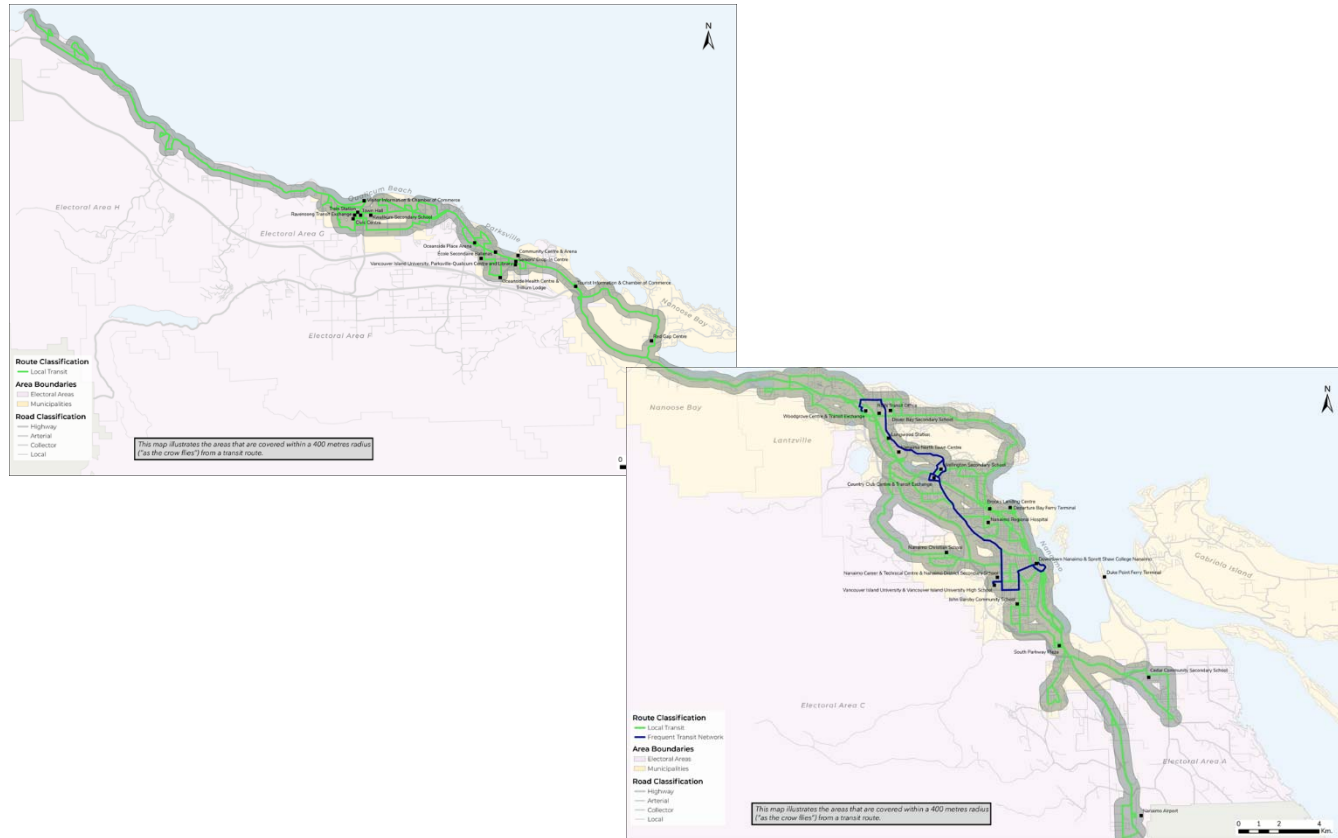


FIGURE 8 400 METRE RADIUS FROM TRANSIT ROUTES

Mapping the RDN transit system for accessibility indicates high transit accessibility for the residents of the City of Nanaimo. This means that most of the residents are within 400 meters of a bus route except for Hammond Bay, Long Lake and North Slope neighbourhoods.

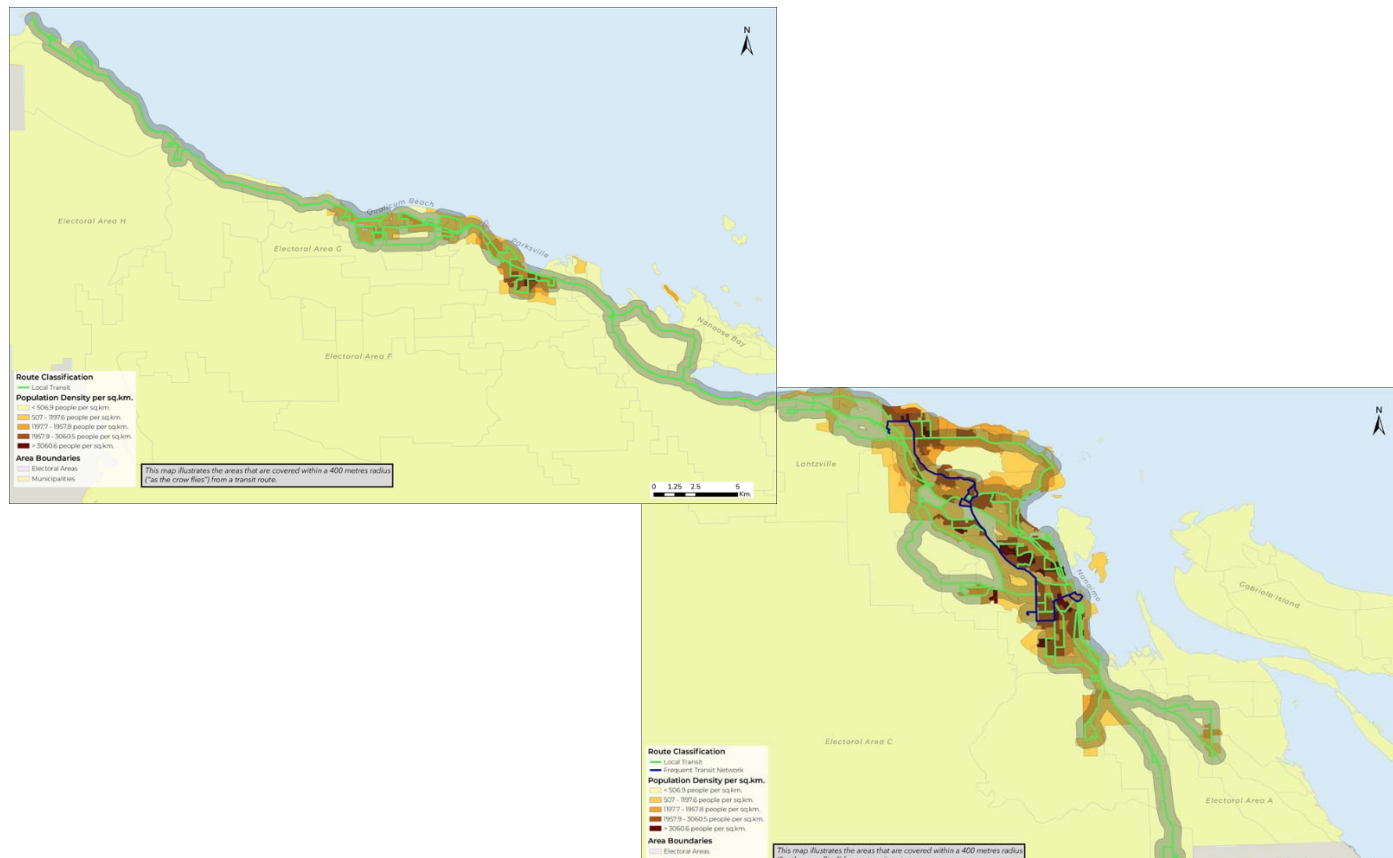


FIGURE 9 MAP OF DENSITY NEAR TRANSIT ROUTES

Similarly, mapping the RDN transit system for density in comparison with the transit network indicates transit service availability in areas of high density in north, central and southern RDN. There are some gaps in some areas of the North Slope neighbourhood in the City of Nanaimo as well as in the Errington and Coombs area of the RDN as indicated in the map above.

System Analysis and Performance Themes

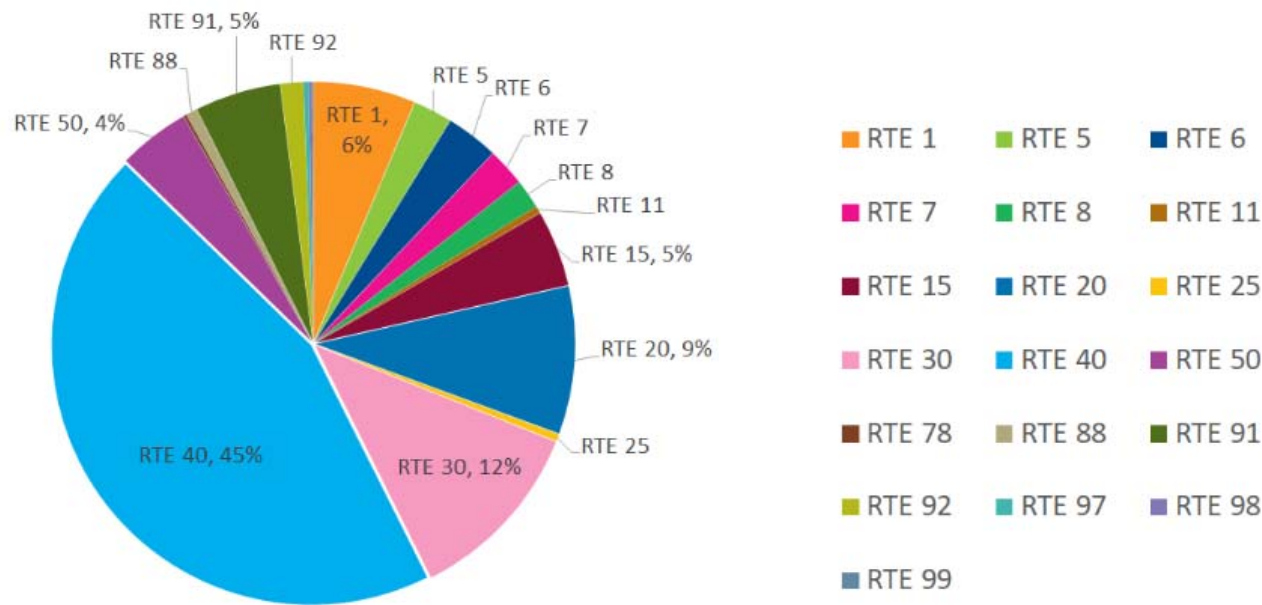


FIGURE 10 PIE CHART OF ROUTES BY USE

of the total system ridership. Routes with the lowest ridership are the ones serving north RDN. While low service hours and service levels could be the main reason for the lower ridership on these routes, the dispersed landuses in the north could also be a contributing factor. During COVID the usage of the routes remained unchanged, with the 40 still having the most ridership. This is obvious in the maps below which show pre-COVID and COVID boarding activity of routes in the Central RDN by stop.

Ridership by route analysis (pre-COVID) illustrates that the route 40 is the most used route in the system, with almost 45% of system ridership being carried by this route. This route also has the highest frequency and number of service hours and high ridership numbers are a direct result of the investment in this route.

Routes 30 and 20 are the next tier of frequently used routes in the system, connecting to major destinations like the Nanaimo Regional General Hospital (NRGH) and the Departure Bay Ferry terminal respectively. In the middle tier, are routes 1, 91, 50 and 15 comprising about 4 to 5%

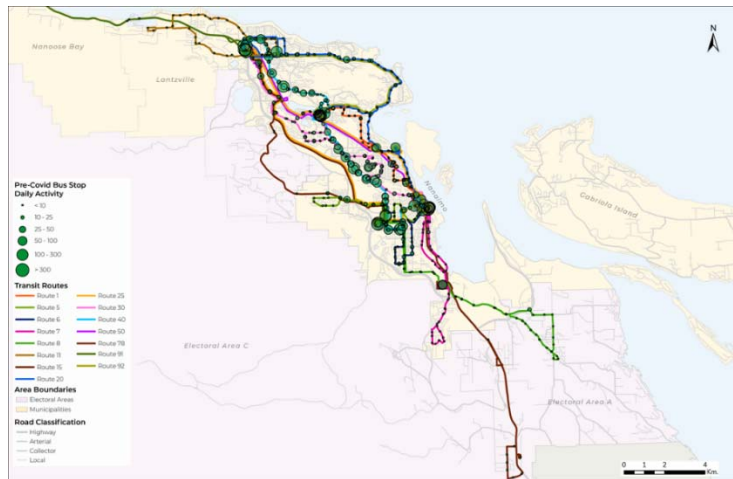


FIGURE 11 PRE-COVID BUS STOP DAILY ACTIVITY

General themes related to route performance that emerge from the mapping and initial analysis are:

- Low service levels for almost all routes on weekends (both span and frequency)
- Major destinations (malls, institutions, major employers) are served by the transit system, however, service levels to these destinations could be improved in the future
- East-west connectivity is poor and reflects the underlying road network
- Redundancy of service in certain corridors makes the overall system less efficient, these resources could be better redistributed within the system.



FIGURE 12 DURING COVID BUS STOP DAILY ACTIVITY

- Need to balance service levels between the proposed Rapid line for the system (**route 50**) and the proposed Frequent line for the system (**route 40**)
- Large gaps in service exist in areas with low density and very dispersed landuses (North RDN, Errington, Coombs, Hammond Bay, north of Dover Road), On-Demand transit could be a solution in these areas
- There is potential for regional connectivity from the South end of the RDN to its northern edges using the **routes 91, 50 and 7**
- **Route 5 and 6**, routes that serve the neighbourhoods around downtown could be straightened out for more direct travel into downtown.

- **Routes 7**, connecting Cinnabar to Downtown Nanaimo is interlined with the 50, giving some residents a direct connection to Woodgrove and Country Club Exchange, however, one-way segments on Halliburton and Victoria Streets is not user-friendly.
- **Route 8**, connecting Cedar to VIU is interlined with the route 15 and provides a quick connection to VIU as well as to Woodgrove Exchange along Nanaimo Parkway, the route serves some low-density areas that could be better served by On-Demand transit.
- **Route 11**, serving Lantzville, is the poorest performing route in the system, primarily because it is a large one-way loop, its routing, frequency, and service span need to be addressed. In addition, the District of Lantzville has requested additional transit service in anticipation of new developments in the municipality.
- **Route 20 and its derivative 20 A**, both serve Hammond Bay, but there is little clarity between the two route patterns, creating confusion among users especially at Country Club Exchange. Brooks Landing is a major connecting point between the Route 1 and Route 20 and improved connectivity at this destination would be good for the overall system.
- **Route 25** is a targeted service, that provides a transit connection to the Departure Bay Ferry Terminal but is also very inefficient in its use of service hours.
- **Route 30** is long and circuitous and has low legibility. More direct, frequent service to the hospital that starts earlier and ends later will better support transportation needs of hospital staff.
- **Route 40**, while called an Express, does not function like one and has many closely spaced stops. Stop-spacing and directness on this route needs to be improved to speed up this route.
- **Route 50** is the fastest and most direct connection from Woodgrove Exchange to downtown, however low frequency results in low ridership on this route.
- **Route 91** connects the communities of Qualicum, Parksville and Nanoose Bay to Woodgrove. This is currently a local service and would be a better service if it worked as an Express that served the three communities at major connection points, on or near the highway to enable a quick and frequent, highway-based connection into Woodgrove Exchange.
- **Routes 99, 98, 97, 88** connect some of the northern most parts of the RDN to the transit system, but service levels are low with no service on Sundays. While routing on some of these routes could be more direct, the major issue is increasing service span and frequency on these routes.

Initial Issues and Opportunities

As illustrated above, the RDN system is a well performing system. Dispersed landuse and low density combined with service span and frequency limitations make the transit system less competitive with the car. Some of the issues and opportunities that can be addressed over the next five years that could also help make the system a viable transportation option are identified below.

Issues



Clarity and legibility

The system is not easily understood. Figuring out, which route connects to which hub and how many connections it takes to get from one point to another is tedious and requires a thorough study of the Rider's Guide to use the system. In a mature transit system, higher order routes would be the most frequent, connecting to main origins and destinations in the most direct routing possible, with local routes connecting to these routes at major exchanges. In the RDN system, the hierarchy of routes is not obvious to the user, making the system less user-friendly and legible.



Naming conventions/Numbering

The current numbering/route naming convention is not helpful in understanding that there is a hierarchy of routes in the system, the numbering system is not continuous and not intuitive, so one is unable to understand the difference in a route numbered in the seventies versus a route numbered from 1 to 10. Ideally the numbering should indicate location of route and/or frequency.



Duplication of services

Routes in the system are duplicative along key corridors and reduce the efficiency of the system. The network is predominantly north-south oriented with routes duplicating services in common corridors: Terminal Ave, Island Highway, Bowen Rd and Highway 19 being the main corridors with duplicative services. For instance, routes 1 and 20 follow the same corridor on the way into downtown from the ferry terminal, routes 25 and 15 are duplicative along Nanaimo Parkway coming into downtown.

. Landuse development patterns

Low-density spread-out development is harder to service efficiently with transit. Routes need to be circuitous and indirect as they move within neighbourhoods or are inaccessible from the neighbourhood if they travel on the main roads, examples of these developments are obvious in the Hammond Bay, Cedar, Cassidy and northern RDN communities of Qualicum Beach, Parksville, and Bowser areas of the system.



Consistency

The network reflects organic growth and not a cohesive, holistic approach to development that addresses the community's travel needs. Multiple route patterns, lack of consistency in spans and frequencies of different routes make the system add to the inconsistency of the system and make it hard to use. For instance, the route 20, has an alternate route that sometimes serves Country Club mall. While having an alternate routing pattern is unavoidable and sometimes efficient, there is no clear repetition to the pattern, it just occurs on random trips and customers need to figure out the right trip for them.

Opportunities



Expansion hours

The RDN has requested several thousands of expansion hours for the next few years. All this potential funding is a huge opportunity for system improvements and to address the issues of service span and frequency described above.



Planning initiatives

Several planning studies that identify the importance of considering multimodality and public transit in landuse decisions are currently underway. The City of Nanaimo OCP update (Reimagine Nanaimo), the RDN Social needs Assessment, multiple community plans from partner jurisdictions that emphasize the need for

improved connections and better transit service all form a supportive framework to plan the future network.



Technological advancements in transit

Transit is being transformed by technological advancements that support mobile fare payment, booking trips and creating virtual stops. All this helps to make transit more accessible to a wider range of people in addition to making it more convenient to use. If one can call a bus to one's place of resident and know that the bus will be there in five minutes, that makes the use of public transit more convenient than having to wait for the bus for 15 minutes at a bus stop, not knowing exactly when it will arrive. This is a huge opportunity, not only for improving service but also to market transit in a modern way.

Transit Future Plan Progress and Looking Forward

In 2014, BC Transit and the RDN prepared a Transit Future Plan to complement the updated RDN Regional Growth Strategy which supports local Official Community Plans. The Transit Future Plan also embraces the directions and policies of the BC Provincial Transit Plan and the BC Transit 2030 Strategic Plan. Notably, the RDN Transit Future Plan sets a transit mode share target of five per cent for all trips by 2039, which will require the RDN's transit ridership to grow from 2.7 million to 13.5 million trips per year. This target was set to align with the Provincial Transit Plan's transit mode share target for regional centres in British Columbia.

The Transit Future Plan envisions a network of transit routes classified as Rapid Transit Network (RTN), Frequent Transit Network (FTN) and Local Transit Network (LTN). There is also provision for Targeted services are a collection of transit services that are more focused on the needs of specific customers. These services include:

- **Inter-regional:** provide connections between regions outside of the local transit service area
- **Custom - handyDART:** door-to-door services for customers unable to use the conventional service
- **Paratransit:** may include transit services that are demand-responsive or operate with flexible routes and schedules in low ridership areas

As a result of the Transit Future Plan, the RDN has sought additional resources for improvements to the system. The potential expansion

hours available to the RDN over the next few years are highlighted below. The recommendations of the TRS will be used to distribute these hours in the system over the next five years.

- **Year 1**
 - 5,000 Hours, 3 Medium Duty buses
 - TFAP/TRS priorities
- **Year 2**
 - 20,000 hours, 7 Heavy Duty & 6 Medium Duty buses
 - TFAP/TRS priorities
- **Year 3**
 - 20,000 hours, 8 Heavy Duty & 6 Medium Duty buses
 - TFAP/TRS priorities
- **Year 4**
 - 20,000 hours, 10 Heavy Duty & 4 Medium Duty buses
 - TFAP/TRS priorities
- **Year 5**
 - 10,000 hours, 1 Heavy Duty & 3 Light Duty buses
 - TFAP/TRS priorities

This Transit Redevelopment Strategy is an essential step in the continued implementation of the Transit Future Plan for the RDN. Before proceeding with proposals for new services and route changes, we looked at the accomplishments to date.

TABLE 2 TRANSIT FUTURE PLAN SHORT- AND MEDIUM-TERM RECOMMENDATIONS

Transit Future Plan Short Term Recommendations	Status
Restructure existing routes to establish the Rapid and Frequent Transit corridors and begin to invest in increases to service levels	Underway <i>Route 40 established as FTN 2015, improved in 2019</i>
Restructure transit routes to serve the new Temporary Downtown Nanaimo Transit Exchange	Complete
Enhance service on the Local Transit Network	Underway
Introduce Inter-regional Transit Services to the Cowichan Valley	Underway
The Regional District of Nanaimo and BC Transit will explore service options to connect Electoral Area 'H' with the Comox Valley Regional District	Outstanding
Transit Future Plan Medium Term Recommendations	Status
Continue to increase service levels of the Frequent and Rapid Transit Network to meet ridership demands	RTN- Underway FTN- Underway
Enhance service on the Local Transit Network by increasing frequency and span of service	Underway
Explore Inter-regional service with regular weekday peak hour service <ul style="list-style-type: none"> to the Comox Valley Regional District 	Initiated
Extend the Rapid Transit Network to South Nanaimo <ul style="list-style-type: none"> Extend the Rapid Transit line to South Parkway Plaza or Sandstone as development occurs Service levels to south Nanaimo should be increased over time to meet the minimum standard of 15 minutes from 7:00 am to 7:00 pm seven days a week 	Outstanding

As shown in Table 3, many recommendations of the Transit Future plan have been implemented or are underway. This Transit Redevelopment Strategy reviewed the performance of changes made to date, it and re-evaluated the remaining proposals to refine them based on new information and overall relevancy.

2.0 SUMMARY OF KEY NETWORK OPPORTUNITIES

Using the results of the network analysis, the outreach undertaken for this project and relevant transit service principles, the following summarizes some of the key opportunities that have been considered in developing the network recommendations for the Transit Redevelopment Strategy (TRS).

- **One network many layers:** The TRS supports the multiple layer recommendation from the Transit Future. The key opportunity here is to develop distinct route type layers within the system. Rather than “one-size-fits-all,” this approach would implement different types of routes, with some routes serving major corridors and destinations that residents would be more willing to walk to due to their frequency and directness, while other complementing routes retained some coverage within neighbourhoods and could potentially be served with smaller vehicles.
- **Make it legible and easy to understand:** Renumbering and renaming routes to reflect the hierarchy of the system as well as clearly show service levels. The big opportunity here is to convert the existing routing and nomenclature of the system into a logical numerical system based on geography.
- **Putting Mobility Where the Action Is:** Serve areas of high demand to make the service consistent and dependable. This will involve several strategies including moving to clockface headways, increasing frequency and service span

in areas/corridors of high demand and then in areas with lower transit demand.

- **Use Resources Wisely:** The opportunity here is to enhance efficiency of the system by reducing duplication of services in the network.

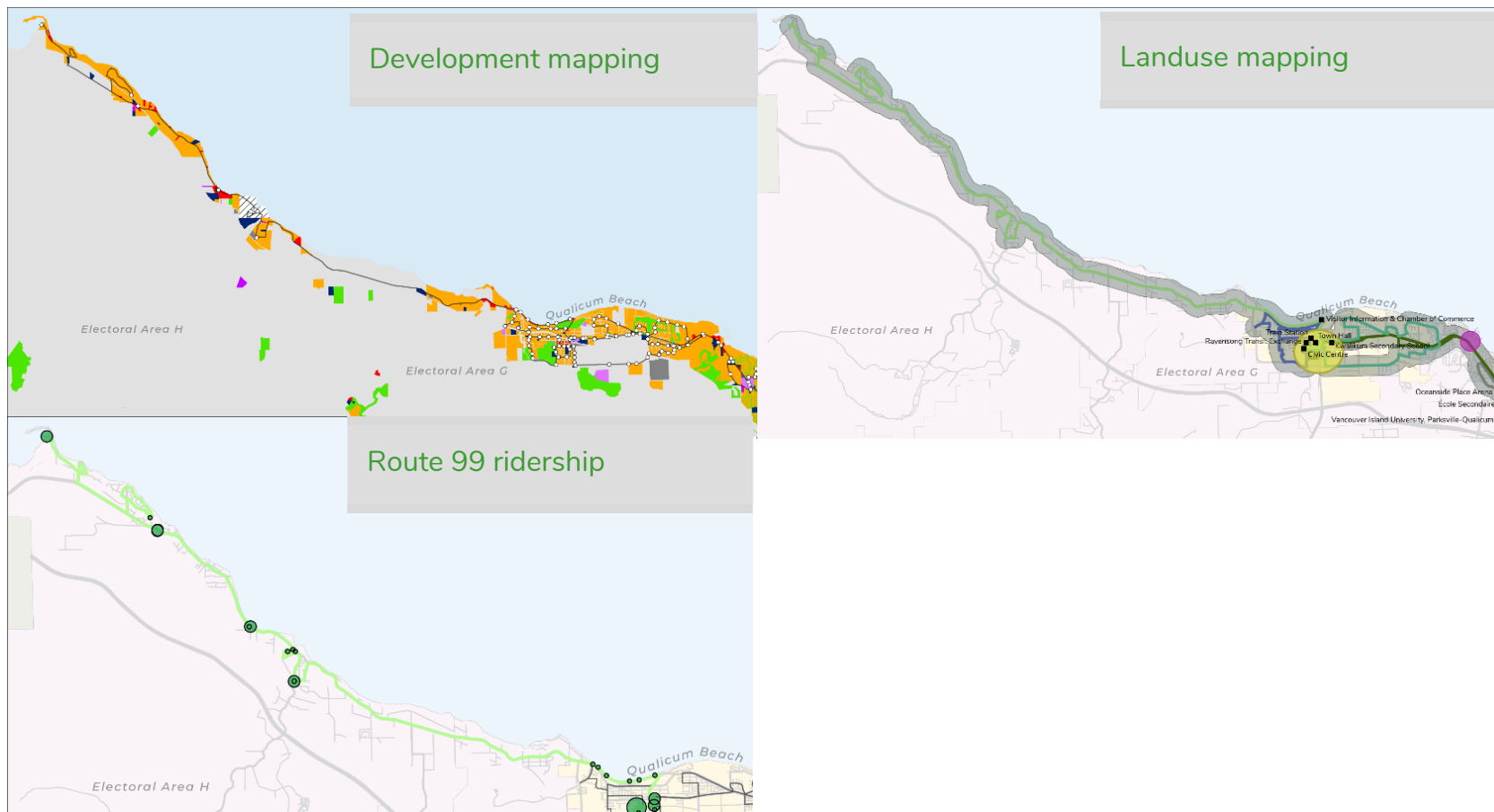
Transit Service Design Principles

Service options are based on the following principles:

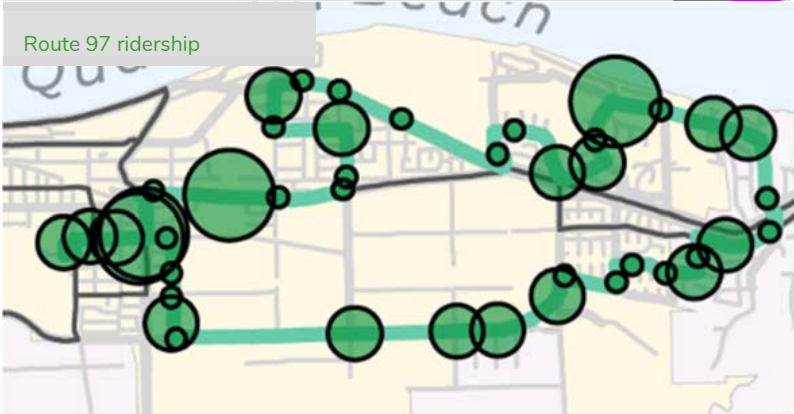
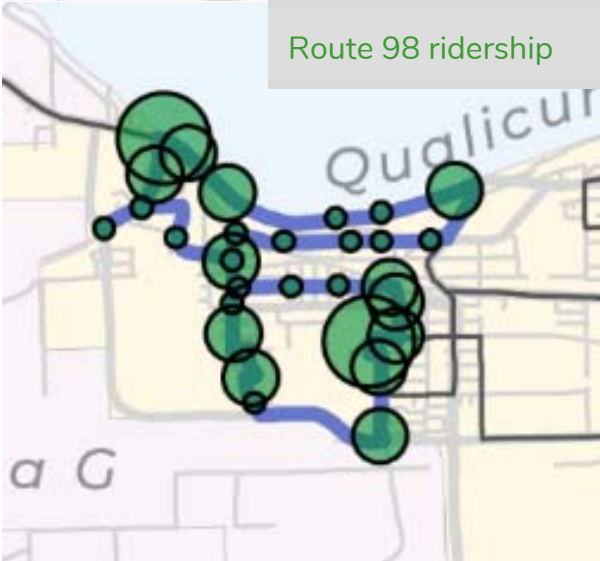
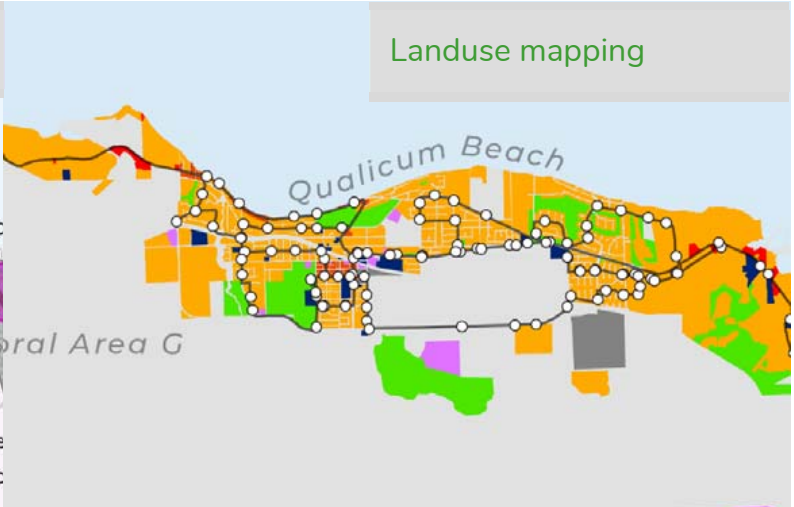
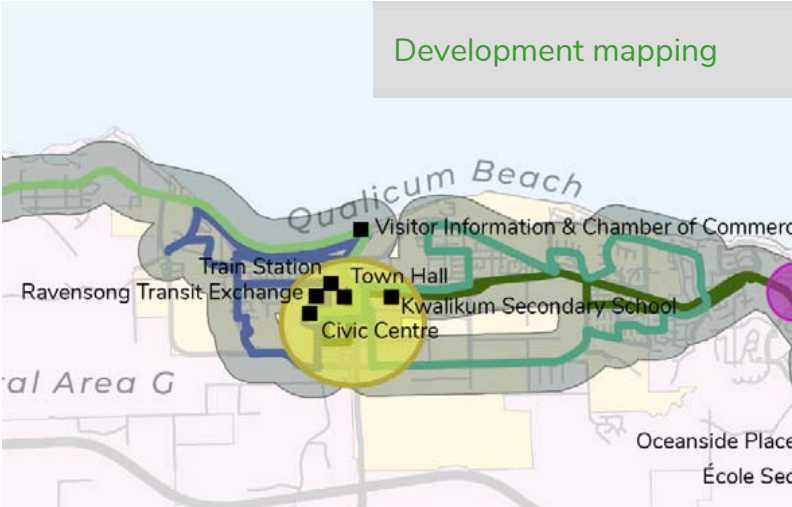
- Where feasible, use routes that are direct and offer two-way service as these are usually easier to understand and attract higher ridership, particularly for higher order Rapid Bus and Core routes.
- Rather than treating all areas equally, focus highest levels of service on corridors that have higher density and major destinations.
- If specific passengers or destinations require closer access to transit, consider doing so on a different layer of service (e.g. Neighbourhood or Targeted routes) or by time of day (e.g. during the non-commuting period). Different styles of service such as On Demand or Flex Route may also be used in these cases.
- Where possible, avoid abrupt changes to the existing transit network that do not result in service quality gain. For instance, this may mean feathering in substantial changes over a series of improvements.

3.0 INITIAL ANALYSIS

DEEP BAY



QUALICUM BEACH

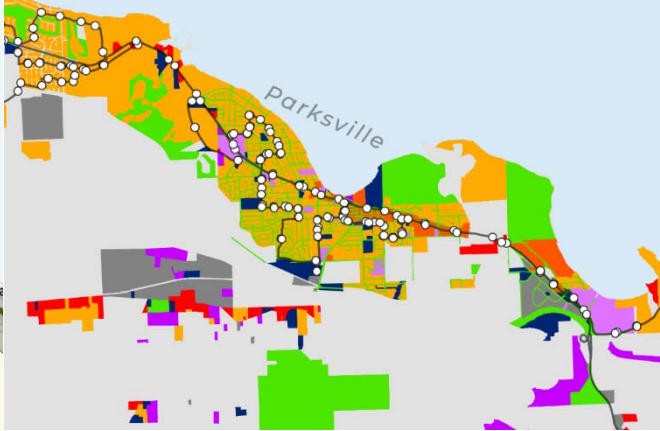


PARKSVILLE

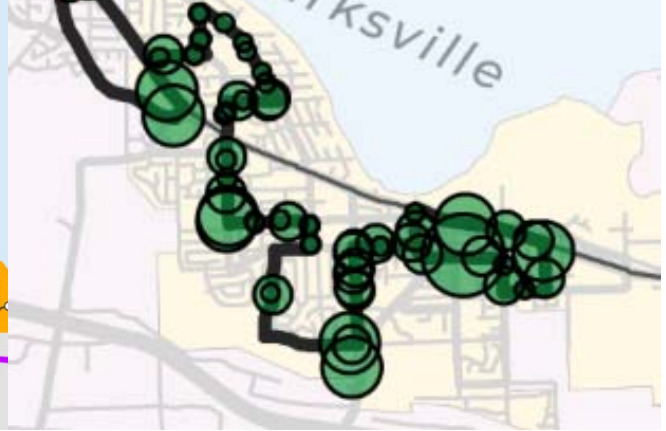
Development mapping



Landuse mapping



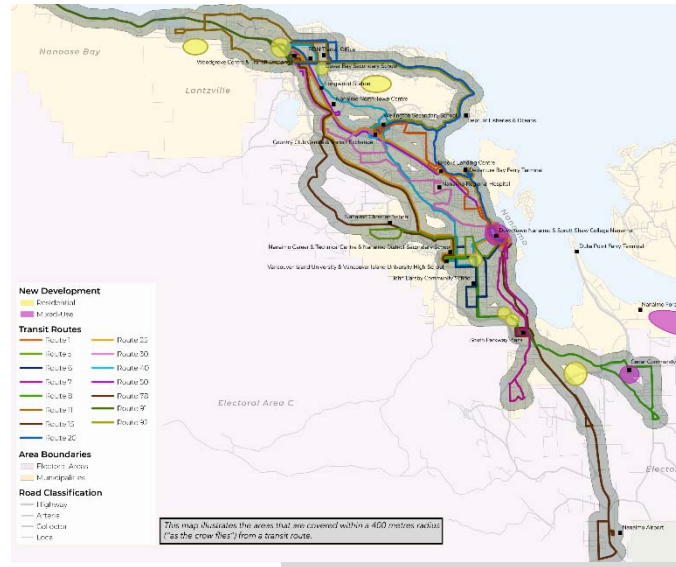
Route 88 ridership



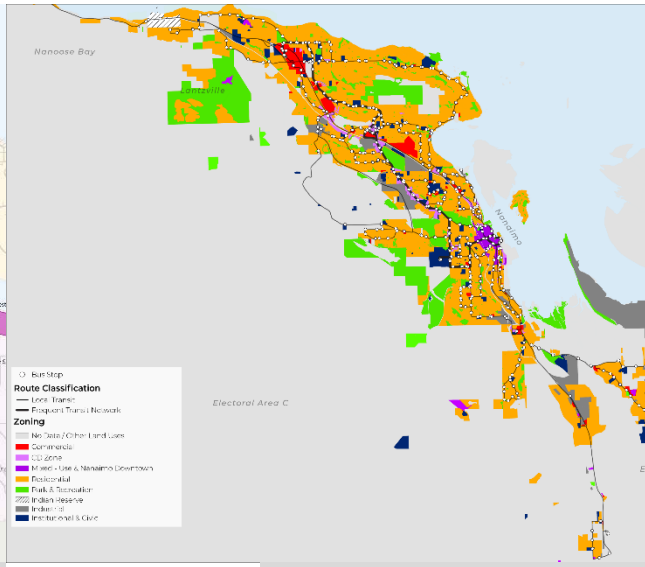
REGIONAL ROUTE



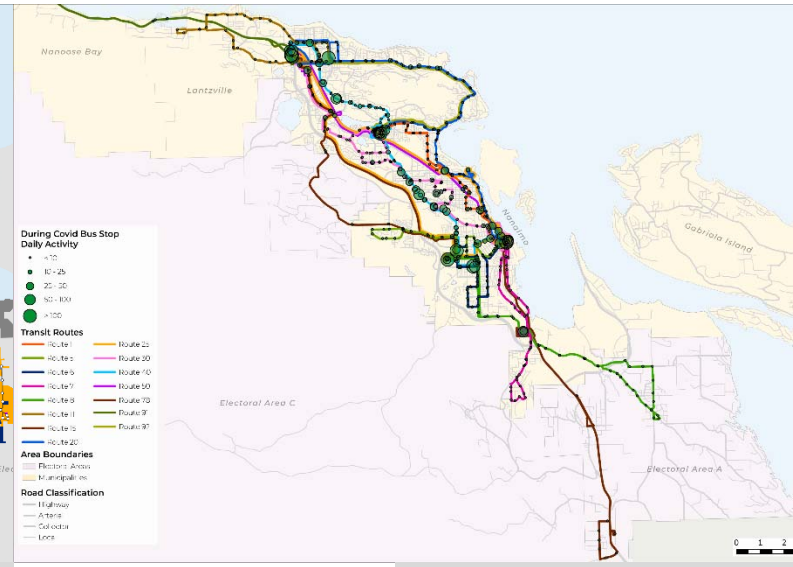
NANAIMO



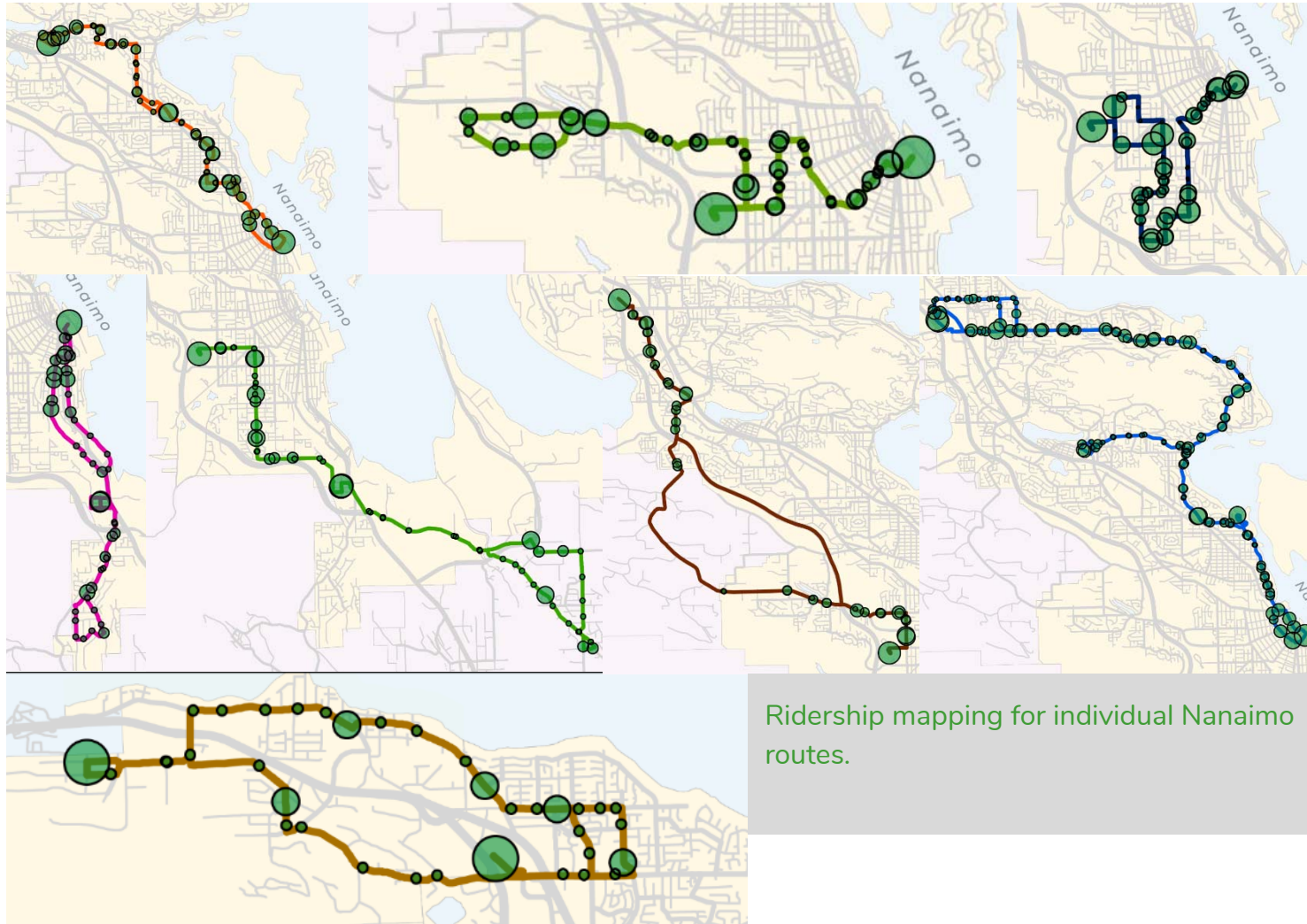
Development mapping

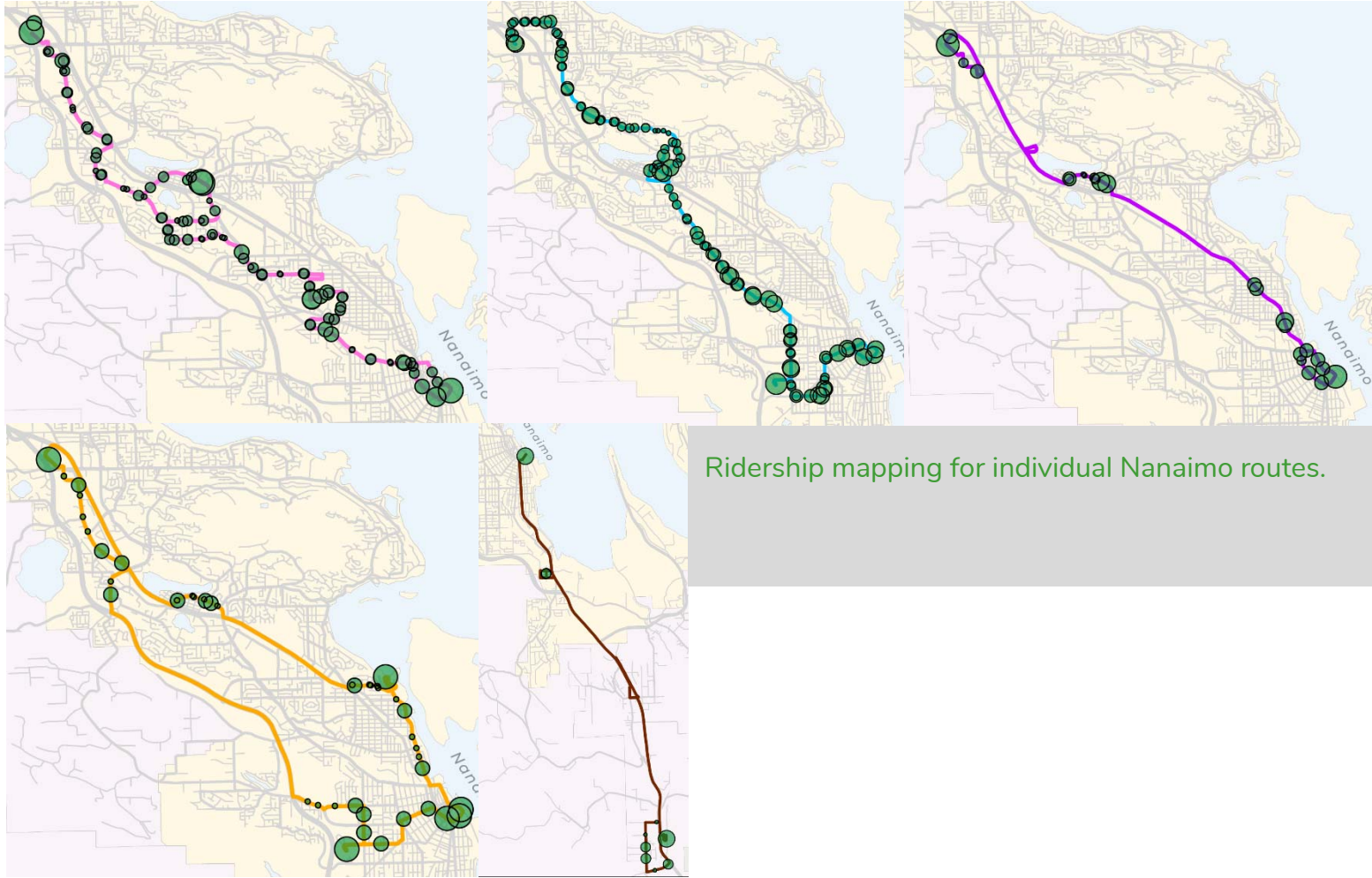


Landuse mapping



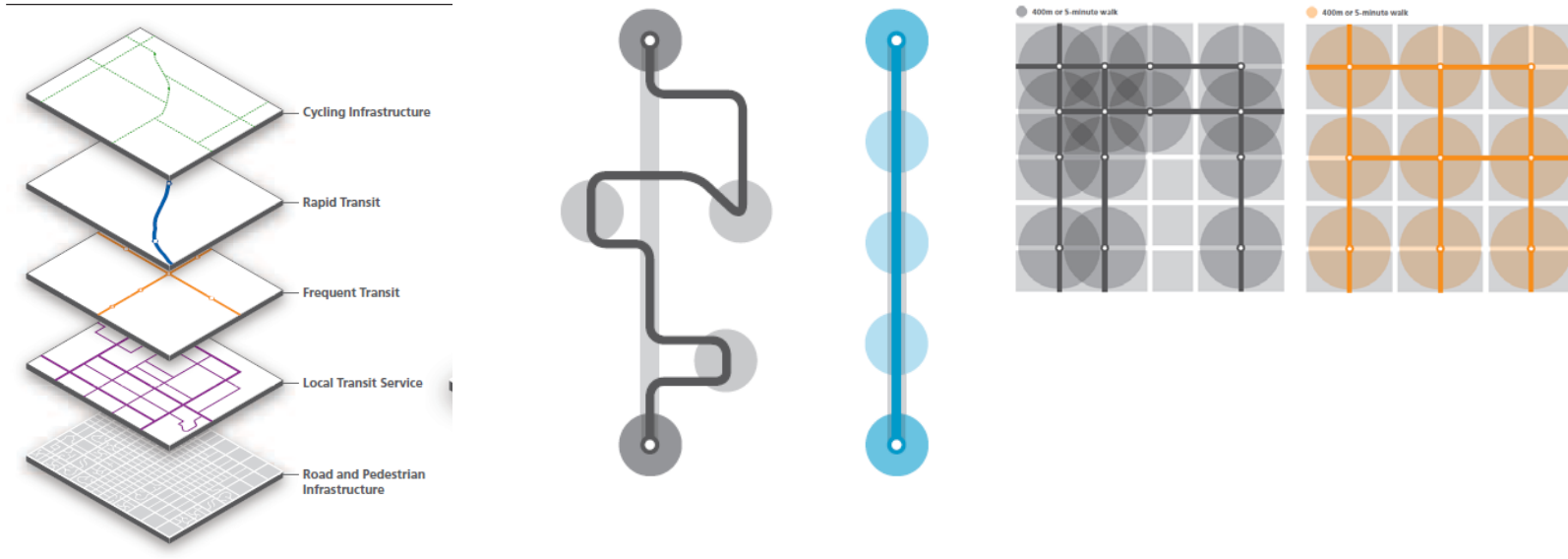
Ridership mapping





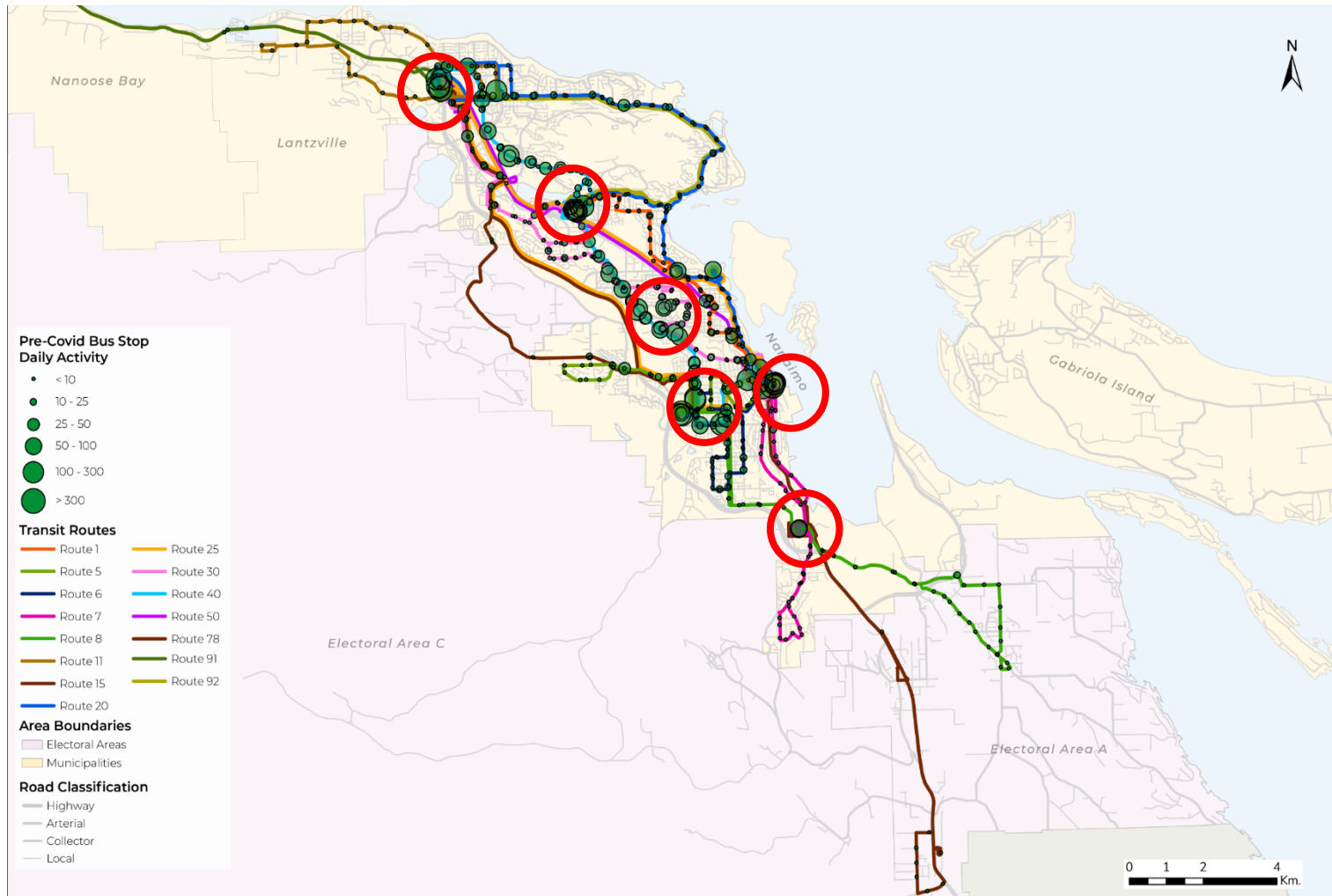
Ridership mapping for individual Nanaimo routes.

4.0 PRELIMINARY NETWORK IDEAS

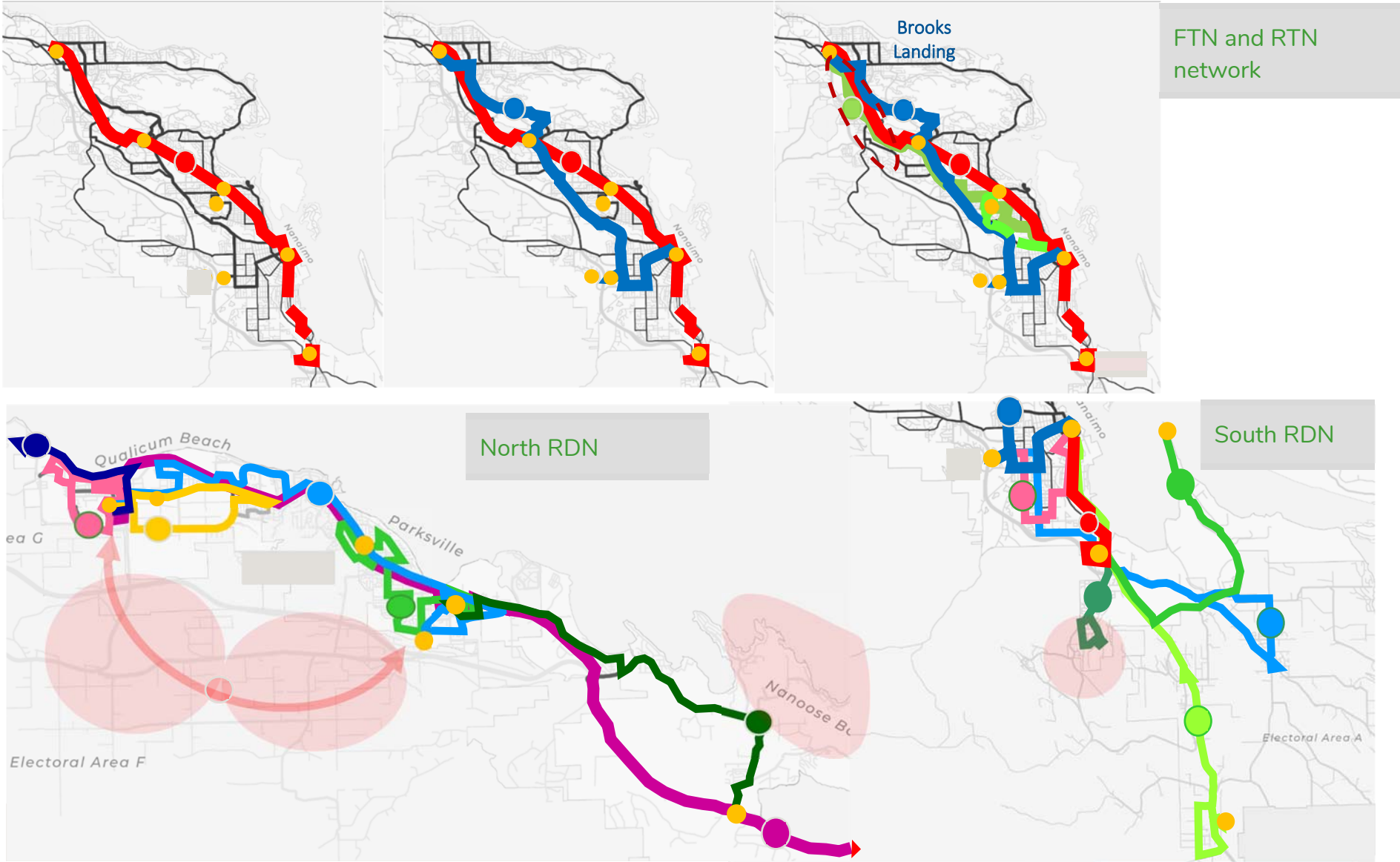


Design Principles

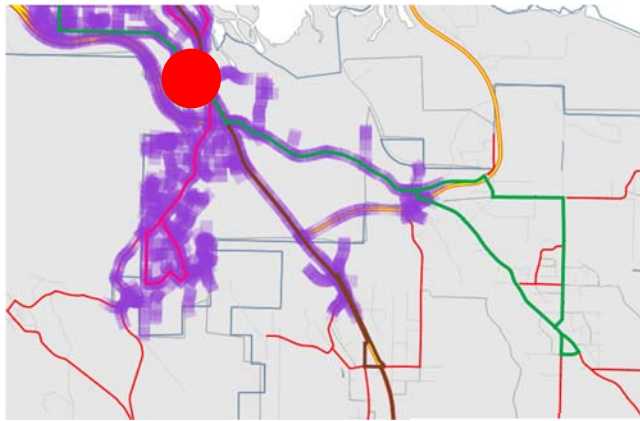
Layered, Connected, Direct, Clear, Consistent, Non-duplicative



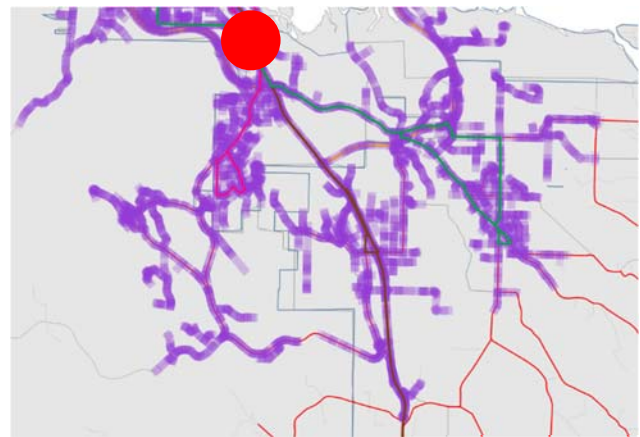
Major Origins and destinations to be connected by the RTN/FTN network with neighborhood routes connecting into the RTN/FTN network



5.0 ON DEMAND TRANSIT ANALYSIS

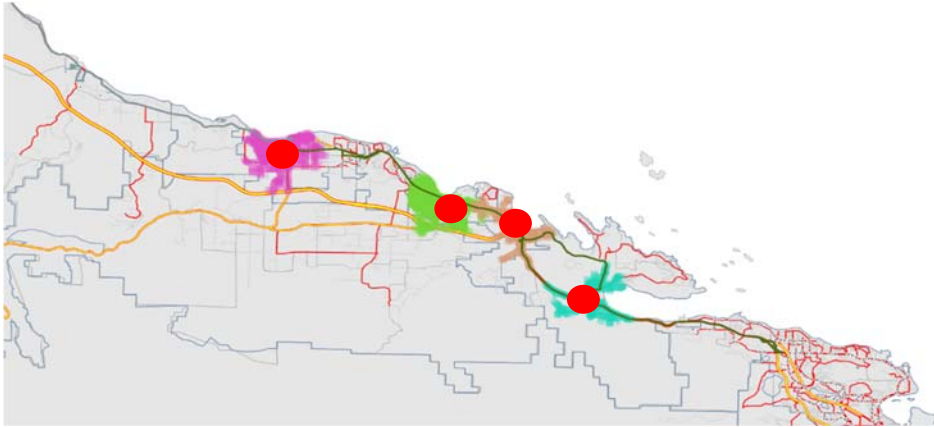


15 min range

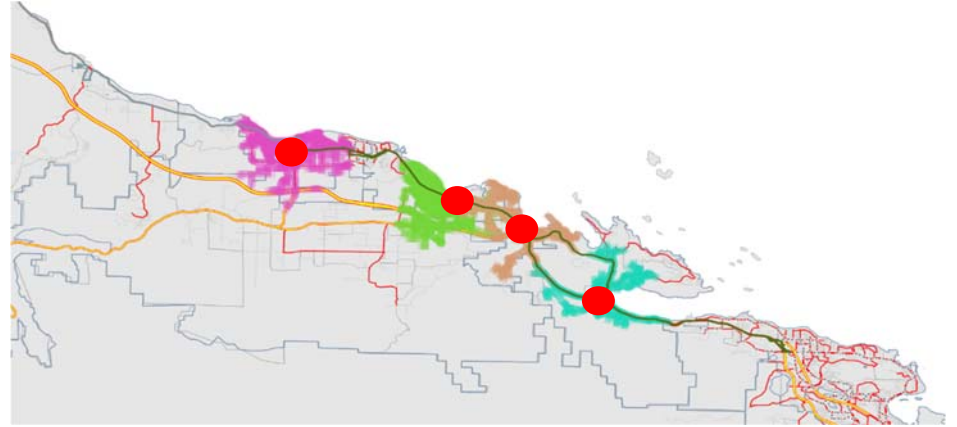


30 min range

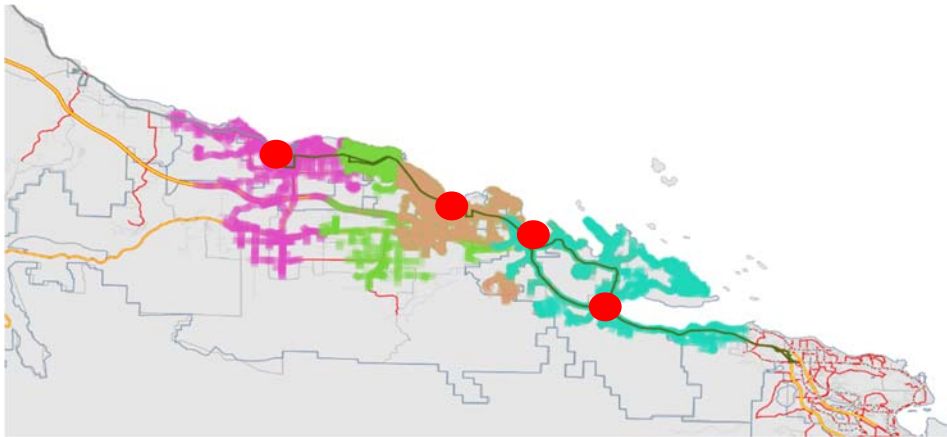
Potential for replacing Route 7 with ODT



10 min range from designated flex points



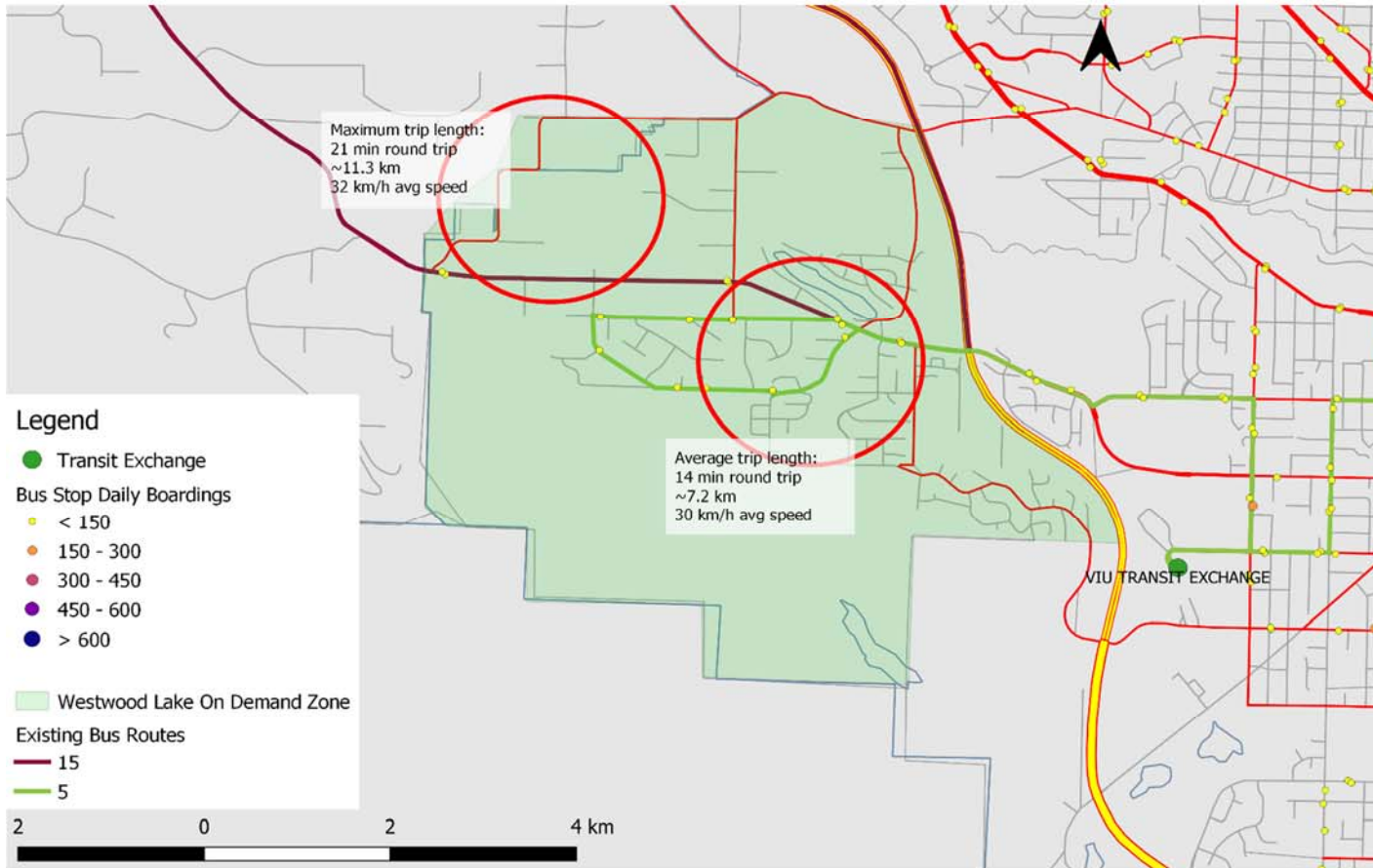
15 min range from designated flex points



30 min range from designated flex points

Potential for replacing fixed routes in Oceanside with ODT connecting to Route 9/91

Westwood Lake On Demand Zone



Potential for OnDemand Transit in the Westwood Lake area

Ridership in Zone

~99 daily riders

Service Utilization

Peak: 11.3 trips per hour

Off-peak: 4.3 trips per hour

Vehicle Requirements

Typical (Peak / Off-Peak)

1 / 1 *

Maximum (Peak / Off-Peak)

1.66 / 1 *

Operating Requirements

Layover space at VIU Exchange

Dial-a-Ride Parameters

Minimum trip request cut-off:

60 minutes prior to travel**

Digital On-Demand Parameters

Typical Passenger Waiting Time:

< 20 min

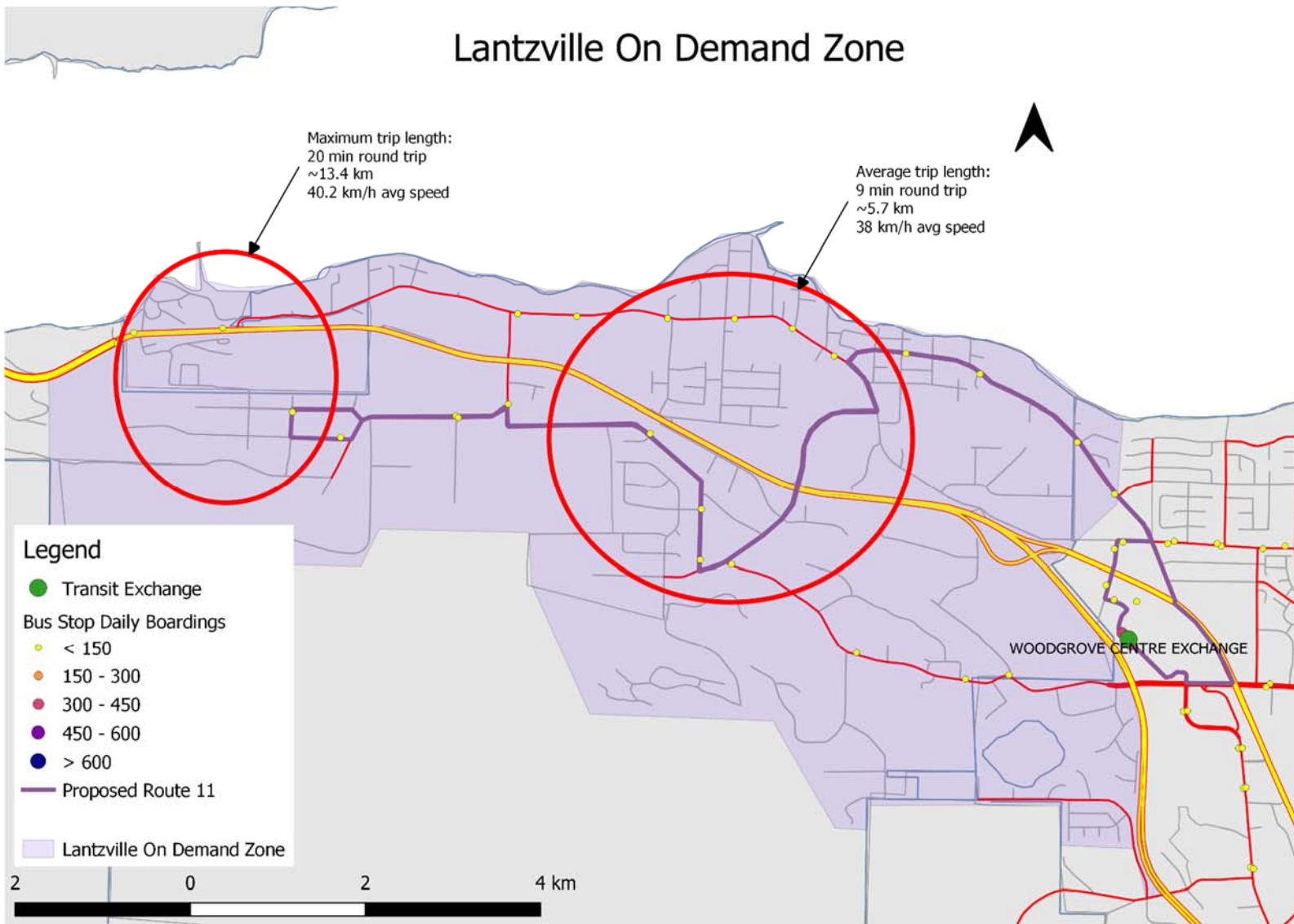
Max Passenger Waiting Time:

< 60 min

* The On Demand zone could be active only during off-peak and weekends as an alternative to Route 5. It may be possible to leverage existing handyDART resources to minimize additional service costs.

** Note that this is limited by capacity of call-takers

Lantzville On Demand Zone



Ridership in Zone

~45 daily riders

Service Utilization

Peak: 4.95 trips per hour

Off-peak: ~2 trips per hour

Vehicle Requirements

Typical (Peak / Off-Peak)

1 / 0.5 per hour

Maximum (Peak / Off-Peak)

1.66 / 0.66 per hour*

Operating Requirements

Layover space at Woodgrove Centre Exchange

Dial-a-Ride Parameters

Minimum trip request cut-off:

30 minutes prior to travel**

Digital On-Demand Parameters

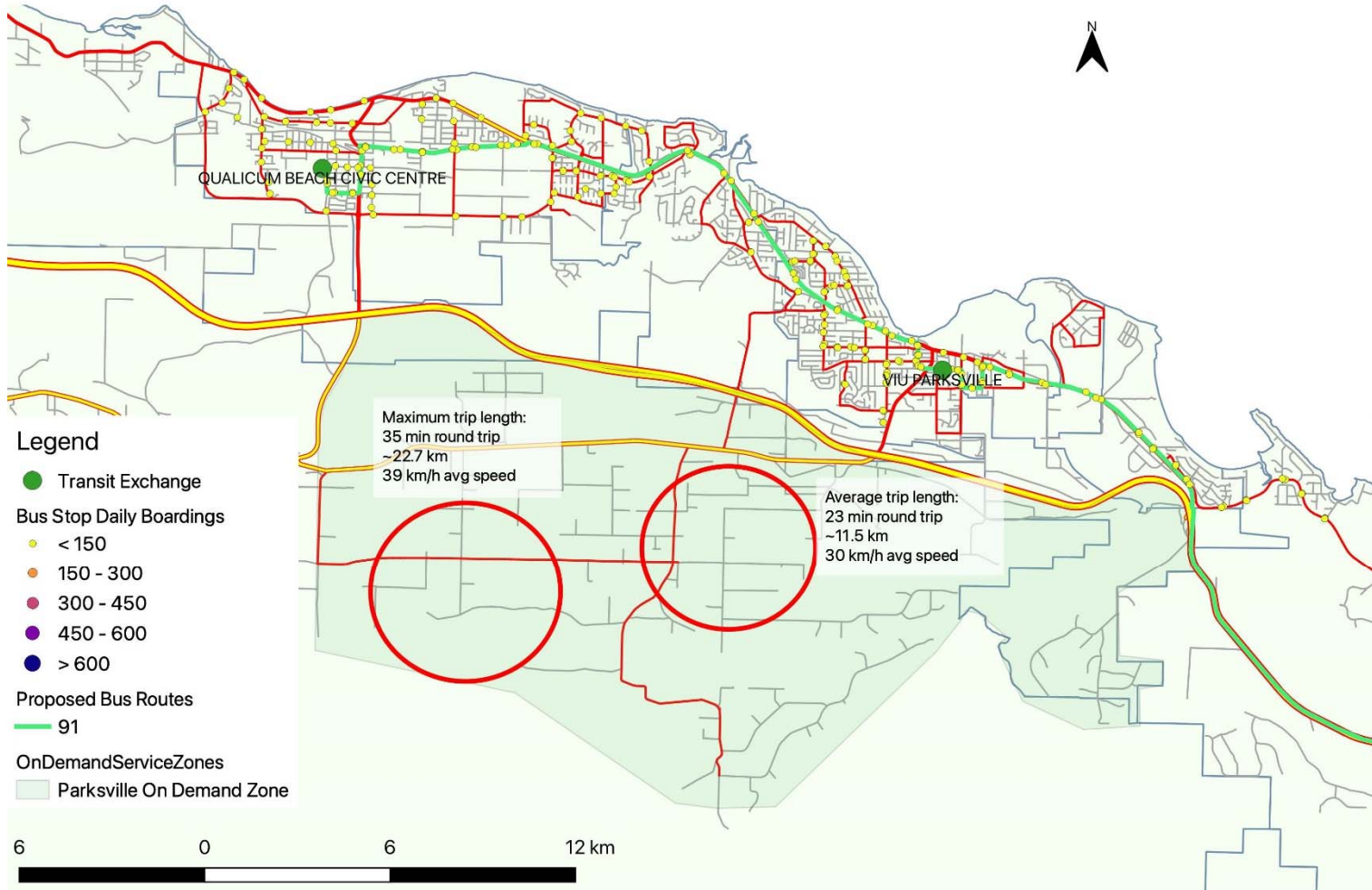
Typical Passenger Waiting Time:

< 15 min

Max Passenger Waiting Time:

< 40 min

Parksville On Demand Zone



Ridership in Zone

Unknown

Service Utilization

Unknown*

1 vehicle can provide 2 trips per hour

Vehicle Requirements

Unknown*

1 Vehicle can provide 2 trips per hour

Operating Requirements

⌘ Layover space at VIU Parksville

Dial-a-Ride Parameters

Minimum trip request cut-off:

60 min**

Digital On-Demand Parameters

Typical Passenger Waiting Time:

< 30 min

Max Passenger Waiting Time:

< 40 min

APPENDIX C

RDN TRS What We Heard Engagement Summaries



REGIONAL
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OF NANAIMO

What We Heard Engagement Summary Report



ROUND 1 AND ROUND 2 ENGAGEMENT SUMMARY REPORT





What We Heard

Engagement Summary Report

Project: RDN Transit Redevelopment Strategy

Date: September 2, 2021

Guiding Principles:

- All feedback provided through the engagement should be included within the engagement evaluation report;
- All consultation evaluation reports must be provided to the appropriate board/committee for discussion; and
- If engagement occurs online, the evaluation report must be publicly available through the project page to ensure that the RDN closes the loop with residents.

Project Overview and Objective for Engagement

The Regional District of Nanaimo is undertaking a Transit Redevelopment Strategy to develop a priority plan for how to improve the RDN's transit services, their links to land use and active transportation, and increase ridership over the next five years.

The key engagement objectives for this initiative are to involve citizens, staff, stakeholders and community leaders in identifying issues and opportunities for the current transit service and shaping future recommendations and priorities for the next five years. Ultimately the goals of both the project and its engagement are to build awareness and positive perception of the transit system and to deliver a detailed year-by-year action plan to enhance and develop the RDN's transit network and its effectiveness.

The Transit Redevelopment Strategy process includes *two* distinct public engagement phases. The first round is the "Listening" stage. It focuses on understanding what the key priorities / issues are with respect to the transit system. The second round will be directly informed by the first. Arranged around the theme of "We heard you, did we get it right?" it will present all the draft components of the plan for public review and feedback.

The public has been asked to provide feedback on the following topics:


- Service frequency
- Hours of operation
- Customer amenities at bus stops
- Infrastructure
- The design of service



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What We Heard Engagement Summary Report

The project process uses diverse engagement techniques to involve the public and stakeholders and to generate and refine recommendations in alignment with the International Association for Public Participation (IAP2) Core Values for Public Participation and the IAP2 Spectrum of Public Participation. Stakeholder and public participation will be a part of both rounds, as noted below, with participation targeted to fulfill the “Involve” aspects of the IAP2 Spectrum of Participation, with some also touching on “Collaborate.”

INCREASING IMPACT ON THE DECISION 					
	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

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IAP2 Spectrum of Public Participation. Source: IAP2, 2018

Process Outline

The first round of engagement was focused on building awareness of the system and project and gathering input from the public, passengers, staff, stakeholders, and leaders on community travel needs and existing system challenges and opportunities.

Engagement in this phase is referred to as the “Listening” stage. It focuses on understanding what the key priorities / issues are with respect to the transit system. Most of the public engagement in this phase was conducted on the RDN’s *Get Involved* website.

Outcomes from Round 1 engagement will be discussed with the project’s Working Group along with the preliminary network redesign direction and any suggested adjustments to system vision and goals. Next, Round 2 engagement will refine the Transit Redevelopment Strategy. This will be followed by revised recommendations and a refined draft report, and then the final report that will guide the future of transit in the RDN.





REGIONAL DISTRICT OF NANAIMO

What We Heard Engagement Summary Report

A timeline of the Transit Redevelopment Strategy process is shown below.



Awareness and Engagement Activities Undertaken

Round 1 engagement used a variety of online engagement tools available via the RDN *Get Involved* website, including:

- A Survey and Quick Poll to gather feedback on the system
- The Ideas tool to gather ideas on routing and service improvements; and,
- An Interactive Map to gather feedback on bus stop improvement suggestions.
- There was also the opportunity to ask questions and view updates.

Engagement tools on the RDN *Get Involved* website were open from June 14 to July 16, 2021.

The survey and other online engagement tools were promoted using the RDN’s social media channels, including its Facebook page and Twitter account. Interior bus cards were also posted on all RDN conventional vehicles and shelter locations. Related comments made via Facebook during the engagement period were also responded to by RDN staff and have been reviewed and summarized here by the project team.

Help shape the future of TRANSIT in the RDN

Provide your feedback on the Transit Redevelopment Strategy by July 16th

<https://www.getinvolved.rdn.ca/trs>

REGIONAL DISTRICT OF NANAIMO CITY OF NANAIMO BCTransit

Interior bus card that was used to promote Round 1 online engagement

Related comments made via Facebook during the engagement period were also responded to by RDN staff and have been reviewed and summarized here by the project team.



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What We Heard Engagement Summary Report

What We Heard

The following provides a summary of results from Round 1. See also the attached detailed results.

Key Themes

- Overall, we heard that survey respondents would like a transit system that is more **frequent**, **connected**, and that **spans more hours**.
- **Efficiency** and **affordability** were also key themes.
- Many participants recognized the positive aspects of transit and said that they would ride the bus more or start riding the bus if the transit system improved in these areas.

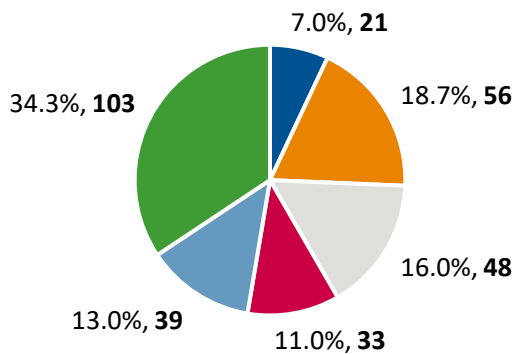
Respondent Transit Use

- Before the COVID-19 pandemic, transit use by participants was split between frequent (using transit every day to 2-4 days per week, 41.7%) and infrequent (not using transit or only using it one day per month to one day per year, 47.4%).

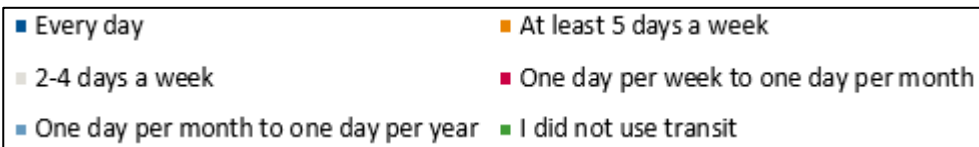
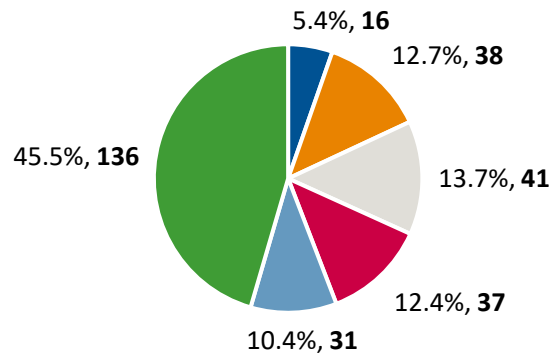


Promotional image that was posted on RDN social media along with a link to the Get Involved website

RDN Transit Use Before COVID-19



RDN Transit Use During COVID-19



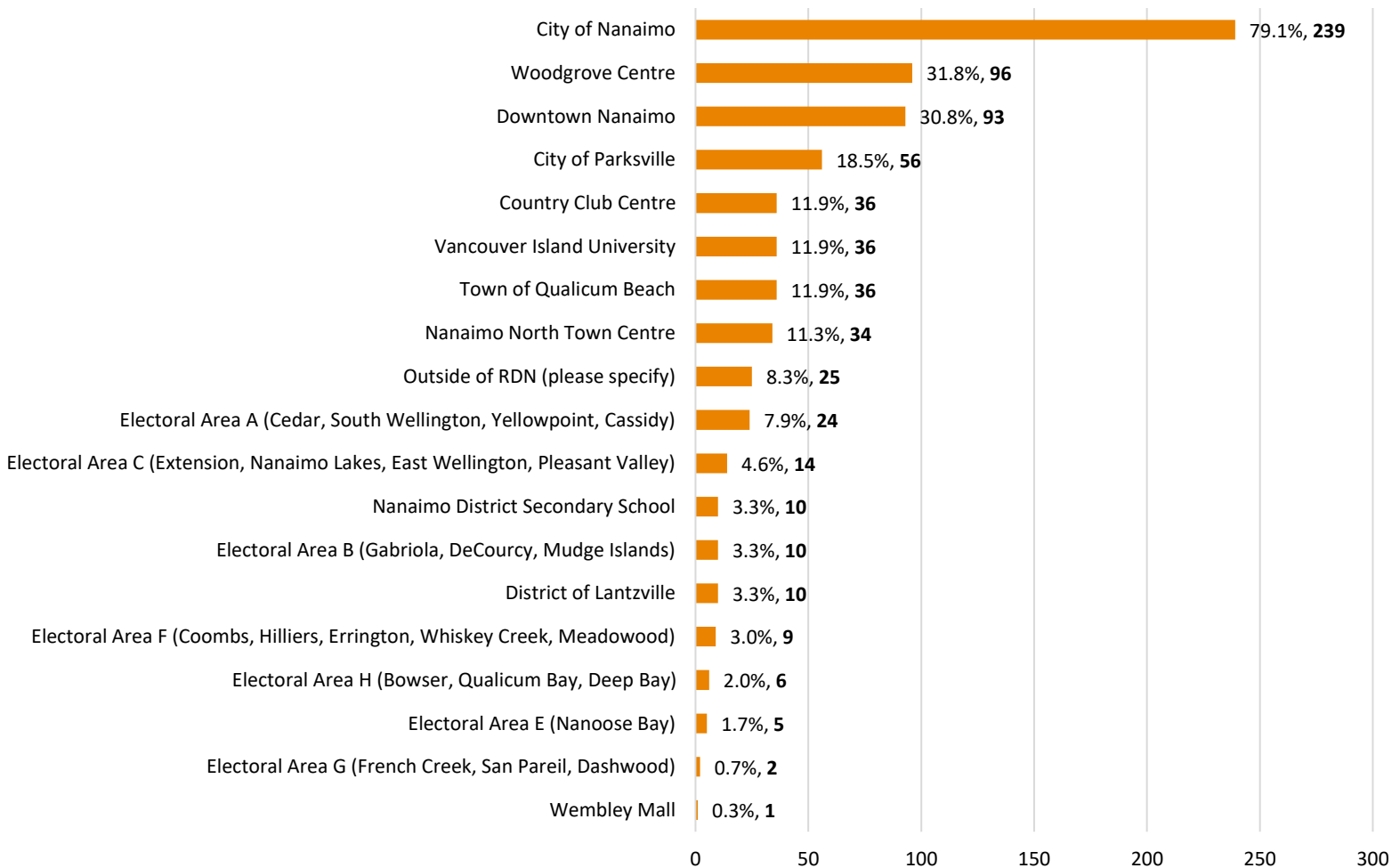


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What We Heard Engagement Summary Report

- The most common reason cited by participants for using RDN Transit prior to COVID-19 was shopping / errands, followed by social / recreation and travel to work. The least common reason was travel to school / post secondary.
 - Since school and post-secondary destinations were typically some of the highest ridership destinations in the system prior to COVID-19, the above responses may indicate that school and post-secondary users were less represented in the survey respondents.
- Participants indicated that their transit use decreased during COVID-19.

Top Destinations for Daily Travel





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What We Heard Engagement Summary Report

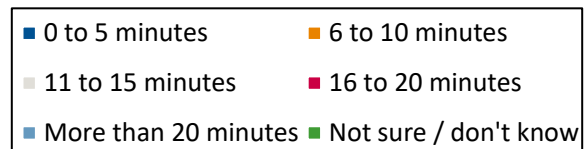
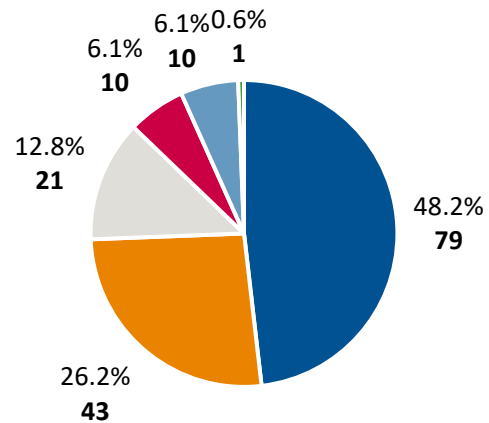
- Most respondents walk to access transit and 74.4% indicated that it takes them 0 to 10 minutes to get to the nearest bus stop or exchange from their home.
- Top routes used by participants were the 40 (VIU Express), 50 (Woodgrove/Downtown), and 30 (NRGH).

Requests for More Frequency

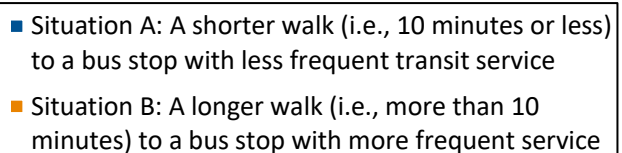
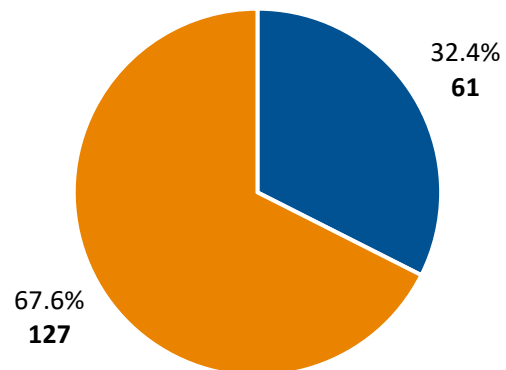
The top trend throughout the survey responses was a desire for increased transit frequency.

- When participants were asked why they don't use transit more often, **the most common response was that trips don't run often enough.**
 - Some participants shared experiences of missing the bus and having to wait 45 minutes or more for the next one.
 - Others commented that they would like more flexibility and to not have to consult a schedule when riding transit.
- The most popular selections for improving transit were **increased frequency on weekdays during the day** and **increased frequency on Sundays and holidays.**
- Participants would also **prefer a longer walk (i.e., 10 minutes or less) to a bus stop with more frequent service** than a shorter walk (i.e., more than 10 minutes) to a bus stop with less frequent service.

Travel Time from Home to Nearest Bus Stop or Transit Exchange



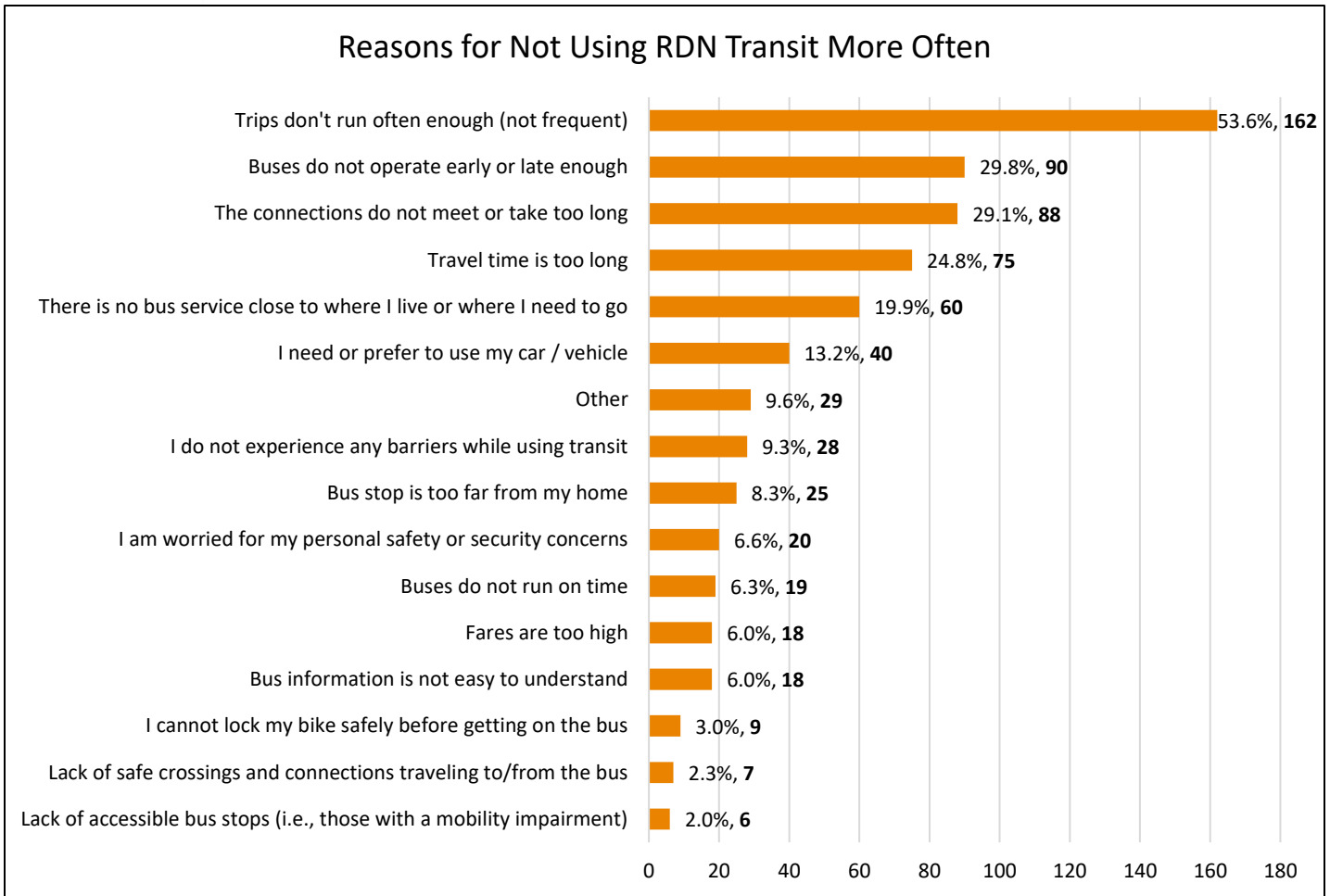
Preferred Travel Options





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What We Heard Engagement Summary Report



Requests for Earlier / Later Service

After transit frequency, the second most common reason for not using transit more often was that **buses do not operate early or late enough**.

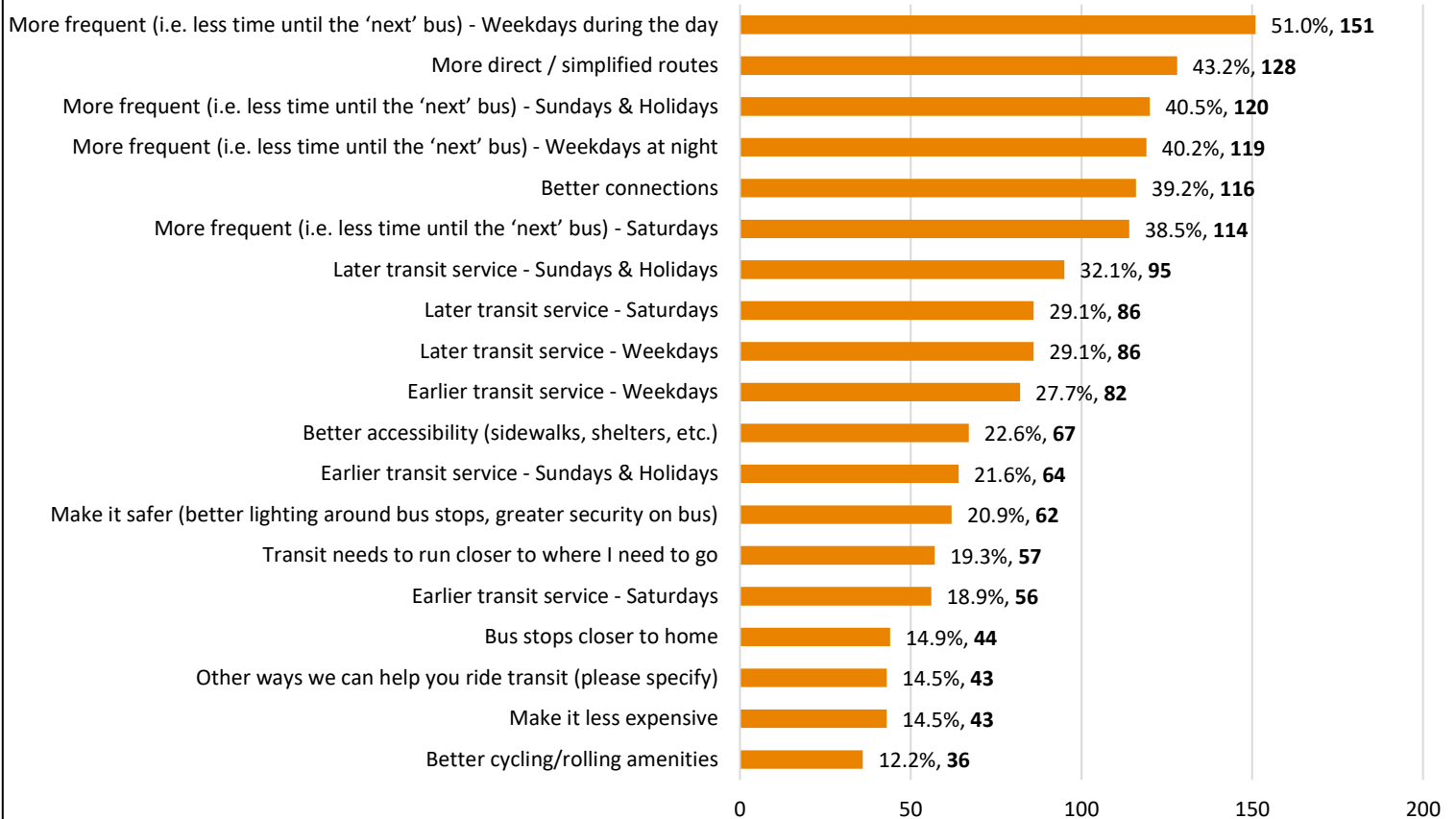
- Some respondents commented that the **current bus schedules do not align with their work shifts and that additional trips are needed in the morning and at night**, especially between Parksville and the City of Nanaimo.
 - For example, a respondent who works at the Nanaimo Regional General Hospital said that their shift starts at 7:00 am and they need an earlier bus to get to work on time.
 - Another participant said that they finish work at 11:00 pm and are rushed to catch the last bus.
 - It was also expressed that later buses into and out of the City of Nanaimo would allow people from neighbouring areas to visit town for the evening and then take the bus home.



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What We Heard Engagement Summary Report

Changes Needed to Improve RDN Transit



Requests for Improved Connections

Having a well-connected transit system is also important to respondents.

- This includes providing service to **key locations** (e.g. ferry terminals, the airport, workplaces, and downtown) and aligning routes and schedules for **easier transfers and lower travel times**.
- When participants were asked to indicate where transit service should be provided that isn't already served, **Duke Point Ferry Terminal** was a common response, as was **Nanaimo Airport** and communities along the Alberni Highway such as **Errington, Coombs, and Hilliers**.
- We also heard that better connectivity is needed between the City of Nanaimo and **Parksville, Lantzville, and Qualicum Beach**.
- Connections to other areas on Vancouver Island outside of the RDN were also highly requested, including **Victoria, Duncan, Ladysmith, Courtenay/Comox, Campbell River**.



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What We Heard Engagement Summary Report

Requests to Increase Transit Directness, Efficiency and Affordability

Increasing the **efficiency of the transit system** was also brought up in some of the survey responses.

- There were requests for **more direct routes** and **implementing a higher frequency “spine” route** with connections to smaller local routes.
- Additionally, some participants indicated that the larger buses appear to have extra capacity and that **smaller buses** would be more appropriate.
- **Affordability** was another theme, with some comments advocating for free transit for seniors and youth, as well as vulnerable riders who can’t afford to pay.
- It was also suggested that a free trial should be offered to introduce more riders to the system and encourage the formation of transit habits.

Suggested Improvements to Customer Information

- When asked about key improvements that could be made to information provided about routes, schedules, and the overall service, many of the responses were **technology related**.
 - Some respondents said that the **online schedule and NextRide trip planner could be made easier to use**, while others asked about **app integration** for viewing schedules and maps and paying fares.
 - A digital rewards program was also suggested.
- Another theme was the need for more **physical schedules**, especially in the form of **signage at bus stops** but also more **printed Rider’s Guides** on board buses.
- We also heard from some respondents that there is a need for **clearer schedules and maps**, including information about how the different routes connect, and that language such as “inbound/outbound” can be confusing.
 - One respondent suggested having a designated transit employee on the bus to act as a guide and answer questions from riders.
 - 24/7 customer service via phone was also requested.

Ranking of Guiding Principles

Participants were also asked to prioritize five guiding principles that were drafted to determine priorities for the next five years of the transit system. The principles in order of average ranking (from highest to lowest priority) were:

1. Easy & Efficient to Use
2. Connected and Integrated
3. Affordable & Fiscally Responsible
4. Accessible & Equitable
5. Environmentally Sustainable.

When participants were asked if there was anything they would like to share about the guiding principles, many indicated that they are all important and tie into one another.



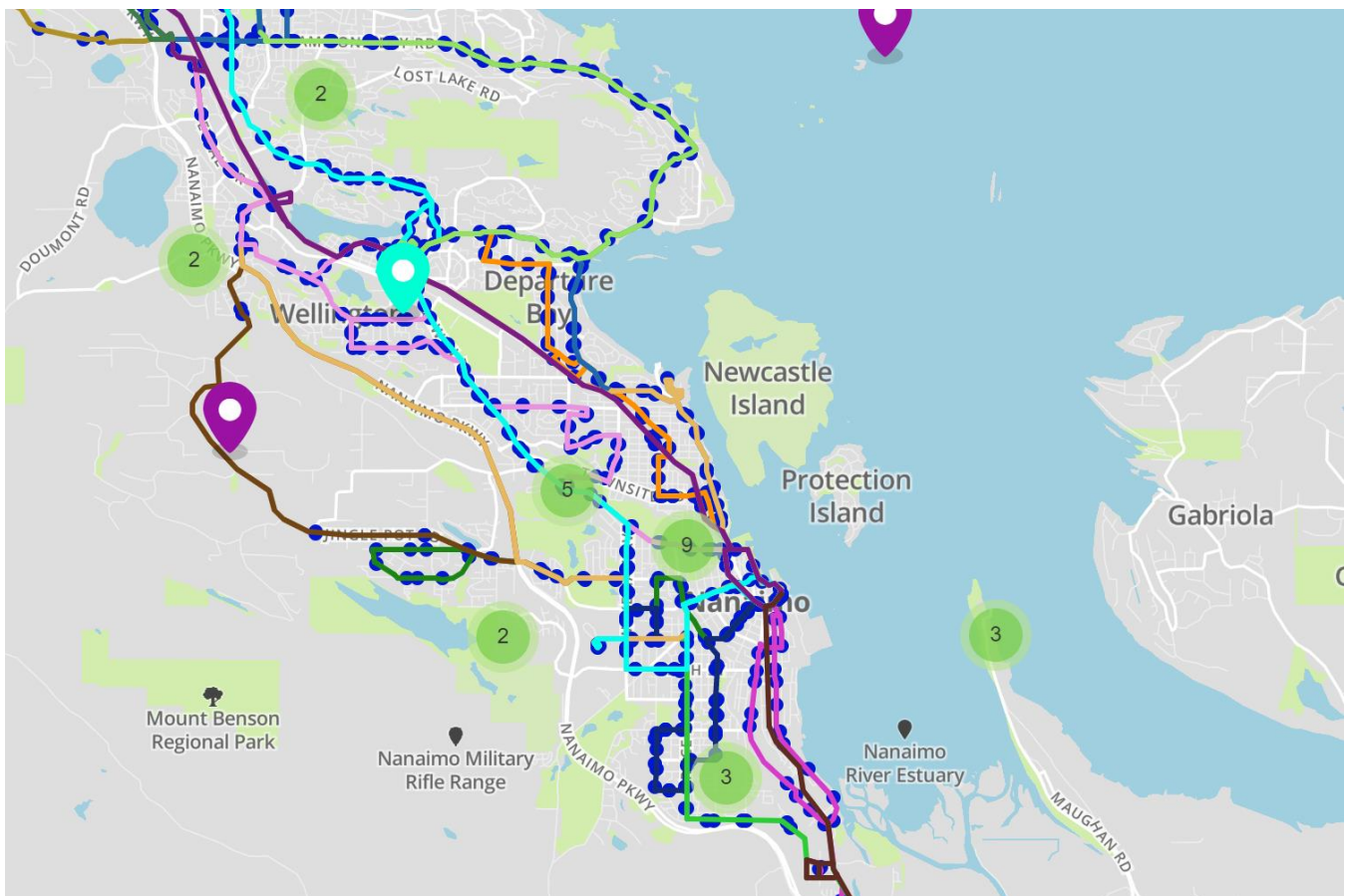


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What We Heard Engagement Summary Report

Interactive Map

The Interactive Map on the engagement site gave people the opportunity to pinpoint locations in the transit network that could be improved. Participants could select from a range of pin types including bus stop or shelter improvements, customer information, on-street amenities, and better connectivity for different travel modes. They could also provide comments about why they think change is needed. The map below shows where the pins were distributed.



Facebook Comments – Key Themes

Feedback was also provided via comments on the RDN's Facebook post promoting the *Get Involved* website.

- The comments followed a similar trend to those provided in the online survey, requesting **earlier and later service hours**, **higher frequency**, **better connectivity**, and **service to specific locations**.
- There were also comments speaking to **bus infrastructure** (e.g., shelters and bus stops), **affordability**, and **efficient use of resources**, as well as **availability of information** and **teaching youth** how to use transit.



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What We Heard Engagement Summary Report

Who We Heard From

527 people visited the RDN *Get Involved* website during the engagement timeframe. Of these, 295 contributed to the Survey. There were also 43 contributions to the Interactive Map that people used to identify where transit improvements (shelters, bus stops, paving, benches, connection points, etc.) are needed.

Survey respondents primarily live in the City of Nanaimo (72.5%). The next most common areas were the Town of Qualicum Beach (6.0%) and the District of Lantzville (4.3%). The City of Nanaimo, Downtown Nanaimo, and Woodgrove Centre were the most common destinations. This suggests that most respondents use transit to travel within the City of Nanaimo.

Most participants fell into the 25-34 age range (19.0%), followed by 55-64 (17.7%) and 65-74 (16.0%).

Next Steps

Outcomes from Round 1 engagement will be discussed with the project's Working Group along with the preliminary network redesign direction and any suggested adjustments to system vision and goals. Feedback will be used to develop draft Transit Redevelopment Strategy recommendations.

Next, Round 2 engagement will present draft components for public review and feedback. Arranged around the theme of "We heard you, did we get it right?", the second round of engagement will present all the draft components of the plan for public review and feedback. Outcomes from the public engagement will be summarized, required revisions to the draft TRS will be assessed and then discussed and confirmed at a follow up Working Group workshop. Timing of public engagement for Round 2 will be from **mid-September – early October 2021**.

Engagement by the numbers...



527 engagement
site visitors



295 surveys
completed



43 pins added to
the map





What We Heard Engagement Summary Report

Project: RDN Transit Redevelopment Strategy

Date: November 8, 2021

Project Overview and Objective for Engagement

The Regional District of Nanaimo (RDN) is undertaking a Transit Redevelopment Strategy to develop a priority plan for improving the RDN's transit services, the links to land use and active transportation, and to increase ridership over the next five years.

The key engagement objectives for this initiative are to involve the public, staff, stakeholders and community leaders in identifying opportunities and making recommendations for RDN Transit service priorities for the next five years. Ultimately the goals of both the project and its engagement are to build awareness and positive perception of the transit system and to deliver a detailed year-by-year action plan to enhance and develop the RDN's transit network and its effectiveness.

The Transit Redevelopment Strategy process included two distinct public engagement phases. The first round was the "Listening" stage. It focused on understanding what the key priorities / challenges are with respect to the transit system. The second round was directly informed by the first. Arranged around the general theme of "We heard you! You want: improved frequency, direct travel and better connections" it presented the draft components of the plan developed from Round 1 input for public review and feedback.

In this second round of engagement, the public was asked to provide feedback on the following topics. Please also see the corresponding maps in **Appendix A**:

- Proposed Primary Network routes, their destinations, phasing, and general proposed frequencies. These routes include the proposed route 1 Nanaimo Rapid Line, route 2 VIU Line, route 3 Nanaimo Hospital Line and the 9 Intercity Line.
- The proposed route structures for the larger transit system as a whole, including information and mapping presented by geographic area for the Central RDN, South RDN and North RDN.
- Proposed infrastructure improvements, including proposed 1 Nanaimo Rapid Line stops, transit signal priority locations and other transit priority measures, potential Park & Ride locations and other potential terminus / mobility hub improvement priorities identified to support the proposed restructured network.


The project process used diverse engagement techniques to involve the public and stakeholders and to generate and refine recommendations in alignment with the International Association for Public Participation (IAP2) Core Values for Public Participation and the IAP2 Spectrum of Public Participation. Stakeholder and public participation



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was part of both rounds, as noted below, with participation targeted to fulfill the “Involve” aspects of the IAP2 Spectrum of Participation, with some also touching on “Collaborate.”

INCREASING IMPACT ON THE DECISION 					
	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
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IAP2 Spectrum of Public Participation. Source: IAP2, 2018

Process Outline

The first round of engagement was focused on building awareness of the system and project and gathering input from the public, passengers, staff, stakeholders, and leaders on community travel needs and existing system challenges and opportunities. Engagement in that phase focused on understanding key areas for improvement to the transit system’s routes, frequencies, hours of operation, service design, and supporting infrastructure. Most of the public engagement in this phase was conducted on the RDN’s *Get Involved* website as well as internal surveys of transit staff.

Outcomes from Round 1 engagement were discussed with the project’s Working Group along with the preliminary network redesign direction and detailed analysis of the system’s performance, opportunities to better serve key destinations and areas of population and employment density, and review of the system’s design with respect to transit best practices.

Based on the Round 1 public engagement the themes heard were: improved frequency, directness of travel, connections and hours of service. The project team developed a suite of proposed routes and services, including higher level “Primary Network” routes offering the most direct and frequent service between key regional destinations, “Local Routes” providing connection to neighbourhoods and communities through fixed



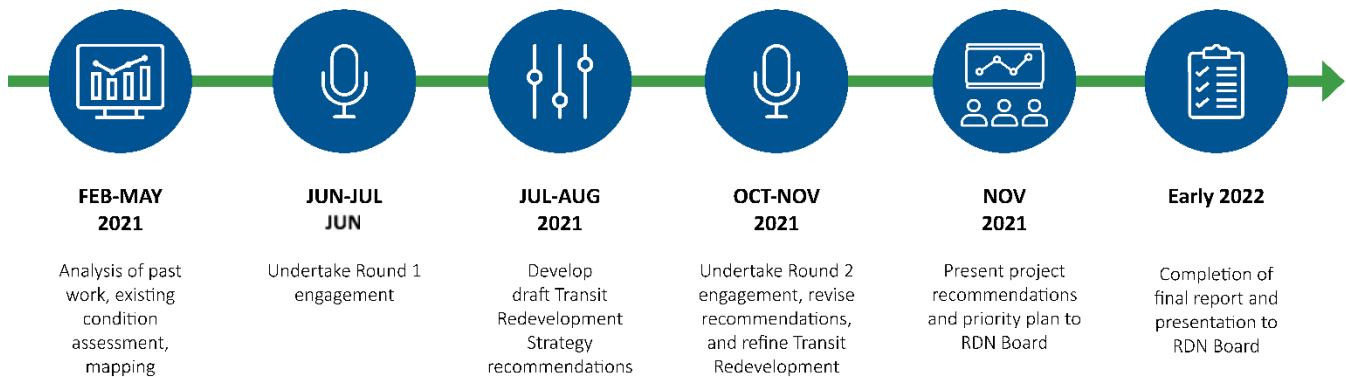
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route and on-demand services, and “Connector Routes” offering interregional connections and links to key transportation nodes, such as to Duncan and Duke Point Ferry. The draft proposed network structures were complemented by draft infrastructure priorities.

The draft proposed routes were presented in the Round 2 public engagement process, with the intent of using the feedback received to help determine further refinements to be considered for the Transit Redevelopment Strategy and further analysis required to support this. Revised recommendations will be incorporated into draft report for presentation to the RDN Transit Select Committee for its consideration, along with the resulting detailed service and infrastructure investment plan for the next five years. If adopted, the resulting Transit Redevelopment Strategy will guide the future of transit in the RDN.

A timeline of the Transit Redevelopment Strategy process is shown below.



Awareness and Engagement Activities Undertaken

Round 2 public engagement invited the community to provide input on proposed routes, services, and infrastructure changes to the RDN Transit network. The proposals were based on analysis, best practices and feedback heard from transit customers, staff and the public in the project’s first round of engagement in summer 2021.



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Round 2 involved the following engagement methods:

- A public survey on the RDN *Get Involved* website that was open from October 14 to November 3, 2021. Links to high-quality PDF maps were provided for each proposed new route, as well as for the proposed infrastructure improvements.
- Five stakeholder workshops held virtually over Microsoft Teams from October 22 to 26, 2021.

The survey was promoted using the RDN's social media channels, including its Facebook page and Twitter account. Interior bus cards were also posted on all RDN conventional vehicles and shelter locations.



We Heard You!
You want:

- Improved Frequency
- Direct Travel
- Better Connections

Tell us what you think about the proposed new routes and services until November 3, 2021 by visiting:

getinvolved.rdn.ca/trs



REGIONAL DISTRICT OF NANAIMO CITY OF NANAIMO BC Transit

Interior bus card that was used to promote Round 2 online engagement



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What We Heard Engagement Summary Report

Who We Heard From

813 people visited the RDN *Get Involved* website during the engagement timeframe. Of these, 248 contributed to the survey.

Survey respondents primarily live in the City of Nanaimo (71.7%). The next most common areas were Electoral Area B (7.8%) and Electoral Area F (4.1%).

Most participants fell into the 35-44 age range (23.4%), followed by 45-54 (18.9%) and 55-64 (16.4%). The smallest age categories were 75+ (3.7%) and 17 and under (4.1%).

Additionally, approximately 100 stakeholder organizations were invited to participate in one of six small-group (5-7 people), 60- to 90-minute workshops held virtually on Microsoft Teams. They were informed that the purpose of the workshop was to provide an update to key local organizations on the project and gather their detailed feedback on draft proposed new routes and priorities for improvements to the overall system, including service levels and infrastructure.

Stakeholders were also encouraged to share the survey link and promotional poster with others in their organizations as well as the larger community.

16 people representing **12 stakeholder organizations** participated in the workshops. Five of the six provided timeslot options were used. The following groups were represented:

- City of Nanaimo
- Gabriola Community Bus Foundation and Gabriola commuters
- School District 68
- South End Community Association
- Nanaimo Chamber
- Stephenson Point Neighbourhood Association (SPNA)
- Nanaimo Family Life Association
- Society of Organized Services (SOS)
- Regional Community Health Network
- Island Health
- Dover Community Association
- Lost Lake Neighbourhood Association

Engagement by the numbers...



813 engagement
site visitors



248 surveys
completed



16 stakeholder
workshop participants



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What We Heard – Online Survey

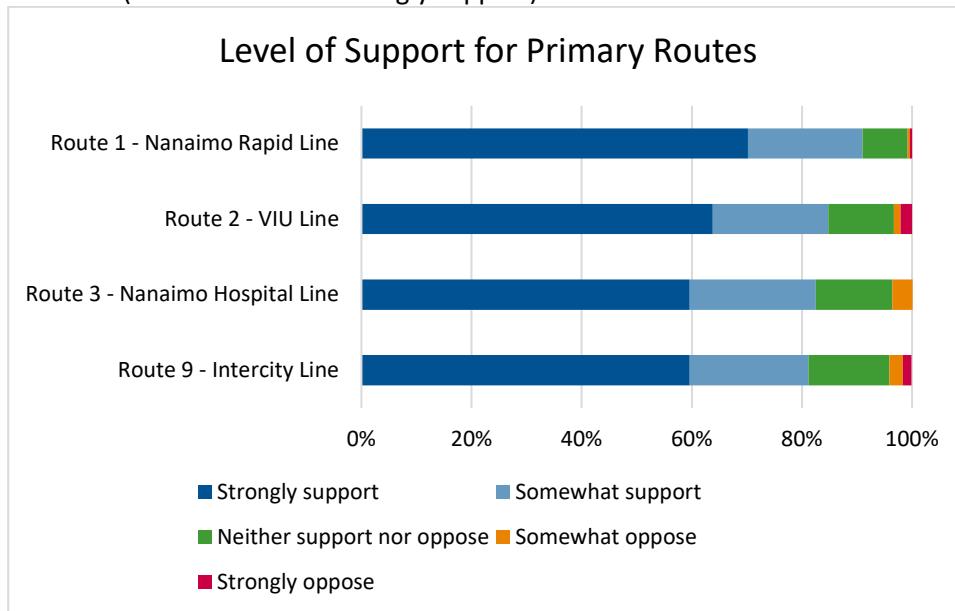
The following provides a summary of the survey results from Round 2. See also the attached detailed results.

Primary Routes

Participants were able to view maps (see **Appendix A**) of each proposed route and were then asked about their level of support for each one. Options ranged from ‘Strongly oppose’ to ‘Strongly support’. Primary routes include:

- **Route 1** Nanaimo Rapid Line
- **Route 2** VIU Line
- **Route 3** Nanaimo Hospital Line
- **Route 9** Intercity Line

The level of support for each primary route is summarized in the graph below. Of the primary routes, level of support was highest for Route 1 (70.2% of respondents strongly support and less than 1% somewhat oppose or strongly oppose). The next most supported primary route was Route 2 (63.8% strongly support), followed by Route 3 and Route 9 (both with 59.6% strongly support).



Participants were also able to provide comments about each proposed route. Their responses are summarized below.



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- **Route 1 Nanaimo Rapid Line**– This route generally received positive feedback. Some respondents expressed that they want to see the route extended to South Nanaimo earlier than the separate Phase 2 extension proposed, as the initial Phase 1 only included from Woodgrove Centre to Downtown Nanaimo. Some respondents also desired extension of this route to serve Cedar and Duke Point Ferry Terminal, with eventual extension to the airport. Having good connections to the Rapid Line from key destinations and residential areas was also seen as highly important.

There was also feedback relating to transit infrastructure, including the need for shelters, garbage facilities, and better lighting and accessibility at bus stops. Concern for pedestrian safety along the highway was also expressed, as well as the need for priority bus lanes and signals.

- **Route 2 VIU Line** – This route also had positive feedback overall. As with Route 1, the importance of lining up connections with side neighbourhoods and outside areas was a theme throughout the comments. Respondents also wanted to ensure that the route accommodates high schools and employment locations. Some respondents were unsupportive of removing bus service from Dover Road, while an almost equal amount noted that they supported the removal from Dover Road to shorten travel times.

There were mixed opinions about maintaining the schedule for this route during the summer when school is not in session, with some respondents in support and others concerned about the efficiency of doing so.

- **Route 3 Nanaimo Hospital Line** – Feedback for this route was largely related to the hospital. Respondents would like to see the schedule synced with hospital shift times and have the bus drop off passengers right in front of the hospital doors. There was also a comment concerned about mixing large numbers of students with people accessing the hospital who use mobility aids.

Other concerns related to the future extension of Route 3 to Vancouver Island University, and the fact that this route seems like a duplication of Route 2. A number of respondents also suggested realigning this route to serve the Departure Bay Road / north east area of Nanaimo rather than duplicating Route 2 along Bowen Road.

- **Route 9 Intercity Line** – This route received mixed responses. Connectivity was a common theme, especially for students travelling to Vancouver Island University (VIU) and Nanaimo District Secondary School (NDSS) but also timed connections to the ferry and downtown. Participants also requested that this route have higher frequency and that buses have more bike rack options.

Additionally, some respondents indicated that this route should extend to the Lantzville village core. Providing service to Errington, Coombs, and Electoral Area F was also mentioned.

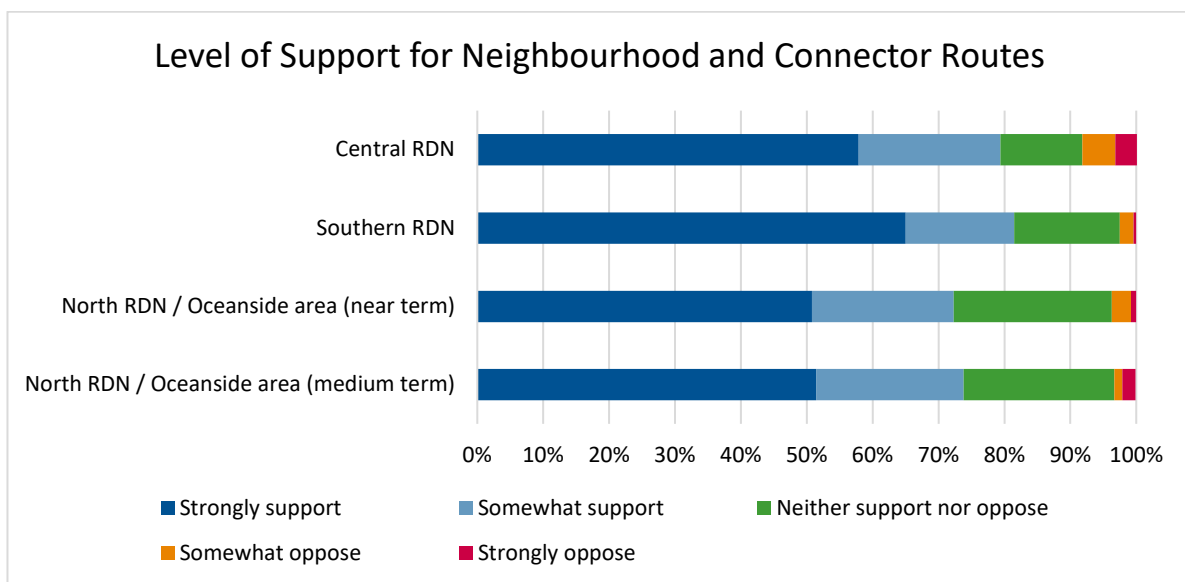


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Neighbourhood and Connector Routes

Next, participants were asked about their level of support for proposed changes to the Central RDN and South RDN parts of the transit network, as well as the North RDN / Oceanside area (in the near and medium term). Their responses are summarized in the graph below. See **Appendix A** for maps of proposed neighbourhood and connector routes.



Changes to the southern part of the transit network had the highest level of support (65% of respondents strongly support and less than 3% somewhat oppose or strongly oppose), while near-term changes to the North RDN / Oceanside area had the lowest (50.8% strongly support). However, of participants who indicated they are residents of the North RDN communities (Lantzville, Parksville, Qualicum Beach, Electoral Areas E, F, G and H), 84.6% either strongly supported or somewhat supported the North RDN medium term proposals. For the Central RDN proposals, there were also 3.3% who strongly oppose and 5% who somewhat oppose the proposed changes to the central part of the transit network.

Additional comments provided for the neighbourhood and connector routes are summarized below.

- **Central RDN** – While there was support for increased service in the Hammond Bay area, several respondents had concerns about Route 12 not going directly to Departure Bay Ferry Terminal or downtown. Removing the existing loop route ferry connection to VIU was also expressed as a concern.



What We Heard

Engagement Summary Report

There was support for the addition of service along Rutherford Road, but a few respondents identified potential safety considerations (such as vehicle speeds and winter weather conditions) with the switchback section of Rutherford Road heading towards Hammond Bay Road.

- **South RDN** – Feedback for this part of the transit network was generally very positive. In particular, the Route 77 to Duke Point Ferry Terminal and Route 70 to Nanaimo Cowichan Express to Duncan received a lot of support. Ensuring good connectivity between the airport / ferry terminal and downtown Nanaimo was seen as important.
- **North RDN / Oceanside area** – This part of the transit network also received positive feedback, with some concerns. The need for service to Errington and Coombs was reiterated several times. Respondents also wanted to ensure that connecting from Route 9 to VIU and NDSS, as well as to the Departure Bay Ferry would be convenient.

Additionally, there was a question about accessing bus stops for Route 36 (Deep Bay), as most residential areas are not within walking distance to the highway.

Transit Infrastructure Improvements

Appendix A also includes the map showing the proposed infrastructure improvements for the RDN transit network. They include:

- Proposed Nanaimo Rapid Line stops
- Potential Park & Ride locations at Hilliers Road, Kaye Road, and Morello Road, as well as at Timberlands Road and/or Cassidy Rest Area
- Opportunities for transit priority measures and signal priority improvements
- Potential for additional Route 9 stops along Highway 19, such as at Superior Road and Ware Road
- Transit exchange / connection hub improvements (including improved passenger amenities) as well as future locations

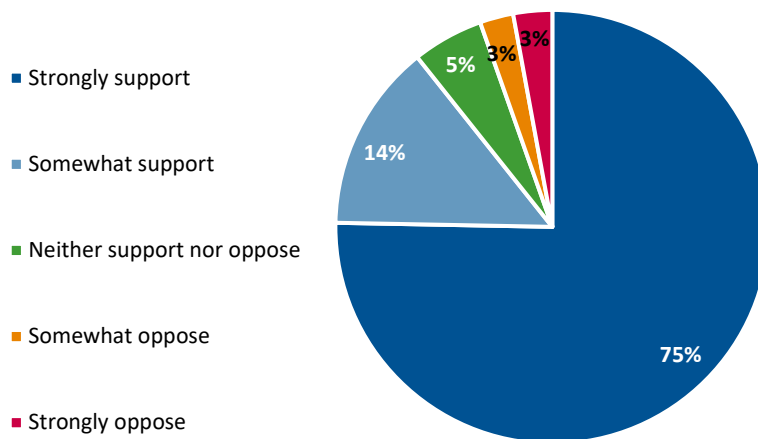


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What We Heard Engagement Summary Report

As shown in the graph below, most respondents either strongly support (75%) or somewhat support (14%) the proposed transit infrastructure improvements.

Level of Support for Proposed Infrastructure Improvements



Several participants provided additional comments about how to improve transit infrastructure in the RDN. Feedback included the following:

- Opposition to the proposed downtown exchange location.
- Need for three-bike capacity bike racks on buses.
- Need for more benches and shelters (ideally weatherproof shelters) and better lighting at bus stops.
- Need for better pedestrian infrastructure, including crosswalks, to access bus stops.

Additional Comments

At the end of the survey, participants were asked if they had any other ideas or comments about how to improve the RDN Transit System. Overall, the feedback was positive and indicated support for the proposed changes. Themes such as the need for more shelters and not moving the downtown exchange to Terminal Avenue / Commercial Street were also reiterated. Additional comments included:

- The need for more buses and later service on Sundays
- Implementing a card / tap payment option
- Adding service to Comox in the future
- Introducing larger buses (such as double deckers) on busy routes
- Need for better signage and information at bus stops



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What We Heard Engagement Summary Report

What We Heard – Stakeholder Workshops

Some of the major themes heard through the stakeholder workshop conversations included:

- **General support for the Primary Network changes**, in particular the introduction of the 1 Nanaimo Rapid Line, the more direct and enhanced service levels through the Nanaimo Regional General Hospital area, and potential for improved service to VIU and along key corridors.
- **Support for many of the other proposed routing changes**, including proposed new service to Duke Point Ferry, Duncan, Rutherford area, as well as the restructuring of service in the Victoria Road / South End area and improved service to the Oceanside Health Centre and better connection between Parksville and Qualicum Beach.
- **General support for the presented draft infrastructure improvements.**
- **Concern and alternate options to explore** to better serve and connect the Hammond Bay area and the north east segment of the City of Nanaimo, as well as potential service levels and routing to connect Woodgrove Centre and VIU and areas between those destinations.
- **Concern to ensure that potential service is being considered for Errington and Coombs** due to what is seen as higher need to connect and access services in the Oceanside core for people who may be choosing to reside in those communities for economic reasons.
- **Background information provided by stakeholders** to continue to better hone services to meet community needs, including key employers and area schools.

Next Steps

Further detailed analysis and development of revised proposals is now underway based on the feedback received to date. Based on this follow up work, proposed next steps for the project include:

- Finalizing network timings, operational review, and costing to confirm the proposed network structure, any trade-offs and the final proposed phasing to improve service frequencies, hours of service and the route structure over the five-year horizon.
- Finalizing the follow up infrastructure analysis now underway to confirm priorities and capital costs for infrastructure improvements.
- Finalizing the Transit Redevelopment Strategy's consolidated investment plan which will show the recommended detailed phasing of service improvements, their associated high level projected operating cost, ridership and revenue impacts, and their supporting infrastructure and fleet capital requirements.
- Preparing the Transit Redevelopment Strategy report for presentation to the RDN Transit Select Committee in January 2022.

APPENDIX D

**RDN TRS Proposed Future Route Frequencies,
Service Spans & Sample Travel Time
Comparisons**

Regional District of Nanaimo Transit Redevelopment Strategy - Proposed Service Level Summaries by Time Period

Year 2: Proposed Service Frequencies (in Minutes) and Hours of Service

Route	Old Route number	Route Type	Weekday						Saturday				Sunday and Holidays						
			Hours of Service	Early Morning (5am-6am)	Peak (6am-9am; 3pm-6pm)	Midday	Evening **	Late Night (After 10pm)	Hours of Service	Morning (7am- 11 am)	Afternoon (11 am to 6 pm)	Evening **	Late Night (After 10pm)	Hours of Service	Morning (to 11am)	Afternoon (after 11am)	Evening (after 6 pm)		
PRIMARY ROUTES																			
1 Nanaimo Rapid Line to Downtown	50	Rapid Transit	5:00am - 12:00am	30	20	30	30	30	6:00am - 12:00am	30	30	30	30	7:00am - 10:00pm	30	30	30		
2 VIU Line	40	Frequent Transit	5:00am - 12:00am	30	10-20	30	30	30	6:00am - 12:00am	30	30	30	30	7:00am - 10:00pm	30	30	30		
3 Hospital Line	30	Frequent Transit	5:00am - 12:00am	30	20	30	30	30	6:00am - 12:00am	30	30	30	30	7:00am - 10:00pm	30	30	30		
9 Intercity Line	91	Regional Transit	5:00am - 12:00am	60	30-60	60	120	120	6:00am - 12:00am	120	60	120	120	7:00am - 10:00pm	120	60-120	120		
NEIGHBOURHOOD ROUTES																			
10 VIU / Woodgrove via Jingle Pot	15	Ridership	6:00am - 11:30pm	60	30	30	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
11 Rutherford - Hospital	1 /30	Ridership	6:00am - 11:30pm	60	30	30	60	60	7:00am - 11:30pm	60	30	60	60	8:00am - 8:00pm	60	60	60		
12 Hammond Bay / Departure Bay Ferry	20	Ridership	6:00am - 11:30pm	30	30	30	60	60	7:00am - 11:30pm	30	30	60	60	8:00am - 8:00pm	60	60	60		
15 Westwood to VIU	5	Coverage	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
16 Harewood / South End	6	Coverage	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
17 Cinnabar	7	Coverage	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
18 Cedar / VIU	8	Ridership	6:00am - 11:30pm	60	60	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
31 Lantzville	11	Coverage	6:30am - 9:00pm	-	60	60-120	120	-	7:30am - 7:00pm	60-120	60	120	-	8:00am - 8:00pm	120	60-120	120		
88 Parksville	88	Coverage	6:30am - 9:00pm	-	60	60	60	-	7:30am - 7:00pm	60	60	60	-	-	-	-	No Service		
97 Eaglecrest	97	Coverage	6:30am - 9:00pm	-	60	60	60	-	7:30am - 7:00pm	60	60	60	-	-	-	-	No Service		
98 Qualicum Beach	98	Coverage	6:30am - 7:00pm	-	60	60	60	-	7:30am - 7:00pm	60	60	60	-	-	-	-	No Service		
99 Deep Bay	99	Coverage	Two trips / day, Monday - Friday						Two trips / day						No Service				
CONNECTOR ROUTES																			
70 NCX - Nanaimo Cowichan Express	-	Connector	7 Round Trips						6 Round Trips						No service				
72 Hammond Bay - NRGH - VIU Commuter	-	Connector	6-9am; 2-6pm	-	30	1 trip	-	-	No Service						No Service				
78 Airport - Cassidy Connector via Haliburton	78	Connector	6:00am - 9:30 pm	5 Round Trips						7:00am - 10:00pm	4 Round Trips						No service		

Note: Highlighted routes would retain similar route numbers and names until their respective significant expansion and restructuring currently planned for either Year 3 or Year 4/5. (See the following proposed frequencies for those respective years in this document).

Year 3: Proposed Service Frequencies (in Minutes) and Hours of Service

Route	Old Route number	Route Type	Weekday						Saturday				Sunday and Holidays						
			Hours of Service	Early Morning (5am-6am)	Peak (6am-9am; 3pm-6pm)	Midday	Evening **	Late Night (After 10pm)	Hours of Service	Morning (7am- 11 am)	Afternoon (11 am to 6 pm)	Evening **	Late Night (After 10pm)	Hours of Service	Morning (to 11am)	Afternoon (after 11am)	Evening (after 6 pm)		
PRIMARY ROUTES																			
1 Nanaimo Rapid Line to South Parkway Plaza	50 + 7	Rapid Transit	5:00am - 12:00am	30	15	20	30	30	6:00am - 12:00am	20	20	30	30	7:00am - 10:00pm	30	30	30		
2 VIU Line	40	Frequent Transit	5:00am - 12:00am	30	10-15	20	30	30	6:00am - 12:00am	20	20	30	30	7:00am - 10:00pm	30	30	30		
3 Hospital Line to VIU	30	Frequent Transit	5:00am - 12:00am	30	15	20	30	30	6:00am - 12:00am	20	20	30	30	7:00am - 10:00pm	30	30	30		
9 Intercity Line	91	Regional Transit	5:00am - 12:00am	60	30-60	60	120	120	6:00am - 12:00am	120	60	120	120	7:00am - 10:00pm	120	60-120	120		
NEIGHBOURHOOD ROUTES																			
10 VIU / Woodgrove via Jingle Pot	15	Ridership	6:00am - 11:30pm	60	30	30	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
11 Rutherford - Hospital	1 /30	Ridership	6:00am - 11:30pm	60	30	30	60	60	7:00am - 11:30pm	60	30	60	60	8:00am - 8:00pm	60	60	60		
12 Hammond Bay / Departure Bay Ferry	20	Ridership	6:00am - 11:30pm	30	30	30	60	60	7:00am - 11:30pm	30	30	60	60	8:00am - 8:00pm	60	60	60		
15 Westwood to VIU	5	Coverage	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
16 Harewood / South End	6	Ridership	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
17 Cinnabar	7	Coverage	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
18 Cedar / VIU	8	Ridership	6:00am - 11:30pm	60	60	60	60	60	7:00am - 11:30pm	60	60	60	60	8:00am - 8:00pm	60	60	60		
19 Cassidy / Airport via Haliburton	7 + 78	Coverage	6:30am - 7:00pm	-	60-120	120	120	-	7:30am - 7:00pm	120	120	120	-	9:00am - 6:00pm	120	120	120		
31 Lantzville	11	Coverage	6:30am - 9:00pm	-	60	60-120	120	-	7:30am - 9:00pm	60-120	60	120	-	8:00am - 8:00pm	120	60-120	120		
88 Parksville	88	Coverage	6:30am - 9:00pm	-	60	60	60	-	7:30am - 7:00pm	60	60	60	-	-	-	-	No Service		
97 Eaglecrest	97	Coverage	6:30am - 9:00pm	-	60	60	60	-	7:30am - 7:00pm	60	60	60	-	-	-	-	No Service		
98 Qualicum Beach	98	Coverage	6:30am - 7:00pm	-	60	60	60	-	7:30am - 7:00pm	60	60	60	-	-	-	-	No Service		
99 Deep Bay	99	Coverage	Two trips / day, Monday - Friday						Two trips / day						No Service				
CONNECTOR ROUTES																			
70 NCX - Nanaimo Cowichan Express	-	Connector	7 Round Trips						6 Round Trips						No service				
72 Hammond Bay - NRGH - VIU Commuter	-	Connector	6-9am; 2-6pm	-	30	1 trip	-	-	No Service						No Service				
77 Duke Point Ferry Connector	-	Connector	6:00am - 9:30 pm	Every 2.5 hours in keeping with ferry schedule						7:00am - 10:00pm	Every 2.5 hours in keeping with ferry schedule						Every 2.5 hours		

Note: Highlighted routes would retain similar route numbers and names until their respective significant expansion and restructuring currently planned for Year 5. (See the following proposed frequencies for that respective year).

Regional District of Nanaimo Transit Redevelopment Strategy - Proposed Service Level Summaries by Time Period

Year 4-5: Proposed Service Frequencies (in Minutes) and Hours of Service

Route	Old Route number	Route Type	Weekday						Saturday					Sunday and Holidays						
			Hours of Service	Early Morning 5am-6am	Peak (6am-9am; 3pm-6pm)	Midday	Evening	Late Night (After 10pm)	Hours of Service	Morning (7am- 11 am)	Afternoon (11 am to 6 pm)	Evening	Late Night (After 10pm)	Hours of Service	Morning (to 11am)	Afternoon (after 11am)	Evening (after 6 pm)			
PRIMARY ROUTES																				
1 Nanaimo Rapid Line to South Parkway Plaza	50 + 7	Rapid Transit	5:00am - 12:00am	30	15	20	20	30	6:00am - 12:00am	20	20	20	30	7:00am - 10:00pm	30	20	30			
2 VIU Line	40	Frequent Transit	5:00am - 12:00am	30	10-15	20	20	30	6:00am - 12:00am	20	20	20	30	7:00am - 10:00pm	30	20	30			
3 Hospital Line to VIU	30	Frequent Transit	5:00am - 12:00am	30	15	20	20	30	6:00am - 12:00am	20	20	20	30	7:00am - 10:00pm	30	20	30			
9 Intercity Line	91	Regional Transit	5:00am - 12:00am	60	30	60	60	120	6:00am - 12:00am	60	60	60	120	7:00am - 10:00pm	120	60	120			
NEIGHBOURHOOD ROUTES																				
10 VIU / Woodgrove via Jingle Pot	15	Ridership	6:00am - 11:30pm	60	30	30	30	60	7:00am - 11:30pm	60	30	60	60	8:00am - 10:00pm	60	30	60			
11 Rutherford - Hospital	1 /30	Ridership	6:00am - 11:30pm	60	30	30	30	60	7:00am - 11:30pm	60	30	60	60	8:00am - 10:00pm	60	30	60			
12 Hammond Bay / Departure Bay Ferry	20	Ridership	6:00am - 11:30pm	30	30	30	30	30	7:00am - 11:30pm	30	30	60	30	8:00am - 10:00pm	60	30	60			
15 Westwood to VIU	5	Coverage	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	30	60	60	8:00am - 10:00pm	60	60	60			
16 Harewood / South End	6	Ridership	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	30	60	60	8:00am - 10:00pm	60	60	60			
17 Cinnabar	7	Coverage	6:00am - 11:30pm	60	30-60	60	60	60	7:00am - 10:00pm	60	30-60	60	60	8:00am - 10:00pm	60	60	60			
18 Cedar / VIU	8	Ridership	6:00am - 11:30pm	60	30	60	60	60	7:00am - 11:30pm	60	30	60	60	8:00am - 10:00pm	60	60	60			
19 Cassidy / Airport via Haliburton	7 + 78	Coverage	6:30am - 7:00pm	-	60-120	120	120	-	7:30am - 7:00pm	120	120	120	-	9:00am - 6:00pm	120	120	120			
31 Lantzville	11	Coverage	6:30am - 9:00pm	-	60	60-120	120	-	7:30am - 9:00pm	60-120	60	120	-	8:00am - 8:00pm	120	60-120	120			
32 Oceanside Connector	97	Coverage	6:30am - 9:30pm	-	60	60	60	-	7:30am - 9:30pm	60	60	60	-	8:00am - 6:00pm	90	60	-			
33 Parksville / East Qualicum Beach	88	Coverage	6:30am - 9:30pm	-	60	60	60	-	7:30am - 9:30pm	60	60	60	-	8:00am - 6:00pm	90	60	-			
34 Qualicum Beach Loop	98	Coverage	6:30am - 9:30pm	-	60	60	60	-	7:30am - 9:30pm	60	60	60	-	8:00am - 6:00pm	90	60	-			
35 Nanoose / South Parksville + On-Demand	91	Coverage	6:30am - 9:30pm	-	60	60-120	120	-	7:30am - 9:30pm	60-120	60	120	-	8:00am - 6:00pm	120	60-120	-			
36 Deep Bay + On-Demand	99	Coverage	Three trip windows / day						Three trip windows / day						Two trip windows / day					
37 Errington- Coombs On-Demand	-	Coverage	Three trip windows / day						Three trip windows / day						No Service					
CONNECTOR ROUTES																				
70 NCX - Nanaimo Cowichan Express	-	Connector	7 Round Trips						6 Round Trips						No service					
72 Hammond Bay - NRGH - VIU Commuter	-	Connector	6-9am; 2-6pm	-	30	1 trip	-	-	No Service						No Service					
77 Duke Point Ferry Connector	-	Connector	6:00am - 9:30 pm	Every 2.5 hours in keeping with ferry schedule						7:00am - 10:00pm	Every 2.5 hours in keeping with ferry schedule						Every 2.5 hours			

Regional District of Nanaimo Transit Redevelopment Strategy – Sample Travel Time Comparisons

The following provides sample travel time comparisons based on the projected Year 5 route structure. Note that projected travel times for the proposed network are high level estimates that may be impacted based on future detailed scheduling and actual running times at the time of implementation. Existing network frequencies are based on fall 2021 average weekday morning peak frequencies.

From	To	Existing Network			Proposed Network		
		Route*	Fastest Travel Time	Frequency	Route*	Fastest Travel Time	Frequency
Downtown Nanaimo	Woodgrove	Multiple options	22 min	30-60 min each	1, 2, or 3 (or others)	20 min	10-15 min each = 4-5 min
Downtown Nanaimo	VIU	40 (or 5, 6)	14 min	10-15 min (rte 40)	2 or 3 (or 16)	10 min	10-15 min each = 5-7 min
Departure Bay Rd at Hammond Bay Rd	Nanaimo Hospital	20→30	26 min	30 min→30 min	3, 12 or 72	7 min	10-15 min
Nanaimo Hospital	Woodgrove	30	39 min	30 min	3 (or 11, 12, 72; or 3→1)	28 min (or less)	10-15 min
Departure Bay Ferry	Bowen Rd at Northfield Rd	20 or 25→40	36 min	30 – 120 min	12	13 min	30 min
Victoria Rd @ Needham St	VIU	7→40	50 min	60 min→10-15 min	16	18 min	30 min
Victoria Rd @ Needham St	Downtown	7	36 min	60 min	16	7 min	30 min
Cedar	Nanaimo Hospital	8→40→30	49 min	60 min→10-15 min→30 min	8→1→3 or 8→3	40 min	30 min→10-15 min→10-15 min
Ravensong Exchange	Parksville Exchange	91	22 min	30-60 min	9, 32 or 33	20 min	15-30 min
Ravensong Exchange	Downtown Nanaimo	91→ 50	96 min	30-60 min→60 min	9→1	92 min	30-60 min→15 min
Ravensong Exchange	VIU	91→15	80 min	30-60 min→30-60 min	9→10 or 2	80 min	30-60 min→60 min or 10-15 min
Ravensong Exchange	Departure Bay Ferry	91→20 or 25	105 min	30-60 min→30-60 min	9→12	86 min	30-60 min→30 min

“→” is used to show transfer between two routes.

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REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY



INFRASTRUCTURE SUMMARY (APPENDIX E)
February 2022



1.0 CAPITAL AND INFRASTRUCTURE OVERVIEW

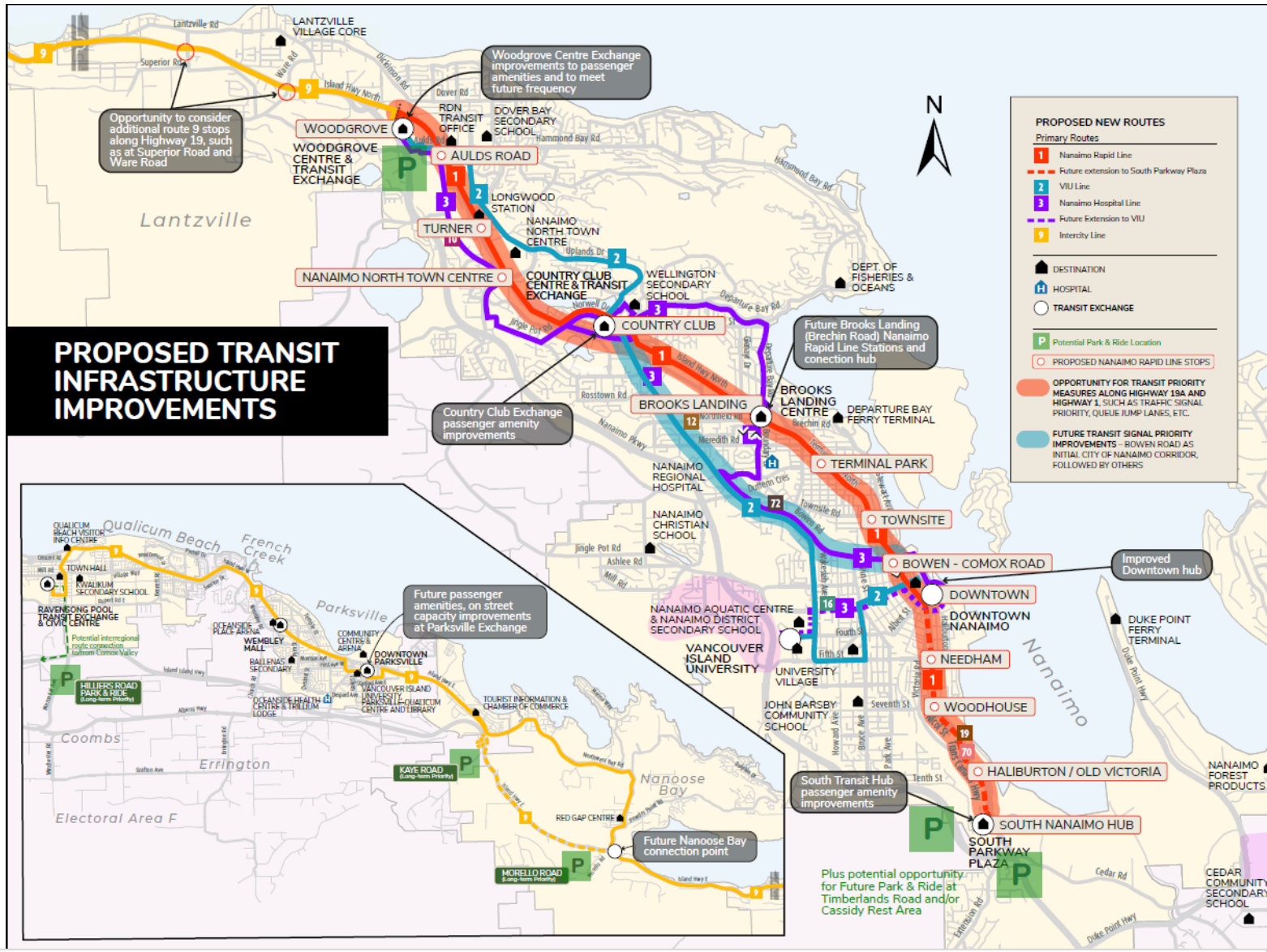


FIGURE 1 PROPOSED TRANSIT INFRASTRUCTURE IMPROVEMENTS

Complementing the system-wide changes to service proposed in **the Transit Redevelopment Strategy (TRS)**, several infrastructure improvements are proposed to support the elements of the Transit Strategy as it develops.

- **This section**, including the preceding map and the following tables, provide an overview of the system-wide capital and infrastructure details needed to implement the service strategies identified in the TRS.
- **Section 1.1** outlines suggested next steps for the Regional District of Nanaimo (RDN) and its partners the City of Nanaimo, BC Transit and the Ministry of Transportation & Infrastructure (MoTI) to work together to plan and implement the improvements.
- **Section 2.0** provides further detail on each of the priority improvements by corridor and by type.

The most critical infrastructure need in the RDN transit system currently is a **new and/or expanded Operations and Maintenance (O&M) Facility**. This Plan does not go into details of this requirement because planning work for this, led by BC Transit and the RDN, has been initiated. We do note that any future service expansion is contingent on this facility being completed. The improvements outlined in the TRS could take several years to complete. However, this document outlines how some of them can be undertaken over the five-year span of this plan, with near-term opportunities identified from Year 1 to 3 and medium- to long-term ones identified from Year 4 and beyond. This is illustrated in pages 3 to 5, where a prioritized

summary of all the infrastructure changes is documented. In sections 1.1 to 1.7 these changes have been described in detail.

In laying out these infrastructure priorities, it is understood that workplans, priorities and available funding play key roles in their execution and therefore the actual year they would be completed could vary. It is important to note that the improvements are prioritized in the order of implementation of the service strategies discussed in TRS Section 6.2 and as a result, changes to the priority order of the infrastructure strategies could impact service strategy implementation.

In addition to funding, multi-agency partnerships or agreements are one of the most effective ways of ensuring that the recommendations in this report are achieved. The RDN collaborates with several different municipalities in the region, as well as with BC Transit and the Ministry of Transportation & Infrastructure (MoTI). A **master agreement** that addresses infrastructure improvements in the different areas of the RDN and associated agency roles and responsibilities will be helpful in the long term.

It is hoped that the recommendations provided in the section provide a strong framework for future partnerships that the RDN can build on, to develop this system, not just over the next five years but over the longer term as well.

Developing Rapid Transit and Frequent Transit Corridors in the RDN

Transit priority measures, exchanges and other infrastructure improvements needed for the RDN system to implement the Transit Redevelopment Strategy

Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement	Required next step	Target Implementation Date	Recommended Priority Level (1-3)	Partners
All	MOU	All	All	Agreement between RDN, City of Nanaimo, BC Transit and MoTI to work together on infrastructure improvements to support transit, including roles and responsibilities, agreement in principle to coordinate on types of signal controller and other technology/infrastructure guidelines to be used, next steps and priorities.	Convene working group to develop MOU	ASAP	Recommended first step prior to all other activities	RDN, City of Nanaimo, BC Transit, MoTI
All	Expanded Operations and Maintenance Facility Capacity	All	All	Expanded Operations and Maintenance Facility Capacity - Additional vehicle maintenance and storage space (either on-site or at additional facility) to accommodate additional vehicles plus also Battery Electric Bus storage/charging/maintenance capacity.	Transit Facility Master Planning Work to Begin in Near Term	TBD	1 - Required for longer term continued service implementation	RDN, BC Transit
Rapid Transit Corridor + Frequent Transit Corridor	Stations/Stops	Woodgrove Exchange to Downtown Nanaimo (Island Hwy, Terminal Ave, Hwy 1)	Brooks Landing / Brechin Road	Phase 1 Rapid Line - Brooks Landing Improvements - Installation of initial stops in the Brooks Landing / Brechin Road area (may or may not have shelters, depends on space availability) plus potentially queue jumps to support route 1 implementation, plus potentially connections from other routes and Frequent Line 3.	Requires conceptual design & costing	Yr 2/3	1 - Required for service implementation	RDN, BC Transit, MoTI
Rapid Transit Corridor	Stations/Stops	Woodgrove Exchange to Downtown Nanaimo (Island Hwy, Terminal Ave, Hwy 1)	Phase 1 Rapid Line Corridor from Woodgrove to Downtown.	Phase 1 Rapid Line - Other Rapid Line Stops - Implementation of additional new stops (with signage, shelters and amenities) at Aulds Road, Turner Road, Townsite/Rosehill Street and Comox Road, plus signage and additional passenger amenities as required at Woodgrove Exchange, Country Club Exchange, Terminal Avenue and Downtown	Requires conceptual design & costing	Yr 2/3	1 - Required for service implementation	City of Nanaimo, RDN, BC Transit, MoTI
Frequent Transit Corridor (Departure Bay Road)	Stations/Stops	Departure Bay Road (Route 3)	Departure Bay Road at Hammond Bay Road	Frequent Transit - Enhanced Connection Point - Shelters, passenger waiting area, upgraded passenger amenities to serve multiple connecting routes in area (Frequent Line 3 + Routes 12 and 72)	Requires conceptual design & costing	Yr 2/3	2 - Priority to optimize service	City of Nanaimo, RDN, BC Transit
Frequent Transit Corridor (Bowen Corridor)	Stations/Stops	Bowen Corridor (Routes 2 & 3)	Bowen Road at Wakesiah Road	Frequent Transit - Enhanced Connection Point - Shelters, passenger waiting area, upgraded passenger amenities to serve multiple connecting Frequent routes	Requires conceptual design & costing	Yr 2/3	2 - Priority to optimize service	City of Nanaimo, RDN, BC Transit
Frequent Transit Corridor (Bowen Corridor)	Stations/Stops	Bowen Corridor (Routes 2 & 3)	Bowen Road at Dufferin Crescent	Frequent Transit - Enhanced Connection Point - Shelters, passenger waiting area, upgraded passenger amenities to serve multiple connecting Frequent routes	Requires conceptual design & costing	Yr 2/3	2 - Priority to optimize service	City of Nanaimo, RDN, BC Transit
Rapid Transit Corridor	Exchange	Downtown Nanaimo to South Nanaimo Transit Hub (Terminal Ave, Hwy 1)	South Nanaimo Transit Hub	Phase 2 Rapid Line - South Transit Hub Improvements - Expanded capacity at South Nanaimo Transit Hub, amenity upgrades, transit operator washroom / respite area	Requires conceptual design & costing	Yr 3/4	1 - Required for service implementation	RDN, City of Nanaimo, BC Transit

Developing Rapid Transit and Frequent Transit Corridors in the RDN

Transit priority measures, exchanges and other infrastructure improvements needed for the RDN system to implement the Transit Redevelopment Strategy

Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement	Required next step	Target Implementation Date	Recommended Priority Level (1-3)	Partners
Rapid Transit Corridor	Stations/Stops	Downtown Nanaimo to South Nanaimo Transit Hub (Terminal Ave, Hwy 1)	Phase 2 Rapid Line Corridor from Downtown to South Nanaimo Transit Hub	Phase 2 Rapid Line - Other Rapid Line Stops - Implementation of additional new stops (with signage, shelters and amenities) on Terminal Avenue at Commercial Street (Downtown Nanaimo) plus at Needham Street, Woodhouse Street and Haliburton Streets.	Requires conceptual design & costing	Yr 3/4	1 - Required for service implementation	City of Nanaimo, RDN, BC Transit, MoTI
Rapid Transit Corridor + Frequent Transit Corridor	Exchange	Woodgrove Exchange to Downtown Nanaimo (Island Hwy, Terminal Ave, Hwy 1)	Country Club Exchange	Country Club Exchange Comprehensive Improvements - Expanded capacity and amenity upgrades at Country Club Exchange + nearby intersection/road network changes to streamline service on Ross and Hammond Bay Roads; potentially consider implementation of roundabouts on Norwell Road at Hammond Bay and Ross Roads	Build from previous conceptual design studies.	Yr 3/4	2 - Priority to optimize service	RDN, City of Nanaimo, BC Transit
Rapid Transit Corridor + Frequent Transit Corridor	Exchange	Woodgrove Exchange to Downtown Nanaimo (Island Hwy, Terminal Ave, Hwy 1)	Downtown Nanaimo Exchange	Downtown Nanaimo Exchange Comprehensive Improvements - Build new exchange at new location including passenger amenities, waiting area, transit operator washroom and respite area and layover space	Depends on direction from City, outcomes from recent engagement	Yr 3/4	2 - Priority to optimize service	RDN, City of Nanaimo, BC Transit, MoTI
Rapid Transit Corridor + Frequent Transit Corridor	Exchange	Woodgrove Exchange to Downtown Nanaimo (Island Hwy, Terminal Ave, Hwy 1)	Woodgrove Exchange	Woodgrove Exchange Comprehensive Improvements - Expanded bus and passenger capacity at Woodgrove Exchange (or in vicinity at Mary Ellen Drive) and amenity upgrades to support long term growth of the service.	Build from previous conceptual design studies.	Yr 5/6	2 - Priority to optimize service	RDN, City of Nanaimo, BC Transit
Rapid Transit Corridor + Frequent Transit Corridor	Exchange	Woodgrove Exchange to Downtown Nanaimo (Island Hwy, Terminal Ave, Hwy 1)	Brooks Landing	Brechin Road / Departure Bay Road Redesign + Brooks Landing Long Term Exchange Improvements - Potentially in tandem with redesign of Brechin and Departure Bay Roads, consider opportunity to consolidate Brooks Landing area stops into an exchange point to support long term growth of the service.	Study to be completed before implementation of changes	Long-term	3 - As resources permit for long-term service function	RDN, City of Nanaimo, BC Transit, MoTI
Rapid Transit Corridor	Queue Jump Lane	Island Hwy / Hwy 1 Woodgrove Exchange to Downtown Nanaimo	Island Highway at Mary Ellen Drive	Queue jump in unused left turn lane for NB Route 1	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoT
			Island Highway at Dickinson Road	NB and SB queue jumps at islands	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoT
			Island Highway at Aulds Road	NB and SB queue jumps at islands	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoT
			Island Highway at Rutherford Road	NB and SB queue jumps at islands	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoT

Developing Rapid Transit and Frequent Transit Corridors in the RDN

Transit priority measures, exchanges and other infrastructure improvements needed for the RDN system to implement the Transit Redevelopment Strategy

Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement	Required next step	Target Implementation Date	Recommended Priority Level (1-3)	Partners
Rapid Transit Corridor	Updated signal timing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	All intersections on Highway 19 from Mary Ellen Drive to Haliburton Street	Prioritising N/S bus movement	Prelim review complete and strategy developed/Implementation Plan to be completed	TBD	TBD	MoT
Rapid Transit Corridor	Removing Split phasing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Bowen Road	Prioritising south bound bus movement	Strategy/study on existing signal timing to be completed	TBD	TBD	MoT
Rapid Transit Corridor	Update traffic signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Brechin Road	Improving traffic movement at intersection	Study of intersection needed/coordination with landuse	Longer Term	TBD	MoT
Rapid Transit Corridor	Pedestrian signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	TransCanada Highway at Woodhouse Road	To enable safe pedestrian crossing for alighting and boarding passengers	MoTI to install ped crossing	Longer Term	TBD	MoT
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Kenworth Road	Prioritising E/W bus movement on Bowen Corridor (largely E/w some n/s movements as well)	Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Meredith Road		Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Wellington Road		Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Prideaux Street		Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Wallace Street		Detailed planning to be completed	TBD	TBD	City of Nanaimo
requent Transit Corridor	Transit Signal Priority and remove Split Phasing	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Northfield Road	To enable improved bus speed	Detailed planning to be completed	TBD	TBD	City of Nanaimo
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority and queue jump lanes	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Labieux Road	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Dufferin Crescent	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Pryde Avenue	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Buttertubs Drive	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Wakesiah Avenue	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Pine Street	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Machleary Street	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo

1.1 SUGGESTED NEXT STEPS

Each of the elements described in the following Sections 2.1 to 2.7 from an expanded transit operations and maintenance facility to bus stops, priority measures, exchanges and Park & Rides are elements of the transit system that work together with service implementation to contribute to the following:

- Increased ability to connect within the system (bus stops, Park & Rides, exchanges).
- Improved perception of safety (bus stops, exchanges, passenger amenities).
- Improved speed and reliability (transit signal priority, queue jump lanes).

These work with improved service frequency and service span (as recommended in the TRS) to then enhance the accessibility of the system and improve its overall efficiency, effectiveness, attractiveness to users, and ridership. While the focus of the immediate few years will be service improvements, it is important to not let the corresponding infrastructure improvements fall behind. In order to ensure that both, service and infrastructure improvements advance in tandem the following next steps are recommended specific to the infrastructure elements:

1. Presentation of infrastructure needs (and TRS strategies) to other agencies and local governments as needed, in particular key infrastructure partners City of Nanaimo, BC Transit, and MoTI.
2. Working with BC Transit to include prioritized infrastructure improvements into the TIPS process.
3. Working with BC Transit to include facility and exchange upgrades and improvements in the 10-Year Capital Plan.
4. Assigning staff from partner organizations (RDN, City of Nanaimo, BC Transit, MoTI) to develop an MOU that agrees to the roles and responsibilities of each organization in the development of the infrastructure priorities as well as a base plan for moving these projects forward.
5. Prioritizing projects for further planning or design studies and/or costing.
6. Prepare Business Cases for big projects for which design and costing are complete.
7. Deliver the infrastructure prioritise identified in this document.

The investments discussed in this summary are important not just for the development of the RDN transit system but also to improve its reliability and to facilitate mode shift and reduce emissions. If the RDN is to achieve its transit mode share target of 5% by 2039 then transit needs to offer the kind of quality that makes it an attractive transportation choice. Infrastructure is key to building the type of system that is easy to use, convenient and reliable.

2.0 CAPITAL AND INFRASTRUCTURE DETAILS

2.1 Facility Masterplan

The existing RDN Transit Operations and Maintenance (O&M) Facility is in the City of Nanaimo at 6300 Hammond Bay Road. Details of the facility are as follows:

- Designed to support a fleet of 70 conventional buses but now includes custom and light duty buses
- Today, the O&M facility supports 74 buses (55 heavy/medium duty compressed natural gas (CNG) and 19 light duty gasoline buses).
- Five bus maintenance bays with one bay being utilized for parts storage, which equates to 18.15 buses per maintenance bay, which is above BC Transit’s desired ratio of 16:1 conventional buses and 22:1 light duty buses per maintenance bay.

The 2014 Transit Future Plan and currently underway Redevelopment Strategy envisions significant transit service investments over the next 25 years. Fleet forecast assumptions are as follows:

- Existing fleet (74 buses) to grow by 33 buses over the next three years (RDN’s desired level of growth).
- Three per cent annual growth thereafter.
- 2022 is considered the master plan’s base year.
- The master plan focusses on the next 25 years of fleet growth but consider growth beyond this time frame for potential future proofing of a second new location (e.g. can facilitate additional growth in bus storage and maintenance capacity requirement).

2021	2022	2023	2024		2037	2047	2062
<i>Existing</i>	<i>RDN Desired Growth</i>			<i>Growth Rate</i>	<i>15 years</i>	<i>25 years</i>	<i>40 years</i>
74	78	91	107	3%	157	210	327

Based on the above projection, BC Transit, in partnership with the RDN is undertaking a Facility Masterplan, that will help determine a program of changes needed over the coming years to support not just the TRS (which is a five-year plan) but also the long-term growth of the RDN transit system with respect to Operations and Maintenance Facilities.

2.2 The Rapid Transit Corridor

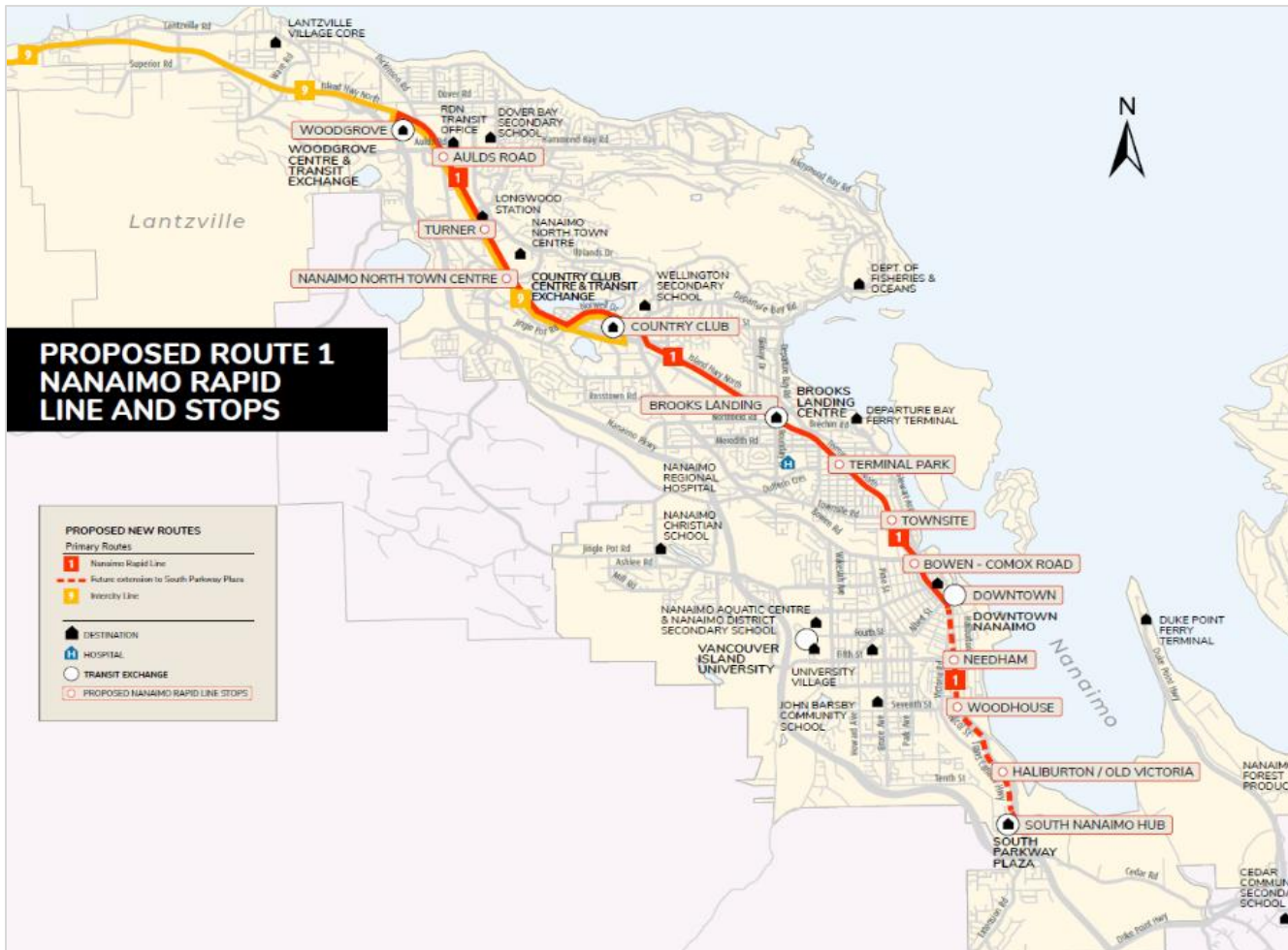


FIGURE 2 PROPOSED ROUTE 1 NANAIMO RAPID LINE AND ITS SUPPORTING INFRASTRUCTURE

The Rapid Transit Corridor as defined in the TRS and the RDN Transit Future Plan, operates along Island Highway (or Highway 19 A), Terminal Avenue and Highway 1. The corridor starts at Woodgrove Center in the north and ends at the Downtown Nanaimo Exchange in Phase 1 (projected for Year 2) and extends to an enhanced South Nanaimo Transit Hub at South Parkway Plaza in Phase 2 (projected for Year 3).

There are approximately fourteen bus stop pairs along the corridor, some of which are existing, while others are proposed.

The 1 Nanaimo Rapid Line as proposed will evolve into the central spine of the system with major destinations along its length, served by high frequency transit service. **For this reason, it is important that infrastructure improvements identified for this corridor are prioritized as TRS recommendations get underway.**

MoTI and the City of Nanaimo (the stretch between Terminal Avenue/Waddington Road and Terminal Avenue/Comox Road) have jurisdiction in this corridor.

Station/stop pairs are proposed at major origins/destinations or at major intersections in the corridor. While many of the Route 1 stops are located directly on the corridor, some of the major station/stop locations like at Woodgrove Centre and Country Club Mall are proposed at locations off the corridor and adjacent to it.

At Woodgrove Centre, the northern most stop and terminus point in the corridor, the assumption is that the Route 1 will drop-off and pick-up at Mary Ellen Drive as well as at the existing exchange in the near-term. In the longer-term, the proposed new exchange location should consider proximity to the Island Highway and convenient transfers between other routes in the system to ensure optimal speed and connectivity of the Route 1.

At Country Club Mall, the Route 1 stop is currently (in the near-term) proposed at the existing exchange on Norwell Drive. However, in the longer-term it is recommended that the exchange activity be moved adjacent to Island Highway. This will improve the speed of not just Route 1, but also, all other routes serving Country Club Exchange. It is to be noted here that the success of the Route 1 depends on seamless transfer activity from other Frequent and Neighbourhood routes also serving this major hub and it is crucial to ensure the ease of connection that exists currently, continues in the longer-term as well, if the Route 1 stop is moved to Island Highway.

The last southern and terminus point stop at **South Parkway Plaza (or South Nanaimo Transit Hub)** is a temporary location until a permanent stop is established in the yet to be developed, 200-plus acre master planned community at Sandstone.

Brooks Landing is a new stop on the corridor, that is likely to become a significant connection point between the routes 12, 1 and 3. This location also has been identified as challenging for transit from the point of view of signal timing and the ability to easily turn in and out from the intersection. Future upgrades are highly recommended at this intersection and have been described in detail in the next few pages.

The stops on Island Highway at **Aulds Road, Turner Road and Rutherford Road** (North Nanaimo Town Centre stop) all have the potential for queue jumps in the future. In the near-term far side and nearside stops are proposed.

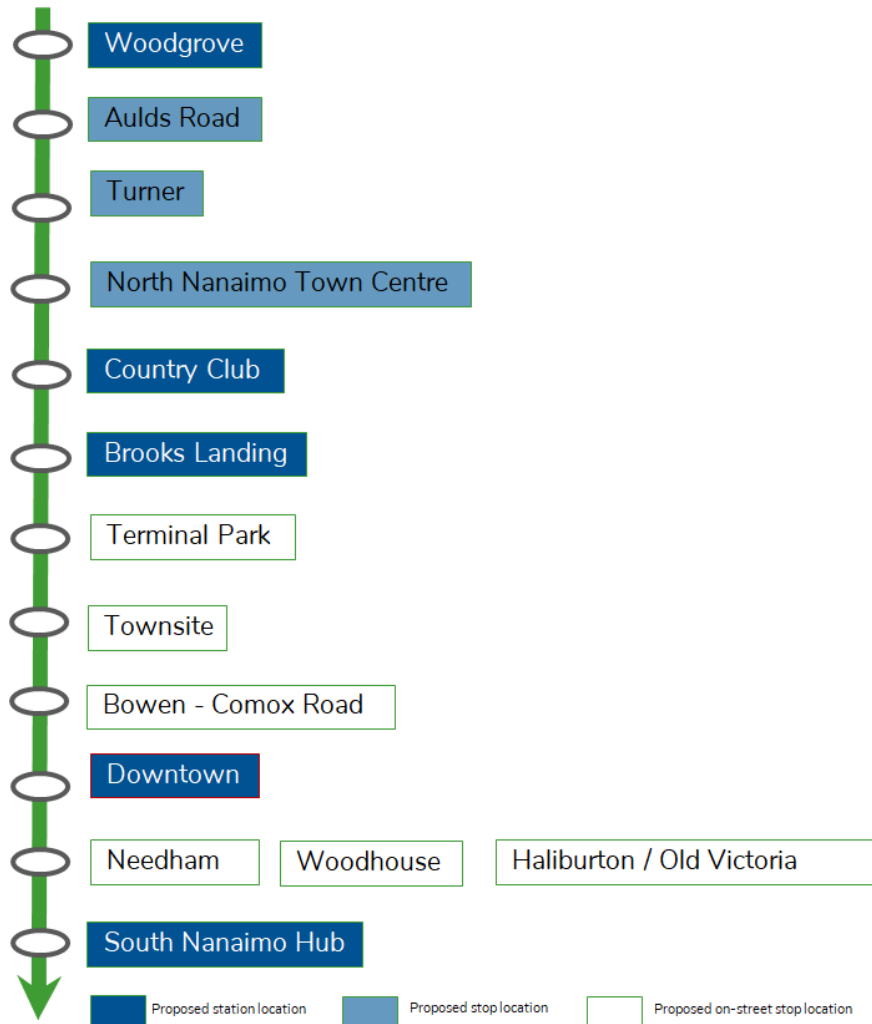


FIGURE 3 PROPOSED ROUTE 1 NANAIMO RAPID LINE STOPS AND STATION LOCATIONS

Station Pair	Stop Pair	On-Street Stop Pair
<ul style="list-style-type: none"> • Woodgrove Centre • County Club Centre • Downtown Nanaimo • South Nanaimo Hub 	<ul style="list-style-type: none"> • Aulds Road • Turner Road • North Nanaimo Town Centre 	<ul style="list-style-type: none"> • Terminal Park • Townsite • Comox Road • Needham Street • Woodhouse Street • Haliburton Street / Old Victoria Road
<p>Station Pair Highlights:</p> <ul style="list-style-type: none"> • Major stops and transfer points on the corridor • Served by multiple routes • Characterized by T-5 shelters, signage, lighting, Next Bus signage and any other amenities to improve customer waiting experience 		
<p>Stop Pair Highlights:</p> <ul style="list-style-type: none"> • Minor stops and transfer points on the corridor • Served by a few different routes • T-3 or T-4 shelters, signage, lighting, Next Bus signage 		
<p>On-Street Stop Pair Highlights:</p> <ul style="list-style-type: none"> • Minor stops and transfer points on the corridor • Served by one or two routes • Limited space for amenities, suggest smallest shelter if it is possible to fit a shelter, if not, just a bus stop sign will suffice 		

A number of improvements are needed along the corridor and at key exchanges to transition the current routes 50/7 to route 1 Nanaimo Rapid Line. These improvements are time sensitive and need follow the service change timeline outlined in the TRS.

Improvement Name	Description
Immediate Term to Support Immediate Network Route Restructuring (Year 1)	
Woodgrove Centre	<ul style="list-style-type: none"> • Routing changed to move NB segments to Island Highway with access to Woodgrove Mall via Island Highway and Mary Ellen Drive. Need stops on Mary Ellen Drive to accommodate passenger boarding and off-loading activity and connections to other North RDN routes (9 and 31) • SB routing through mall, serving existing exchange and turning right on to Island Highway from internal mall road • NB and SB stops on Mary Ellen Drive with space for layover. • Improved bus stop amenities for the Route 1, includes signage, lighting, Next Bus sign and T5 Bus Shelter for both NB and SB travel
Along the corridor	<ul style="list-style-type: none"> • Start removing route 50 signage from intermediate stops between main stops
Immediate Term to Support Immediate Network Route Restructuring (Year 2)	
Woodgrove Centre	<ul style="list-style-type: none"> • Roundabout at Mary Ellen Drive • Exchange relocation plans for Woodgrove Centre, ideally closer to Island Highway • Doubling up of amenities: signage, Next Bus sign and shelter at both stops • Layover on east curb of Mary Ellen Drive after drop-off on west curb
Country Club Exchange	<ul style="list-style-type: none"> • Improved bus stop amenities for the Route 1, includes signage for both NB and SB travel • NB stop at north curb of Norwell Drive between Departure Bay Road and Barons Road • SB stop at south curb of Norwell Drive between Barons Road and Departure Bay Road • Both stops lengthened to accommodate two buses by painting curb

Improvement Name	Description
Downtown Exchange	<ul style="list-style-type: none"> Improved bus stop amenities for the Route 1, includes signage, lighting, Next Bus sign and T5 Bus Shelter for both NB and SB travel at existing exchange Create new on-street SB stop at Commercial St. and Terminal Ave, with bus stop sign, lighting, exact location TBD
New stops along Route 1 corridor	<ul style="list-style-type: none"> Establish on-street stops at Brooks Landing, SB, and NB
Along Highway 1	<ul style="list-style-type: none"> Transit signal priority measures implemented sequentially
Medium Term to Support Immediate Network Route Restructuring	
New stops along Route 1 corridor	<ul style="list-style-type: none"> Establish on-street stops at Aulds Rd and Island Highway, Turner Rd and Island Highway, Rutherford Rd and Island Highway (pad, crosswalk, striping, painting red lane)
	<ul style="list-style-type: none"> New signage at Terminal Park Mall, amenities to include T3 shelter, Next Bus sign New signage at Terminal and Townsite, amenities to include T3 shelter, Next Bus sign New signage at Terminal-Comox Rd, amenities to include T3 shelter, Next Bus sign
	<ul style="list-style-type: none"> New stops at Island Highway and Needham, Woodhouse and Haliburton, only bus stop sign
South Parkway Plaza	<ul style="list-style-type: none"> SB and NB stop on west curb of Lawlor Road to enable buses to access stop via Twelfth and Lawlor and leave via Tenth and Lawlor, additional bus capacity at this location is needed for Route 1 extension to South Nanaimo New signage, T5 Shelter, Next Bus sign Layover location on west curb of Lawlor Road and restroom access agreement

Improvement Name	Description
Medium Term to Support Immediate Network Route Restructuring (Year 4)	
Downtown Exchange	<ul style="list-style-type: none"> Establish NB and SB on-street stops at Commercial Street and Terminal Ave Route 1 routing through Downtown changes to continue Potentially implement revised downtown Exchange (depending on City of Nanaimo timing)
	<ul style="list-style-type: none"> All stops along highway now commissioned and open Transit Signal Priority functioning (ideal condition)

In addition to stations and stops along the corridor, traffic signal improvements are suggested at several locations in the corridor based on a VISSIM study undertaken as part of the TRS. Error! Reference source not found. The table below provides details about these suggested improvements. Priority levels for those traffic signal improvements were determined as part of the VISSIM analysis and indicate the intersections that need upgrades to the signal timing there to improve transit speed and reliability.

Priority level 1 represents the highest priority and resulting gain to transit speed from the recommended change, and priority lowers as we move further down the sequence.

Station/Stop Name	Designation	Intersection	Direction	FS/NS	Suggested Traffic Control Treatment	Priority Level 1 = High 2 = Medium 3 = Low	New Shelter Y/N	Shelter Type	Pull Out/In Traffic Stop	Pad Needed
Woodgrove Centre Transit Exchange	Station	Mary Ellen drive and Island Highway (New Exchange or	Northbound	N/A	Queue jump in unused left turn lane for NB Route 1 (Island Highway on to Mary Ellen Drive)	2	Y	T5	N/A	Y
			Southbound	N/A			Y	T5	N/A	Y

Station/Stop Name	Designation	Intersection	Direction	FS/NS	Suggested Traffic Control Treatment	Priority Level 1 = High 2 = Medium 3 = Low	New Shelter Y/N	Shelter Type	Pull Out/In Traffic Stop	Pad Needed
		new stop for Rt 1 and 9)								
Aulds Road	Stop	Island Highway and Aulds Road	Northbound	FS	NB and SB queue jumps at islands	1	Y	T3	Y	Y
			Southbound	FS			Y	T3	Y	Y
Turner Road	Stop	Island Hwy and Turner Road	Northbound	FS	Queue jump conditional on space to enable in-island boarding. ROW acquisition will be needed	3	Y	T3	N/A	Y
			Southbound	FS			Y	T3	N/A	Y
North Nanaimo Town Centre	Stop	Island Highway and Rutherford Road	Northbound	FS	NB and SB queue jumps at islands	2	Y	T3	N/A	Y
		Island Highway and Mostar Road	Southbound	FS			Y	T3	N/A	Y
Country Club Centre Transit Exchange	Station	Norwell Rd between Departure Bay and Barons Rd	Northbound	Mid-block	Remove Split Phase @ Bowen Rd, recommend SB Queue jump	1	Y	T5	N/A	Y
			Southbound	Mid-block			Y	T5	N/A	Y
Brooks Landing	Station (stop in the interim)	Island Hwy and Departure Bay Road	Northbound	FS	NB and SB queue jumps at islands, new signal(s) for all of Brooks Landing	1	Y	T3	N/A	Y
			Southbound	NS			Y	T3	N/A	Y
Terminal Park Mall	Stop	Terminal Avenue (existing stop)	Northbound	FS	Queue Jump SB	3	N	T3	N/A	N/A
			Southbound	FS			N	T3	N/A	N/A

Station/Stop Name	Designation	Intersection	Direction	FS/NS	Suggested Traffic Control Treatment	Priority Level 1 = High 2 = Medium 3 = Low	New Shelter Y/N	Shelter Type	Pull Out/In Traffic Stop	Pad Needed
Townsite Road and Terminal Avenue	Stop	Terminal Avenue and Rosehill Street (existing stop)	Northbound	FS	Updated signal timing	3	N		N/A	N/A
		Island Highway and Mostar Road	Southbound	FS			N		N/A	N/A
Terminal Avenue and Comox Road	Stop	Comox Street and Terminal Avenue	Westbound/Northbound	FS	Updated signal timing	2	?		N/A	N/A
			Southbound	NS			Y		N/A	N/A
Downtown Nanaimo Transit Exchange	Station	Commercial St and Terminal Ave	Northbound	NS	Updated signal timing	2	Y	Custom	N/A	N/A
			Southbound	FS			Y	Custom	N/A	N/A
Needham Street	Stop	TransCanada Highway and Needham Street	Northbound	FS	Updated signal timing	3	Y	T3	N/A	Y
			Southbound	FS			Y	T3	N/A	Y
Woodhouse Street	Stop	TransCanada Highway and Woodhouse Street	Northbound	FS	-	-	Details to be determined once the stop is possible on this route			
			Southbound	FS						
Haliburton Street / Victoria Road	Stop	TransCanada Highway and Haliburton Street	Northbound	FS	Updated signal timing	3	Y	T3	Y	Y
		TransCanada Highway and Victoria Street	Southbound	FS			Y	T3	Y	Y

Station/Stop Name	Designation	Intersection	Direction	FS/NS	Suggested Traffic Control Treatment	Priority Level 1 = High 2 = Medium 3 = Low	New Shelter Y/N	Shelter Type	Pull Out/In Traffic Stop	Pad Needed
South Nanaimo Hub Transit Exchange/South Parkway Plaza	Station	Twelfth Street and Lawlor Road	Northbound	FS	Add left turn lane @ 10th St EB	2	Y	T5	N/A	Y
			Southbound	FS			Y	T5	N/A	Y

It is to be noted here that Woodhouse Street has been identified as a potential stop location on the Rapid Transit Corridor but there is no pedestrian crossing here currently. MoTI has indicated low priority for a safe pedestrian crossing here currently, however, it is highly recommended that a stop be provided here due to adjacent density and landuses when safe pedestrian crossing becomes a possibility.

2.3 Transit Priority Measures

Transit Priority measures are measures to ensure the timely and efficient use of transit resources. In cases where increased ridership and congestion are causing delays or inconsistent schedule adherence, these measures can have a sizeable impact on transit system operating costs and customer experience. For the TRS, the WATT team undertook a traffic signal modeling using VISSIM software to determine congestion points along the Rapid and Frequent Transit Corridor and have recommended mitigating measures based on this analysis. The analysis

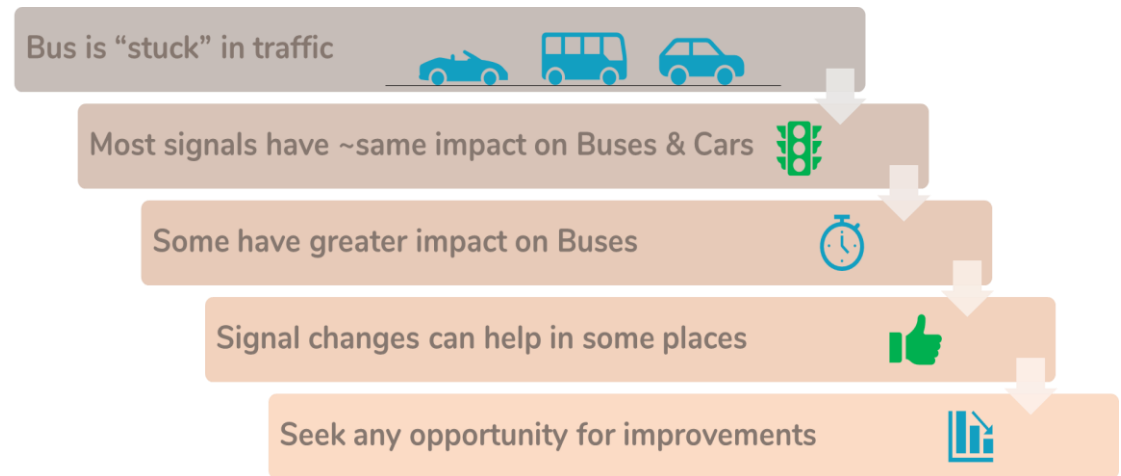


FIGURE 4 RESULTS OF TRAFFIC MODELLING ALONG THE RAPID TRANSIT CORRIDOR USING VISSIM

identified that at some signals the delay to both modes was equal, at some others, buses seemed more impacted than others.

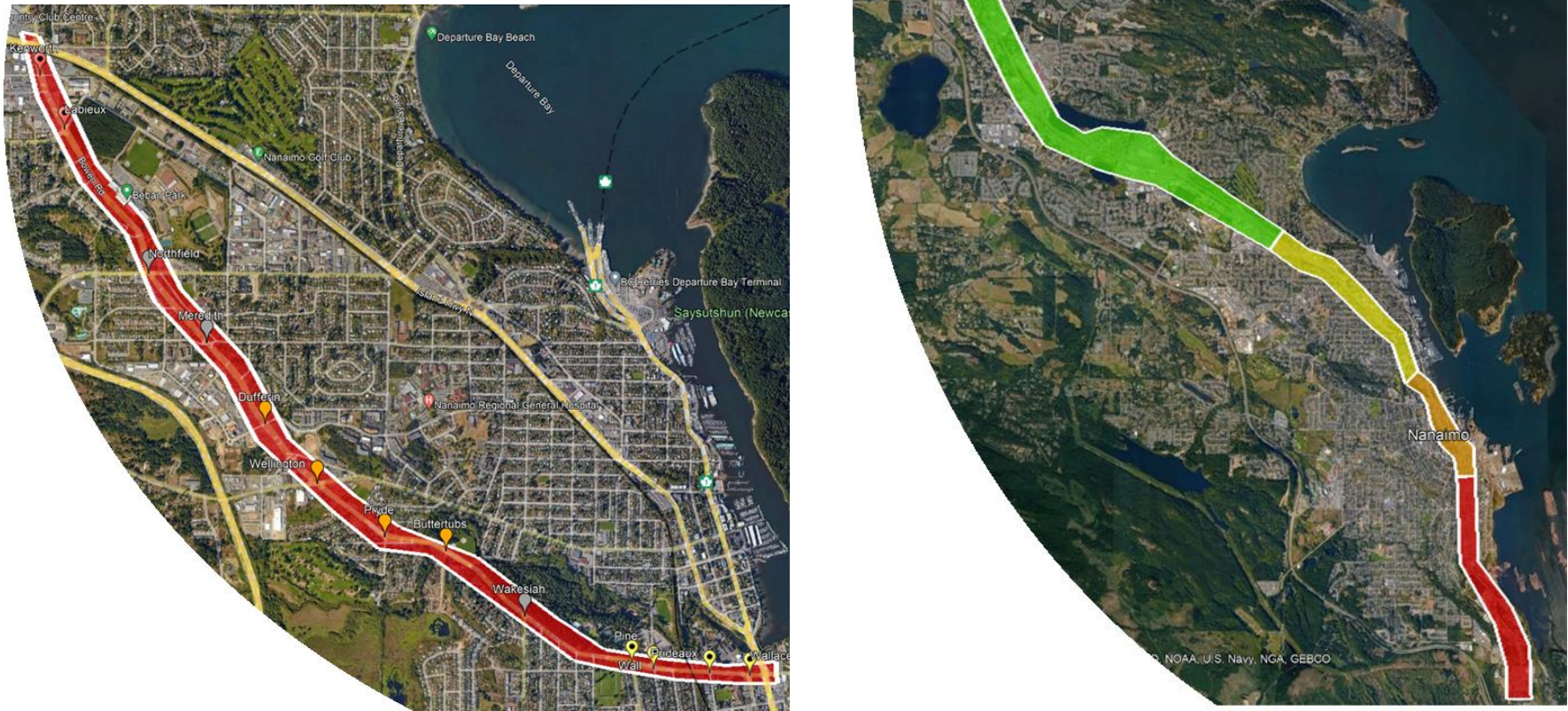


FIGURE 5 EXTENTS OF FREQUENT (L) AND RAPID TRANSIT (R) CORRIDORS STUDIED USING VISSIM MODELING

2.3.1 Rapid Transit Corridor

The biggest delay to buses in the Rapid Transit Corridor was from being stuck behind cars in traffic. While traffic signal prioritization and queue jumps help alleviate the delay by a few seconds per trip per bus across the entire corridor, significant improvement in bus travel times can only be realized using dedicated bus lanes. It is estimated that on an individual corridor, a reserved bus lane can yield 15-20% shorter travel times, with an increase of 65% in overall on-time performance. We understand that in the RDN the possibility of dedicated bus lanes in a constrained Right-of Way environment is highly unlikely, so the VISSIM study was focused on identifying congested intersections along the Rapid Transit Corridor and mitigation measures for these locations. The model itself was divided up into four segments:

- The south model (Tenth Street to Milton Street);
- The downtown model (Stewart Avenue to Esplanade Avenue);
- The mid model (Townsite Road to Northfield Road);
- The north model (Mary Ellen Drive to Turner Road)

Based on travel time comparisons observed in these four segments, the following intersections have been identified as the ones with the highest need for traffic signal treatment that will help speed up the buses:

- Aulds Road and Island Highway
- Bowen Road and Island Highway
- Departure Bay Road and Island Highway
- Brechin Road and Island Highway

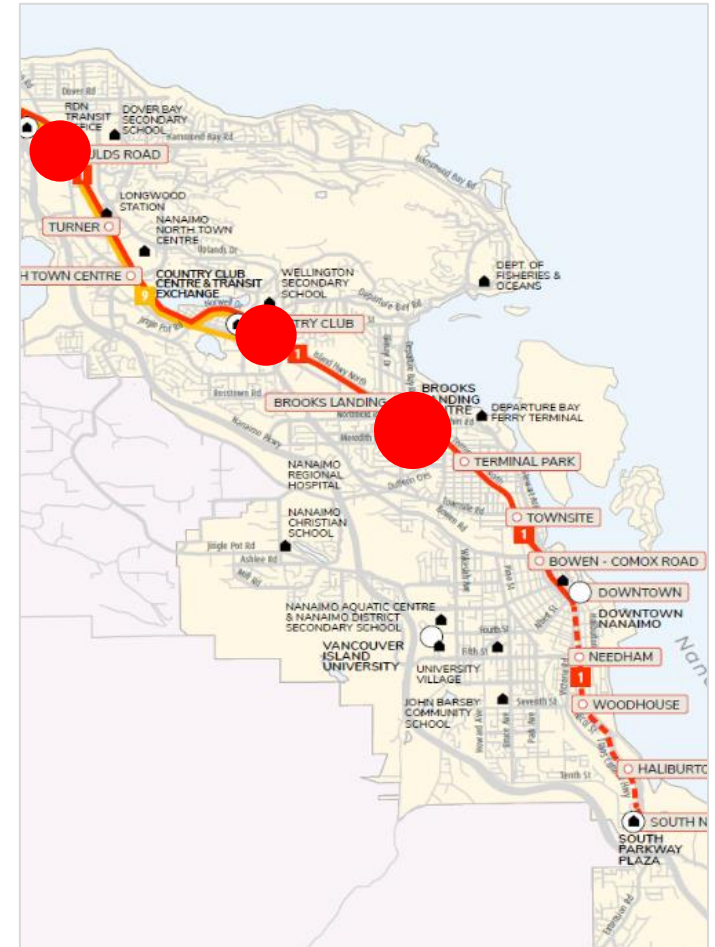


FIGURE 6 TOP FOUR INTERSECTIONS FOR TSP ALONG THE RAPID TRANSIT CORRIDOR

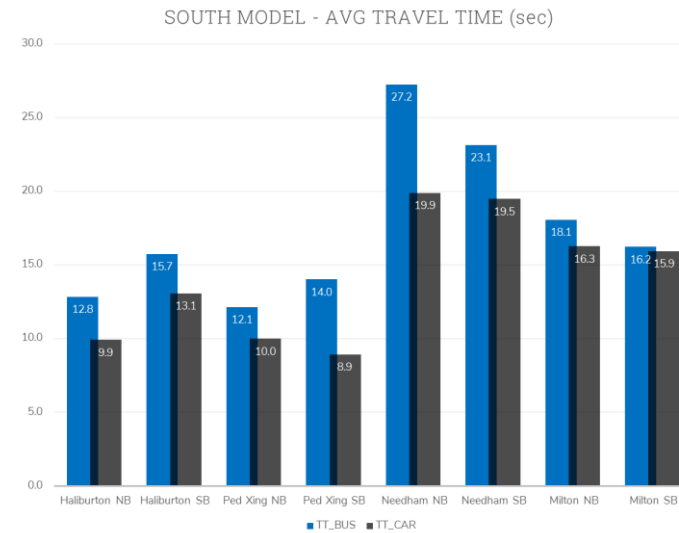
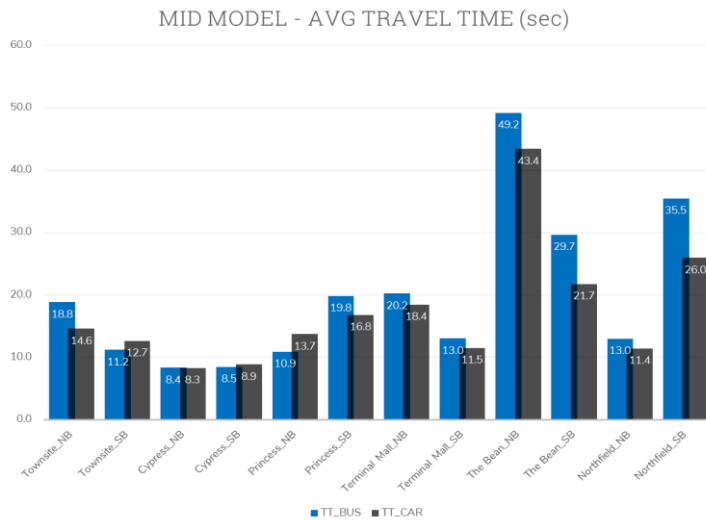
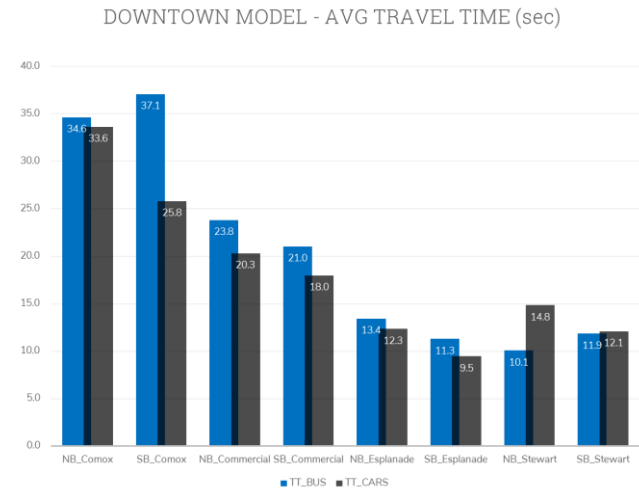
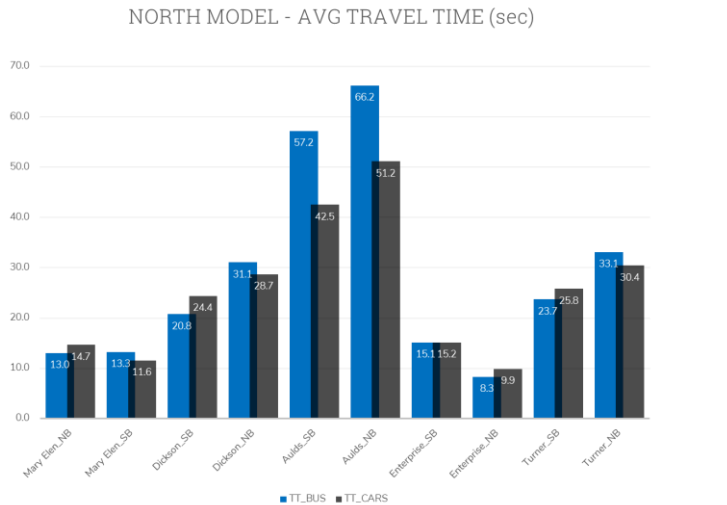


FIGURE 7 RESULTS OF TRAFFIC MODELING BY INTERSECTION

In the near term, transit priority measures for the RDN should focus on supporting transit in the Rapid Transit corridor as suggested in the table below.

Rapid Transit Corridor - Key transit priority measures needed for the RDN system to implement the Transit Redevelopment Strategy								
Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement	Required next step	Target Implementation Date	Recommended Priority Level (1-3)	Partners
All	MOU	All	All	Agreement between RDN, City of Nanaimo, BC Transit and MoTI to work together on infrastructure improvements to support transit, including roles and responsibilities, agreement in principle to coordinate on types of signal controller and other technology/infrastructure guidelines to be used, next steps and priorities.	Convene working group to develop MOU	ASAP	Recommended first step prior to all other activities	RDN, City of Nanaimo, BC Transit, MoTI
Rapid Transit Corridor	Queue Jump Lane	Island Hwy / Hwy 1 Woodgrove Exchange to Downtown Nanaimo	Island Highway at Mary Ellen Drive	Queue jump in unused left turn lane for NB Route 1	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoTI
			Island Highway at Dickinson Road	NB and SB queue jumps at islands	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoTI
			Island Highway at Aulds Road	NB and SB queue jumps at islands	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoTI
			Island Highway at Rutherford Road	NB and SB queue jumps at islands	Prelim design to be completed (costing and feasibility to be finalised)	TBD	2 - Priority to optimize service	MoTI
Rapid Transit Corridor	Updated signal timing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	All intersections on Highway 19 from Mary Ellen Drive to Haliburton Street	Prioritising N/S bus movement	Prelim review complete and strategy developed/Implementation Plan to be completed	TBD	TBD	MoTI
Rapid Transit Corridor	Removing split phasing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Bowen Road	Prioritising southbound bus movement	Strategy/study on existing signal timing to be completed	TBD	TBD	MoTI
Rapid Transit Corridor	Update traffic signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Brechin Road	Improving traffic movement at intersection	Study of intersection needed/coordination with landuse	Longer Term	TBD	MoTI
Rapid Transit Corridor	Pedestrian signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	TransCanada Highway at Woodhouse Road	To enable safe pedestrian crossing for alighting and boarding passengers	MoTI to install ped crossing	Longer Term	TBD	MoTI

FIGURE 8 LIST OF RECOMMENDED RAPID TRANSIT CORRIDOR TRANSIT PRIORITY TREATMENTS

As mentioned previously, priority also coincides with the implementation phasing for these measures (priority #1 = phase#1 for implementation). While it is understood that implementation will depend on funding availability and how these projects fit with others planned to be undertaken by the City of Nanaimo and MoTI, it is recommended that the priority order suggested in the table above is followed for best results for the service implementation.

In addition to Transit Priority measures, queue jumps have also been recommended at certain intersections as is illustrated in the table above. Some of the high priority intersections for queue Jumps are described below:

Brooks Landing



FIGURE 9 BROOKS LANDING INTERSECTION

Brooks Landing is located at the intersection of Island Highway and Departure Bay Road and Brechin Road. This is a new stop being proposed on the Rapid Transit Corridor. This stop is anticipated to become a key transfer point as the proposed network evolves. Based on the VISSIM analysis, there is a significant time advantage to be gained by prioritizing signal improvements and queue jumps at this intersection.

There are significant challenges for transit at this intersection.

Buses travelling straight through this intersection are delayed by signals at both Departure Bay Road and Brechin Road. In addition, turning restrictions to and from Island Highway increases route length of the buses serving this intersection (routes 1, 3 and 12).

In the short-term, a near side stop (southbound) and far side stop (northbound) are recommended at the intersection of Island Highway and Departure Bay Road. A queue jump lane in the southbound direction as illustrated in Figure 10 below, supported by traffic signal priority here would significantly reduce delays of the buses travelling southbound to downtown.

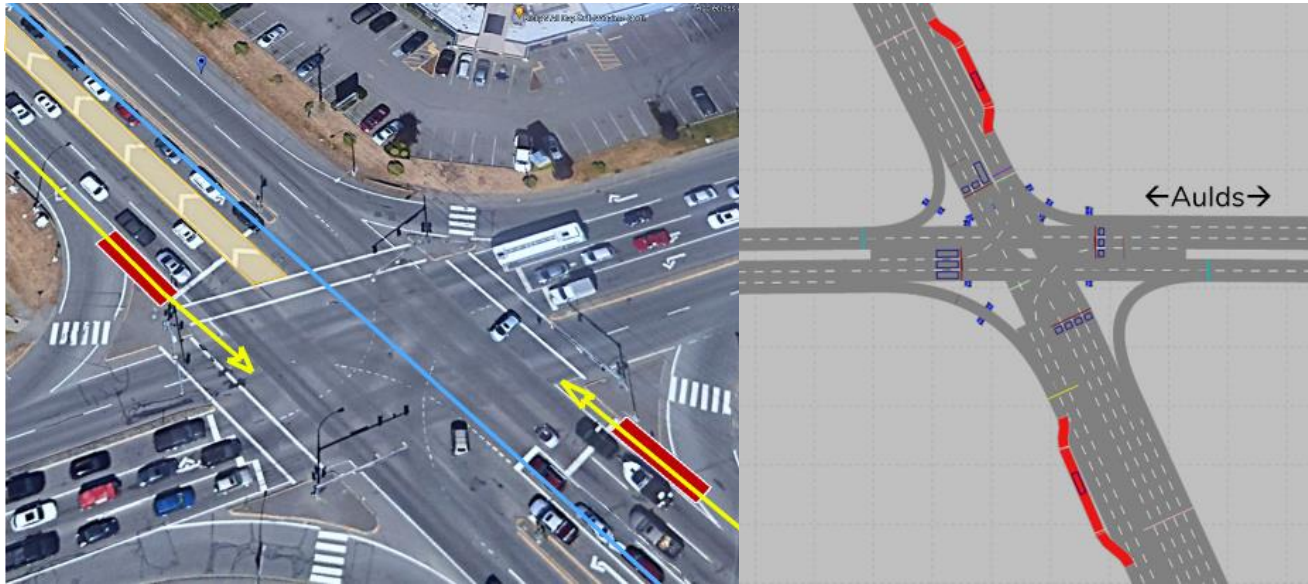


FIGURE 10 RECOMMENDED QUEUE JUMP LOCATIONS ALONG RAPID TRANSIT CORRIDOR AT DEPARTURE BAY RD

Other locations where queue jumps would support transit service along the Rapid Transit Corridor are

- Island Highway and Mary Ellen Drive
- Island Highway and Dickinson Road
- Island Highway and Aulds Road
- Island Highway and Rutherford Road

At all these intersections, queue jump lanes are suggested as a long-term measure for improving transit speed and reliability. In the near-term, far side stops are suggested. This is shown for the Island Highway and Aulds Road intersection below.



It is also to be noted here that queue jumps have been indicated in locations where there appears to be space for such a treatment. This will have to be field verified before any further action is taken.

FIGURE 11 RECOMMENDED LONG TERM (QUEUE JUMP LANES) AND NEAR TERM (PULLOUT STOPS) TREATMENTS FOR THE RAPID TRANSIT CORRIDOR AT ISLAND HIGHWAY AND AULDS ROAD

1. 2.3.2 Frequent Transit Corridor (Bowen Road)

For the purposes of the VISSIM model, Bowen Road was the corridor prioritized for analysis. Results were similar to those in the Rapid Transit corridor: the buses are stuck in traffic and the most significant improvement in travel times would be achieved by dedicated bus lanes in both directions. But while the Island Highway corridor might have some additional right of way to enable bus lanes, the Bowen Road corridor is severely constricted as far as additional roadway width is concerned. As a result, recommendations focus on transit priority measures like signal priority and signal phasing removal where feasible. The results of the analysis are discussed in detail below.

There were seven traffic signal movements that showed significant results. They are listed below:

- Highway 19A at Norwell Drive SB (Route 2 only)
 - Split phasing causes significant delays.
- Kenworth Road NB (Route 2 only)
 - Bus travel time was -4.5seconds (faster) than the car travel time.
- Dufferin Crescent WB (Route 3 only)
 - Left turn from Dufferin Crescent onto Bowen.
- Wellington Road NB
- Pryde Avenue SB
- Pryde Avenue NB
- Wallace Street SB (Route 2 only)



MODELLING LIMITATIONS

- COMPILED FROM MULTIPLE DAYS / YEARS
- PEAK HOUR DIFFERS FOR EACH INTERSECTION
- SIGNAL TIMING NOT EXACTLY THE SAME AS FIELD
- PM PEAK ONLY
- NO DRIVEWAYS OR OTHER ACCESS MODELED
- SB LT TRAFFIC WAS REDUCED AT 19A AND NORWELL REDUCED BY 33%
- EXCESSIVE DELAY IMPACTED BUSES IN MODEL

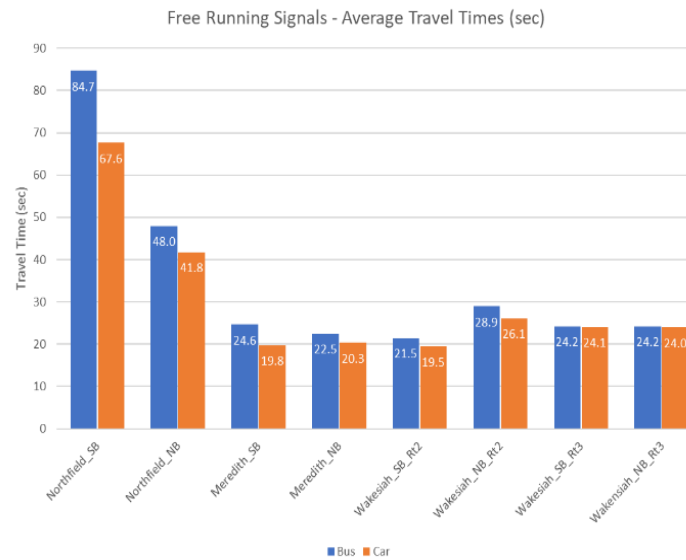
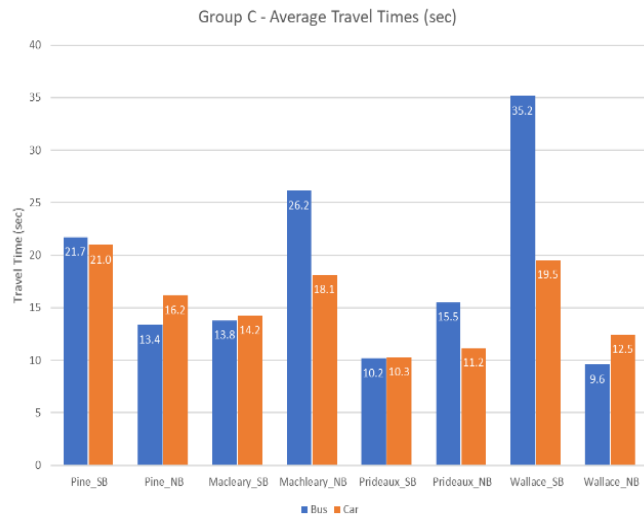
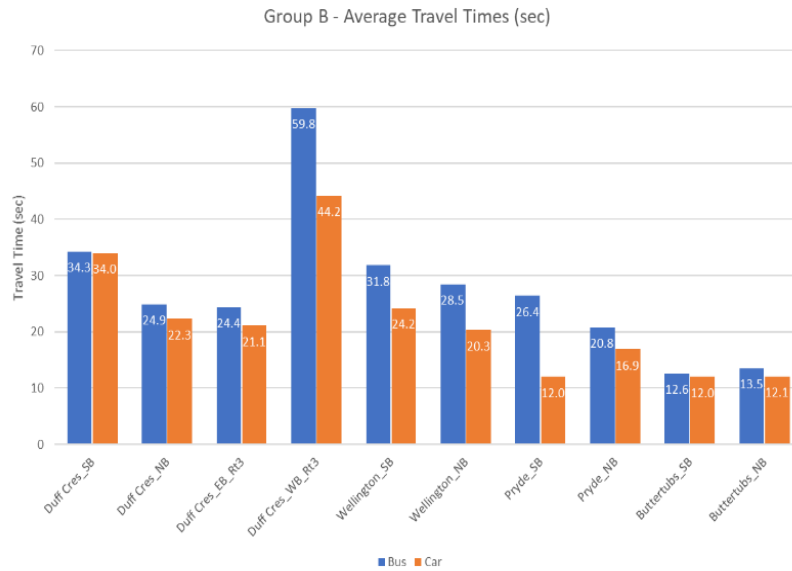
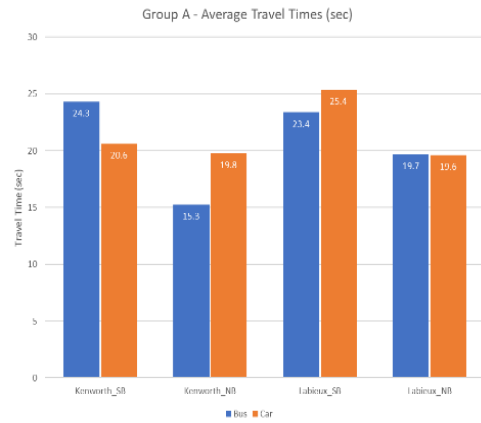


FIGURE 12 TRAVEL TIME COMPARISON ACCORDING TO VISSIM MODEL FOR BOWEN CORRIDOR INTERSECTIONS

Observation of the model revealed that some of the signals appeared to unintentionally have the stop dwell time synch up with the coordination scheme. For example, at Kenworth Road NB the bus passed through the Labieux Road signal (which is coordinated with Kenworth Road) and completed a stop in between the two signals. The bus dwell time was such that by the time the bus started moving again the Kenworth Road signal was (or very nearly was) displaying a green indication. Effectively the bus avoided queuing at the signal because it was dwelling at the stop and thus the travel time reduction seen at Kenworth Road. Since the dwell time coordination combination elsewhere in the corridor generally resulted in an increase in travel time, the addition of TSP to the corridor has a strong potential to alleviate some of that increase by allowing the bus (while stopped) to activate the TSP function and in turn pass through the intersection quicker.

The Bowen Road results show that a few signals have increased travel time for busses. However, the results did not demonstrate a clear pattern that would show how to allocate funding and resources to upgrade the corridor to better serve transit. Considering Bowen Rd's importance in Nanaimo and

that it will host two Frequent Line routes, the general recommendation would be to upgrade and enhance signals within the more congested northern part of the corridor (Wellington Road to Island Highway at Norwell).

Planned works on the Bowen Corridor support this approach; the City of Nanaimo will soon upgrade several traffic signals and lay fibre optic lines that will allow for the adoption of a central management system for traffic signals. The adoption of that system is a key first step to creating a traffic signal system that can utilize the transit-specific features found in modern signal controllers.

Although a central management system is needed as a first step that does not mean that other work cannot be done. TSP can be added to most of the signals along the corridor, especially those signals that run in "free" operation. Ultimately every signal on the corridor should be given TSP and tied into the central management system. Once that system is built out, it will require dedicated staff resources, likely a new full-time position, to oversee and maintain it. A TSP system is not a "set it and forget it" system, and neglect has the potential to negate any improvements in the long term.

In the near term, transit priority measures in the Bowen Road corridor should be focused on the recommended areas and improvements as suggested in the table below.

Bowen Road Frequent Transit Corridor - Key transit priority measures needed for the RDN system to implement the Transit Redevelopment Strategy								
Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement	Required next step	Target Implementation Date	Recommended Priority Level (1-3)	Partners
All	MOU	All	All	Agreement between RDN, City of Nanaimo, BC Transit and MoTI to work together on infrastructure improvements to support transit, including roles and responsibilities, agreement in principle to coordinate on types of signal controller and other technology/infrastructure guidelines to be used, next steps and priorities.	Convene working group to develop MOU	ASAP	Recommended first step prior to all other activities	RDN, City of Nanaimo, BC Transit, MoTI
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Kenworth Road	Prioritising E/W bus movement on Bowen Corridor (largely E/W some N/S movements as well)	Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Meredith Road		Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Wellington Road		Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Prideaux Street		Detailed planning to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Wallace Street		Detailed planning to be completed	TBD	TBD	City of Nanaimo
Frequent Transit Corridor	Transit Signal Priority and remove Split Phasing	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Northfield Road	To enable improved bus speed	Detailed planning to be completed	TBD	TBD	City of Nanaimo
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority and queue jump lanes	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Labieux Road	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Dufferin Crescent	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Pryde Avenue	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Buttertubs Drive	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Wakesiah Avenue	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo
			Bowen Road at Pine Street	If space for queue jumps can be negotiated	Prelim design to be completed	TBD	TBD	City of Nanaimo

FIGURE 13 LIST OF RECOMMENDED BOWEN ROAD FREQUENT TRANSIT CORRIDOR TRANSIT PRIORITY TREATMENTS

2.3.3 Other supportive actions for Transit Signal Priority

As transit evolves within the RDN, in addition to the measures suggested above, other comprehensive upgrades to the signalization systems should be considered in relation to the implementation of new transit exchanges / Park & Rides and adjacent intersection signals, and over the longer term in conjunction with the evolution of the transit system. These recommendations are:

- Enter into a Mutual Aid agreement between MoTI and the City of Nanaimo (and other entities as needed), this helps:
 - Codify existing relationships.
 - Explore joint maintenance opportunities.
 - Coordinate funding opportunities.
 - Create shared vision/plan for signal changes.
- Implement a Central Management System for traffic signals/ITS infrastructure and develop plan to add intersections to the system, including:
 - Controller upgrades.
 - Communication backbone, using existing infrastructure if available.
- Look for minor intersection improvement opportunities, focusing on critical intersections:
 - Add TSP sensors and other related ITS infrastructure.
 - Add advanced loops during paving or if there is available budget.
 - Controller upgrades.
- Plan for major intersection improvements along all Rapid Bus and Frequent Line Corridors:
 - Prioritize removal of split phasing, including working with MoTI as needed to develop terms
 - General traffic signal upgrades (controllers, communications, etc.)
 - Explore opportunities to convert signalized intersections into roundabouts, including multilane.
- Increase in-house capacity for the traffic signal system
 - Hire dedicated signal engineer/staff for on-going maintenance, including sharing with other entities if cost prohibitive.
 - Develop plan for reoccurring corridor updates (every 2-4 years) to adjust signal timing
 - Develop standards for time/density features and implement as they can significantly increase efficiency.
 - Consider creating a new timing sheet or abandoning STS and instead using the controller database printout.
 - Utilize ATSPM/detector data streams to test efficacy of timing plans and determine improvements.

2.4 Park & Rides

Park & Ride facilities provide people using public transportation with a parking location, drop-off point, or transfer point. A prototypical trip involving Park & Ride begins with the customer leaving his or her origin, driving to the Park & Ride facility, parking, riding public transportation, alighting, and walking to his or her destination. Park & Rides are particularly useful in suburban areas with low density as they make available a convenient connection to the transit system by overcoming the distance barrier.

In the RDN system, the ability to connect to transit could be significantly enhanced by strategically placed Park & Rides in the suburban communities (Cedar, Cinnabar, Qualicum Beach, Parksville, Electoral Area G and Nanoose Bay) where transit is not easily or conveniently accessible by walking or biking.

This section identifies potential Park & Ride locations for both near- and long-term. Existing easily accessible locations within communities are identified and also where there are remnant parcels available within MoTI ROW, that could support longer term future express services. Wherever possible, Park & Rides should be located adjacent to or part of other key destinations (grocery store, recreation centre, café, community hub) to make use of them more feasible by accomplishing multiple tasks with the same visit and to encourage safety by providing “eyes on the street” and activity around them.

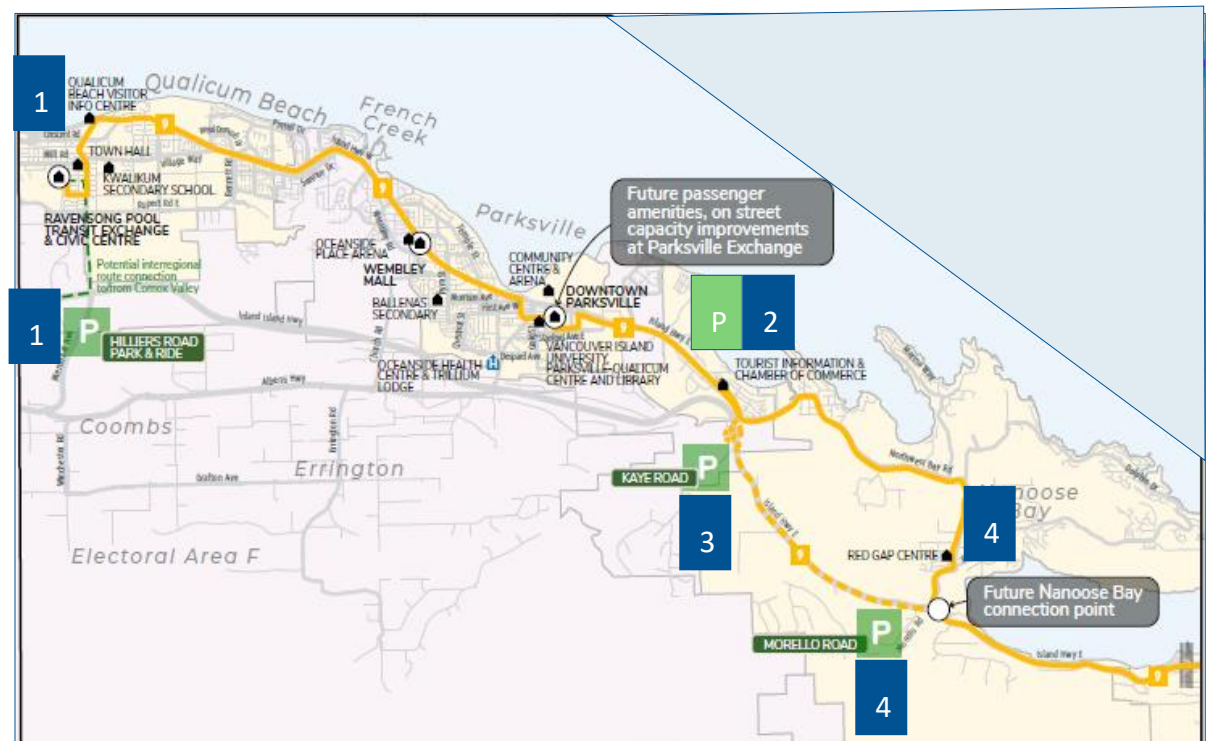


FIGURE 14 NORTH RDN MAP SHOWING POTENTIAL LOCATIONS FOR PARK & RIDES
Park & Ride facilities provide convenient access at transit hubs that includes parking, walking, biking, and shared vehicles.

Park & Rides may also be established through partnership with other existing uses rather than purpose built, such as an agreement with a shopping centre or recreation centre to set aside a specified number of spaces for Park & Ride use and denoting these with signage.

1 Qualicum Beach

Two Park & Ride locations are suggested for Qualicum Beach.

In the near-term the existing Park & Ride at Ravensong Aquatic Centre (1A) would continue to be used.

In the long-term, a remnant parcel (1B) of MoTI land at the intersection of Highway 19 and Highway 4 would be ideal for an additional Park & Ride location. This will facilitate:

- 1) Connections with a proposed interregional connection with Comox Valley Regional District
- 2) Connections with a potential future longer term express version of route 9 that could travel on Highway 19 connecting communities.



1A

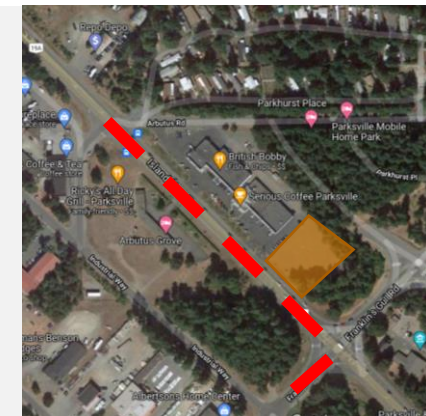
1B

2 Parksville

Two Park & Ride locations are suggested for Parksville.

In the near-term if it is possible to sign an agreement to use the parking lot adjacent to the Serious Coffee (Island Highway at Franklin's Gull Road) as a Park & Ride, this would be an ideal location to access the Route 9 from some of the areas further out in Parksville as well as from Nanoose Bay.

The location has adequate space for a totally separated transit function (shown in yellow) and an existing stop on Island Highway for easy access to the route 9.



3 Parksville

Two Park & Ride locations are suggested for Parksville.

In the long-term, a remnant parcel of MoTI land at the Highway 19 and **Kaye Road** interchange will support both, Nanoose Bay and Parksville as well as residents in Electoral Area F.



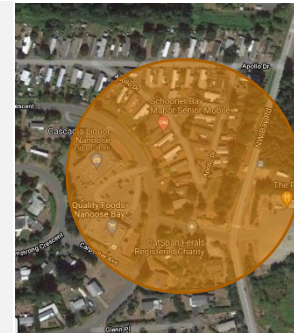
4 Nanoose Bay

Two Park & Ride locations are suggested for Nanoose Bay.

In the near term, The Red Gap Centre, the neighbouring elementary School and the Nanoose Place Community Centre could be ideal locations.

In the medium term, a parcel at the intersection of Morello Road and Alcott Road (shown in yellow) is suggested for a Park & Ride in the Nanoose Bay area.

In both cases, transfers with the Route 9 will occur on Island Highway.



4A



4B

The longer-term Park & Ride locations specific to the North RDN routes will support the growth of a future express version of Route 9 that could primarily use the highway and serve these northern communities at these Park & Ride locations, thereby speeding it up.

Two potential locations could connect the southern RDN better as well. These are:

- **The Cassidy Airport:** this would be an ideal location for connecting to the interregional connection to Cowichan Valley
- **The South Transit Hub:** would be another ideal location for a Park & Ride to enable commuters to connect to the Route 1.

2.5 Transit Exchanges

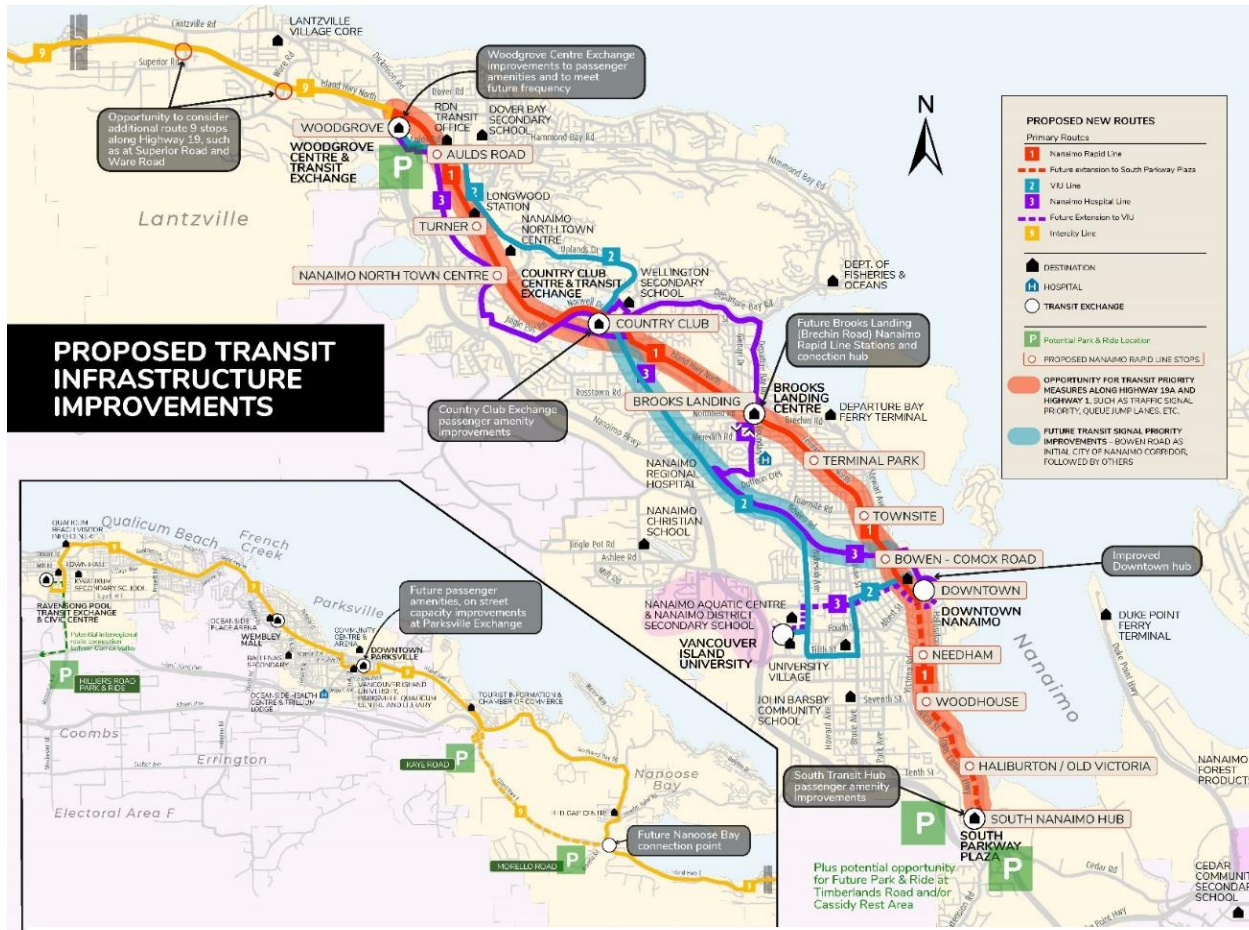


FIGURE 15 MAP SHOWING INFRASTRUCTURE IMPROVEMENTS SUPPORTING THE RDN TRS SERVICE CHANGES

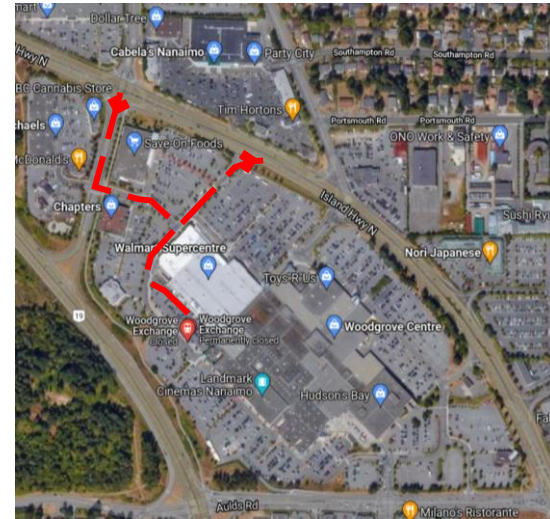
There are currently six exchanges that are part of the current network. While the TRS does not add more exchanges to the proposed revised network, it recommends upgrades to most of these existing exchanges to ensure smooth transfer activity between routes, enhanced passenger amenities and improved operations of the routes (layovers, driver facilities etc.).

1 Woodgrove Exchange

The RDN is planning a new location for the exchange at Woodgrove Centre.

In the near-term to accommodate the evolution of the route 50 into the 1 Nanaimo Rapid Line, it is recommended that the route use Mary Ellen Drive for drop-off and pick-ups at Woodgrove Exchange. Connections with routes coming in from the north (routes 9, 31 etc.) would also occur here. Also, in the near-term, it is anticipated that the Route 1 will serve the existing exchange to enable connections with other routes (routes 2 and 3 specifically)

In the long-term, a new exchange with improved transit vehicle capacity, passenger amenities, located to enable quick and easy connections between the Regional, Rapid and Frequent Lines is recommended.



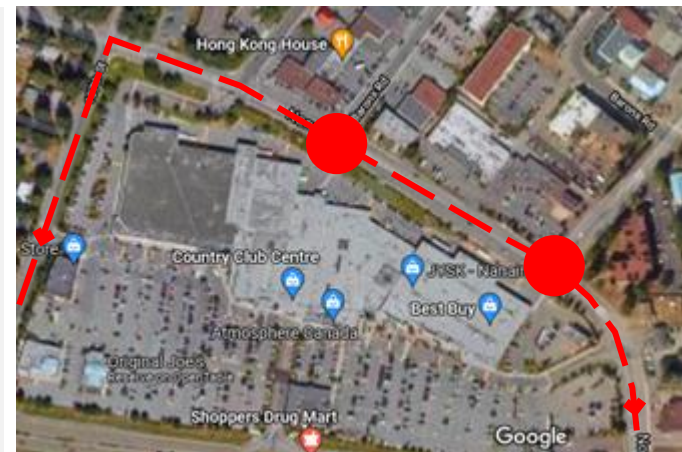
2 Country Club Exchange

The City of Nanaimo in coordination with the RDN is planning upgrades to the exchange at Country Club.

In the near-term it is recommended that two roundabouts at Ross Road and Departure Bay Road/Norwell Drive be explored to see if that configuration could provide more efficient access to the exchange.

It is also recommended that improved passenger amenities and waiting area be created for north- and southbound buses on Norwell Drive.

In the longer-term, it is recommended that opportunities to bring the exchange out to Island Highway be explored.



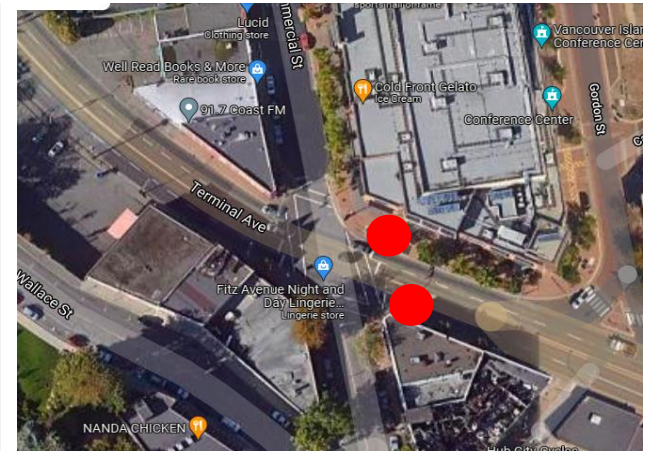
3

Downtown Exchange

A revised location for the Downtown Exchange is currently being explored by the City of Nanaimo for Terminal Avenue at Commercial Street.

In the near-term it is anticipated that the existing exchange will continue to be used as the route 50 evolves into the 1 Nanaimo Rapid Line. Should the exchange transfer to the new proposed location, it is highly recommended that the 1 Nanaimo Rapid Line use on-street stops at the Terminal / Commercial intersection (shown in red).

In the long-term, the new exchange at this location should be designed to accommodate layover, easy connections between Rapid and Frequent Line routes and enhanced passenger amenities and waiting areas.



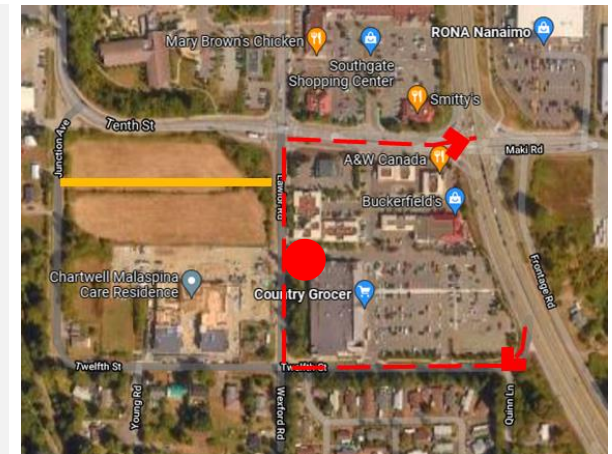
4

South Nanaimo Transit Hub

The South Nanaimo Transit Hub is proposed to evolve from the existing stop location at Tenth Street and Lawlor Road.

In the near-term it is anticipated that this existing stop will continue to be used by the routes in the south RDN. When the 1 Nanaimo Rapid Line extends to the south, additional passenger amenities, waiting space and layover space will be needed at this location. Restroom facilities for the operators will also be needed at end of line. An option to the Tenth and Lawlor location is the use of 11th Street and Junction Avenue (shown in yellow in the adjacent map) when that road is built.

In the long-term, this location could be the permanent location for the South Hub, an alternative is an exchange with Park & Ride facilities in the Sandstone development.



Parksville Exchange

With additional routes proposed in the north RDN portion of the transit network, it is important that the existing exchange in **Parksville**, located at Jensen Avenue between Corfield Street and McCarter Street be expanded to accommodate increased capacity and improved passenger amenities and waiting space.

Brooks Landing, is another location that needs to be mentioned in the context of future infrastructure improvements. Improvements to signalisation at this intersection (Departure Bay Road, Brechin Road and Island Highway) have been discussed in section 1.3, however, given the potential for the number of routes accessing the stops at this location, this could become an important multi-modal transfer point in the future. Infrastructure improvements to bus stop and stop capacity should be considered at this location whenever MoTI proposes upgrading this intersection.

2.6 OTHER SIGNIFICANT INTERSECTIONS IN THE NETWORK

1) Bowen Road at Buttertubs Drive

This location is a minor transfer point and will continue to be one with the introduction of the Frequent Line routes (routes 2 and 3). It is important to ensure passenger waiting capacity and amenities are improved at this location.

Recommended amenities include:

- Shelters
- Signage: Stop sign, NextBus electronic signage
- Network map
- Route and schedule information
- Increased seating capacity and bike racks



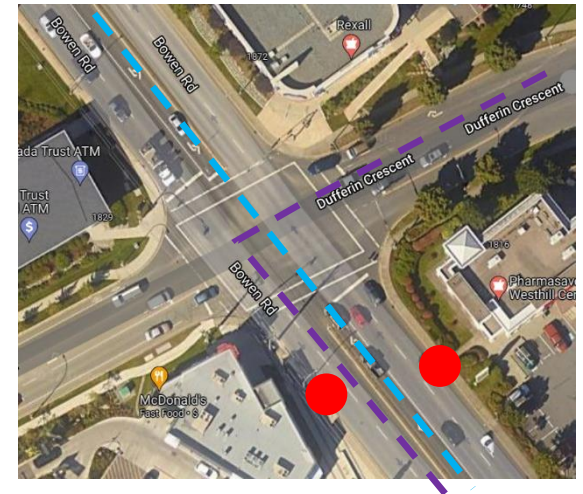
2) Bowen Road at Dufferin Crescent

The intersection of Bowen Road and Dufferin Crescent will become a significant interchange point in the proposed network with the two frequent routes, route 2 and 3 meeting and then diverging at this intersection, with southbound route 2 continuing to VIU and route 3 continuing to downtown Nanaimo (or to Nanaimo Regional General Hospital in the other direction). For passengers transferring between the two routes, this will be a key location.

As a result, it is important to provide the following in the future:

- Bus stops for both routes, 2 and 3, far side of intersection (southbound) and near side of intersection (northbound/eastbound). These locations will enable ease and safety of transferring between the two routes.
- T5 Shelters (if space allows)/regular shelters if space is a constraint
- Signage: Stop sign, NextBus electronic signage
- Network map
- Route and schedule information
- Increased seating capacity
- Bike racks

It is to be noted here that this intersection is constrained for space and the locations for bus stops suggested above are the ideal (optimal) locations from a transfer activity and safety perspective. If other locations might be more feasible from a space perspective, then safety (crosswalks, lighting etc.) must be considered at these alternate locations.



3) Bowen Road at Wakesiah Avenue

The intersection of Bowen Road and Wakesiah Avenue will also become a significant interchange point in the proposed network with the two frequent routes, route 2 and 3 meeting at this intersection, while the route 2 will continue to VIU (southbound), the route 3 (southbound) will head to downtown Nanaimo. For passengers transferring between the two routes, this will be a key location.

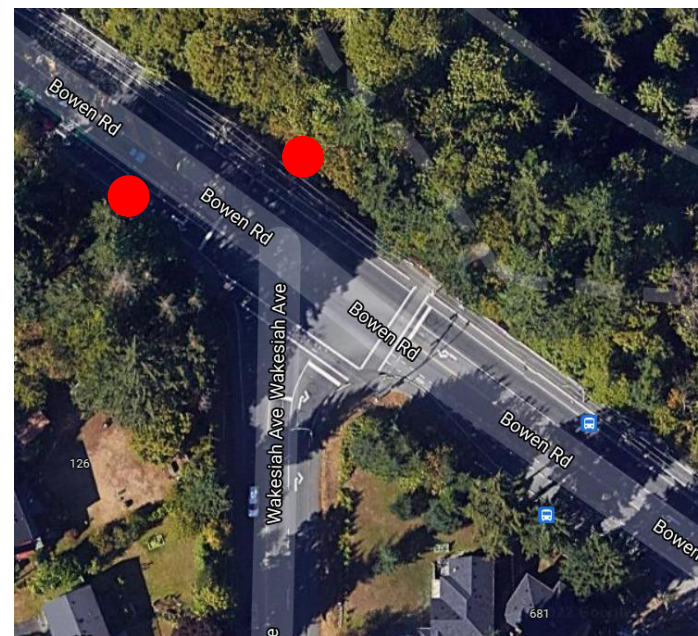
Currently there are existing stops at this location (both nearside in north- and south-bound directions). For supporting transfer activity between the routes 2 and 3, both these stops will need to move from their current location for the most efficient transfer activity.

Southbound stop: moved to near side of the intersection (southbound as shown in figure).

Northbound stop: moved to far side of the intersection (northbound as shown by red dot in the figure).

It is also possible for the existing stops to serve only the route 3 and the route 2 gets two new nearside stops on Wakesiah Avenue, just before making the turn on to Bowen Road. Other improvements to consider here are:

- T5 Shelters (if space allows)/regular shelters if space is a constraint
- Signage: Stop sign, NextBus electronic signage
- Network map
- Route and schedule information
- Increased seating capacity
- Bike racks

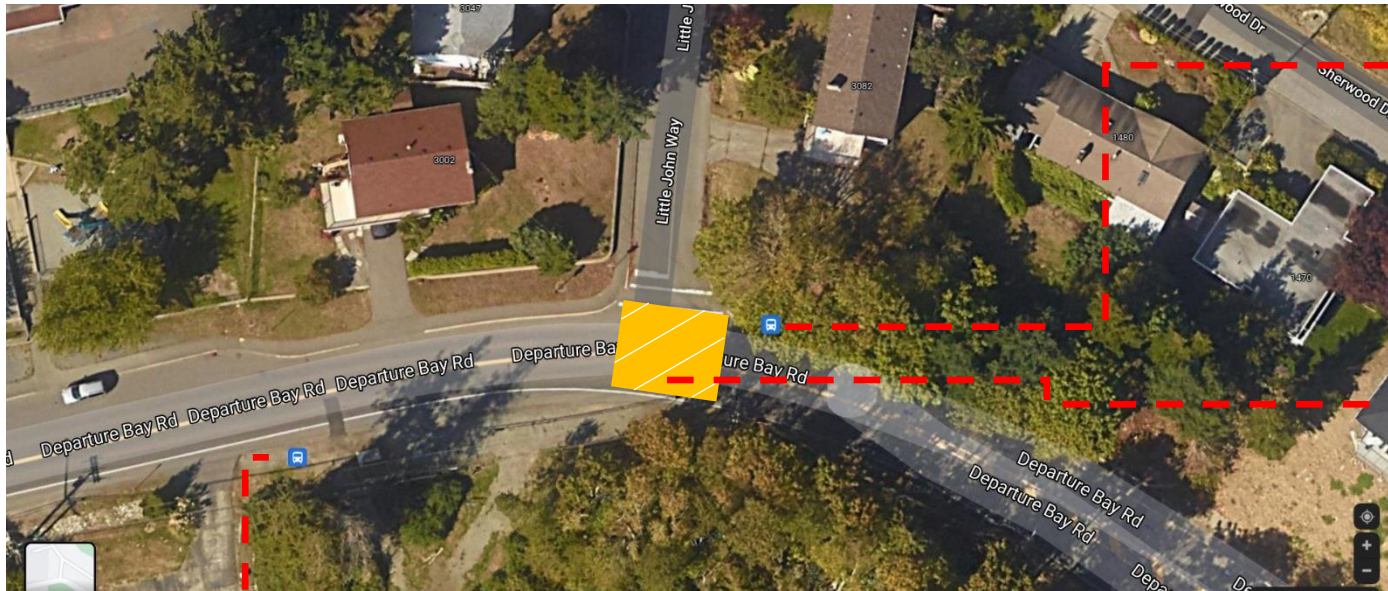


4) Departure Bay Road at Hammond Bay Road

This location will be a transfer point between the route 3, 12 and 72, primarily to enable connections to the Departure Bay Ferry terminal. Safe pedestrian crossing, improved passenger waiting, and amenities will be crucial at this location.

Recommended amenities at this location include:

- Shelters
- Signage: Stop sign, NextBus electronic signage
- Network map
- Route and schedule information
- Increased seating capacity



Existing SB bus stop

Expand capacity to accommodate 2 buses at the same time

Crosswalk and pedestrian crossing light needed for safe transfer activity between route 3 and 72, 12

Existing NB bus stop

5) Northfield Road at Boundary Avenue

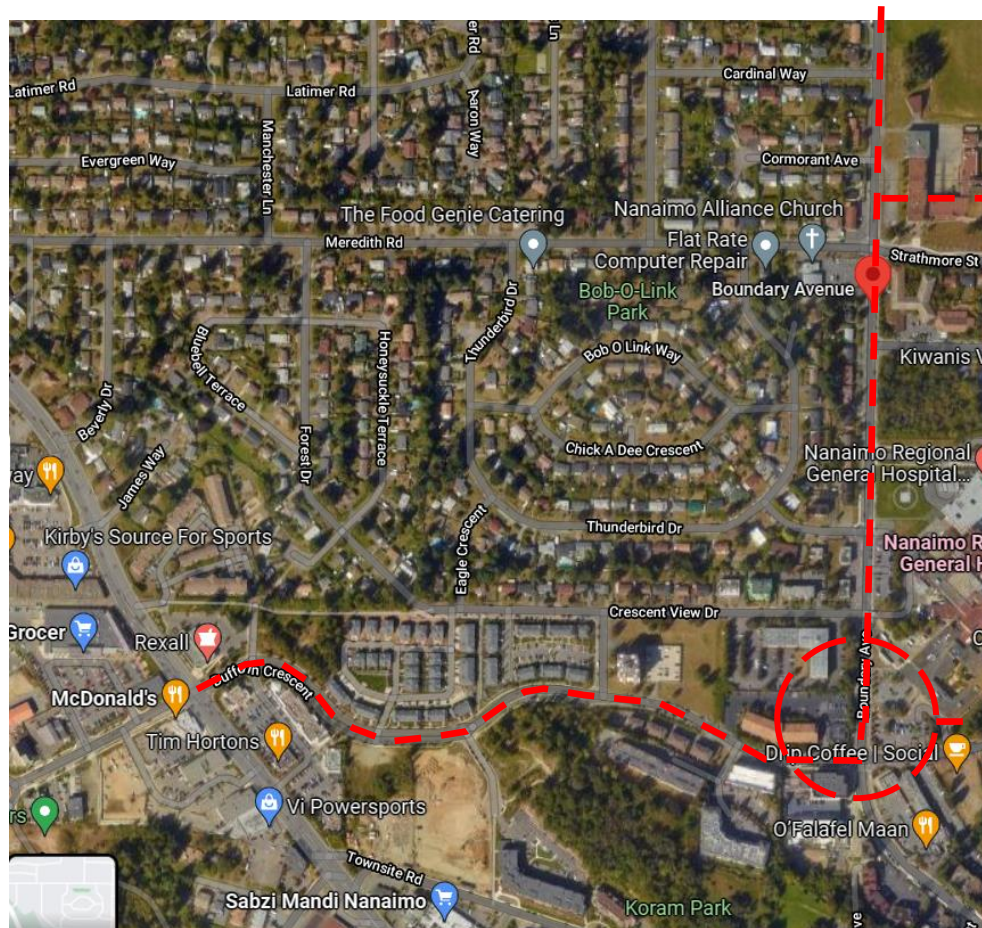
This location presents a challenge for safe turn movements of the routes 3 and the 72, turning left from Northfield Road onto Boundary Avenue for southbound travel to the Nanaimo Regional General Hospital. There is an existing left turn lane and a signal that allows for this movement; however, the length of the left turn is limited and a bus turning left here could lead to back ups at the Northfield/Island Highway intersection.

One alternative is to have the bus pull up ahead of the bar to turn left, but in cases where the bus is in queue this might not be possible.

The other alternative is reflected in the current proposed routing the routes 3 and 72, where the bus travels to Duggan Road and travels south until Meredith Road and then continues south on Boundary Avenue. On the northbound it just travels on Boundary Avenue. This alternative is safe and should continue to be used until such time that the queuing lane to turn south on to Boundary Avenue can be lengthened.



6) NRGH area (Dufferin Crescent and Boundary Avenue)



Boundary Avenue prioritizes north south movement, supportive of transit

Recommended left turn signal at intersection, could be triggered by bus

It is recommended that the intersection of Dufferin Crescent and Boundary Avenue be upgraded to have a left turn signal for northbound buses.

2.7 NORTH RDN STOPS ON ISLAND HIGHWAY

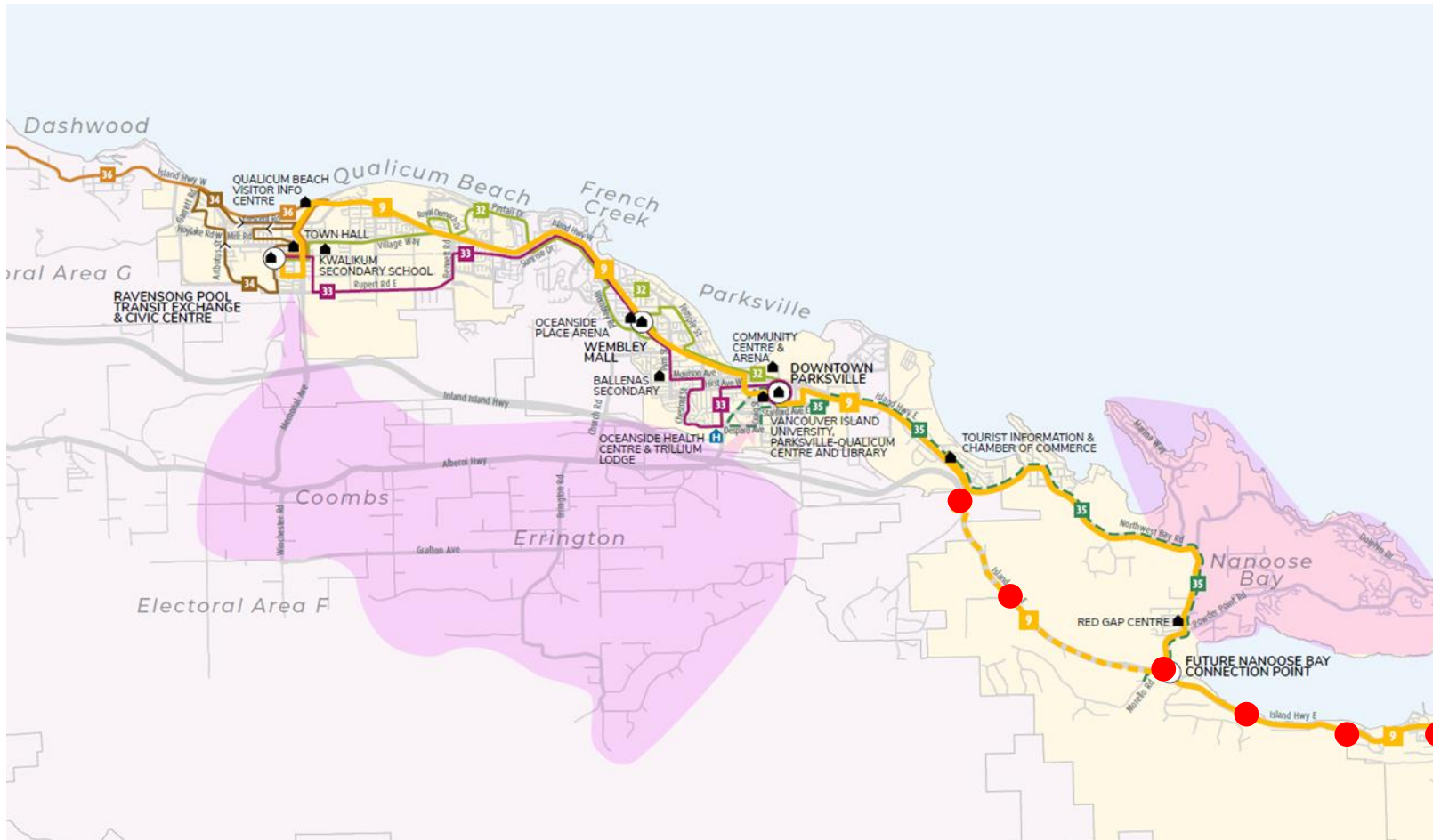


FIGURE16 MAP SHOWING POTENTIAL STOP LOCATIONS ON ISLAND HIGHWAY

The following pages identify potential locations for stops on Island Highway in the northern segments of the RDN between Woodgrove Centre and Parksville. These locations will need to be field tested for safety before stops are finalised. According to the BC Transit Infrastructure Design Summary, these are the guidelines to consider while designing stops on high-speed roads:

1) Speed and minimum sight distance

Initial Operating Speed (km/h)	Perception and Reaction Time (sec)	Perception and Reaction Distance (m)	Brake Distance (m)	Minimum Stopping Sight Distance (m)
40	2.5	28	56	84
50	2.5	35	88	123
60	2.5	42	126	168
70	2.5	49	172	221
80	2.5	56	225	281
90	2.5	63	284	347

2) Typically use a bus bay for buses stopping on high-speed roads

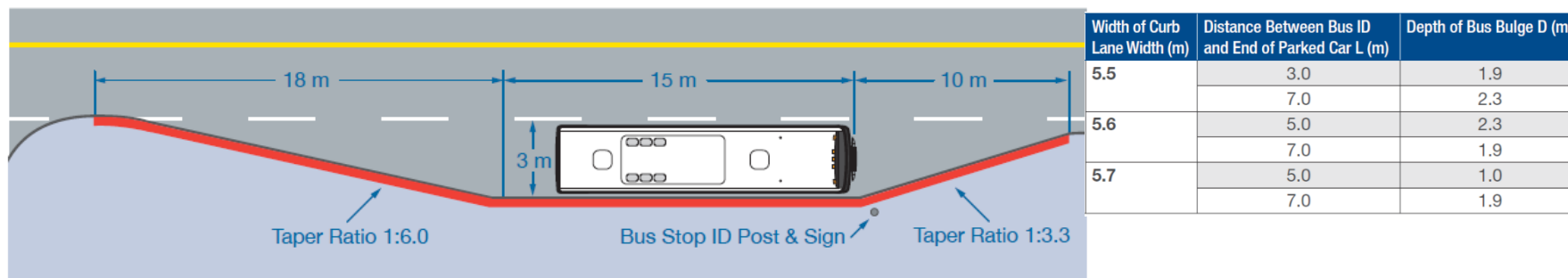


FIGURE17 BUS BAY REQUIREMENTS FOR STOPS ON HIGH SPEED ROADS, SOURCE: BC TRANSIT INFRASTRUCTURE DESIGN SUMMARY

Stops should ideally be located adjacent to a signalised intersection to ensure safe pedestrian crossing activity on the highway. While far side stops are generally recommended for safety reasons, it is possible that a combination of nearside and far side stops might have to be used on the highway depending on road conditions and speeds.

Some examples of stop locations on Island Highway are shown below. Some of these locations have existing stops in at least one direction. Where a stop does not exist, field testing for safety is crucial before finalizing a stop location.



Island Highway and NW Logging Road



Island Highway and Kaye Road



Island Highway and NW Bay Road (existing stops)



Island Highway and Arlington Road



Island Highway and Skyview/Hillview Road



Island Highway and Snaw-Naw-As Road

At the intersection of Snaw-Naw-As Road and Island Highway signal upgrades have been completed and it is possible to install bus stops at the pullout locations visible in the adjacent image, however safety of passengers boarding and alighting from the bus as well as crossing the highway will need be ensured before a stop is finalized here.

3.0 CONCLUSION

Enabling a full suite of transportation choices for residents within the Regional District of Nanaimo requires that region's transit system continue to evolve to offer improved frequency, reliability and quality of service. The RDN's Transit Redevelopment Strategy outlines a path to reshape the transit system to align with development and make these improvements.

Central to the new revised network will be the implementation of the Primary Network routes, including the 1 Nanaimo Rapid Line, its supporting Frequent Transit routes the 2 VIU Line and 3 Nanaimo Hospital Line and the Regional 9 Intercity Line. These routes will serve as the higher frequency spine for the system, carrying the most passengers and the highest population areas of the RDN.

Infrastructure works hand in hand with service improvements and operating investment in these routes and others in the system. Maximizing that investment and attracting strong ridership depends on the ability of these routes to offer high quality, convenient service that is welcoming and interfaces with other modes of travel (e.g. by providing bus stops, exchanges and Park & Rides that are well-appointed and are easily accessed on foot, by bike, and by other vehicles) and which also provides efficiency and reliability through transit priority measures and other intersection improvements.

This summary outlines the priorities that should be considered for further infrastructure investment and partnership to continue to move the system forward.

APPENDIX F

MARKETING AND BRANDING

BEST PRACTICES OVERVIEW

BRANDING AND MARKETING BEST PRACTICES OVERVIEW

This document provides an overview of branding and marketing best practices that have informed the Regional District of Nanaimo (RDN) Transit Redevelopment Strategy (TRS) process and recommended restructured system to-date, and which may also be helpful in guiding system implementations, marketing and outreach strategies going forward.

This Transit Redevelopment Strategy (TRS) is a comprehensive five-year plan that seeks to optimize current transit services in the RDN to improve their efficiency and effectiveness. It also outlines how to focus future investment in service and infrastructure to increase ridership, better align mobility with future development and population changes, and integrate transit with active transportation.

As a result of the TRS, there are service changes planned for the system that provide branding and marketing opportunities:

- The comprehensive nature of the system changes will necessitate significant updates to all customer information and customer-facing materials, such as route names and numbering, system maps and schedules, bus stop signage, and potentially even the look and feel of some transit vehicles.
- A series of major service and infrastructure implementations provides the opportunity to have more of an ongoing dialogue with customers and the general public, such as through potential further engagement that may accompany implementations, as well as communications about the changes (ads, media releases, social media) and through customer feedback received.
- In particular, the highest order routes proposed for the system—its new Primary Network consisting of RapidBus, Frequent Lines and a Regional Line—also present an opportunity to brand or otherwise highlight those routes and communicate the value that they offer.

This document seeks to highlight branding and transit service promotion best practices and provide a tool kit for the RDN's use in marketing the upcoming changes in the system. This document:

1. Provides examples of re-branding/branding (both system and specific service type) from different agencies in Canada
2. Discusses the importance of branding and marketing
3. Provides best practices in branding and marketing
4. Discusses the process specific to the RDN and outlines next steps in the process.

EXAMPLES OF BRANDING IN TRANSIT SYSTEMS

This section provides some examples from Canadian communities that have undertaken branding of routes and services, as well as whole transit systems. This section focuses on those systems with a new Rapid or Frequent route network that were a major focus for the changes and branding. However, some system—including some of those shown here—have also included branding for some local services, such as Digital On-Demand or hybrid specialized/handyDART and conventional transit services.

Example #1: VIVA BRT, York Region Transit



VIVA

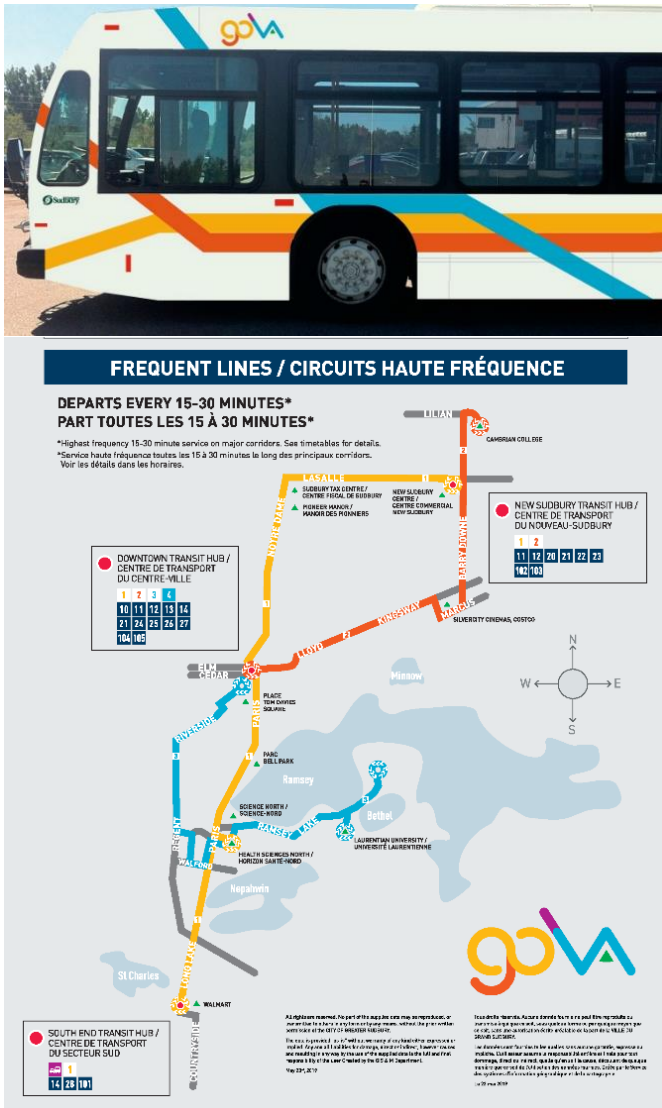
- VIVA BRT, York Region Transit.
- Viva is the bus rapid transit operations of York Region Transit in York Region, Ontario, Canada.
- Viva started operations in 2005.
- System is currently comprised of six routes.
- Colours are blue and white.
- The “V” represents high speed, limited stop service in the York Region Transit System.
- Stop signage, shelters, vehicles, passenger information and passes are all branded for a uniform look to this service.
- There is an immediate sense of distinction between the conventional service and this high-speed service, among York region residents.

Example #2: Rapid Bus, TransLink



- Rapid Bus, TransLink.
- RapidBus is the Bus Rapid Transit operations of TransLink, Vancouver, Canada.
- RapidBus was rebranded from the previous rapid transit service, originally called the B-Line.
- System comprises of six routes as well
- The vehicles, stop and signage all conform to the branding.
- The promise: 20-per-cent faster than current local service.
- The features: dedicated bus lanes, queue jumps at intersections, fewer stops and all-door boarding on articulated buses.

Example #3: GOVA, City of Greater Sudbury

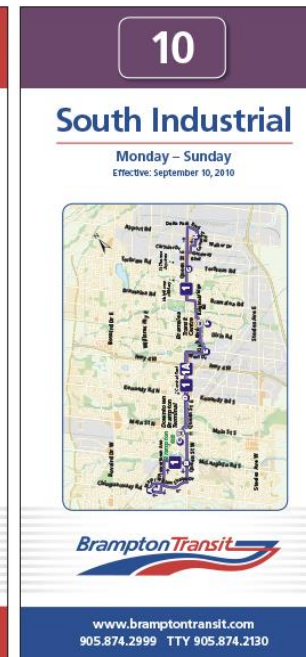
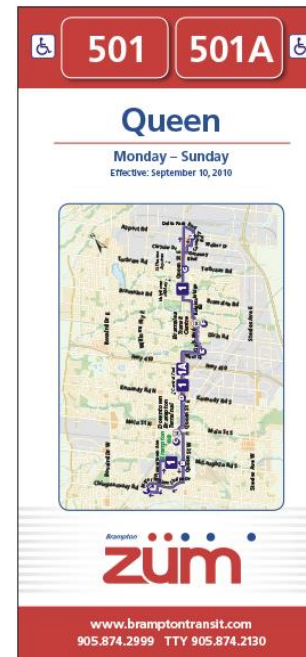
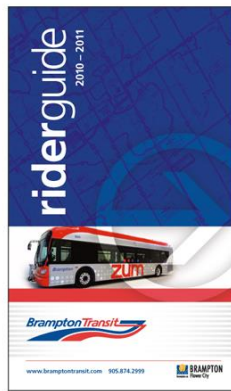


- In August 2019 the City of Greater Sudbury implemented a complete restructuring of its transit network that also included a comprehensive rebranding of its names and all services.
- A bilingual community, the new system name was developed to work in both official languages, pairing the English verb "go" with its French equivalent "va".
- Encompassing an extremely large region like the RDN, the branding process also developed bilingual sub-brands for their on-demand service delivered in less populated areas by partner taxi companies (formerly "taxidart," now "Gova Zone") as well as rebranding of their handyDART service (now "Gova Plus").
- The rebranding also launched new bus livery, signage, mapping, and customer information materials that also featured separate treatments for the new hierarchy of Frequent, Core, Local and Regional routes.

Example #4: Züm, City of Brampton, ON



- Züm is the Bus Rapid Transit component of Brampton Transit.
- Five routes serving major corridors of the city and acting as the spine for the other conventional transit routes.
- The vehicles, stops and signage all conform to the branding.
- Operated with standard length buses that are branded but which offer enhanced features such as “plus, high-back seats for a smooth ride.”
- The promise: “See you sooner.”
- The features: distinctive shelter / station design limited stops, real time Next Bus information, transit signal priority.



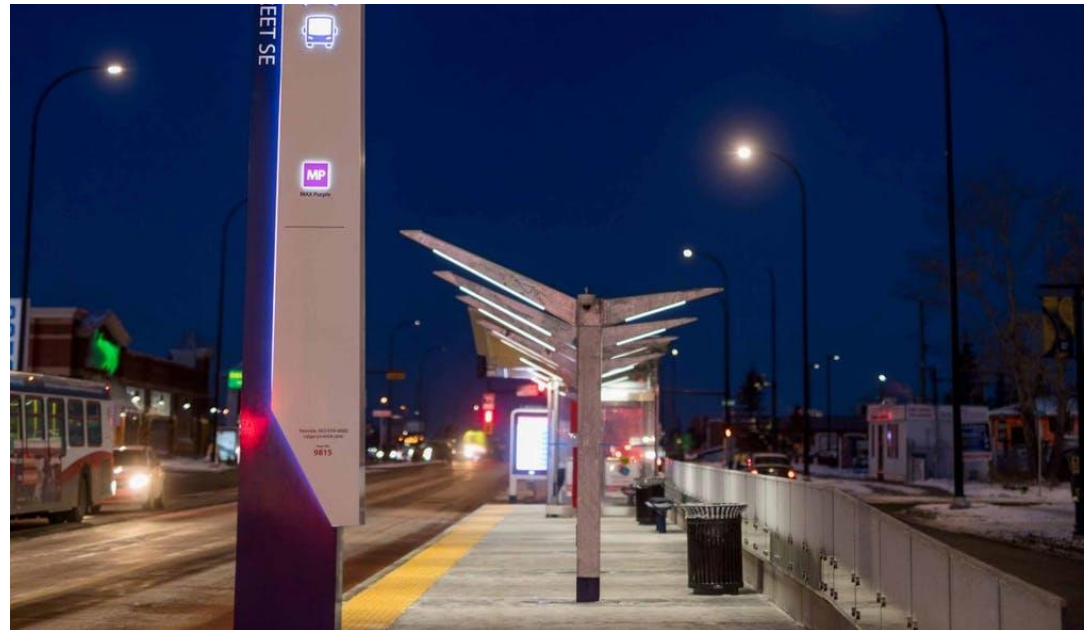
Example #5: MAX, City of Calgary



Rapid Transit Network



- MAX is the Bus Rapid Transit component of the Calgary Transit’s Rapid Transit Network.
- Coordinates with existing and proposed C-Train lines to serve major corridors and quadrants of the city.
- MAX consist of four lines.
- The vehicles, stop and signage all conform to the branding.
- The promise: MAX convenience, MAX comfort, and MAX connections.
- The features: dedicated bus lanes, queue jumps at intersections, fewer stops, distinctive stations, mix of vehicle types including standard buses.



WHY FOCUS ON BRANDING AND MARKETING

In the case of the RDN Transit System, branding and marketing strategies will both have a role in launching the new network, describing the value that Rapid and Frequent routes and other transit services are intended to deliver, and creating awareness and curiosity about the new system.

- **Branding** a product or service creates an identifiable, marketable, and common theme that extends across the product and all related touch points, such as opportunities the customer has to interact with the brand.

In a transit system, examples of those touch points include everything potentially required to take a trip, including accessing system information online or by phone, the process of identifying and walking to/from stop and its environment, and all the elements of being on board the bus.

Branding in transit can also be used to convey a personality or promise of value for specific types of service, such as Rapid or Frequent lines.

See also:

- BRT Branding, Imaging and Marketing (American Public Transportation Association) - https://www.apta.com/wp-content/uploads/APTA-BTS-BRT-RP-001-10_Rev1.pdf
- Bus Rapid Transit Practitioner's Guide (Transit Cooperative Research Program) - <https://www.nap.edu/catalog/23172/bus-rapid-transit-practitioners-guide>
- Branding and Bus Rapid Transit (Government of Canada Urban Showcase Program) - https://publications.gc.ca/collections/collection_2012/tc/T41-1-67-eng.pdf



- **Marketing** a product or service creates an awareness, builds a customer base, and generates interest in a service or brand that is either launching new or creating a subsidiary service or rebranding.

However, marketing for transit can be somewhat different than marketing products like a type of shoe or a car. This is because a substantial amount of marketing transit involves trying to influence behaviour change, as opposed to just simply building brand preference for one type of product over another, such as liking Toyota cars better than Ford).

So, a portion of marketing transit involves traditional product-based approaches geared to building awareness of the transit system, addressing negative perceptions/issues, making the product itself as appealing as possible and framing its best aspects in a positive light.

Other aspects that borrow from behaviour change marketing involve identifying and addressing barriers to the desired behaviour (for instance, making it easy to find system information and making the system itself easier to understand), providing prompts and supports to try it (such as outreach at the start of school or around service changes), providing rewards for giving it a try (incentives or prizes for riders), and developing social norms around the behaviour (e.g. transit is an easy way to get around the RDN and living in a more car-light way is part of the lifestyle here).

The above factors influence marketing for transit in that it's not just about selling the features of Rapid/Frequent transit and tranist system as a whole but also thinking about how the timing of launches and activities are potentially geared to when people are most open to trying new transportation behaviours, such as in the early fall.

See also:

- Community Based Social Marketing - <https://cbsm.com/>



OVERVIEW OF TRANSIT BRANDING AND MARKETING BEST PRACTICES

Regardless of type of product, the following elements of developing a brand strategy are consistent and can be applied to transit:

Step 1 - Develop a branding strategy: Define the “Who-What-How” behind your brand

Who: Identify and characterize the target audience

- For transit, there are multiple audiences (decision makers, business leaders, youth, seniors, adult commuters, general public, etc.) Of particular importance is also remembering that front-line staff are a key audience for the process.

What: determine the “brand promise” to be made to the audience

- What is the new service like and what value is it delivering? For Greater Sudbury, this brand promise for its revised system was “Better routes. Better schedules. Better Service.” For the City of Calgary’s new MAX network of Bus Rapid Transit routes it was “MAX Comfort, MAX Convenience, and MAX Connections” (see right for both).

How: determining how all the audience “touch points” will communicate the brand

- As discussed later in this section, transit touchpoints include everything from stops and vehicles to signage, maps, advertising, digital and print media, Operator uniforms, and promotion.



MAX Yellow is Calgary's newest rapid transit line serving Mount Royal University, Rockyview Hospital, Southland Leisure Centre and other southwest destinations. With the expansion of MAX, improvements are also coming to existing bus routes.

MAX Comfort	MAX Convenience	MAX Connections
Heated shelters, larger platforms, real-time displays, improved lighting and CCTV security cameras provide commuters with a new level of comfort, accessibility and safety.	With signal-light priority and queue jumps to bypass traffic, plus fewer stops, MAX gets you to your destination before you know it.	With fewer transfers and better connections to major destinations, the CTrain and other bus routes, MAX makes it easier to get where you need to go.

Step 2 - Develop a brand identity: What story are you telling? What promises are you making? What is your Unique Selling Point?

Once the elements in Step 1 are defined, the next step is to develop the identity of the brand. This could be for an individual route or a suite of services. The components of a typical brand identity and their attributes include:

- **Name:** Simple, memorable, and easily identifiable.
- **Logo:** Relatable, easily understood, easily identifiable.
- **Colours:** representative (of values), creates an impression.
- **Tagline:** is the promise of the service/what it stands for.

As a transit system is ultimately owned by its community, the process of developing a brand identity often includes an element of (quiet) public engagement. For instance, when the Central Fraser Valley transit system went through the process of rebranding its name and identifier in the early 2000's, it used a stakeholder workshop to help define the desired personality and attributes and to test out early name and logo drafts. For Greater Sudbury, an online survey sought citizen and rider feedback on qualities they wanted associated with the new transit information materials and then intercept surveys (i.e. with a survey team approaching transit customers at the main exchange) were used to seek feedback on favoured design and name options, with a later full phase of engagement asking for feedback on the draft new system schedules and maps.

Step 3 - Market the identity and its brand, and garner support for the service.

Once the brand and its attributes are confirmed, a marketing campaign is developed to promote it. In transit, such a campaign is often developed in tandem with promotion of a major service change or a series of service changes. Marketing strategies typically define the following:

- **Story:** What is changing? Why the change? What is better?
- **Strategy:** What are the specific marketing tools that will be used to reach each audience, including? What elements will be used to create awareness, educate and/or drive behaviour change? What components will be web-based, in-person and/or use traditional or social media?
- **Campaign:** What are the materials, events and/or people that will form the elements of promoting the brand and system?
- **Success:** How will success be defined and measured and how will the system share and promote its success?

Step 4 – Develop the elements of the transit system and/or route brand.

As noted previously, elements of the transit system brand can include numbering and naming, visual identifiers (logos, symbols), mapping, signage, vehicles, and infrastructure. This final section discusses each of those and how it might potentially apply to the RDN Transit Primary Network services within a BC Transit context.

Route Numbering and Naming

- **Best practice** – Create numbering and naming that makes Rapid/Frequent Transit distinctive from other routes.
- **Examples** – Examples of numbering include using the lowest numbers in a system (i.e. 1, 2, 3) to show the importance of these routes, others a series of numbers (i.e. all numbers in the 90’s like TransLink’s 98, 99, etc. or 500’s like Züm), or colours like Calgary’s MAX. Route names may convey special significance related to the brand (like Calgary’s colour-branded MAX lines, Kelowna Transit’s “97 Okanagan Line” Rapidbus route) but more commonly refer to the corridors or destinations they serve in cases with multiple lines
- **How this might apply to RDN Transit** –
 - Generally, using a number is more accessible than a colour alone as it is not impacted by colour blindness and is easier to use for people who may not speak or read English.
 - The benefit of the lowest numbers is that they always naturally appear first in any list or materials, showing their importance that way.
 - The numbering system suggested by the TRS already shows a way of aligning with numbering best practices. It would likely be beneficial to confirm approach to naming and whether other names are desired beyond what is shown.

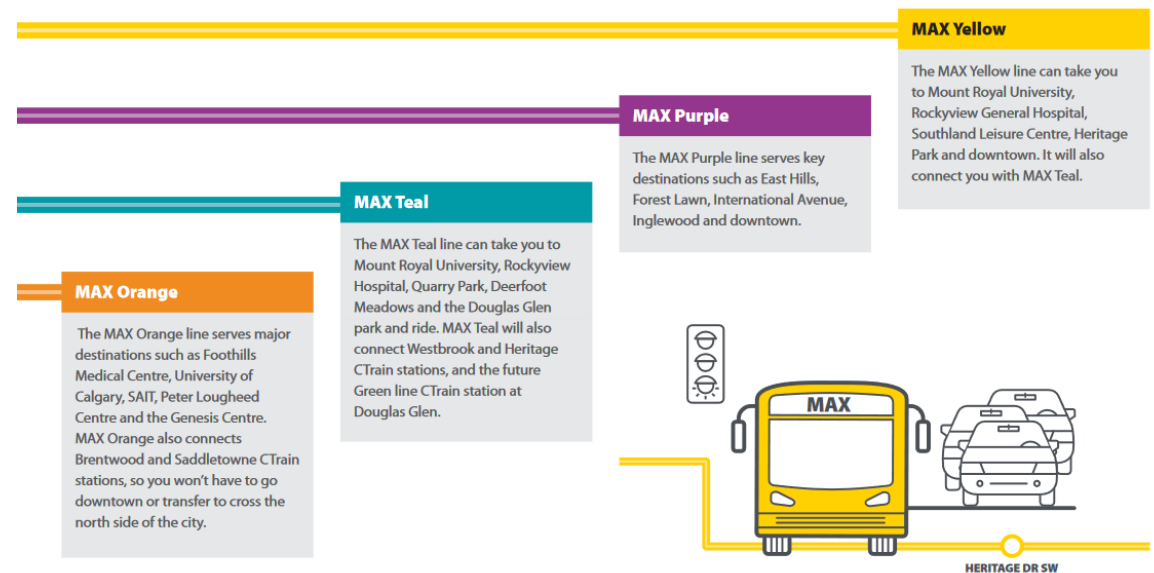
PROPOSED NEW ROUTES	
Primary Routes	
1	Nanaimo Rapid Line
Future extension to South Parkway Plaza	
2	VIU Line
3	Nanaimo Hospital Line
Future Extension to VIU	
9	Intercity Line
Neighbourhood Routes	
10	VIU / Woodgrove via Jingle Pot
11	Rutherford - Hospital
12	Hammond Bay / Departure Bay Ferry
15	Westwood to VIU
16	Harewood / South End
18	Cedar / VIU
19	Cassidy / Airport via Haliburton
31	Lantzville
Connector Routes	
70	NCX - Nanaimo Cowichan Express
72	Hammond Bay Commuter

Visual Identifiers

- **Best practice** – Logos and visual style treatments that may be used in other applications (stop signage, vehicle livery, customer information materials, etc.) to create a distinct sense of the Rapid/Frequent Transit distinctive from other routes.
- **Examples** – Usually the visual identifiers are created in concert with numbering / naming decisions. These may include specific colours (which are often brighter and more fun than others used in the system’s information), fonts, and logos / images used with the service and its information. They also often include a tag line or other promise of value integrated with the visual identity.
- **How this might apply to RDN Transit** –
 - There may be an opportunity to develop a specific visual identity but doing so would depend on further discussion with BC Transit and how much the RDN is willing to take on in terms of producing downstream materials. For instance, customer information materials, website, visual items used in traditional advertising and social media, etc.

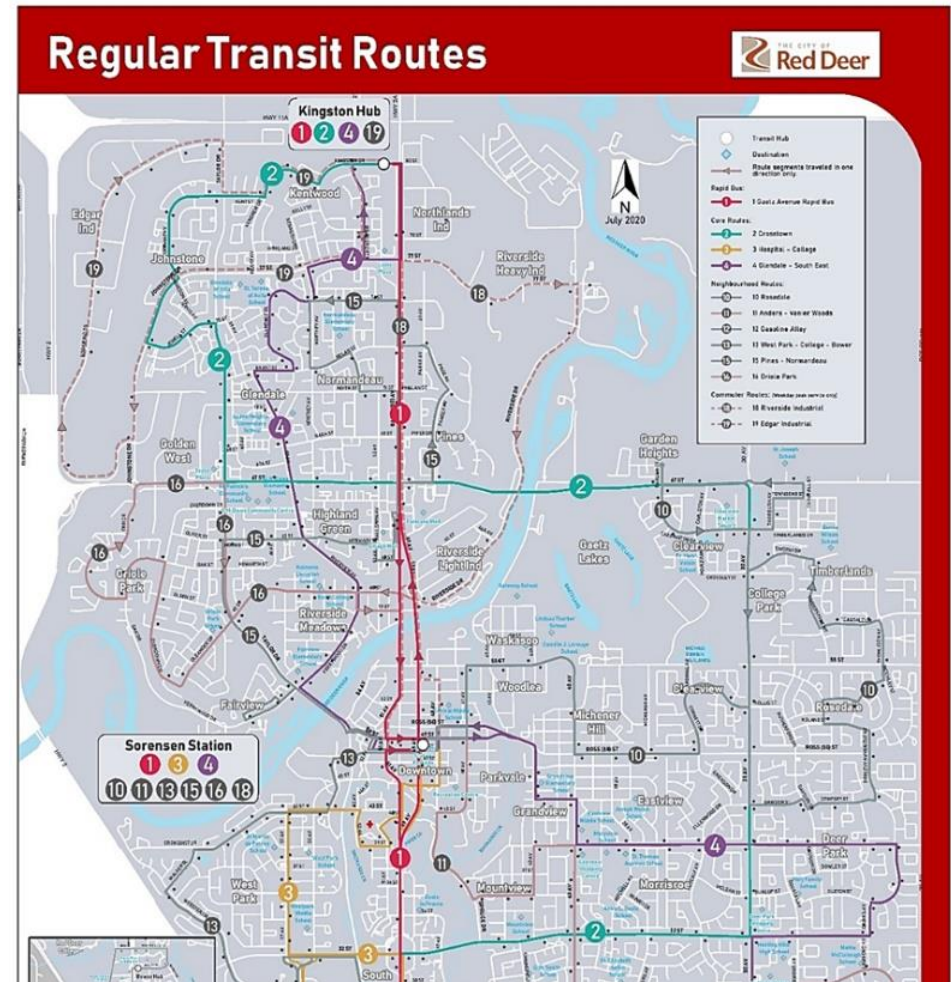
Introducing MAX Yellow

With the addition of MAX Yellow, Calgary’s rapid transit network serves all four quadrants of the city, with more convenience, more comfort and more connections than ever before.



Mapping

- **Best practice** – The highest order routes should appear as the thickest and most noticeable lines on maps to convey their value.
- **Examples** – In addition to using thicker and brighter lines for the highest order routes, many other systems will also “drop back” the supporting network by either reducing the spectrum of colours used (such as the greys used in current BC Transit Transit Future mapping styles in Victoria and Kelowna), or by muting the hues or reducing the vibrancy of the other routes (like the Red Deer Transit example below).
- **How this might apply to RDN Transit** –
 - The mapping styles used for the TRS maps were chosen as an example whereby the Primary Network routes have more “pop” on the page and the supporting network still has a distinctive colour for each route but are from a more subdued colour palette and using a thinner line to reduce competition with the other routes.
 - Adding a subway style “spider map” to show the highest order routes and where they go in a graphic way (including their major stops and destinations) as a supplemental system map is also useful and could be a fun addition to the system as a way of building awareness of the routes.



Bus Stop Signage

- **Best practice** – As particularly RapidBus may be limited stop and not serve all stops in a corridor, it is useful to either have a distinctive way of incorporating those routes into signage or having an additional sign at stops served by RapidBus.
- **Examples** – In addition to bus stop route names on the signage, it may also convey customer information, wayfinding, and the number of the signage itself. The example shown below is the signage added to the Frequent line stops (their future RapidBus routes) in Greater Sudbury.
- **How this might apply to RDN Transit** –
 - BC Transit already has standard bus stop signage developed. There may be an opportunity to develop a specific style for the Primary routes in the RDN—and in some ways this is the easiest way to associate a visual identity with the routes—but similar to the discussion on visual identifiers, doing so would depend on further discussion with BC Transit and how much the RDN is willing to take on in terms of producing downstream materials.



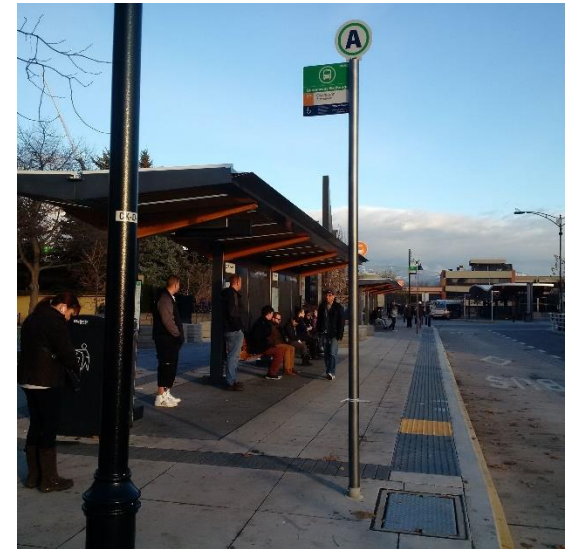
Vehicles

- **Best practice** – Rapid Transit often uses distinctive bus types and livery (i.e. the exterior paint scheme of vehicles) where possible to convey that they are different.
- **Examples** – In many cases, higher capacity vehicles may be assigned to a Rapid/Frequent route (such as double deck or articulated buses) but many systems also use standard length vehicles. The constraint to branding a whole line with distinctive bus livery is that there must be sufficient vehicle spare associated with that livery and route to operate it as a “system within a system” as there will be less ability to mix in other vehicles.
- **How this might apply to RDN Transit** –
 - The RDN’s CNG buses are already quite distinctive in and of themselves and so no further treatment may be necessary on this over the short term. Likewise, the system’s lower spare ratio means that operating a separate set of branded buses is likely not economically feasible over the short term. However, the system could consider wrapping one or two buses with distinctive temporary livery (similar to what is done for advertising campaign bus wraps) and operate those buses as a way of promoting a newly implemented Rapid or Frequent Line service.



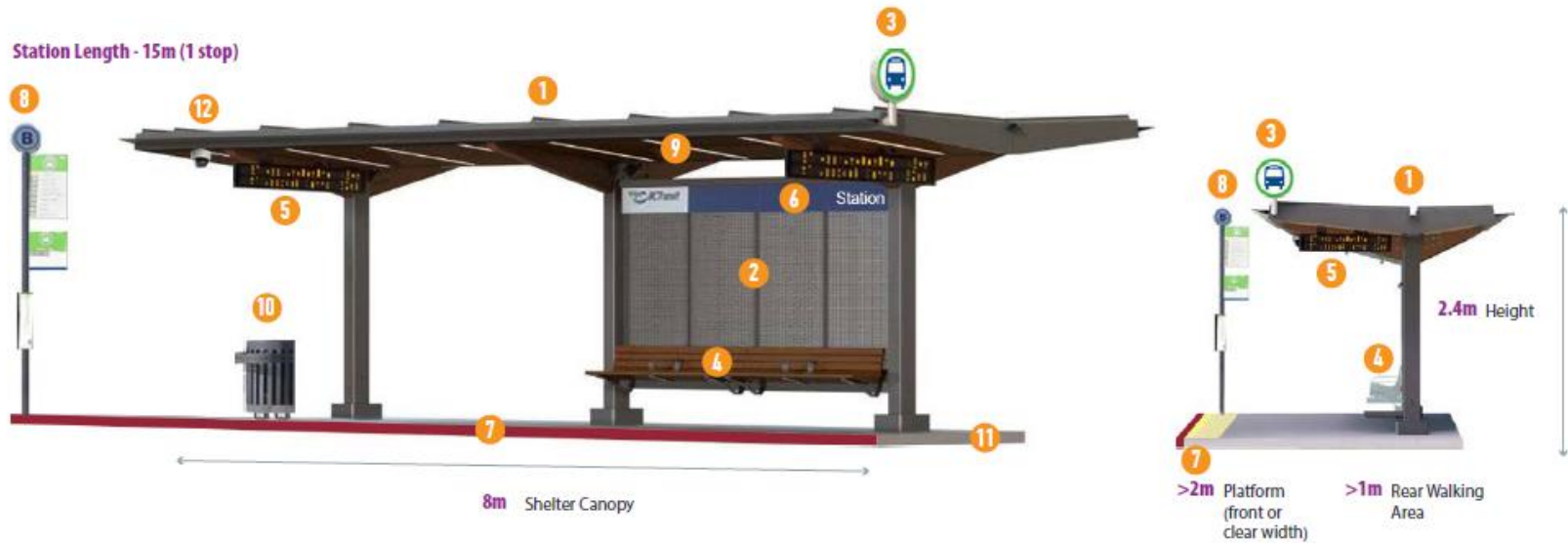
Infrastructure

- **Best practice** – Other than the supporting transit priority infrastructure described in the TRS (queue jump lanes, transit signal priority, etc.), Rapid Transit infrastructure provides enhanced customer amenities at stops/stations.
- **Examples** –As described in the BC Transit graphic on the next page (from the Victoria Regional RapidBus Implementation Strategy) and shown in the pictures of the Kelowna Okanagan Line stations at right, RapidBus stations should provide more generous space for waiting passengers, including ideally separation from other pedestrians walking / rolling by. Stations may be “standard” (minimum 3m deep by 15m long) or “enhanced” (minimum 5m deep by 30m long) and should include:
 - Large “T-5” RapidBus style shelter (canopy width/length may vary)
 - Station name, ID Sign Post, BC Transit marker
 - Seating
 - Tactile strip, universally accessible design.
 - Lighting
 - Garbage receptacle
 - Bike parking / storage
 - Electrical capacity for future addition of Next Bus Display
 - Advertising panel, smart waste bin, landscaping based on municipal preference.
- **How this might apply to RDN Transit** –
 - BC Transit’s shelter program is well advanced and already provides a distinctive look. The RDN can likely build on this existing framework for it customer infrastructure at stops, as described in the TRS.



//

STANDARD RAPIDBUS STATION FEATURES



- | | | | |
|---------------------|--------------------|-------------------------------|--|
| 1 Shelter Canopy | 4 Seating | 7 Tactile / Visible Curb Edge | 10 Smart Waste Bin |
| 2 Back Windscreen | 5 Next Bus Display | 8 ID Sign Post | 11 Universal Accessible Station Entry / Exit |
| 3 BC Transit Marker | 6 Station Name | 9 Station Lighting | 12 Security Camera |

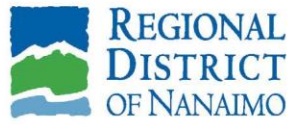


www.bctransit.com RDN Transit

REGIONAL DISTRICT OF NANAIMO TRANSIT REDEVELOPMENT STRATEGY



SERVICE DESIGN STANDARDS & PERFORMANCE GUIDELINES
February 2022



SERVICE DESIGN STANDARDS AND PERFORMANCE GUIDELINES

As part of the on-going management of the transit network, Service Design Standards and Performance Guidelines were developed and approved for the Regional District of Nanaimo (RDN) Transit System as part of the 2014 RDN Transit Future Plan.

This document updates the system's Service Design Standards and Performance Guidelines to reflect the revised route structure, hierarchy and priorities developed in the approved 2022 RDN Transit Redevelopment Strategy.

Service Design Standards and Performance Guidelines are tools that facilitate service planning decisions and measure how the transit system is progressing towards achieving its goals.

- **Service Design Standards** define service levels, the service area and when new service should be introduced to an area.
- **Performance Guidelines** measure service effectiveness and monitor how well the transit system is progressing to achieving the vision of the Transit Future Plan and determine whether change is required.

These measures are meant to ensure resources are used effectively, that an acceptable level of service quality is provided to the customer, and, along with the Transit Future Plan, guide planning decisions and recommendations.

Similar to the process used in this update, Service Design Standards and Route Performance Guidelines should ideally be reviewed periodically (every 3-10 years depending on the level of community development), since they evolve as the system develops and as the needs of the community change.

SERVICE DESIGN STANDARDS

What they are and what they define:

Service Design Standards define levels of transit service desired to meet individual community needs. Service Standards are specific to a particular transit system and the communities it serves and should reflect community values. Transit policies identified in the 2014 RDN Transit Future Plan and other previous system plans have been incorporated into the RDN Transit System Service Design Standards, which have been updated as a component of the 2022 RDN Transit Redevelopment Strategy.

Service Design Standards usually define features such as:

- Service span (the hours and days of service when it operates)
- Frequency of routes or groups of routes
- Walking distance to bus stops
- Level of accessibility
- Thresholds for the introduction of new transit service to areas beyond the walking distance of existing transit services (subdivision density, population, etc.)

Why they matter:

The key benefit of service design standards is that they assist RDN Transit and BC Transit in determining and managing community expectations around the level of transit service to be provided. They also provide principles for decision making regarding system design, such as whether to provide a new service or change an existing service.

NETWORK DESIGN PRINCIPLES

- Transit service should be focused on major activity centres and residential nodes within urban areas, with connections to rural village centres.
- Ensure that transit routes connect neighbourhood residents to the closest regional centre and that the bulk of transit trips between centres can be made with no more than one transfer.
- Transit routes should be kept as direct and frequent as possible to be competitive with the automobile.
- Connections should be provided between Rapid and Frequent Transit Routes to Neighbourhood Transit Routes, at major exchange points.
- Transit service should connect to other layers of the transportation network, allowing passengers to conveniently connect to other transportation modes, including active transportation, intercity bus routes, ferry terminals, airports and rail passenger services, as well as custom transit services.
- Transit service should be operated on the arterial and collector road network and be limited on the local road network. Future arterial and collector roads should be designed to accommodate transit stops and transit priority measures.
- At least 90% of residents and employees within the RDN's urban containment boundary are within 400 metres walking distance of a transit route. (This metric may be reassessed with the potential implementation of Digital On-Demand services).

Ease of Use Principles

- To make the transit system easy to understand and use for all passengers, routes should be direct and straightforward, with service frequencies and schedules that are consistent for each route and during each time period
- Customer information should be designed to be straightforward with simple route and schedule information.
- Transit information should be developed to communicate the layers of service identified in the Transit Redevelopment Strategy, including the Primary Network (Rapid, Frequent, Regional routes), Neighbourhood Routes (Local Ridership and Local Coverage Routes) and Connector Routes (Targeted Transit and Interregional routes), with specific attention to the following:
 - Strategies for route identification such as naming and numbering conventions.
 - A simple to understand transit network map.
 - Information and branding for the system, as well as how the layers of the transit network interrelate. This includes mapping, numbering and branding styles, with particular attention paid to conveying the quality, distinct identify and importance of the Primary Network routes.
- Persons with mobility and cognitive disabilities should be provided with a range of transit options, including handyDART service, taxi programs, and fully accessible conventional transit vehicles and bus-stop infrastructure.

Introducing New Service

The following guidelines have been identified to determine when it may be feasible to introduce conventional transit service into new residential, industrial, commercial, and recreational developments:

- Minimum density of 10 residents or 10 employment jobs per hectare measured over a minimum developed area of 10 hectares
- There is a road and pedestrian access that provides for safe access and efficient operation of transit service.

Thresholds for Digital On-Demand service will typically have lower density. Wherever possible planning for new developments should occur in tandem with planning for transit. Developers and local governments are encouraged to reach out to transit early in the process.

Types of Transit Service

Table 1 describes a hierarchy of transit services that will support the implementation of the five-year transit strategy and satisfies various market segments, including the regular transit rider and potential users. **Existing bus route numbers shown reflect the current state as of February 2022, while proposed new bus route numbers reflect those outlined in the RDN Transit Redevelopment Strategy.**

TABLE 1 – TYPES OF TRANSIT SERVICE

Type	Service Description	Existing (Bus Route #)	Proposed New (Bus Route #)
Primary Routes – These routes act as the highest frequency spine of the system connecting the region’s key destinations and corridors			
Rapid	Limited stop and highest frequency service (every 15 minutes or better) connecting key destinations and population centres along the City of Nanaimo’s Highway 19A and Highway 1 corridors.	50, 7	1
Frequent	High frequency services (every 15 minutes or better) on key corridors with regular stop spacing that provide connection to Rapid Bus and major neighbourhoods and destinations.	40 30	2 3
Regional	Reliable and regular services (at least 30 minutes at peak commute times) connecting key population centres within the region, including the Town of Qualicum Beach, City of Parksville and the City of Nanaimo, as well as connection points to the District of Lantzville and Electoral Areas E and G.	91	9
Neighbourhood Routes - Services to medium- and lower-density residential and employment areas that connect to the Primary Routes at key points.			
Local Network – Ridership Based	Fairly direct services that connect medium density neighbourhoods and destinations to the Primary routes and which may also offer resilience to Primary network.	15 1 / 30 20	10 11 12

Type	Service Description	Existing (Bus Route #)	Proposed New (Bus Route #)
		8	18
Neighbourhood Routes (Continued)			
Local Network – Coverage Based	Services to lower density residential and industrial areas with a focus on connecting to the Primary network.	5	15
		6	16
		7	17
		78	19
		11	31
		88	32
		97	33
		98	34
		-	35
99	36		
Connector Routes – Routes serving targeted commuter and interregional travel needs.			
Targeted Services	Service targeted for specific users and markets, such as school and work commuters and targeted connection to transportation hubs, such as Duke Point Ferry.	-	72
		-	77
Interregional	Services connecting the RDN to other regions, such as the Cowichan Valley and Comox Valley Regional Districts and Systems.	-	70 NCX
handyDART – Specialized services for registered eligible users.			
handyDART	On demand service to and from accessible building entrances for citizens who cannot use the conventional portion of the transit system because of a disability or physical need.	handyDART	handyDART

Frequency and Span of Service

Service frequency defines the minimum frequency at which a route operates, while **span of service** defines the operating hours for each service type, as described in

Table 2.

Service frequencies shown in Table 2 depict the future five-year targets for the RDN system, subject to meeting performance guidelines.

- Investments to increase service levels will be considered to strategically develop the network or when route performance indicates the route is performing 25% above the target for the routes class. As described later in the Performance Guidelines section, a suite of options is also available in the case when routes are underperforming.
- “Peak” refers to typical commuter times while “base” refers to service in the early morning, midday and evenings. On weekends “peak” service is typically in the midday to afternoon.

Span of service shown in the table also depicts the future five-year target. Extension to the span of service shall be considered when the first and last hour of service has productivity (typically measured in rides per hour) greater than the average productivity on the route. In general, most routes operate from 6:30 am to 11:30 pm on weekdays with more limited service on weekends.

- Service should be available 7 days per week and 365 days per year.
- Service should start early enough to meet rider needs to access key destinations, such as commuters travelling to downtown Nanaimo on Nanaimo Regional General Hospital to meet typical shift start times. Service on Primary routes would typically start earlier and end later than other routes.
- Service should start early enough to allow for an 8:00 am arrival at other major nodes on weekdays, and a 9:00 am arrival on weekends using all regular service routes.
- Outbound service from downtown should be provided until at least 12 midnight, Monday to Saturday, on all Primary routes.
- Outbound service from other major nodes should be provided until at least 11:30 pm, Monday to Saturday on all Primary routes.
- Span of service extension shall be considered when the first and last hour of service has a rides per hour productivity greater than the average rides per hour on the route.

TABLE 2 – FIVE YEAR TARGET: FREQUENCY AND SPAN OF TRANSIT SERVICE

Type	Period	Frequency: Base (Peak)	Span
Rapid	Weekday	20 - 30 min (15 min)	5:00am - 12:00am
	Saturday	20 - 30 min	6:00am - 12:00am
	Sunday	20 - 30 min	7:00am - 10:00pm
Frequent	Weekday	20 - 30 min (10 - 15 min)	5:00am - 12:00am
	Saturday	20 - 30 min	6:00am - 12:00am
	Sunday	20 - 30 min	7:00am - 10:00pm
Regional	Weekday	60 min (30 min)	5:00am - 12:00am
	Saturday	60 - 120 min	6:00am - 12:00am
	Sunday	60 - 120 min	7:00am - 11:00pm
Neighbourhood - Ridership Based	Weekday	30 - 60 min (30 min)	6:00am - 11:30pm
	Saturday	30 - 60 min	7:00am - 11:30pm
	Sunday	30 - 60 min	8:00am - 10:00pm
Neighbourhood - Coverage Based	Weekday	60 - 120 min (30 - 60 min)	6:30am - 9:30pm
	Saturday	60 - 120 min	7:30am - 9:30pm
	Sunday	60 - 120 min	8:00am - 6:00pm
Connector Routes	Weekday	30 - 180 min (Depends on route)	6:00am - 9:30pm
	Saturday	Targeted Service Depending on Route	Targeted Service Depending on Route
	Sunday	Targeted Service Depending on Route	Targeted Service Depending on Route

Vehicle Type Classification

Table describes the vehicle type’s attributes such as capacity and length, as well as the operating guidelines such as life span, maximum annual hours of operation and kilometers.

TABLE 3 - VEHICLE TYPE CLASSIFICATION

High Capacity	Heavy Duty	Medium Duty	Light Duty
			
<p>Low Floor/Accessible</p> <p>Minimum of 2 wheelchair positions</p> <p>35 or more seats, 95 passengers with standees</p> <p>Double Deck or Articulated</p> <p>13 / 20 year lifespan</p> <p>40 feet or greater in length</p> <p>2,500 maximum annual operating hours</p> <p>75,000 maximum annual kms</p> <p>Midlife upgrade</p>	<p>Low Floor/Accessible</p> <p>Minimum of 2 wheelchair positions</p> <p>13 – 15 year lifespan</p> <p>30 or more seats, 70 passengers with standees</p> <p>35 feet or greater in length</p> <p>2,500 maximum annual operating hours</p> <p>75,000 maximum annual kms</p>	<p>Low Floor/Accessible</p> <p>Minimum of 1 wheelchair position</p> <p>8 – 10 year lifespan</p> <p>Fewer than 25 seats, 40 passengers with standees</p> <p>Less than 35 feet in length</p> <p>2,500 maximum annual operating hours</p> <p>75,000 maximum annual kms</p> <p>No midlife extension</p>	<p>Low Floor/Accessible</p> <p>Capable of having more than 2 wheelchair positions</p> <p>5 year lifespan</p> <p>Up to 20 seats, No standees</p> <p>Less than 35 feet in length</p> <p>2,000 maximum annual operating hours</p> <p>60,000 maximum annual kms (300,000 km life)</p> <p>No midlife or life extension</p>

Vehicle Type by Service Layer

Vehicle type is driven by passenger loads during the peak hour of the relevant operating period. On routes where bus capacity is exceeded, consideration should be given to operating buses with additional capacity or with increased service frequency. On routes where a small bus would accommodate passenger loads at peak times, consideration should be given to operating a smaller bus (light duty bus) and maintaining existing frequency.

On larger vehicles, a typical approach is to allow standing passengers during peak periods (optimally for shorter runs) but to provide sufficient capacity for seated passengers during the off-peak hours. **Table 4** describes the vehicle types associated with each layer of the revised transit network proposed in the RDN Transit Redevelopment Strategy.

TABLE 4 – VEHICLE TYPES ASSOCIATED WITH SERVICE LAYERS

Service	Short-term	Medium to Long-term
Rapid	Heavy duty vehicle	Heavy duty vehicle or high-capacity vehicle
Frequent	Heavy duty vehicle	Heavy duty or high-capacity vehicle
Regional	Heavy duty vehicle	Heavy duty or high-capacity vehicle
Neighbourhood – Ridership Based	Heavy duty to medium duty vehicle	Heavy duty to medium duty vehicle
Neighbourhood – Coverage Based	Heavy duty to light duty vehicle	Heavy duty to light duty vehicle
Targeted Services	Heavy duty to light duty vehicle	Heavy duty to light duty vehicle
Interregional	Heavy duty vehicle	Heavy duty vehicle
Custom Transit	Light duty vehicle	Light duty vehicle

Transit Infrastructure

Design principles for transit facilities should conform to the BC Transit Infrastructure and Design Guidelines, as well as the federal guidelines for transportation and transit infrastructure.

Transit Stops



Transit stops and facilities should include a hard surface landing/waiting area and should be universally accessible. The RDN should work with local municipalities to improve on-street passenger facilities, including the provision of bus benches, shelters, lighting, waste receptacles, and route/schedule information.



- Direct pedestrian and cycling connections should be provided to bus stops via sidewalks, pathways and crosswalks, with curb ramps and barrier-free access.
- Bus stops should be located on the far side of crosswalks, or at least 20 metres in advance of a crosswalk.
- Buses may stop in the traffic lane (with a bus bulge where on-street parking is provided) and bay if the posted speed limit is greater than 50km/h at curbside out of the traffic lane, or in a dedicated bus pullout.
- Adequate sight distances should be achieved for motorists approaching the bus stop as well as transit passengers crossing the road from the bus stop.

Passenger amenities at transit stops can enhance the quality of service for customers and can also have a significant impact on attracting new users. **Table** describes what transit stop amenities should be associated with each type of service.

See also the RDN Transit Redevelopment Strategy for further information on stop requirements and proposed improvements to key Rapid and Frequent transit routes.

TABLE 5 – TRANSIT SERVICE TYPE AND ASSOCIATED STOP AMENITIES

Facility	Short - Medium-term	Long-term
 <p>Rapid Transit & Transit Exchanges</p>	<ul style="list-style-type: none"> • Transit shelters • Bike storage • Quality customer information (such as transit schedule and map information) • Universally accessible • Easy to interpret way-finding 	<ul style="list-style-type: none"> • Premium transit shelters • Elevated boarding platform • Off-board fare payment • Real time schedule information • Bike storage • Customer wayfinding information • Universally accessible • May include Park & Ride facilities
 <p>Frequent & Regional Routes</p>	<ul style="list-style-type: none"> • Transit Shelter • Universally accessible • Bench • Easy to interpret way-finding 	<ul style="list-style-type: none"> • Transit shelters • Bike storage • Quality customer information (such as transit schedule and map information) • Universally accessible • May include Park & Ride facilities

Facility	Short - Medium-term	Long-term
 <p>Neighbourhood Routes*</p>	<ul style="list-style-type: none"> • Universally accessible • Bench 	<ul style="list-style-type: none"> • Transit Shelter • Universally accessible • Bench • May include Park & Ride facilities
 <p>Connector Routes</p>	<ul style="list-style-type: none"> • Universally accessible • Bench 	<ul style="list-style-type: none"> • Transit Shelter • Universally accessible • Bench
Custom Transit	Not required	Not required
<p>* Note that Neighbourhood Routes served by Digital On-Demand services rather than fixed-route services may not have physical stops and therefore stop infrastructure may not be required.</p>		

Stop Intervals

Transit stops should be spaced along a corridor based on the type of transit service. Transit stops that are spaced too close together lead to slower transit trips and higher transit stop maintenance costs while transit stops that are too far apart limit passenger access to the system. Therefore, consideration should be given to balancing passenger needs and service efficiency, as well as the market and nature of the destination served. Outside the urbanized area bus stops should be limited to major destinations, connection points, points of interest, and residential concentrations. Select types of service will have different spacing intervals. See **Table** for the appropriate standard for each service type.

TABLE 6 – SERVICE TYPE AND APPROPRIATE STOP INTERVALS

Service	Stop Interval
Rapid	Limited stops at key locations. Stops are typically spaced 800 – 2,000 metres apart
Frequent	Frequent stops along a corridor, 300 – 500 metres apart
Regional	Limited stops at key locations. Stops are typically spaced 800 – 2,000 metres apart, but may be closer together within local urban areas.
Neighbourhood – Ridership Based	Frequent stops along a corridor, 250 – 400 metres apart
Neighbourhood – Coverage Based	Frequent stops along a corridor, 250 – 300 metres apart
Connector Routes	Varies depending on service
Custom Transit	Not applicable

Transit Priority Measures

As described in more detail in the RDN Transit Redevelopment Strategy, transit priority measures should be provided on the Rapid and Frequent route corridors to improve travel time and reliability as required. Transit priority is a term used to refer to a variety of physical and operational improvements designed to give transit vehicles and their passengers’ priority over general vehicle traffic. Transit priority measures can be:

- Regulatory, such as “Yield to the Bus” regulations and signage
- Operational, such as retiming traffic signals to respect the large number of passengers on transit vehicles compared to private vehicles
- Physical, such as exclusive transit ways, intersection queue-jumpers, bus bulges, and transit signal priority measures

TABLE 7 – TRANSIT PRIORITY MEASURES - OVERVIEW




Signal Priority Measures	Lane Priority Measures
 <p data-bbox="1024 662 1465 727">Transit is given signal priority along the corridor at the majority of intersections</p>	 <p data-bbox="1486 662 1969 760">Bus only lanes for part or all of the route corridor, or bus queue-jumper lanes when the number of buses exceed 25 buses per hour or at key areas of congestion</p>
Queue-jumper lanes at key areas of congestion	
	

TABLE 8 – TRANSIT SERVICE TYPE AND TYPICAL TRANSIT PRIORITY MEASURES

Service	Priority	Short- to Medium-term*	Longer-term
Rapid Transit	Signal	Transit is given signal priority at key delay points	Transit is given signal priority along the corridor at all intersections
	Lane	Transit queue-jumper lanes at key areas of congestion	Transit only lanes for all or part of the route corridor, when the number of buses exceeds 25 buses per hour or at key areas of congestion
Frequent Transit	Signal	Signal timing is optimized to benefit transit	Transit is given signal priority at key delay points
	Lane	Transit queue-jumper lanes at key areas of congestion	Transit queue-jumper lanes at key areas of congestion
Regional Transit	Signal	Signal timing is optimized to benefit transit	Transit is given signal priority at key delay points
	Lane	Transit queue-jumper lanes at key areas of congestion	Transit queue-jumper lanes at key areas of congestion
Neighbourhood – Ridership Based	Signal	Signal timing is optimized to benefit transit	Signal timing is optimized to benefit transit
	Lane	Not required	Only if overlaps with part of Primary Route.
Neighbourhood – Coverage Based	Signal	Signal timing is optimized to benefit transit	Signal timing is optimized to benefit transit
	Lane	Not required	Only if overlaps with part of Primary Route.
Connector Routes	Signal	Not required	Only if overlaps with part of Primary Route.
	Lane	Not required	Only if overlaps with part of Primary Route.
Custom Transit	None	Not required	Not required

* See the RDN Transit Redevelopment Strategy for specific transit priority measures prioritized for implementation over the short- to medium-term.

Transit Exchanges and Park & Rides

Transit exchanges are typically located within the activity centres of the community, such as the downtown, village centres and shopping malls, to reinforce the relationship with land use patterns. If properly planned and designed, transit exchanges can become effective multi-modal exchanges and pedestrian-oriented sites. Transit exchanges should provide weather protection; seating, transit route and schedule information, lighting, bicycle parking and other amenities as shown in the passenger amenities for stops (see Table 5).

Park & Rides should be located in proximity to suburban and semi-rural areas to provide residents who live in areas with no transit service or poor transit service an access point to higher quality transit services. Below are the basic site functional requirements for transit exchanges and Park & Ride facilities:

Site functional requirements for transit exchanges and Park & Rides

- Sites with no significant safety concerns, which provide for direct and safe pedestrian access, and which minimize the interaction between buses and general traffic on adjacent roads.
- Sites that can be accessed safely and efficiently, avoiding traffic congestion and queuing.
- Sites that provide high visibility to pedestrians, motorists and others, minimizing personal safety concerns for transit passengers using the terminals in evenings and at other off-peak times.
- The sites must be located to minimize additional routing and costs.
- Wherever possible, Park & Rides should be located adjacent to or part of other key destinations (grocery store, recreation centre, café, community hub) to make use of them more feasible by accomplishing multiple tasks with the same visit and to encourage safety by providing “eyes on the street” and activity around them.
- Park & Rides may also be established through partnership with other existing uses rather than purpose built, such as an agreement with a shopping centre or recreation centre to set aside a specified number of spaces for Park & Ride use and denoting these with signage.

Physical requirements

- All transit platforms should accommodate standard 12m buses, including double decker buses in the future. Access and egress to the location (along with corridors of the routes) should have overhead clearance for the buses, and a maintenance plan in place.
- All Rapid Transit stops and select exchange platforms should be designed for articulated buses.
- Buses must be able to arrive and depart from platforms independently.
- Passenger facilities should include:
 - Passenger amenities, including weather protection, seating, illumination, and bicycle storage.
 - Accessibility to all areas of the terminal for persons with disabilities.
 - Wayfinding signage and information.
- Transit terminals should also incorporate operator washrooms.
- In addition, Park & Ride sites should include parking for automobiles, bicycles and bus stops for transit access

ROUTE PERFORMANCE GUIDELINES

What they are and what they define:

Performance guidelines are a tool by which numerical thresholds and targets are set for a particular system and its routes and services.

Why they matter:

Working in tandem with service standards, performance guidelines are a tool that can be used to evaluate existing services, identify trends in performance and, based on this evidence, determine how service and supporting features (fares, marketing, facilities, etc.) should be adjusted to improve the effectiveness and efficiency of the system to optimize resources.

For a service to be efficient and productive, a balance should be achieved between oversupply and overcrowding. A number of measures can establish this equilibrium such as:

- Implementing transit priority
- Altering frequency
- Reducing/increasing coverage
- Targeted marketing/corridor branding
- Changing service span
- Changing bus stop spacing
- Bus route changes
- Fleet type allocation



When system performance falls below or above the set guidelines, recommendations to the RDN Transit Select Committee will focus on the utilization of the above tools to maximize efficiency.

Measures

Performance measures have been chosen that measure the effectiveness of service planning investments on a system and route level.

System Level – The measures used for the system guidelines are:

Average rides per revenue hour - Measures the total volume of ridership as compared to the supply of transit service.

- **Cost per ride** – Measures the average cost to provide service per trip.
- **Cost recovery** – A measure of the financial performance of the transit system usually expressed in terms of total operating revenue/total operating expenses.
- **Rides per capita** – Measures the ratio between transit trips and the population of the service area.

Route Level – The measures used for the route level guidelines are:

- **Average rides per revenue hour** – Measures the total volume of ridership as compared to the supply of transit service.
- **Average rides per trip** – Measures the total number of people that board a vehicle on a specific trip.

Route level performance guidelines have been classified into five categories: Rapid, Frequent, Regional, Neighbourhood and Connector Routes, to acknowledge different performance expectations based on a route's objective.

Performance Targets

Table 9 and **Table 10** outline the performance targets set for the system and route level. As well as monitoring existing performance against these guidelines, historical trends will also be monitored to determine if the system or routes are becoming more or less efficient over time. Significant variance (+/ – 25%) from the target will place a route on an action list for further investigation and will require more detailed analysis. Routes that fall below the 25% variance will be candidates for corrective action and routes that fall above the 25% variance will be candidates for service improvements. BC Transit will report on an annual basis how the system and routes are performing and this will help guide planning decisions.

System Level

The purpose of monitoring system wide performance is to identify trends in system performance and compare the performance of the transit system with other peer transit systems. These measures are designed to monitor the pulse of the RDN Transit System as a whole and guide service planning. This can be particularly useful when identifying system wide impacts of major investments in the transit network, such as the development of the rapid and frequent transit networks.

TABLE 9 – SYSTEM LEVEL PERFORMANCE TARGETS (RDN TFP 2014)

System	Measure
Rides per service hour	30
Cost per ride	\$4.60
Cost recovery	25.5%
Rides per capita	33.85

Route Level

Analysis on a route-by-route basis provides a detailed indication of how individual components of the transit system are performing. A route-by-route analysis allows observations of the impact of service changes and investments made in the past and identifies future opportunities for strategic investment or re-investment.

Service Reliability

The following guidelines have been developed to provide on-time performance targets that can be monitored to ensure service reliability:

- 90% of trips on each route should depart the terminus not more than two minutes late and not early.
- 85% of trips on each route should depart each mid-route scheduling point not more than two minutes late and not early.
- 90% of trips on each route should arrive at the terminus no more than three minutes late.

TABLE 10 – ROUTE LEVEL PERFORMANCE TARGETS

Type of Route	Rides per Trip	Rides per Revenue Hour
Rapid	30	40
Frequent	30	40
Regional	30	25
Neighbourhood - Ridership Based	20	30
Neighbourhood – Coverage Based	10	20
Connectors	30	25

TRAVEL TIME ANALYSIS OF PROPOSED RDN RAPID AND FREQUENT TRANSIT CORRIDORS

Technical Memo - DRAFT

Andy Kading

Author:

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Reviewer:

Date: March 2022

File No.:
2998. B01



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As part of the Regional District of Nanaimo (RDN) Transit Redevelopment Strategy (TRS) project, WATT Consulting Group was retained by the RDN in partnership with the City of Nanaimo and BC Transit to assess bus speed and reliability performance in the proposed Rapid and Frequent Transit corridors. This memo outlines the process of that assessment, and its results.

1.0 INTRODUCTION

The RDN, in conjunction with the City of Nanaimo (CoN), BC Transit and the Ministry of Transportation and Infrastructure (MoTI), are in the planning stages of creating a revised transit network that will include Rapid Transit and Frequent Transit corridors. As part of this planning work, both the RDN and the CoN, need to understand where to focus their resources for traffic signal changes that support the Rapid and Frequent lines.

Why Travel Time is Critical for Rapid and Frequent Transit

While minimizing travel time is important for all transit routes, it is especially important for Rapid and Frequent Transit, such as those proposed as the RDN's new high frequency transit network spines.

- **Rapid and Frequent Transit lines will serve the highest density areas of the City of Nanaimo and are designed to carry the most ridership.**
 - Attracting riders depends on the ability of these routes to offer direct, high quality, reliable service.
 - Minimizing intersection delays and volatility in running times is a key way that the system can ensure reliability and reduced travel times for passengers.
- **Rapid and Frequent Transit lines will have the highest frequency and therefore represent a significant investment in annual operating hours and budget for the system.**
 - Reducing transit travel times and/or mitigating the need to increase travel times in future as other traffic congestion grows in turn has a direct impact on on-going transit system operating costs. Transit signal priority and other transit priority measures and signal timing adjustments enables the system and its funding partners to mitigate future cost increases.



In order to help determine a resource investment strategy, the project partners commissioned a study with a focus on the following two key corridors.

- **Rapid Line** – Island Highway, Terminal Avenue and Highway 1 from Mary Ellen Drive to Tenth Street that is the alignment of the proposed **1 Nanaimo Rapid Line**.
- **Frequent Line** – Bowen Road from Highway 19A (Island Highway) at Norwell Drive to Highway 19A/Terminal Avenue at Comox Avenue. This corridor is proposed to be served by both the **2 VIU Frequent Line** and the **3 Nanaimo Hospital Frequent Line** which serve different segments, some of which overlap.

Specifically, the study examined Travel Time (TT) differences between transit vehicles and passenger vehicles operating in the proposed corridors. It is anticipated that significant TT issues would be exposed and therefore priorities for traffic signal changes or other transit priority improvements could be identified.

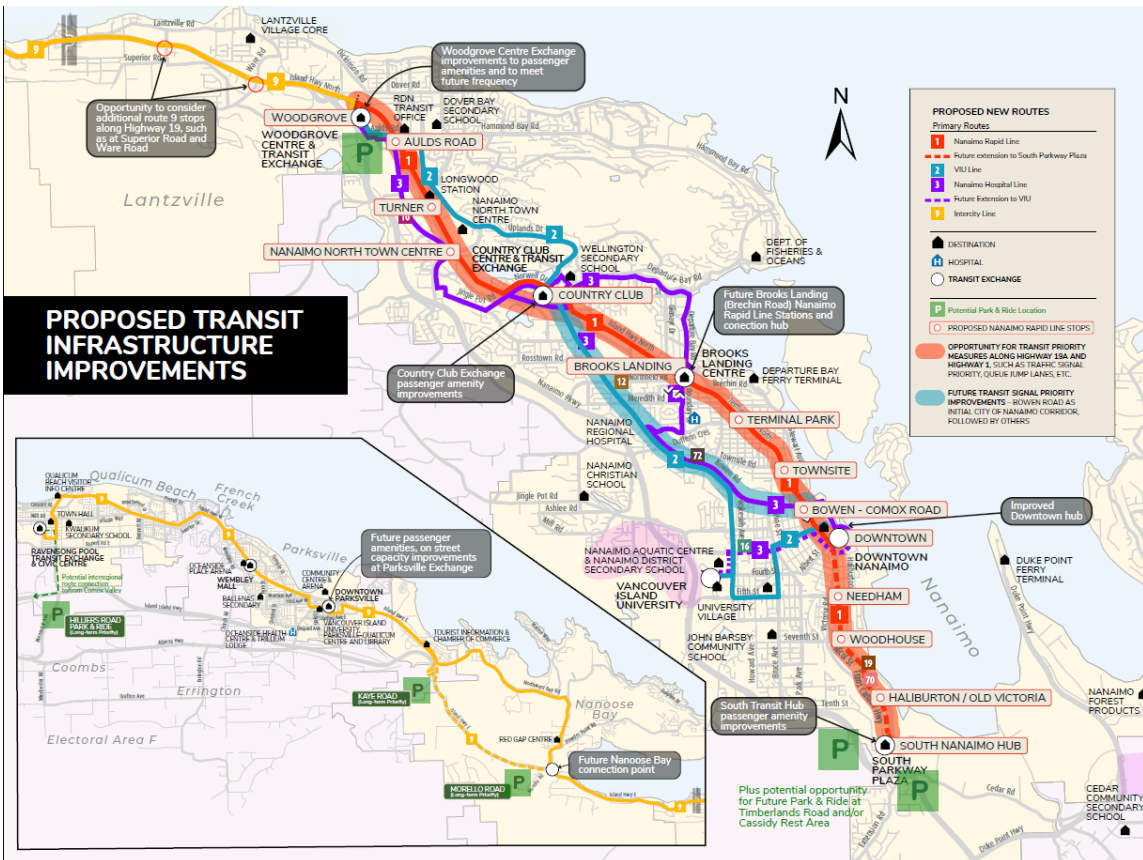


Figure 1: Infrastructure map showing proposed 1 Nanaimo Rapid Line and Frequent route 2 VIU Line and 3 Nanaimo Hospital Line, along with corridors that are the focus of this study: red shaded corridor is Highway 19A / Terminal Avenue, Highway 1; blue shaded corridor is Bowen Road.



2.0 METHODOLOGY

The analysis of travel time impacts used the following methods:

- Computer micro-simulation tool VISSIM was used to conduct the study.
 - VISSIM is an industry leading software that includes the ability to model transit routes and complex traffic signal timing.
- The model was built with the roadway (laning, etc.) as it was at the time of the study (November 2021 – January 2022).
- Bus stops were modeled two ways.
 - The Bowen Road corridor was modeled as existing at the time of the study.
 - The Highway 19A / Terminal Avenue / Highway 1 corridor was modeled to include changes proposed from the Transit Redevelopment Strategy, which mainly involved positioning and building in proposed Rapid Line stops.
 - Some modeled stops were placed at existing stops, while new stops used a mix of in- and out-of-traffic stops.
- No queue jumps or Transit Signal Priority (TSP) were modeled.
- Traffic signal data was from existing timing sheets provided by MoTI and CoN. This data included signal coordination information used in the modeling.
- Traffic volumes came from a mix of sources.
 - For Highway 19A / Terminal Avenue / Highway 1 the volumes came from a collection of previously done traffic counts conducted by WATT and others. Dates ranged from 2009 to 2020. All counts were scaled to traffic to 2019 (pre Covid pandemic) levels, while the turning movement percentages were retained.
 - For the Bowen Road corridor, the volumes were taken from a recently completed corridor-wide coordination project called the *Bowen Road/Comox Road Traffic Signal Coordination Project, Jan 2020* performed by Great Northern Engineering Consultants. In that report a compilation of counts taken from 2015 – 2018 was used, which were a mix CoN provided and gathered information. Refer to that report for details.
 - The traffic volumes for Highway 19A southbound had to be altered to avoid excessive delay impacting the bus operation. Specifically, the SB left turn volumes were reduced by 33%.



- Bus data was assumed with the following parameters, which are in line with the projected peak frequencies for each route at the future Year 5 horizon:
 - **Route 1:** One bus every 15 minutes along Highway 19A / Terminal Avenue / Highway 1 from Mary Ellen Drive to Tenth Street, plus buses operating at an identical frequency in the opposite direction.
 - **Route 2:** One bus every 10 minutes along Bowen Road from Highway 19A at Norwell Drive to Wakesiah Avenue, plus buses operating at an identical frequency in the opposite direction.
 - **Route 3:** One bus every 15 minutes along Bowen Road from Highway 19A / Terminal Avenue at Comox Road to Dufferin Crescent, plus buses operating at an identical frequency in the opposite direction.
 - Routes were modelled in both north and south directions.
 - A ridership and load rate of 40 passengers per stop per hour was assumed.
- Only the PM peak hour was examined in order to determine the greatest anticipated impact to bus TT.
- Model was run for 1 hour with a 15min seeding interval. 11 total runs for each scenario, using a different random seed for each run.
- Travel time trackers were added to the model at each signalized intersection, roughly 100m before each intersection's stop bar and immediately after it (see **Figure 1** for an example), for each direction of travel.
- The TT results of each of the 11 runs were averaged and the Standard Deviation (STDV) was determined.
- Any bus stops located within the TT tracker had their dwell time (the time that the transit vehicle may be at the stop for the purposes of loading/unloading passengers) subtracted from the signal's TT.

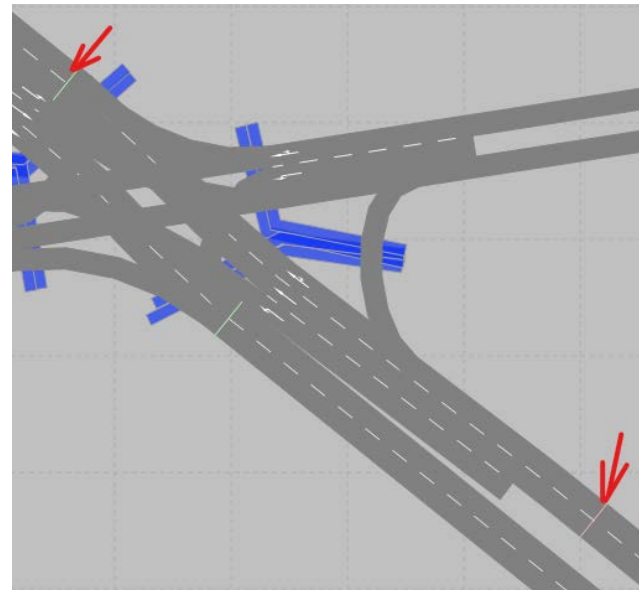


Figure 2: Travel Time tracker example (red arrows mark beginning and end).



3.0 RESULTS & ANALYSIS

3.1 ANALYSIS METRICS

The results of the model runs were analyzed. The absolute value of the TT (average of 11 runs) difference between passenger vehicles and the Rapid / Frequent transit vehicles was compared against the STDV of the transit vehicle TT.

$$|TT_{bus} - TT_{car}| \geq 1\sigma_{bus}$$

If the difference between the passenger vehicles and the transit vehicles was greater than 1 STDV of the transit vehicle then the TT result was considered significant. If the difference was less than 1 STDV of the transit vehicle then the result was considered within normal transit vehicle TT and therefore not significant.

3.2 HIGHWAY 19A / TERMINAL AVENUE / HIGHWAY 1 CORRIDOR RESULTS

For the modelling, the corridor was divided into four segments as shown in the figure at right and comprised of all the intersections falling in each segment.

Results of the modeling can be seen in **Table 1** and the following graphs.



Figure 2 Rapid Transit Corridor study area

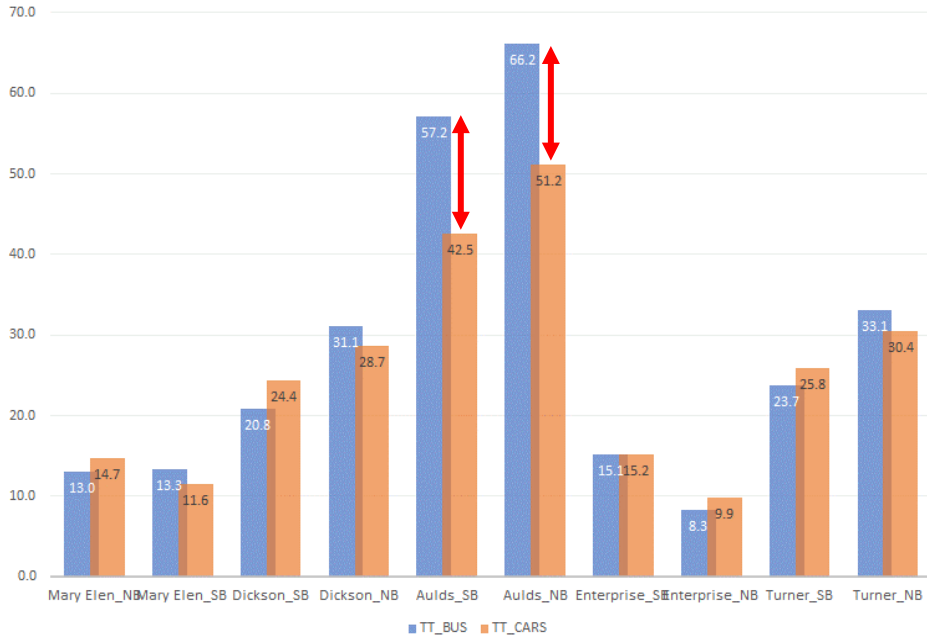


Table 1: Highway 19A / Terminal Avenue / Highway 1 Corridor TT Results

Signal Group	Signal	Bus TT (sec)	Car TT (sec)	Diff (Sec)	BUS STDV	Diff > 1 STDV?
South Section	Haliburton NB	12.8	9.9	2.9	3.4	
	Haliburton SB	15.7	13.1	2.7	4.6	
	Needham NB	27.2	19.9	7.4	6.3	>1STDV
	Needham SB	23.1	19.5	3.7	8.5	
	Milton NB	18.1	16.3	1.8	3.8	
	Milton SB	16.2	15.9	0.3	5.1	
Mid Section	Townsite_NB	18.8	14.6	4.2	2.1	>1STDV
	Townsite_SB	11.2	12.7	-1.5	1.4	>1STDV
	Cypress_NB	8.4	8.3	0.1	1.9	
	Cypress_SB	8.5	8.9	-0.4	1.6	
	Princess_NB	10.9	13.7	-2.8	3.4	
	Princess_SB	19.8	16.8	3.0	4.5	
	Terminal Mall_NB	20.2	18.4	1.8	6.6	
	Terminal Mall_SB	13.0	11.5	1.5	2.7	
	Departure Bay Rd_NB	49.2	43.4	5.8	9.3	
	Departure Bay Rd_SB	40.6	21.7	18.9	3.9	>1STDV
	Northfield_NB	13.0	11.4	1.6	3.4	
Northfield_SB	35.5	26.0	9.5	13.4		
Downtown Section	Comox_NB	82.8	33.6	49.2	12.3	>1STDV
	Comox_SB	37.1	25.8	11.3	6.4	>1STDV
	Commercial_NB	67.1	20.3	46.8	5.5	>1STDV
	Commercial_SB	68.0	18.0	50.0	4.5	>1STDV
	Esplanade_NB	13.4	12.3	1.1	3.7	
	Esplanade_SB	11.3	9.5	1.8	3.4	
	Stewart_NB	10.1	14.8	-4.8	3.9	>1STDV
	Stewart_SB	11.9	12.1	-0.3	4.0	
North Section	Mary Elen_NB	13.0	14.7	-1.7	1.8	
	Mary Elen_SB	13.3	11.6	1.7	0.3	>1STDV
	Dickson_SB	20.8	24.4	-3.6	9.7	
	Dickson_NB	31.1	28.7	2.3	17.1	
	Aulds_SB	57.2	42.5	14.6	23.4	
	Aulds_NB	66.2	51.2	15.1	14.6	>1STDV
	Enterprise_SB	15.1	15.2	-0.1	6.7	
	Enterprise_NB	8.3	9.9	-1.6	3.7	
	Turner_SB	23.7	25.8	-2.1	11.1	
	Turner_NB	33.1	30.4	2.7	14.9	
	Rutherford_SB	50.4	35.8	14.6	21.2	
	Rutherford_NB	35.1	36.9	-1.8	16.8	
	Jingle Pot_SB	76.0	61.1	14.9	17.9	
	Jingle Pot_NB	29.8	25.3	4.6	9.2	
	Ross_SB	17.4	20.0	-2.6	9.0	
	Ross_NB	21.2	16.5	4.8	8.6	
	Departure Bay_SB	17.5	16.9	0.6	8.0	
	Departure Bay_NB	44.7	31.9	12.7	13.4	
Bowen_SB	59.5	53.6	5.9	17.3		
Bowen_NB	25.3	20.8	4.6	5.5		



NORTH MODEL - AVG TRAVEL TIME (sec)



MID MODEL - AVG TRAVEL TIME (sec)

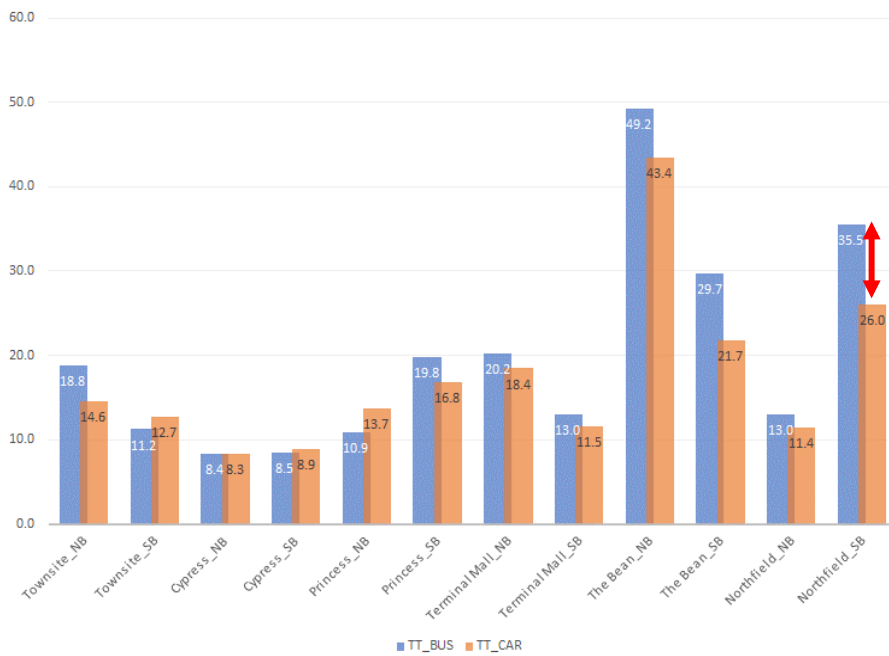
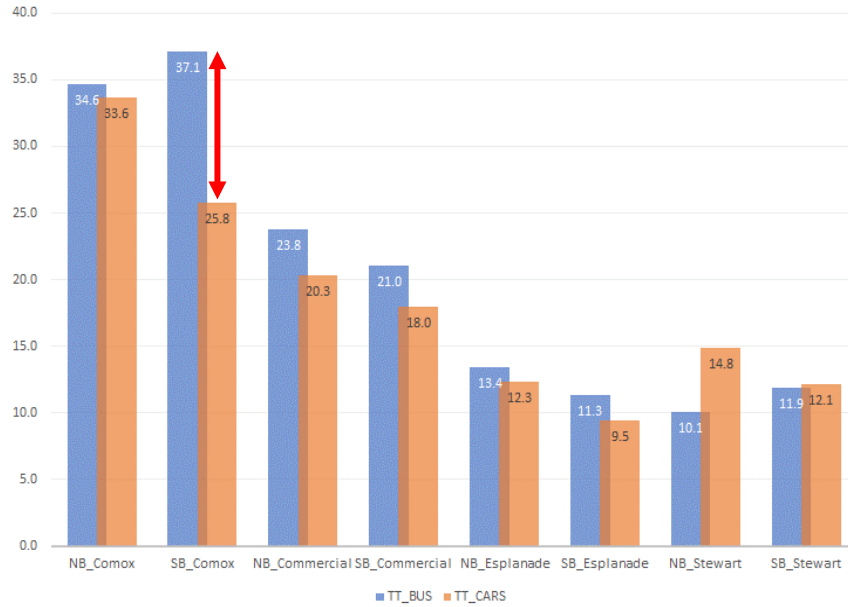


Figure 3: Travel Time graphs for North (top) and Mid sections for each segment



DOWNTOWN MODEL - AVG TRAVEL TIME (sec)



SOUTH MODEL - AVG TRAVEL TIME (sec)

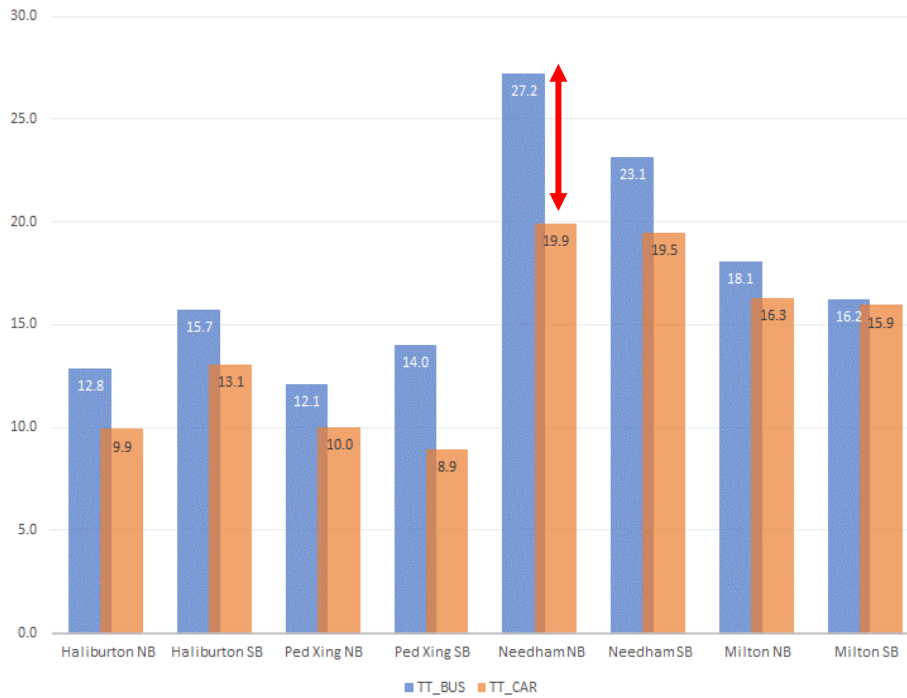


Figure 4: Travel Time graphs for Downtown (top) and South sections for each segment



There were 11 traffic signal movements that showed significant results:

- Needham Street NB
- Townsite Road NB
- Townsite Road SB
- Departure Bay Road SB
- Comox Road NB
 - Split phasing causes significant delays.
- Comox Road SB
 - Split phasing causes significant delays.
- Commercial Street NB
- Commercial Street SB
- Stewart Avenue NB
- Mary Ellen Drive SB
- Aulds Road NB

For most of these it appears the transit vehicles were “unlucky” in that the buses (only four per hour) happened to be stopped at each signal. This however is largely the purpose of the modeling, and these movements / intersections represent opportunities for improvements.

3.3 BOWEN CORRIDOR RESULTS

The Bowen corridor intersections were also split into separate groups for analysis based on their signal grouping (from north to south Group A to Group C) or if they were free running signals or within MoTI jurisdiction:

- Group A: Kenworth Road to Labieux Road
- Group B: Dufferin Crescent to Buttertubs Drive
- Group C: Pine Street to Wallace Street
- Free Running Signals: Northfield Avenue, Meredith Road, Wakesiah Avenue
- MoTI Signals: Highway 19A

Results of the modeling can be seen in **Table 2** and the graphs below.



Table 2: Bowen Corridor TT Results

Signal Group	Signal	Bus TT (sec)	Car TT (sec)	Diff (Sec)	BUS STDV	Diff > 1 STDV?
A	Kenworth_SB	24.3	20.6	3.7	3.9	
	Kenworth_NB	15.3	19.8	-4.5	3.0	>1STDV
	Labieux_SB	23.4	25.4	-2.0	11.5	
	Labieux_NB	19.7	19.6	0.1	5.0	
B	Duff Cres_SB	34.3	34.0	0.3	4.5	
	Duff Cres_NB	24.9	22.3	2.6	4.4	
	Duff Cres_EB_Rt3	24.4	21.1	3.2	4.0	
	Duff Cres_WB_Rt3	59.8	44.2	15.6	2.4	>1STDV
	Wellington_SB	31.8	24.2	7.6	10.7	
	Wellington_NB	28.5	20.3	8.2	6.2	>1STDV
	Pryde_SB	26.4	12.0	14.4	7.0	>1STDV
	Pryde_NB	20.8	16.9	3.9	3.6	>1STDV
	Buttertubs_SB	12.6	12.0	0.6	2.7	
	Buttertubs_NB	13.5	12.1	1.4	2.5	
C	Pine_SB	21.7	21.0	0.7	10.4	
	Pine_NB	13.4	16.2	-2.8	3.3	
	Macleary_SB	13.8	14.2	-0.5	3.6	
	Machleary_NB	26.2	18.1	8.0	15.0	
	Prideaux_SB	10.2	10.3	-0.1	0.4	
	Prideaux_NB	15.5	11.2	4.3	5.5	
	Wallace_SB	35.2	19.5	15.6	8.0	>1STDV
	Wallace_NB	9.6	12.5	-2.9	6.0	
Free Running	Northfield_SB	84.7	67.6	17.1	18.6	
	Northfield_NB	48.0	41.8	6.2	8.9	
	Meredith_SB	24.6	19.8	4.9	5.5	
	Meredith_NB	22.5	20.3	2.2	6.2	
	Wakesiah_SB_Rt2	21.5	19.5	1.9	2.1	
	Wakesiah_NB_Rt2	28.9	26.1	2.9	5.5	
	Wakesiah_SB_Rt3	24.2	24.1	0.2	6.0	
	Wakesiah_NB_Rt3	24.2	24.0	0.2	9.8	
MoTI	19A N_SB	106.0	96.8	9.2	9.1	>1STDV
	19A N_NB	65.8	61.4	4.4	19.3	
	19A S_SB	54.5	42.5	12.0	15.7	
	19A S_NB	103.3	66.7	36.6	54.4	

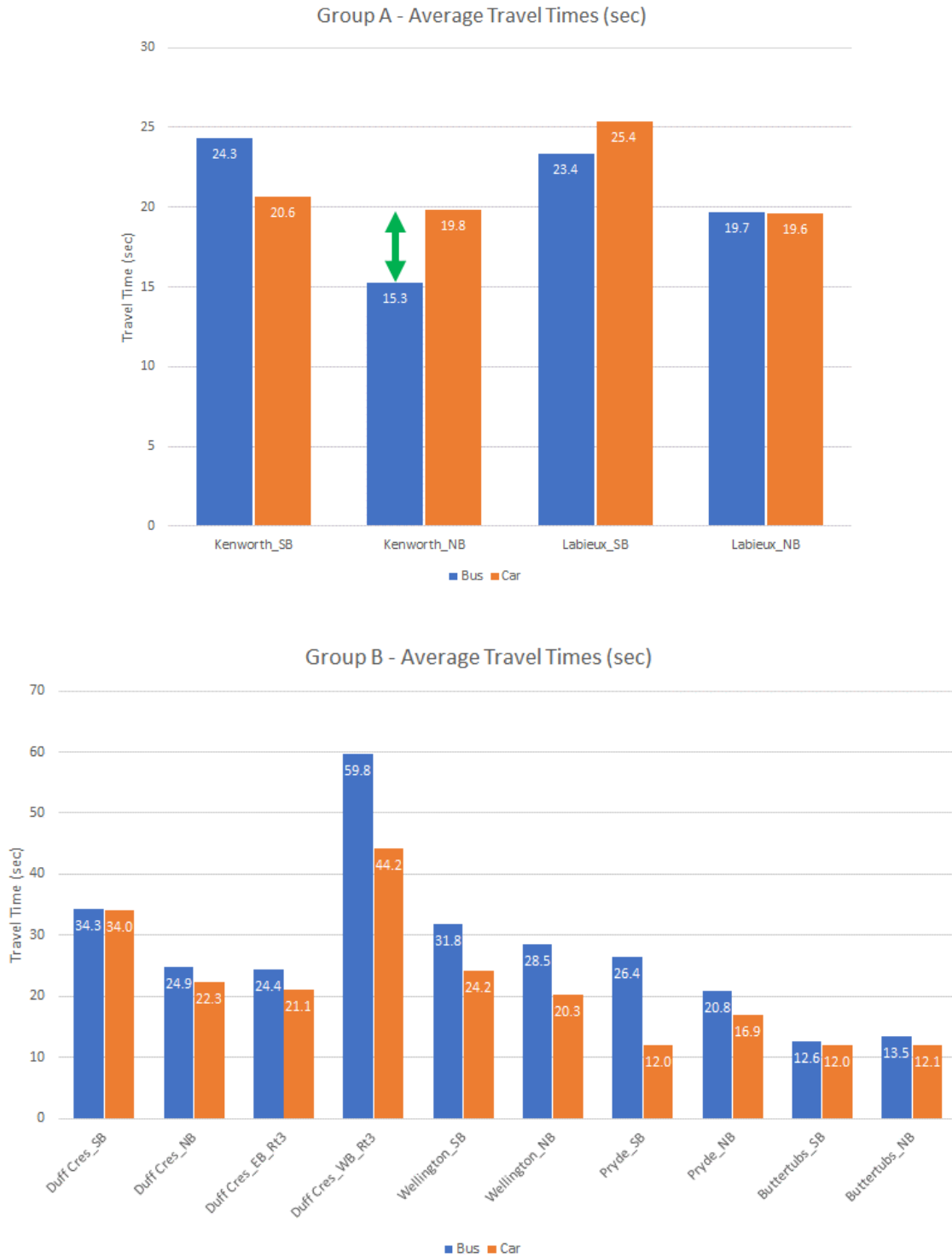


Figure 5: Travel Time graphs for each Bowen Road segment, Group A (above) and Group B

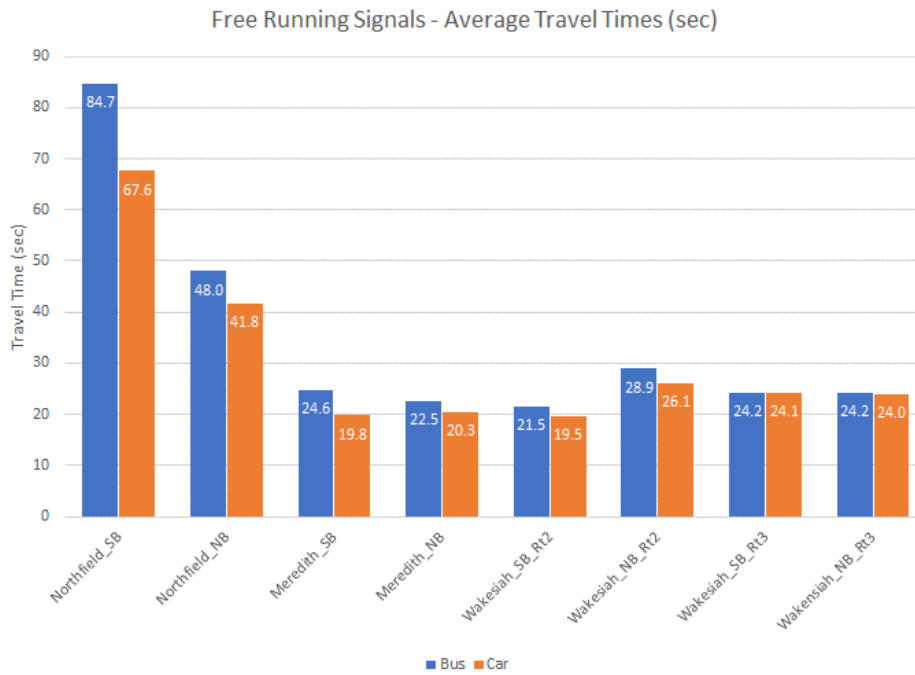
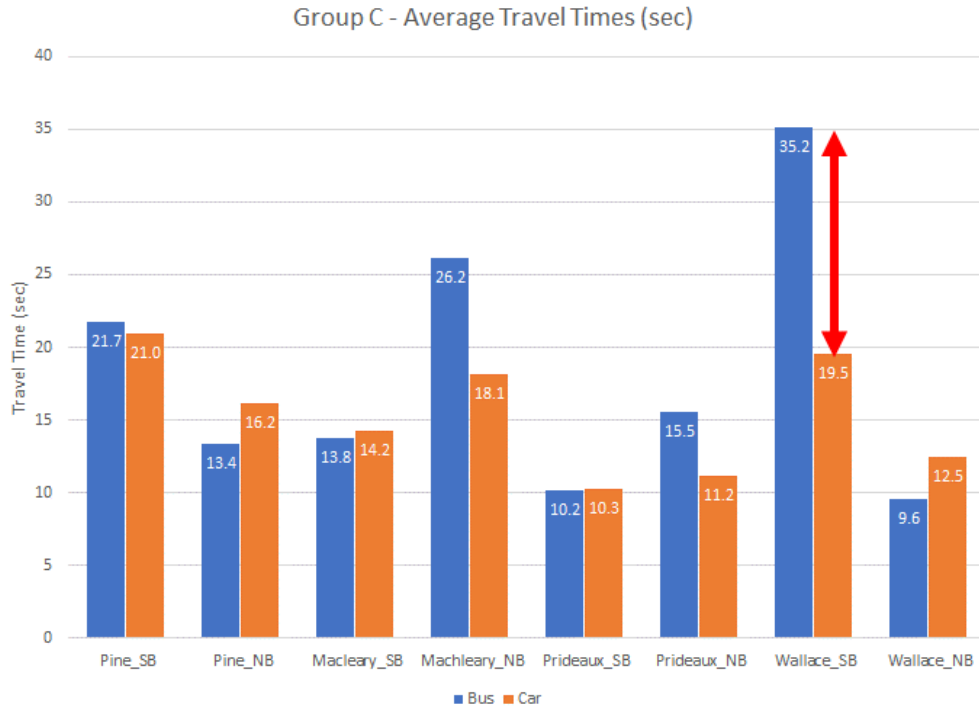


Figure 6: Travel Time graphs for each Bowen Road segment: Group C (top) and Free Running Signals.

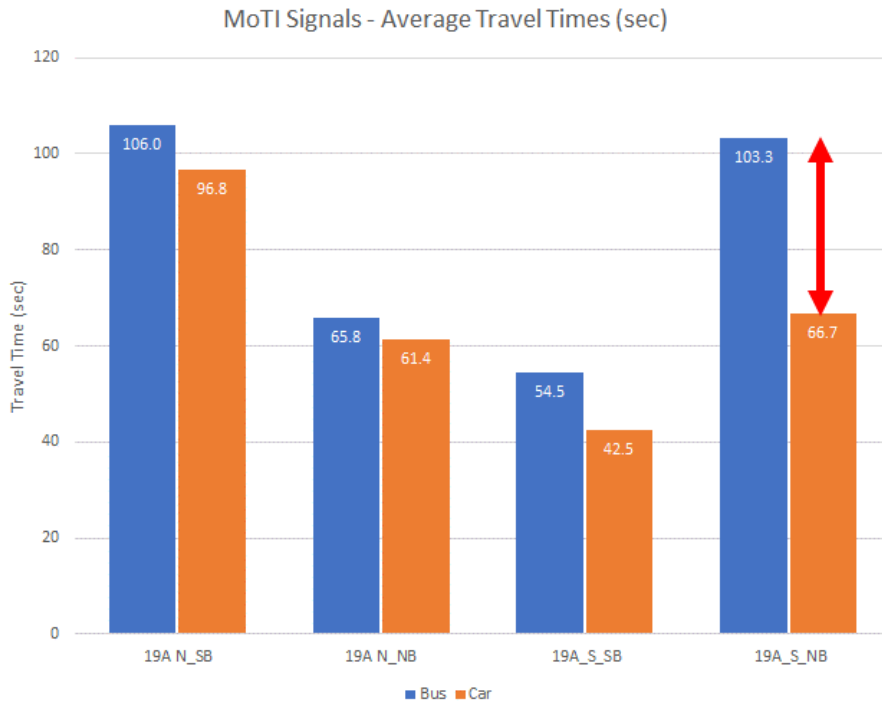


Figure 7: Travel Time graphs for MoTI signals

There were 7 traffic signal movements that were showed significant results:

- Highway 19A at Norwell Drive SB (Route 2 only)
 - Split phasing causes significant delays.
- Kenworth Road NB (Route 2 only)
 - Bus TT was -4.5seconds (faster) than the car TT
- Dufferin Crescent WB (Route 3)
 - Left turn from Dufferin Crescent onto Bowen.
- Wellington Road NB
- Pryde Avenue SB
- Pryde Avenue NB
- Wallace Street SB (Route 2 only)

Observation of the model revealed that some of the signals appeared to unintentionally have the transit stop dwell time synch up with the coordination scheme. For example, at



Kenworth Road NB the bus passed through the Labieux Road signal (which is coordinated with Kenworth Road) and completed a stop in between the two signals. The bus dwell time was such that by the time the bus started moving again the Kenworth Road signal was (or very nearly was) displaying a green indication.

Effectively the bus avoided queuing at the signal because it was dwelling at the stop and thus the TT reduction seen at Kenworth Road. Since the dwell time coordination combination elsewhere in the corridor generally resulted in an increase in TT, the addition of TSP to the corridor has a strong potential to alleviate some of that increase by allowing the bus (while stopped) to activate the TSP function and in turn pass through the intersection more quickly.

4.0 DISCUSSION & RECOMMENDATIONS

The purpose of the modeling was to find specific traffic signals that would be good candidates for transit related traffic signal improvements. The results of each corridor will be discussed below, and recommendations provided. **Appendix A** contains the full list of recommendations.

4.1 HIGHWAY 19A / TERMINAL AVENUE / HIGHWAY 1 CORRIDOR

Results indicate that the majority of the 23 traffic signals along the corridor did not significantly impede the operations of future Rapid transit vehicles. However, some signals did, and mitigations can be undertaken to address them.

Recommendations include:

- A corridor-wide coordination and signal timing update should be undertaken, with the recently completed Bowen Road/Comox Road Traffic Signal Coordination study noted in Section 2.0 serving as an excellent example.
- Removal of split-phasing at intersections.
- If split phasing cannot be removed, update the intersection with a modern signal controller and advanced loops, run in Free mode, and activate efficiency features like volume-density.
- Build queue jump opportunities wherever feasible.
- Look to integrate signals into the forthcoming CoN central management system.



The majority of the signals on this corridor are controlled by MoTI and are therefore outside the direct control of CoN, which complicates the implementation of changes.

Based on the modelling results, the specific intersections and priority improvement recommendations for this corridor are as follows:

Developing Rapid Transit and Frequent Transit Corridors in the RDN				
Transit priority measures, exchanges and other infrastructure improvements needed for the RDN system to implement the Transit Redevelopment Strategy				
Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement
All	MOU	All	All	Agreement between RDN, City of Nanaimo, BC Transit and MoTI to work together on infrastructure improvements to support transit, including roles and responsibilities, agreement in principle to coordinate on types of signal controller and other technology/infrastructure guidelines to be used, next steps and priorities.
Rapid Transit Corridor	Queue Jump Lane	Island Hwy / Hwy 1 Woodgrove Exchange to Downtown Nanaimo	Island Highway at Mary Ellen Drive	Queue jump in unused left turn lane for NB Route 1
			Island Highway at Dickinson Road	NB and SB queue jumps at islands
			Island Highway at Aulds Road	NB and SB queue jumps at islands
			Island Highway at Rutherford Road	NB and SB queue jumps at islands
Rapid Transit Corridor	Updated signal timing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	All intersections on Highway 19 from Mary Ellen Drive to Haliburton Street	Prioritising N/S bus movement
Rapid Transit Corridor	Removing split phasing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Bowen Road	Prioritising southbound bus movement
Rapid Transit Corridor	Update traffic signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Brechin Road	Improving traffic movement at intersection
Rapid Transit Corridor	Pedestrian signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	TransCanada Highway at Woodhouse Road	To enable safe pedestrian crossing for alighting and boarding passengers



4.2 BOWEN ROAD CORRIDOR

The Bowen Road analysis results show that a few signals have increased TT for busses. However, the results did not demonstrate a clear pattern that would show how to allocate funding and resources to upgrade the corridor to better serve transit. Considering Bowen Road's importance in Nanaimo and that it will host two Frequent Transit routes, the general recommendation would be to upgrade and enhance signals within the more congested northern part of the corridor (Wellington Road to Highway 19A at Norwell Drive).

Planned works on the Bowen Road corridor support this approach: CoN will soon upgrade several traffic signals and lay fiber optic lines that will allow for the adoption of a central management system for traffic signals. **The adoption of that system is a key first step to creating a traffic signal system that can utilize the transit-specific features found in modern signal controllers.**

Although a central management system is needed first step, that does not mean that other work cannot be done. TSP can be added to most of the signals along the corridor, especially those signals that run in "free" operation. **Ultimately every signal on the corridor should be given TSP and tied into the central management system.** Once that system is built out, it will require dedicated staff resources, likely a new full-time position, to oversee and maintain it. A TSP system is not a "set it and forget it" system, and neglect has the potential to negate any improvements in the long term.



Based on the modelling results, the specific intersections and priority improvement recommendations for the Bowen Road corridor are as follows:

Developing Rapid Transit and Frequent Transit Corridors in the RDN				
Transit priority measures, exchanges and other infrastructure improvements needed for the RDN system to implement the Transit Redevelopment Strategy				
Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement
All	MOU	All	All	Agreement between RDN, City of Nanaimo, BC Transit and MoTI to work together on infrastructure improvements to support transit, including roles and responsibilities, agreement in principle to coordinate on types of signal controller and other technology/infrastructure guidelines to be used, next steps and priorities.
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Kenworth Road Bowen Road at Meredith Road Bowen Road at Wellington Road Bowen Road at Prideaux Street Bowen Road at Wallace Street	Prioritising E/W bus movement on Bowen Corridor (largely E/W some N/S movements as well)
Frequent Transit Corridor	Transit Signal Priority and remove Split Phasing	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Northfield Road	To enable improved bus speed
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority and queue jump lanes	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Labieux Road Bowen Road at Dufferin Crescent Bowen Road at Pryde Avenue Bowen Road at Buttertubs Drive Bowen Road at Wakesiah Avenue Bowen Road at Pine Street Bowen Road at Machleary Street	If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated



4.3 STUDY AREA-WIDE RECOMMENDATIONS

4.3.1 SPLIT PHASING

One significant TT issue seen in both corridors was the impact of split phasing on signal operation. The additional delay caused by the timing scheme resulted in TT increase for buses and significant delays for all vehicles. Efforts should be made to remove this mode of operation for both MoTI and CoN signals.

4.3.2 SIGNAL CONTROLLERS AND TIMING

Both corridors contain a mix of modern and older signal controllers and ancillary equipment. Additionally, the timing sheets provided indicate long spans of time in between updates of the timing plans. Modernization of signal equipment, and ongoing upkeep of the signal timings, can help move traffic more efficiently, and in turn reduce TT for the Rapid and Frequent Transit networks.

Modern signal controllers have many features that are not being utilized along the corridors. These features can improve general signal performance and in turn TT for the Rapid and Frequent lines. The addition of advanced loops and other signal hardware is often required. Including these when signals are updated should be examined, especially at split phase signals.

4.3.3 PARTNERSHIPS

It was observed in the signal timing sheets that there appears to be a lack of direct coordination between MoTI and CoN when it comes to operation of traffic signals within the City boundary. Since MoTI controls so many of the critical signals within the CoN, an agreement should be pursued that outlines mutual goals and expectations between the two parties. It should include items like integration of local traffic signals into the municipal traffic signal central management system, and definition of parameters for non-standard signal timing (TSP, volume-density, etc.). Coordination between the CoN and MoTI systems (in partnership with the RDN and BC Transit) is critical to running an efficient transit network oriented around Rapid and Frequent spines.



5.0 WHY BUS SPEED AND RELIABILITY IS IMPORTANT

This study focused only on a singular aspect of bus travel, Travel Time (TT) analysis. As such this study does not identify specific time savings allotted to the use of a specific priority treatment, rather our approach is to generically highlight the benefits of transit priority measures from existing literature.

Why focus on buses?

In larger systems we could see transit ridership distributed across various modes (buses, trains, light rail etc.). In the RDN system, buses are the primary resource used to carry people from one destination to another.

If they move slowly causing travel time delays to the passengers, they will opt to drive if they have that option. This in turn means, more people SOVs, higher emissions and lower environmental stewardship. None of this supports the RDN's, partner municipalities' and the provincial government's goals to address the threats posed by Climate Change.

Why does travel time matter?

This is best illustrated in a recent report published by TransLink, shared below:

If a route took 50 minutes to get from point A to point B and ran every 10 minutes, it would essentially need **5** buses to provide the **10**-minute frequency.

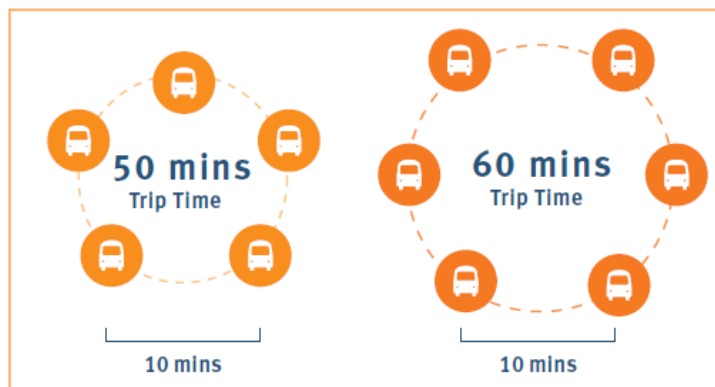


Figure 8: Travel Time delays need investment to maintain same level of service, Source: TransLink Bus Speed and Reliability Report

In a scenario where traffic congestion increases and no measures are taken to



address the travel time increase due to congestion and it now takes 60 minutes to run the same distance from point A to point B, this means one of two things:

- 1) it would need **6** buses to provide **10**-minute frequency (**additional cost to buy new fleet**)
- 2) it would reduce the frequency to 12 minutes if the number of buses remained the same (**this means a lower level of service to the community**)

A bus costs close to \$ 1 M dollars, if the RDN were to invest its resources in buying additional fleet to mitigate the consequences of bus travel time delays in traffic, instead of focusing resources towards improving span and frequency of service, it would be interrupt planned span and frequency improvements in the system and be an inefficient use of resources. Downstream, this will also impact Climate Action goals of all levels of government.

Why transit priority?

Transit priority is one of the tools that helps improve the speed and reliability of the buses. According to a National Association of City Transportation Officials (NACTO) publication, *TSP can reduce transit delay significantly. In some cases, bus travel times have been reduced around 10%, and delay was reduced up to 50% at target intersections, depending on treatment employed.*

In a number of different transit agencies, the focus has now shifted from constantly recalibrating travel times in schedules to proactively working with partner agencies to determine ways of implementing signal priority measures that will support travel time improvements, thereby freeing up resources to invest in improving the existing system.

6.0 CONCLUSION

Enabling a full suite of transportation choices for residents within the City of Nanaimo and the larger Regional District of Nanaimo requires that region's transit system continue to evolve to offer improved frequency, reliability, and directness of trips. The RDN's Transit Redevelopment Strategy outlines a path to reshape the transit system to align with development and make these improvements.

Central to the new revised network will be the implementation of the 1 Nanaimo Rapid Line routes and its supporting Frequent Transit routes the 2 VIU Line and 3 Nanaimo



Hospital Line. These routes will serve as the high frequency spine for the system, carrying the most passengers and the highest population areas of the City. They also represent a significant proportion of the system in terms of capital investment and ongoing operating hours and costs.

Maximizing that investment and attracting strong ridership depends on the ability of these routes to offer high quality, reliable service that also mitigates the need for further cost increases due to congestion from other vehicles. This study examined the corridors that will be predominantly served by these Rapid and Frequent routes to determine what priority mitigation measures should be considered.

The results of the modeling, combined with assessment of the existing signal timing resulted in a list of improvements for each of the corridors, which will help to facilitate the movement of transit and to ensure its speed and reliability.

TRAVEL TIME ANALYSIS OF PROPOSED RDN RAPID AND FREQUENT TRANSIT CORRIDORS

Technical Memo - DRAFT

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Reviewer:

Date: March 2022

File No.:
2998. B01



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As part of the Regional District of Nanaimo (RDN) Transit Redevelopment Strategy (TRS) project, WATT Consulting Group was retained by the RDN in partnership with the City of Nanaimo and BC Transit to assess bus speed and reliability performance in the proposed Rapid and Frequent Transit corridors. This memo outlines the process of that assessment, and its results.

1.0 INTRODUCTION

The RDN, in conjunction with the City of Nanaimo (CoN), BC Transit and the Ministry of Transportation and Infrastructure (MoTI), are in the planning stages of creating a revised transit network that will include Rapid Transit and Frequent Transit corridors. As part of this planning work, both the RDN and the CoN, need to understand where to focus their resources for traffic signal changes that support the Rapid and Frequent lines.

Why Travel Time is Critical for Rapid and Frequent Transit

While minimizing travel time is important for all transit routes, it is especially important for Rapid and Frequent Transit, such as those proposed as the RDN's new high frequency transit network spines.

- **Rapid and Frequent Transit lines will serve the highest density areas of the City of Nanaimo and are designed to carry the most ridership.**
 - Attracting riders depends on the ability of these routes to offer direct, high quality, reliable service.
 - Minimizing intersection delays and volatility in running times is a key way that the system can ensure reliability and reduced travel times for passengers.
- **Rapid and Frequent Transit lines will have the highest frequency and therefore represent a significant investment in annual operating hours and budget for the system.**
 - Reducing transit travel times and/or mitigating the need to increase travel times in future as other traffic congestion grows in turn has a direct impact on on-going transit system operating costs. Transit signal priority and other transit priority measures and signal timing adjustments enables the system and its funding partners to mitigate future cost increases.



In order to help determine a resource investment strategy, the project partners commissioned a study with a focus on the following two key corridors.

- **Rapid Line** – Island Highway, Terminal Avenue and Highway 1 from Mary Ellen Drive to Tenth Street that is the alignment of the proposed **1 Nanaimo Rapid Line**.
- **Frequent Line** – Bowen Road from Highway 19A (Island Highway) at Norwell Drive to Highway 19A/Terminal Avenue at Comox Avenue. This corridor is proposed to be served by both the **2 VIU Frequent Line** and the **3 Nanaimo Hospital Frequent Line** which serve different segments, some of which overlap.

Specifically, the study examined Travel Time (TT) differences between transit vehicles and passenger vehicles operating in the proposed corridors. It is anticipated that significant TT issues would be exposed and therefore priorities for traffic signal changes or other transit priority improvements could be identified.

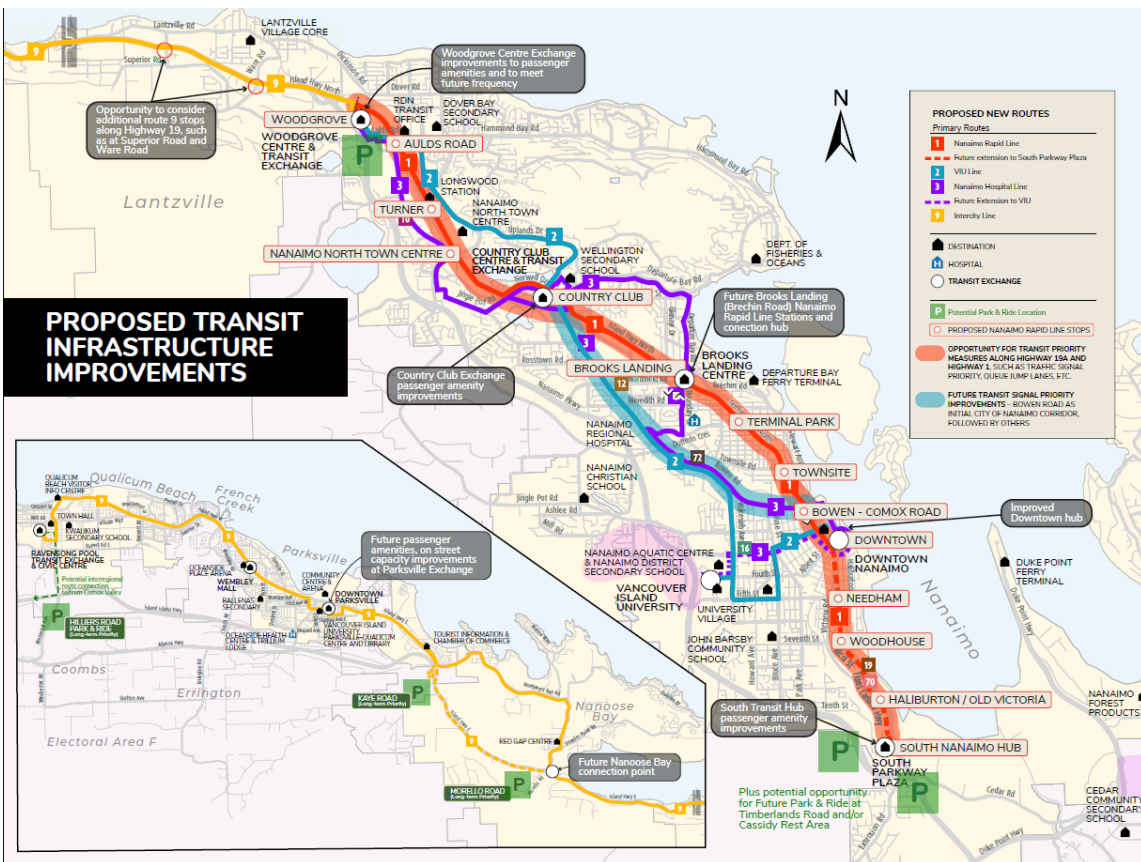


Figure 1: Infrastructure map showing proposed 1 Nanaimo Rapid Line and Frequent route 2 VIU Line and 3 Nanaimo Hospital Line, along with corridors that are the focus of this study: red shaded corridor is Highway 19A / Terminal Avenue, Highway 1; blue shaded corridor is Bowen Road.



2.0 METHODOLOGY

The analysis of travel time impacts used the following methods:

- Computer micro-simulation tool VISSIM was used to conduct the study.
 - VISSIM is an industry leading software that includes the ability to model transit routes and complex traffic signal timing.
- The model was built with the roadway (laning, etc.) as it was at the time of the study (November 2021 – January 2022).
- Bus stops were modeled two ways.
 - The Bowen Road corridor was modeled as existing at the time of the study.
 - The Highway 19A / Terminal Avenue / Highway 1 corridor was modeled to include changes proposed from the Transit Redevelopment Strategy, which mainly involved positioning and building in proposed Rapid Line stops.
 - Some modeled stops were placed at existing stops, while new stops used a mix of in- and out-of-traffic stops.
- No queue jumps or Transit Signal Priority (TSP) were modeled.
- Traffic signal data was from existing timing sheets provided by MoTI and CoN. This data included signal coordination information used in the modeling.
- Traffic volumes came from a mix of sources.
 - For Highway 19A / Terminal Avenue / Highway 1 the volumes came from a collection of previously done traffic counts conducted by WATT and others. Dates ranged from 2009 to 2020. All counts were scaled to traffic to 2019 (pre Covid pandemic) levels, while the turning movement percentages were retained.
 - For the Bowen Road corridor, the volumes were taken from a recently completed corridor-wide coordination project called the *Bowen Road/Comox Road Traffic Signal Coordination Project, Jan 2020* performed by Great Northern Engineering Consultants. In that report a compilation of counts taken from 2015 – 2018 was used, which were a mix CoN provided and gathered information. Refer to that report for details.
 - The traffic volumes for Highway 19A southbound had to be altered to avoid excessive delay impacting the bus operation. Specifically, the SB left turn volumes were reduced by 33%.



- Bus data was assumed with the following parameters, which are in line with the projected peak frequencies for each route at the future Year 5 horizon:
 - **Route 1:** One bus every 15 minutes along Highway 19A / Terminal Avenue / Highway 1 from Mary Ellen Drive to Tenth Street, plus buses operating at an identical frequency in the opposite direction.
 - **Route 2:** One bus every 10 minutes along Bowen Road from Highway 19A at Norwell Drive to Wakesiah Avenue, plus buses operating at an identical frequency in the opposite direction.
 - **Route 3:** One bus every 15 minutes along Bowen Road from Highway 19A / Terminal Avenue at Comox Road to Dufferin Crescent, plus buses operating at an identical frequency in the opposite direction.
 - Routes were modelled in both north and south directions.
 - A ridership and load rate of 40 passengers per stop per hour was assumed.
- Only the PM peak hour was examined in order to determine the greatest anticipated impact to bus TT.
- Model was run for 1 hour with a 15min seeding interval. 11 total runs for each scenario, using a different random seed for each run.
- Travel time trackers were added to the model at each signalized intersection, roughly 100m before each intersection's stop bar and immediately after it (see **Figure 1** for an example), for each direction of travel.
- The TT results of each of the 11 runs were averaged and the Standard Deviation (STDV) was determined.
- Any bus stops located within the TT tracker had their dwell time (the time that the transit vehicle may be at the stop for the purposes of loading/unloading passengers) subtracted from the signal's TT.

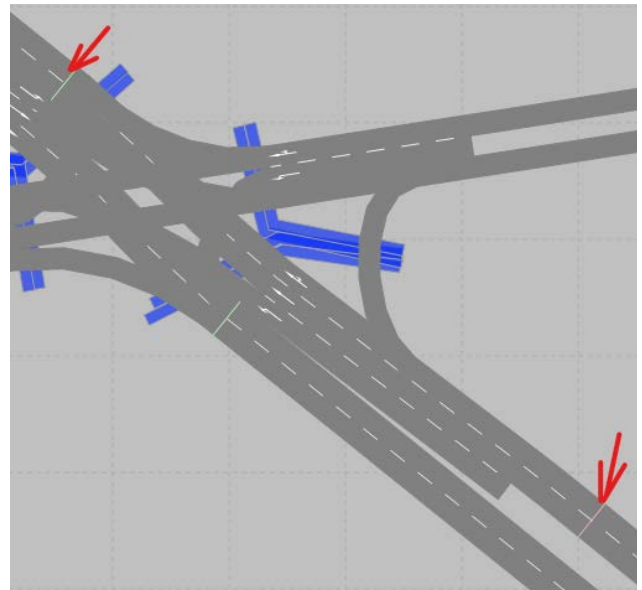


Figure 2: Travel Time tracker example (red arrows mark beginning and end).



3.0 RESULTS & ANALYSIS

3.1 ANALYSIS METRICS

The results of the model runs were analyzed. The absolute value of the TT (average of 11 runs) difference between passenger vehicles and the Rapid / Frequent transit vehicles was compared against the STDV of the transit vehicle TT.

$$|TT_{bus} - TT_{car}| \geq 1\sigma_{bus}$$

If the difference between the passenger vehicles and the transit vehicles was greater than 1 STDV of the transit vehicle then the TT result was considered significant. If the difference was less than 1 STDV of the transit vehicle then the result was considered within normal transit vehicle TT and therefore not significant.

3.2 HIGHWAY 19A / TERMINAL AVENUE / HIGHWAY 1 CORRIDOR RESULTS

For the modelling, the corridor was divided into four segments as shown in the figure at right and comprised of all the intersections falling in each segment.

Results of the modeling can be seen in **Table 1** and the following graphs.

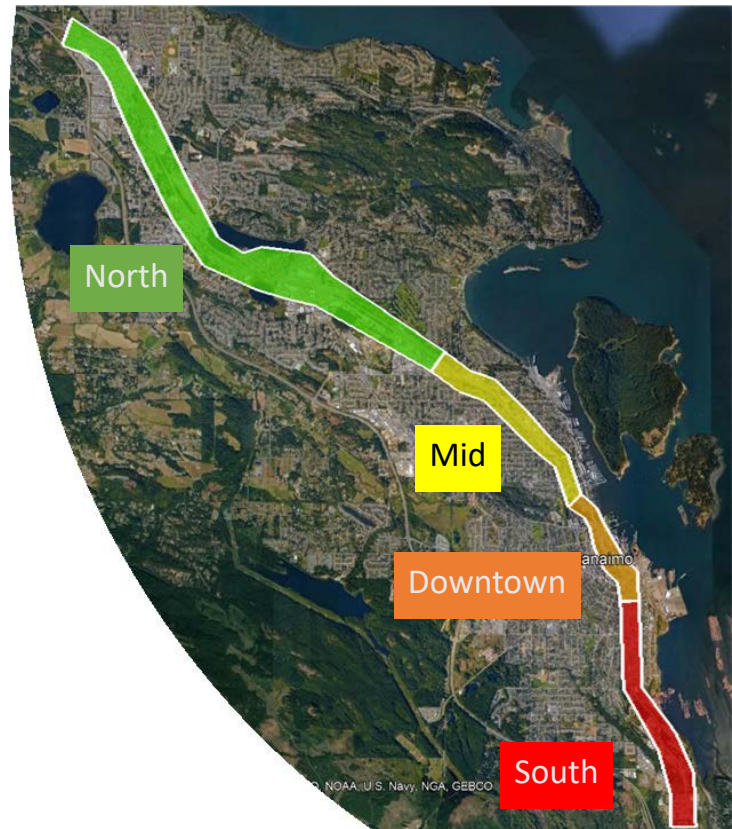


Figure 2 Rapid Transit Corridor study area

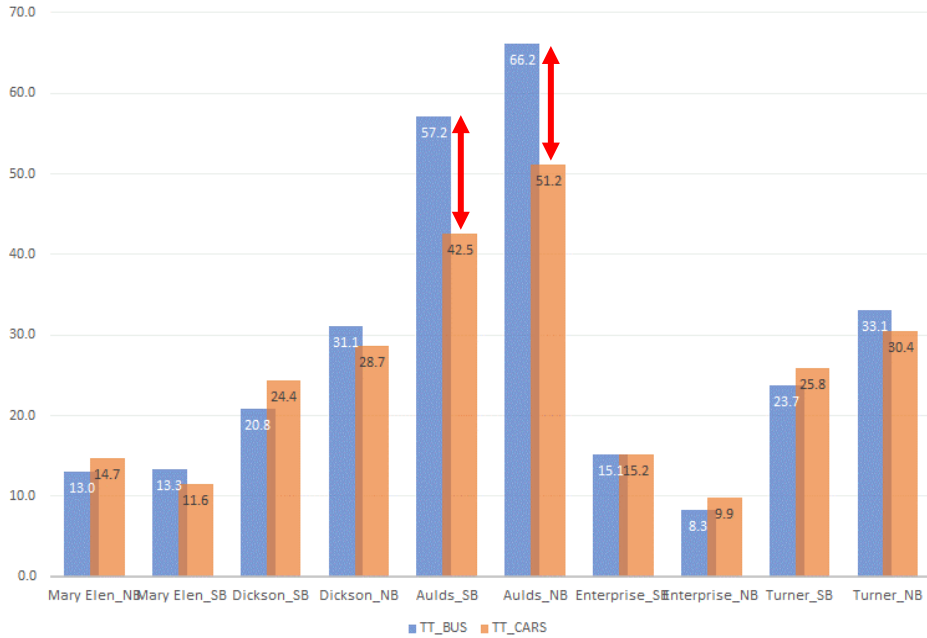


Table 1: Highway 19A / Terminal Avenue / Highway 1 Corridor TT Results

Signal Group	Signal	Bus TT (sec)	Car TT (sec)	Diff (Sec)	BUS STDV	Diff > 1 STDV?
South Section	Haliburton NB	12.8	9.9	2.9	3.4	
	Haliburton SB	15.7	13.1	2.7	4.6	
	Needham NB	27.2	19.9	7.4	6.3	>1STDV
	Needham SB	23.1	19.5	3.7	8.5	
	Milton NB	18.1	16.3	1.8	3.8	
	Milton SB	16.2	15.9	0.3	5.1	
Mid Section	Townsite_NB	18.8	14.6	4.2	2.1	>1STDV
	Townsite_SB	11.2	12.7	-1.5	1.4	>1STDV
	Cypress_NB	8.4	8.3	0.1	1.9	
	Cypress_SB	8.5	8.9	-0.4	1.6	
	Princess_NB	10.9	13.7	-2.8	3.4	
	Princess_SB	19.8	16.8	3.0	4.5	
	Terminal Mall_NB	20.2	18.4	1.8	6.6	
	Terminal Mall_SB	13.0	11.5	1.5	2.7	
	Departure Bay Rd_NB	49.2	43.4	5.8	9.3	
	Departure Bay Rd_SB	40.6	21.7	18.9	3.9	>1STDV
	Northfield_NB	13.0	11.4	1.6	3.4	
Northfield_SB	35.5	26.0	9.5	13.4		
Downtown Section	Comox_NB	82.8	33.6	49.2	12.3	>1STDV
	Comox_SB	37.1	25.8	11.3	6.4	>1STDV
	Commercial_NB	67.1	20.3	46.8	5.5	>1STDV
	Commercial_SB	68.0	18.0	50.0	4.5	>1STDV
	Esplanade_NB	13.4	12.3	1.1	3.7	
	Esplanade_SB	11.3	9.5	1.8	3.4	
	Stewart_NB	10.1	14.8	-4.8	3.9	>1STDV
	Stewart_SB	11.9	12.1	-0.3	4.0	
North Section	Mary Elen_NB	13.0	14.7	-1.7	1.8	
	Mary Elen_SB	13.3	11.6	1.7	0.3	>1STDV
	Dickson_SB	20.8	24.4	-3.6	9.7	
	Dickson_NB	31.1	28.7	2.3	17.1	
	Aulds_SB	57.2	42.5	14.6	23.4	
	Aulds_NB	66.2	51.2	15.1	14.6	>1STDV
	Enterprise_SB	15.1	15.2	-0.1	6.7	
	Enterprise_NB	8.3	9.9	-1.6	3.7	
	Turner_SB	23.7	25.8	-2.1	11.1	
	Turner_NB	33.1	30.4	2.7	14.9	
	Rutherford_SB	50.4	35.8	14.6	21.2	
	Rutherford_NB	35.1	36.9	-1.8	16.8	
	Jingle Pot_SB	76.0	61.1	14.9	17.9	
	Jingle Pot_NB	29.8	25.3	4.6	9.2	
	Ross_SB	17.4	20.0	-2.6	9.0	
	Ross_NB	21.2	16.5	4.8	8.6	
	Departure Bay_SB	17.5	16.9	0.6	8.0	
	Departure Bay_NB	44.7	31.9	12.7	13.4	
Bowen_SB	59.5	53.6	5.9	17.3		
Bowen_NB	25.3	20.8	4.6	5.5		



NORTH MODEL - AVG TRAVEL TIME (sec)



MID MODEL - AVG TRAVEL TIME (sec)

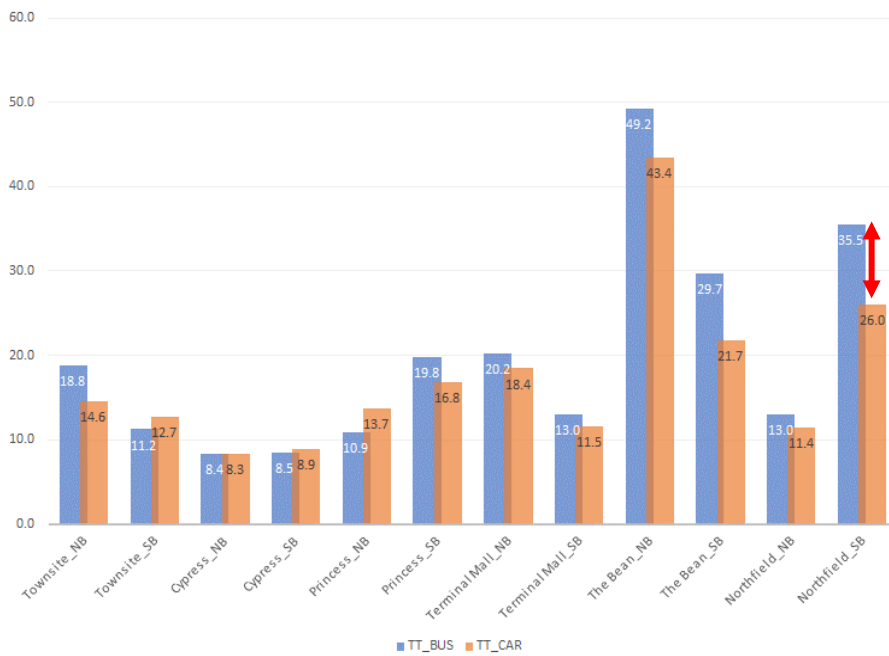
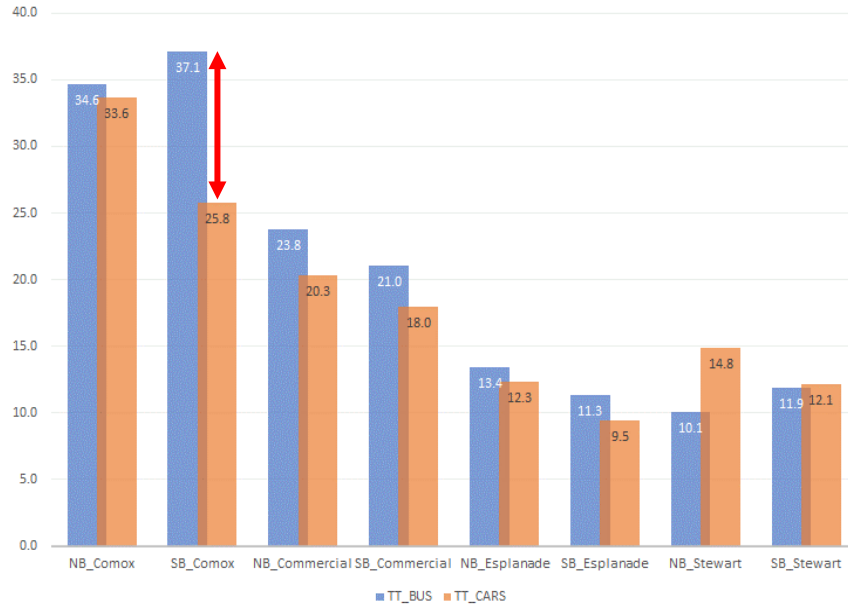


Figure 3: Travel Time graphs for North (top) and Mid sections for each segment



DOWNTOWN MODEL - AVG TRAVEL TIME (sec)



SOUTH MODEL - AVG TRAVEL TIME (sec)

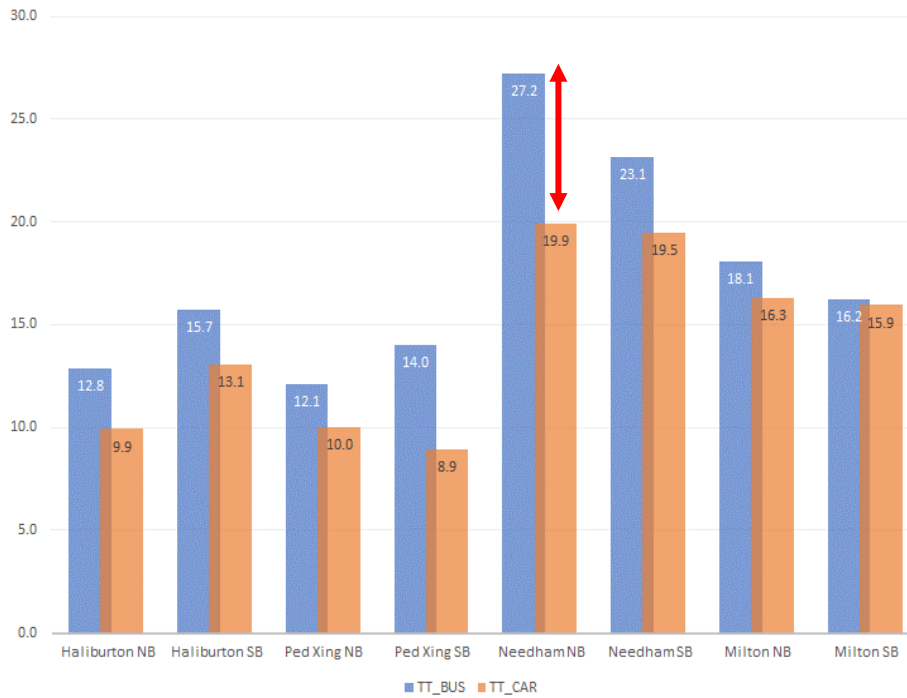


Figure 4: Travel Time graphs for Downtown (top) and South sections for each segment



There were 11 traffic signal movements that showed significant results:

- Needham Street NB
- Townsite Road NB
- Townsite Road SB
- Departure Bay Road SB
- Comox Road NB
 - Split phasing causes significant delays.
- Comox Road SB
 - Split phasing causes significant delays.
- Commercial Street NB
- Commercial Street SB
- Stewart Avenue NB
- Mary Ellen Drive SB
- Aulds Road NB

For most of these it appears the transit vehicles were “unlucky” in that the buses (only four per hour) happened to be stopped at each signal. This however is largely the purpose of the modeling, and these movements / intersections represent opportunities for improvements.

3.3 BOWEN CORRIDOR RESULTS

The Bowen corridor intersections were also split into separate groups for analysis based on their signal grouping (from north to south Group A to Group C) or if they were free running signals or within MoTI jurisdiction:

- Group A: Kenworth Road to Labieux Road
- Group B: Dufferin Crescent to Buttertubs Drive
- Group C: Pine Street to Wallace Street
- Free Running Signals: Northfield Avenue, Meredith Road, Wakesiah Avenue
- MoTI Signals: Highway 19A

Results of the modeling can be seen in **Table 2** and the graphs below.



Table 2: Bowen Corridor TT Results

Signal Group	Signal	Bus TT (sec)	Car TT (sec)	Diff (Sec)	BUS STDV	Diff > 1 STDV?
A	Kenworth_SB	24.3	20.6	3.7	3.9	
	Kenworth_NB	15.3	19.8	-4.5	3.0	>1STDV
	Labieux_SB	23.4	25.4	-2.0	11.5	
	Labieux_NB	19.7	19.6	0.1	5.0	
B	Duff Cres_SB	34.3	34.0	0.3	4.5	
	Duff Cres_NB	24.9	22.3	2.6	4.4	
	Duff Cres_EB_Rt3	24.4	21.1	3.2	4.0	
	Duff Cres_WB_Rt3	59.8	44.2	15.6	2.4	>1STDV
	Wellington_SB	31.8	24.2	7.6	10.7	
	Wellington_NB	28.5	20.3	8.2	6.2	>1STDV
	Pryde_SB	26.4	12.0	14.4	7.0	>1STDV
	Pryde_NB	20.8	16.9	3.9	3.6	>1STDV
	Buttertubs_SB	12.6	12.0	0.6	2.7	
	Buttertubs_NB	13.5	12.1	1.4	2.5	
C	Pine_SB	21.7	21.0	0.7	10.4	
	Pine_NB	13.4	16.2	-2.8	3.3	
	Macleary_SB	13.8	14.2	-0.5	3.6	
	Machleary_NB	26.2	18.1	8.0	15.0	
	Prideaux_SB	10.2	10.3	-0.1	0.4	
	Prideaux_NB	15.5	11.2	4.3	5.5	
	Wallace_SB	35.2	19.5	15.6	8.0	>1STDV
	Wallace_NB	9.6	12.5	-2.9	6.0	
Free Running	Northfield_SB	84.7	67.6	17.1	18.6	
	Northfield_NB	48.0	41.8	6.2	8.9	
	Meredith_SB	24.6	19.8	4.9	5.5	
	Meredith_NB	22.5	20.3	2.2	6.2	
	Wakesiah_SB_Rt2	21.5	19.5	1.9	2.1	
	Wakesiah_NB_Rt2	28.9	26.1	2.9	5.5	
	Wakesiah_SB_Rt3	24.2	24.1	0.2	6.0	
	Wakesiah_NB_Rt3	24.2	24.0	0.2	9.8	
MoTI	19A N_SB	106.0	96.8	9.2	9.1	>1STDV
	19A N_NB	65.8	61.4	4.4	19.3	
	19A S_SB	54.5	42.5	12.0	15.7	
	19A S_NB	103.3	66.7	36.6	54.4	

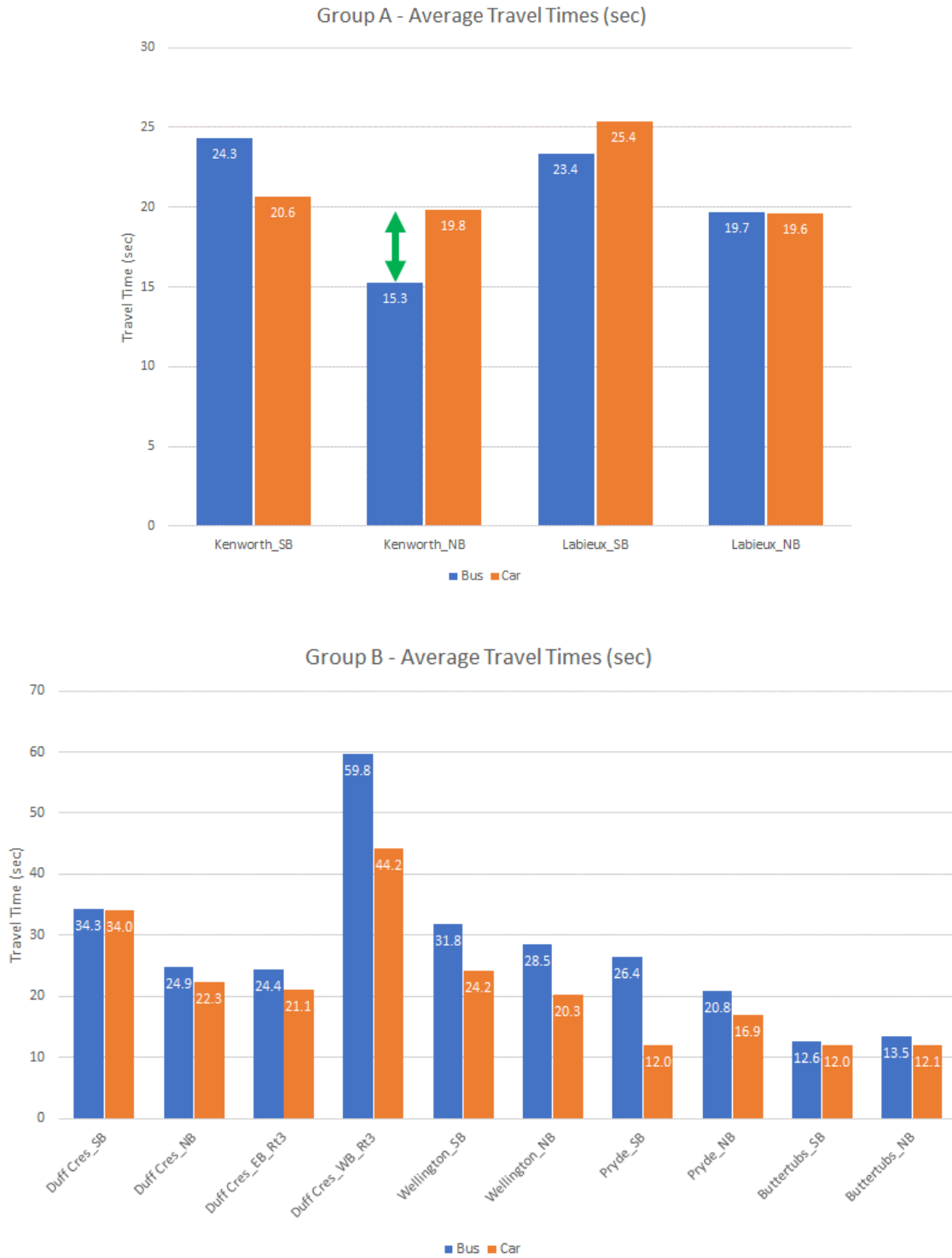


Figure 5: Travel Time graphs for each Bowen Road segment, Group A (above) and Group B

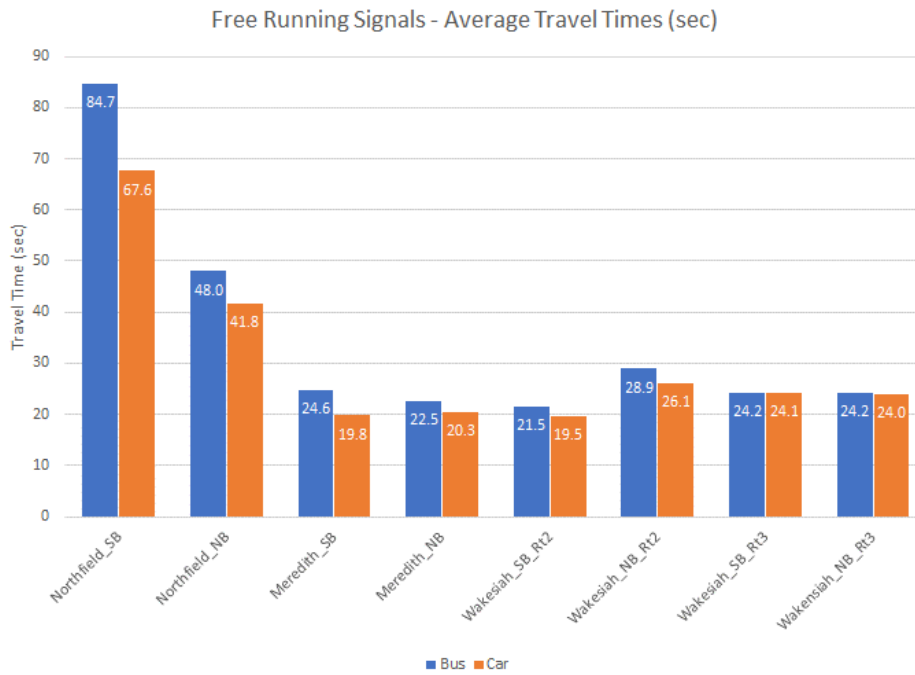
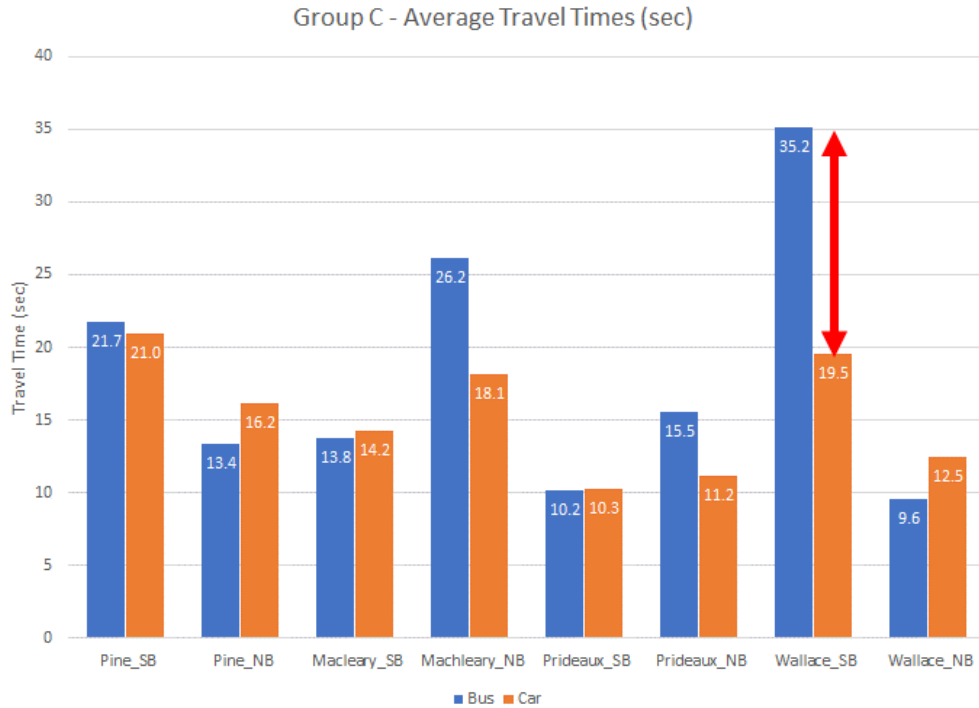


Figure 6: Travel Time graphs for each Bowen Road segment: Group C (top) and Free Running Signals.

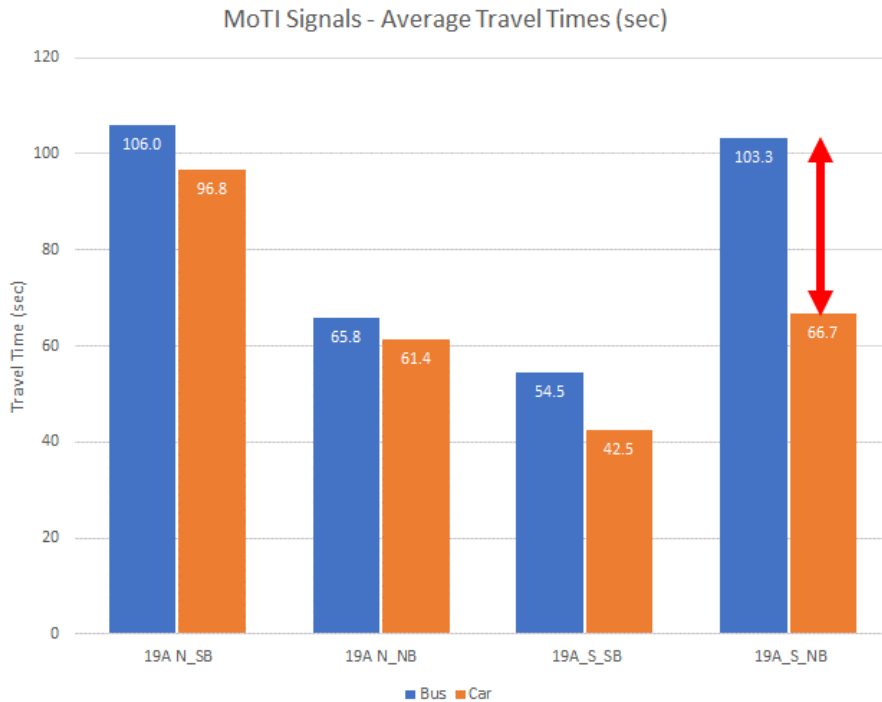


Figure 7: Travel Time graphs for MoTI signals

There were 7 traffic signal movements that were showed significant results:

- Highway 19A at Norwell Drive SB (Route 2 only)
 - Split phasing causes significant delays.
- Kenworth Road NB (Route 2 only)
 - Bus TT was -4.5seconds (faster) than the car TT
- Dufferin Crescent WB (Route 3)
 - Left turn from Dufferin Crescent onto Bowen.
- Wellington Road NB
- Pryde Avenue SB
- Pryde Avenue NB
- Wallace Street SB (Route 2 only)

Observation of the model revealed that some of the signals appeared to unintentionally have the transit stop dwell time synch up with the coordination scheme. For example, at



Kenworth Road NB the bus passed through the Labieux Road signal (which is coordinated with Kenworth Road) and completed a stop in between the two signals. The bus dwell time was such that by the time the bus started moving again the Kenworth Road signal was (or very nearly was) displaying a green indication.

Effectively the bus avoided queuing at the signal because it was dwelling at the stop and thus the TT reduction seen at Kenworth Road. Since the dwell time coordination combination elsewhere in the corridor generally resulted in an increase in TT, the addition of TSP to the corridor has a strong potential to alleviate some of that increase by allowing the bus (while stopped) to activate the TSP function and in turn pass through the intersection more quickly.

4.0 DISCUSSION & RECOMMENDATIONS

The purpose of the modeling was to find specific traffic signals that would be good candidates for transit related traffic signal improvements. The results of each corridor will be discussed below, and recommendations provided. **Appendix A** contains the full list of recommendations.

4.1 HIGHWAY 19A / TERMINAL AVENUE / HIGHWAY 1 CORRIDOR

Results indicate that the majority of the 23 traffic signals along the corridor did not significantly impede the operations of future Rapid transit vehicles. However, some signals did, and mitigations can be undertaken to address them.

Recommendations include:

- A corridor-wide coordination and signal timing update should be undertaken, with the recently completed Bowen Road/Comox Road Traffic Signal Coordination study noted in Section 2.0 serving as an excellent example.
- Removal of split-phasing at intersections.
- If split phasing cannot be removed, update the intersection with a modern signal controller and advanced loops, run in Free mode, and activate efficiency features like volume-density.
- Build queue jump opportunities wherever feasible.
- Look to integrate signals into the forthcoming CoN central management system.



The majority of the signals on this corridor are controlled by MoTI and are therefore outside the direct control of CoN, which complicates the implementation of changes.

Based on the modelling results, the specific intersections and priority improvement recommendations for this corridor are as follows:

Developing Rapid Transit and Frequent Transit Corridors in the RDN				
Transit priority measures, exchanges and other infrastructure improvements needed for the RDN system to implement the Transit Redevelopment Strategy				
Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement
All	MOU	All	All	Agreement between RDN, City of Nanaimo, BC Transit and MoTI to work together on infrastructure improvements to support transit, including roles and responsibilities, agreement in principle to coordinate on types of signal controller and other technology/infrastructure guidelines to be used, next steps and priorities.
Rapid Transit Corridor	Queue Jump Lane	Island Hwy / Hwy 1 Woodgrove Exchange to Downtown Nanaimo	Island Highway at Mary Ellen Drive	Queue jump in unused left turn lane for NB Route 1
			Island Highway at Dickinson Road	NB and SB queue jumps at islands
			Island Highway at Aulds Road	NB and SB queue jumps at islands
			Island Highway at Rutherford Road	NB and SB queue jumps at islands
Rapid Transit Corridor	Updated signal timing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	All intersections on Highway 19 from Mary Ellen Drive to Haliburton Street	Prioritising N/S bus movement
Rapid Transit Corridor	Removing split phasing	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Bowen Road	Prioritising southbound bus movement
Rapid Transit Corridor	Update traffic signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	Island Highway at Brechin Road	Improving traffic movement at intersection
Rapid Transit Corridor	Pedestrian signal	Island Hwy / Hwy 1 Woodgrove Exchange to South Nanaimo	TransCanada Highway at Woodhouse Road	To enable safe pedestrian crossing for alighting and boarding passengers



4.2 BOWEN ROAD CORRIDOR

The Bowen Road analysis results show that a few signals have increased TT for busses. However, the results did not demonstrate a clear pattern that would show how to allocate funding and resources to upgrade the corridor to better serve transit. Considering Bowen Road's importance in Nanaimo and that it will host two Frequent Transit routes, the general recommendation would be to upgrade and enhance signals within the more congested northern part of the corridor (Wellington Road to Highway 19A at Norwell Drive).

Planned works on the Bowen Road corridor support this approach: CoN will soon upgrade several traffic signals and lay fiber optic lines that will allow for the adoption of a central management system for traffic signals. **The adoption of that system is a key first step to creating a traffic signal system that can utilize the transit-specific features found in modern signal controllers.**

Although a central management system is needed first step, that does not mean that other work cannot be done. TSP can be added to most of the signals along the corridor, especially those signals that run in "free" operation. **Ultimately every signal on the corridor should be given TSP and tied into the central management system.** Once that system is built out, it will require dedicated staff resources, likely a new full-time position, to oversee and maintain it. A TSP system is not a "set it and forget it" system, and neglect has the potential to negate any improvements in the long term.



Based on the modelling results, the specific intersections and priority improvement recommendations for the Bowen Road corridor are as follows:

Developing Rapid Transit and Frequent Transit Corridors in the RDN				
Transit priority measures, exchanges and other infrastructure improvements needed for the RDN system to implement the Transit Redevelopment Strategy				
Corridor	Type of Facility / Improvement	Segment	Location	Proposed Infrastructure improvement
All	MOU	All	All	Agreement between RDN, City of Nanaimo, BC Transit and MoTI to work together on infrastructure improvements to support transit, including roles and responsibilities, agreement in principle to coordinate on types of signal controller and other technology/infrastructure guidelines to be used, next steps and priorities.
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Kenworth Road Bowen Road at Meredith Road Bowen Road at Wellington Road Bowen Road at Prideaux Street Bowen Road at Wallace Street	Prioritising E/W bus movement on Bowen Corridor (largely E/W some N/S movements as well)
Frequent Transit Corridor	Transit Signal Priority and remove Split Phasing	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Northfield Road	To enable improved bus speed
Frequent Transit Corridor (Bowen Corridor)	Transit Signal Priority and queue jump lanes	Bowen Road: Island Highway to Terminal Ave and Comox Road	Bowen Road at Labieux Road Bowen Road at Dufferin Crescent Bowen Road at Pryde Avenue Bowen Road at Buttertubs Drive Bowen Road at Wakesiah Avenue Bowen Road at Pine Street Bowen Road at Machleary Street	If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated If space for queue jumps can be negotiated



4.3 STUDY AREA-WIDE RECOMMENDATIONS

4.3.1 SPLIT PHASING

One significant TT issue seen in both corridors was the impact of split phasing on signal operation. The additional delay caused by the timing scheme resulted in TT increase for buses and significant delays for all vehicles. Efforts should be made to remove this mode of operation for both MoTI and CoN signals.

4.3.2 SIGNAL CONTROLLERS AND TIMING

Both corridors contain a mix of modern and older signal controllers and ancillary equipment. Additionally, the timing sheets provided indicate long spans of time in between updates of the timing plans. Modernization of signal equipment, and ongoing upkeep of the signal timings, can help move traffic more efficiently, and in turn reduce TT for the Rapid and Frequent Transit networks.

Modern signal controllers have many features that are not being utilized along the corridors. These features can improve general signal performance and in turn TT for the Rapid and Frequent lines. The addition of advanced loops and other signal hardware is often required. Including these when signals are updated should be examined, especially at split phase signals.

4.3.3 PARTNERSHIPS

It was observed in the signal timing sheets that there appears to be a lack of direct coordination between MoTI and CoN when it comes to operation of traffic signals within the City boundary. Since MoTI controls so many of the critical signals within the CoN, an agreement should be pursued that outlines mutual goals and expectations between the two parties. It should include items like integration of local traffic signals into the municipal traffic signal central management system, and definition of parameters for non-standard signal timing (TSP, volume-density, etc.). Coordination between the CoN and MoTI systems (in partnership with the RDN and BC Transit) is critical to running an efficient transit network oriented around Rapid and Frequent spines.



5.0 WHY BUS SPEED AND RELIABILITY IS IMPORTANT

This study focused only on a singular aspect of bus travel, Travel Time (TT) analysis. As such this study does not identify specific time savings allotted to the use of a specific priority treatment, rather our approach is to generically highlight the benefits of transit priority measures from existing literature.

Why focus on buses?

In larger systems we could see transit ridership distributed across various modes (buses, trains, light rail etc.). In the RDN system, buses are the primary resource used to carry people from one destination to another.

If they move slowly causing travel time delays to the passengers, they will opt to drive if they have that option. This in turn means, more people SOVs, higher emissions and lower environmental stewardship. None of this supports the RDN's, partner municipalities' and the provincial government's goals to address the threats posed by Climate Change.

Why does travel time matter?

This is best illustrated in a recent report published by TransLink, shared below:

If a route took 50 minutes to get from point A to point B and ran every 10 minutes, it would essentially need **5** buses to provide the **10**-minute frequency.

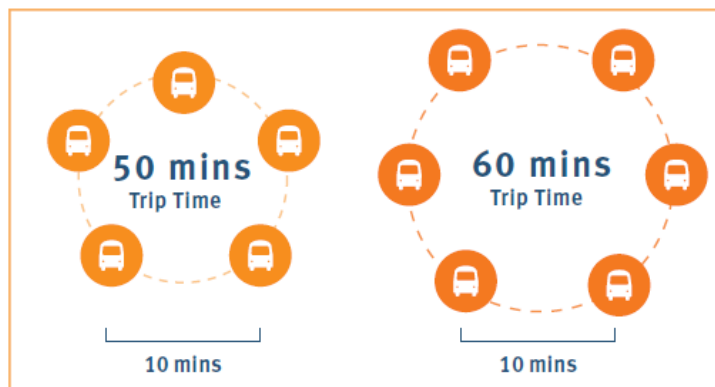


Figure 8: Travel Time delays need investment to maintain same level of service, Source: TransLink Bus Speed and Reliability Report

In a scenario where traffic congestion increases and no measures are taken to



address the travel time increase due to congestion and it now takes 60 minutes to run the same distance from point A to point B, this means one of two things:

- 1) it would need **6** buses to provide **10**-minute frequency (**additional cost to buy new fleet**)
- 2) it would reduce the frequency to 12 minutes if the number of buses remained the same (**this means a lower level of service to the community**)

A bus costs close to \$ 1 M dollars, if the RDN were to invest its resources in buying additional fleet to mitigate the consequences of bus travel time delays in traffic, instead of focusing resources towards improving span and frequency of service, it would be interrupt planned span and frequency improvements in the system and be an inefficient use of resources. Downstream, this will also impact Climate Action goals of all levels of government.

Why transit priority?

Transit priority is one of the tools that helps improve the speed and reliability of the buses. According to a National Association of City Transportation Officials (NACTO) publication, *TSP can reduce transit delay significantly. In some cases, bus travel times have been reduced around 10%, and delay was reduced up to 50% at target intersections, depending on treatment employed.*

In a number of different transit agencies, the focus has now shifted from constantly recalibrating travel times in schedules to proactively working with partner agencies to determine ways of implementing signal priority measures that will support travel time improvements, thereby freeing up resources to invest in improving the existing system.

6.0 CONCLUSION

Enabling a full suite of transportation choices for residents within the City of Nanaimo and the larger Regional District of Nanaimo requires that region's transit system continue to evolve to offer improved frequency, reliability, and directness of trips. The RDN's Transit Redevelopment Strategy outlines a path to reshape the transit system to align with development and make these improvements.

Central to the new revised network will be the implementation of the 1 Nanaimo Rapid Line routes and its supporting Frequent Transit routes the 2 VIU Line and 3 Nanaimo



Hospital Line. These routes will serve as the high frequency spine for the system, carrying the most passengers and the highest population areas of the City. They also represent a significant proportion of the system in terms of capital investment and ongoing operating hours and costs.

Maximizing that investment and attracting strong ridership depends on the ability of these routes to offer high quality, reliable service that also mitigates the need for further cost increases due to congestion from other vehicles. This study examined the corridors that will be predominantly served by these Rapid and Frequent routes to determine what priority mitigation measures should be considered.

The results of the modeling, combined with assessment of the existing signal timing resulted in a list of improvements for each of the corridors, which will help to facilitate the movement of transit and to ensure its speed and reliability.