Cowichan Valley Regional District / Regional District of Nanaimo Interregional Transit

Service Discussion Document

January 2021

CVRD | Regional District of Nanaimo | BCTransit

Table of Contents

1. Executive Summary

In 2012 and 2014, BC Transit completed long-term transit strategies (Transit Future Plans) for the Cowichan Valley Regional District (CVRD), and the Regional District of Nanaimo (RDN) and respectively. Both regions' 25 year strategic priorities include the introduction of interregional transit services which have now been included in 2022/2023 Transit Improvement Process (TIP) Memorandum of Understandings (MOU).

Public engagement

Online and in-person engagement was originally scheduled for March – April 2020, but was postponed due to the COVID-19 pandemic and its relaunch in September 2020 was impacted by the snap British Columbia general election. Public engagement marketing was re-launched between December 4 and December 18, 2020 and garnered an overwhelming 1,950 responses, indicating strong support in the service.

Though previous planning work identified commuters as the main market for the service, public engagement indicates strong interest in service throughout the day (peak and midday) with a general pattern northbound during the morning and early afternoon and southbound during the latter part of the day. The primary purpose of travel is for social, recreational and entertainment opportunities. Shopping and errands are the second most popular reason followed closely by BC Ferries connections and work.

Service Options

Transit service designed with trip times throughout the day serves the population traveling daily for work and school while providing flexibility to those traveling for social or recreational activities, errands, and other appointments. A wide service span throughout the day can meet the demands of many different kinds of passengers, providing the ability to travel to their

Figure 1: Timeline of Interregional planning work

destination and remain in the region during the day or for a few hours, before returning home.

Table 1 below summarizes the proposed service options based on previous planning work, discussions with the Working Group, and public feedback.

Option	1	2	3
Weekday Round Trips/ Day	7	7	6
Sat Round Trips/ Day	6	0	0
Weekday Service Span	6 am-8 pm	6 am-8 pm	6 am-7 pm
Sat Service Span	6 am-7 pm	N/A	N/A
Frequency peak (min)	45	45-60	135
Frequency midday (min)	120-240	120-240	135
Peak Buses	3	2	1
Annual Weekday Hours	4900	4900	4200
Annual Sat Hours	900	0	0
Total Annual Hours	5800	4900	4200
Est. Annual Revenue	$ 243,600	$ 205,800	$ 176,400
Est. Annual Total Costs	$ 1,167,074	$ 969,806	$ 804,537
Est. Annual Net Muni Share	$ 463,111	$ 375,078	$ 294,771

Table 1: Proposed service options

Option 1 (Preferred) provides weekday service with three round trips each in the AM and PM peaks at a frequency of 45 minutes and one round trip during the midday (same as Option 2). This option also provides 6 round trips on Saturday for all day service.

This option most closely resembles the level of service proposed by the combined Transit Improvement Programs of the CVRD and RDN. It benefits many discretionary trips and has the greatest potential to attract commuters as they return to the transit market following the COVID-19 pandemic. This option is the most strongly supported by the results of public engagement and provides the greatest benefit to users and therefore has the greatest likelihood of success upon implementation.

Option 2 provides weekday-only hourly peak service plus a midday round trip. It features three round trips each in the AM peak and PM peak for a total of seven round trips per weekday.

This service is focused on the commuter with some opportunities for day trips between the regions.

Option 3 provides weekday-only service throughout the day throughout a 12-hour period. It features six round trips per day at a frequency of 135 minutes.

This option does not provide typical peak service and represents a minimal level of all-day service to connect the two regions for discretional travel and a minimal level of commuter travel.

Future service improvements can include additional frequency during the peak and Sunday service.

Proposed Route

The proposed service is designed to compete with the automobile and has limited stops, with some acting as Drop-off or Pick-up only depending on the time of day and direction of travel. Service originates and terminates at Village Green in Duncan and Downtown Nanaimo Exchange with stops likely occurring at Duncan Train Station, VIU Cowichan Campus, Cowichan Commons, Ladysmith, Nanaimo Airport, and Southgate. Additional future stops could be located near the Crofton (Mt. Sicker Road) and Chemainus (Henry Road) intersections with the Trans-Canada Highway 1.

Figure 2: Proposed Cowichan Valley to RDN interregional route

Next Steps

If the CVRD and RDN wish to pursue delivery of the preferred service option (Option 1 noted above), next steps are outlined in Table 2 below.

Date	Milestone
December 2020	Transit Improvement Program memorandum of understanding signed by local governments and returned to BC Transit listing interregional transit service for implementation in September 2022.
April 2021	Governance, operations, revenue and cost-sharing agreement(s) signed by local governments.
April 2021	Transit Improvement Program memorandum of understanding to local governments for review. Interregional service rolled forward from Year 2 to Year 1 (2022/2023). This includes a commitment and approval to order the required buses.
June 2021	Transit Improvement Program memorandum of understanding signed by local governments and returned to BC Transit.
February 2022	Provincial budget finalized and projects for 2022/2023 fiscal year confirmed.
March 2022	Detailed planning, scheduling, and marketing work beings for implementation of interregional service.
September 2022	Interregional service between the Cowichan Valley Regional District and Regional District of Nanaimo begins.

Table 2: Timeline for September 2022 Implementation

2. COVID-19 impact on planning

The outbreak of the global COVID- 19 pandemic has caused significant widespread disruption to travel behaviors. This has led to reduction in driving, transit use, and the reduction in travel trips related to work and higher education.

Image 1: Masked passengers board bus during COVID-19 pandemic

Transit is and will continue to be an essential service for communities as residents go about their daily lives. Transit will continue to play a pivotal role in addressing the challenges that will exist long after the pandemic is over, including climate change, congestion, and affordability. BC Transit acknowledges that demand characteristics across communities will be different, and the staged reopening of different sectors may impact ridership on the interregional route and how the service is delivered over time.

The focus of this Service Discussion Document is to outline potential interregional service delivery models for the CVRD and the RDN; however, due to the pandemic, it is acknowledged that the

needs and priorities of transit users may have changed and may continue to change. Implementation and service design may be impacted as the CVRD and the RDN transit systems, along with employment, education, and other institutions, transition through the recovery phases of the pandemic and transit ridership demand returns.

The goal is to ensure the best transportation solution for the proposed interregional connection and an initial service model that reflects the current impacts of COVID-19 while positioning the route to improve connections between the communities in the future.

3. Introduction

In 2020, BC Transit introduced a new five-year strategic plan. It is the culmination of extensive dialogue, feedback and innovation from people and communities across the province that we work with on a daily basis. The diversity and scale of these partnerships is reflected in the Strategic Plan and enables us to provide assistance to communities to meet the challenges of the future. Action Area 3 of the Strategic Plan includes the goal of expanding interregional services to meet customer needs. BC Transit, in collaboration with the CVRD and the RDN, developed this Service Discussion Document to explore service options for interregional transit service between the two regional centers. This document builds upon the work completed to date, incorporates community feedback, and develops a recommended service model and governance structure to implement interregional transit service as funding becomes available.

4. Background

In 2012 and 2014, BC Transit completed long-term transit strategies (Transit Future Plans) for the CVRD and the RDN respectively. The long-term transit strategies developed through widespread public engagement envision what the transit networks should look like in 25 years describing service change priorities, new infrastructure, and the investment needed to get there.

Figure 3: Timeline of Interregional planning work

Both regions' 25 year strategic priorities include the introduction of interregional transit services. In addition, both systems have included the implementation of interregional service in their Transit Improvement Process (TIP) MOUs for the 2022/2023 period. BC Transit's Strategic Plan (2020-2025) also includes expanding interregional services as an opportunity to improve safe and responsive service delivery.

Substantial investment and analysis in planning reports and stakeholder and public engagement has occurred over the last eight years to gauge the feasibility and the communities' desire and demand for an interregional transit service between the key centers in the CVRD and the RDN. Figure 3 outlines the timeline and planning that has and will occur to realize the implementation of an interregional service in September 2022

4.1. Summary of Key Project Objectives

- Support the goals of the BC Transit 2020-2025 Strategic Plan
- Support the Goals and Vision of the RDN and CVRD Transit Future Plans
- Understand transit ridership potential between key origin and destinations including but not limited to, downtown Nanaimo, Vancouver Island University (VIU), Nanaimo Regional General Hospital, Nanaimo Airport, Ladysmith, and Duncan
- Evaluate opportunities within each region to deliver a conventional transit service solution on fixed routes and schedules
- Develop and recommend transit service options, including an operational plan and fleet required to transition existing transit systems to the proposed vision, including identifying recommendations on priorities and phasing
- Develop the next steps for establishing the regional district governance model and Operating Agreement
- Develop high level implementation plan to direct the delivery of the service

4.2. Cowichan Valley Regional District

Completed in 2012, the CVRD's Transit Future Plan identified developing an interregional transit service to Nanaimo as a medium-term (6-15 years) priority. It also identified the need for additional Park & Ride locations at:

- Duncan;
- Trans-Canada Highway at Highway 18;
- Chemainus;
- Ladysmith; and
- Cedar

The TFP indicates that in the long-term (15+ years), improvements could be made to interregional service by increasing frequency and introducing weekend service.

4.3. Regional District of Nanaimo

Completed in 2014, the RDN's Transit Future Plan identified developing an interregional transit service to the Cowichan Valley as a short-term (0-5 years) priority. It also identified the need for additional Park & Ride locations in rural areas, particularly Cedar. In the long-term (15+ years) improvements could be made to interregional service by adding midday trips and introducing weekend service.

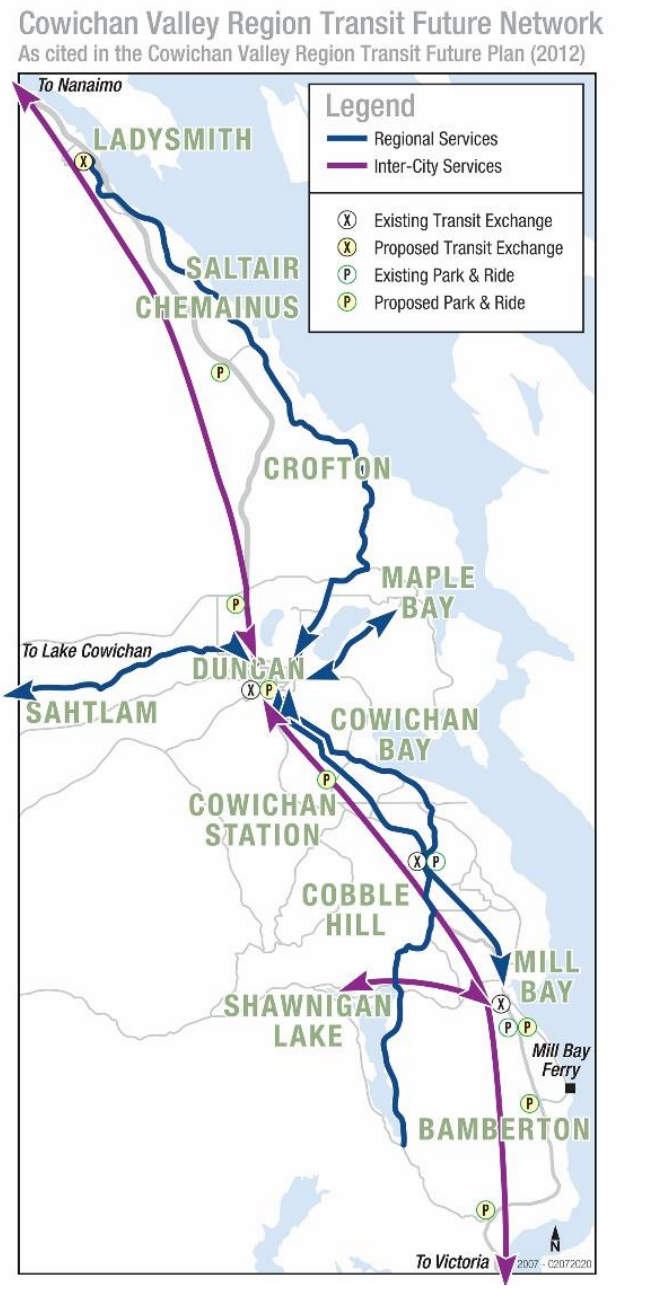

Figure 4: Cowichan Valley Transit Future Network showing interregional connections

Completed in 2019, the South Nanaimo Local Area Transit Plan reaffirmed the need for interregional transit service.

4.4. Existing Transportation Options

This section provides a brief overview of the transportation options currently available within the CVRD and RDN.

4.4.1. Public Transit

Both the CVRD and RDN have regional transit systems that operate within the boundaries of their respective district, with the CVRD transit system also providing connections to the Capital Regional District. The CVRD/CRD interregional service has been running successfully for 12 years and has transitioned in this time from 250 daily trips to 350. According to the 2016 Census, 3.3 per cent of RDN residents and 1.9 per cent of CVRD residents use public transit to get to and from work.

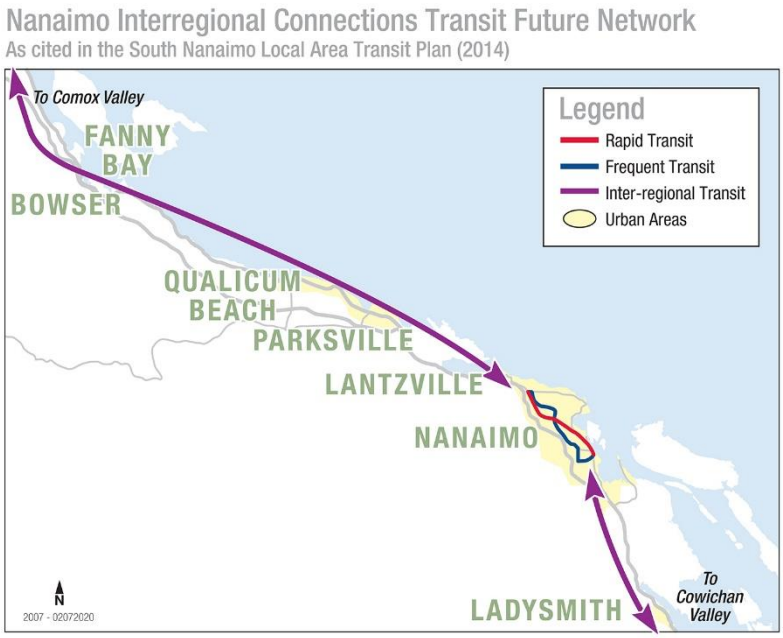

Figure 5: Nanaimo Transit Future Network showing interregional connections

4.4.2. Personal Automobile Travel

Travel between the CVRD and RDN is heavily auto-oriented. According to the 2016 Census, 86.6 per cent of RDN residents and 89.5 per cent of CVRD residents drive to work. There is an opportunity with a new interregional transit service between the key centres to reduce reliance on the automobile.

4.4.3. Highway Coach and Shuttle Service

There are two private operators offering interregional service between the CVRD and RDN: IslandLink Bus and Vancouver Island Connector. Services range from $15.75 to $28.99 for a one-way fare and are available for travel between downtown Duncan and Nanaimo Airport, Port Place Mall, or Departure Bay in Nanaimo. In general private operator vehicles have limited capacity for mobility devices, are more costly to use, and service is less flexible than public transit service with only one or two trips per day. It should be noted that as of December 2020, Vancouver Island Connector was not in service due to the COVID-19 pandemic.

5. Market Demand Summary 2015

To gauge the potential for each proposed interregional transit connections on Vancouver Island (RDN/CVRD, Campbell River/Comox Valley Regional District, Comox Valley Regional District/RDN), a clear understanding of the key origin and destination points within each region and the demand for travel between regions is required. The potential transit market analysis segment of this Service Discussion Document has been delivered through a Market Research Report (see Appendix B) developed in collaboration with consultants SNC Lavalin in 2015. The Market Research Report explored the potential ridership markets between key regional centres on Vancouver Island, specifically across each of the three transit region boundaries from Cowichan Valley Regional District to Campbell River. The report analyzed the available public and institutional data sources to determine:

- The primary transit markets that would use the interregional type service if it was implemented.
- Development of a high level of understanding of where travel takes place.
- Critical analysis of travel data with other population metrics to indicate what percentage of transit ridership could be achieved from these travel patterns and habits in the localities.

The Interregional Market Research Report provides a high level analysis to help understand the potential for transit use across the regional boundaries. A full description of the overall methodology and the detailed outputs is contained within Appendix B. It is noted that the estimation methodology and rating provided for the Captive Market results helps determine where demand for non-peak services may exist. The goal of the study was to help determine what type of service model would address the existing and future travel demand and to substantiate additional expenses and resource allocation. The results were intended to be in order of magnitude only, separating the high to medium potential markets from the low to no potential markets. Further planning work revealed increased and unexpected demand for discretionary travel. Due to the effects of the COVID-19 pandemic, the Market Research Report results were considered in tandem with results of the 2020 public engagement and changed travel demand patterns observed throughout the two regions.

5.1. Commuter Market Demand

The interregional transit demand between the RDN and the CVRD found by the Market Research Report is summarized in Figure 6. The estimate is comprised almost entirely of the Nanaimo VIU population (staff and students). The Market Research Report recommended that any new interregional transit service should be initially designed around this specific post-secondary education market, with opportunity to grow and accommodate other markets as demand is warranted.

Figure 6: Potential ridership markets between key regional centres on Vancouver Island. Source: SNC Lavalin Market Research Report

5.2. Captive Market Demand

Captive ridership analysis for Ladysmith indicated a low ratio of employment to population which directs a high exit of workers out of Ladysmith during normal morning peaks combined with a high percentage of youth and seniors who indicate a lack of amenities within the area. In summary, major employment opportunities outside Ladysmith create a high potential for travel from Ladysmith to the RDN or southern portions of the CVRD. Currently, while the Cowichan Valley Transit system operates two routes from Ladysmith to Duncan and Chemainus respectively, no direct transit connection exists to facilitate transit travel from Ladysmith to the RDN.

6. Public Engagement

Online and in-person engagement was originally scheduled for March – April 2020, but was postponed due to the COVID-19 pandemic. In the fall of 2020, as British Columbia entered Phase 3 of the Restart Plan, BC Transit, the CVRD, and RDN, implemented online public engagement. Engagement focused on confirming the need for the service, span, frequency, fares, and origins and destinations for the route.

6.1. Engagement Overview

The online engagement platform (engage.bctransit.com/cvrd-rdn) and survey garnered 1,951[1] responses. This public engagement campaign is one of the most successful in either region in the past eight years in terms of number of responses, indicating strong public interest in the introduction of the service (see Figure 7).

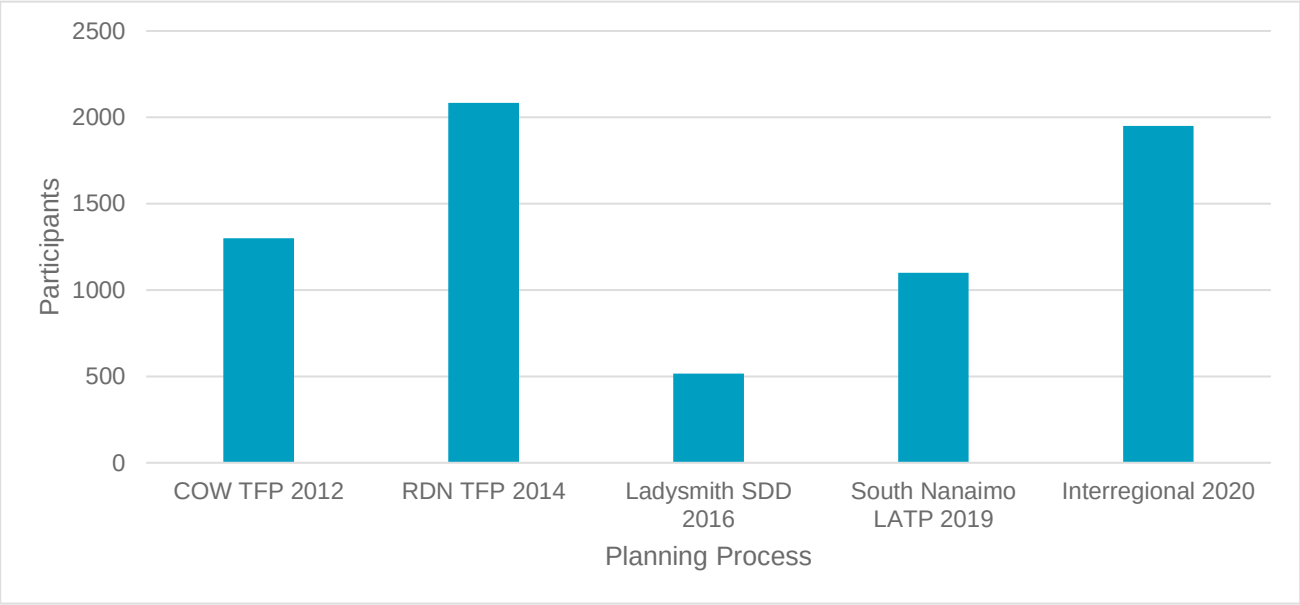

Figure 7: Public engagement reach for major planning processes in CVRD and RDN

Both the engagement platform and survey were promoted via local newspapers, social media, email lists, and IBCs (interior bus cards) and were publicly available between September 18 and December 18, 2020. Original engagement dates were September 18 – October 16, 2020.

[1] There were 1,951 recorded responses as of December 14, 2020 when this document was drafted. Survey closes on December 18, 2020. In order to meet local government deadlines,

However, due to the snap British Columbia general election, marketing efforts were suspended on September 21. Public engagement marketing was re-launched between December 4 and December 18, 2020 to provide members of the public an extended opportunity to view the website material and complete the survey.

6.2. Key Results

This Service Discussion Document was finalized on December 16, 2020. Responses discussed throughout the document were collected prior to December 11, 2020. Survey responses gathered between December 11 and December 18 are not expected to affect overall trends and resulting recommendations. Though it is not anticipated this will occur, any changes to service options and recommendations will be made after a post-survey data analysis.

6.2.1. Engagement Demographic Information

The online survey engaged residents across the CVRD and RDN with approximately 64 per cent from CVRD, 32 per cent of participants from RDN, and a further 4 per cent from elsewhere on Vancouver Island and some Gulf Islands as shown in Figure 8.

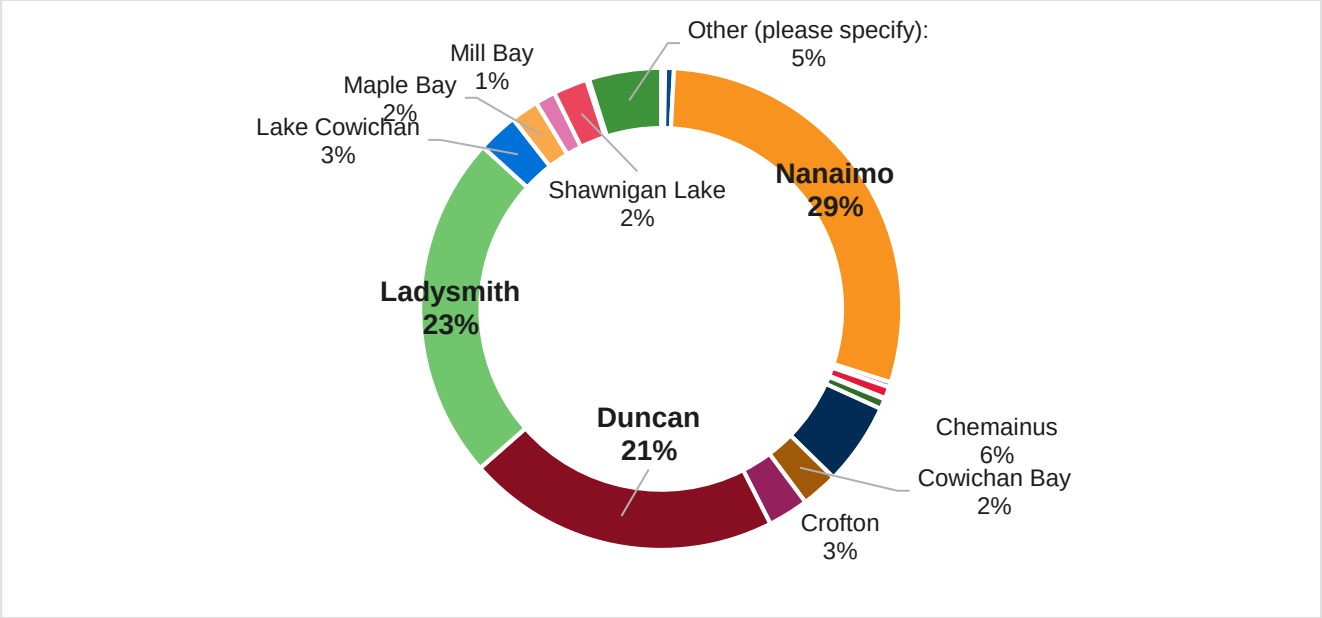

Figure 8: Where Survey Participants Live

Together, residents of the three major centres along this corridor make up approximately 75 per cent of all participants. About 30 per cent of participants live in Nanaimo, 23 per cent in Ladysmith, and 21 per cent in Duncan as indicated in Figure 8.

Most participants are between the ages of 25 and 54, with slightly fewer responses coming from those aged 55-74 as shown in Figure 9.

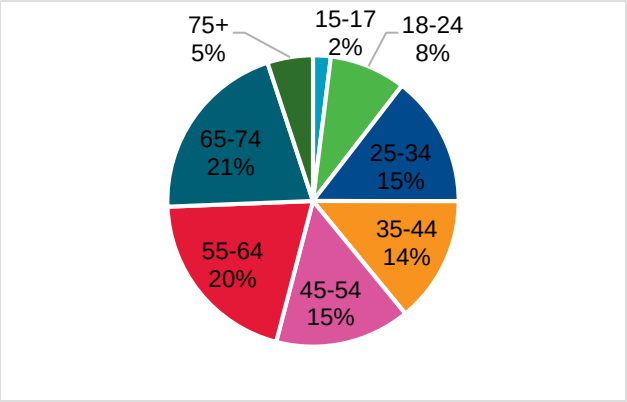

Figure 9: Age of Survey Participants

6.2.2. Travel Behavior

Participants were asked what time of day they would be most likely to travel on the interregional route. The most popular response was Midday between the hours of 9:30 a.m. and 3 p.m. followed by AM Peak (7 a.m. – 9:30 a.m.) and then PM Peak (3 p.m. – 6 p.m.) as indicated by Figure 10.

Though Midday travel was most popular in terms of responses, those making midday trips are more likely to make the trip only a few times per month.

Of the participants who are most likely to make up the bulk of sustained daily ridership, those who responded indicated they would like to travel 5+ day per week, 30 per cent indicated the desire to travel during the peak periods, more than during any other time period.

The graph below in Figure 10 illustrates the preferred arrival times for each destination (to the Cowichan Region and to the RDN).

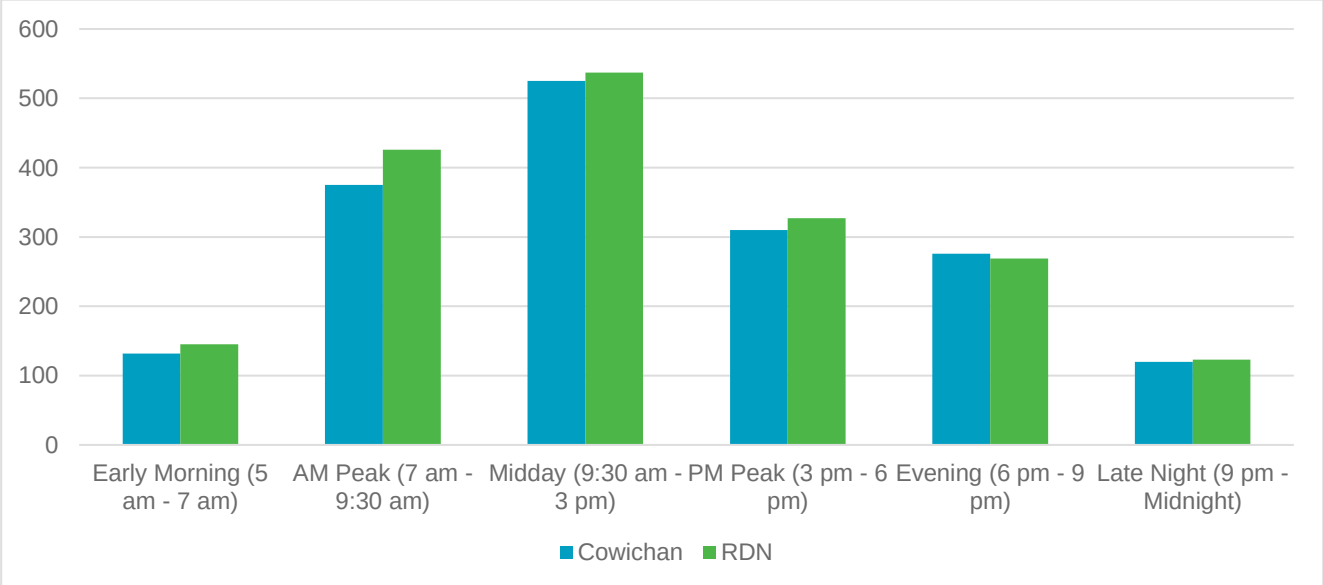

Figure 10: Time of travel preference by destination

Participants indicated a desire to arrive in the Cowichan Valley between 7 a.m. and 6 p.m. and in RDN between 7 a.m. and 3 p.m.

Figure 11 shows that about 40 per cent of participants would use the service for travel to social events, recreational activities, entertainment, shopping, and errands (often called discretionary trips). Another approximately 16 per cent would use the service to connect to BC Ferries, while approximately 19 per cent would use the service for work and college/university. These responses regarding trip purpose support the preferred travel times for including both peak and midday services.

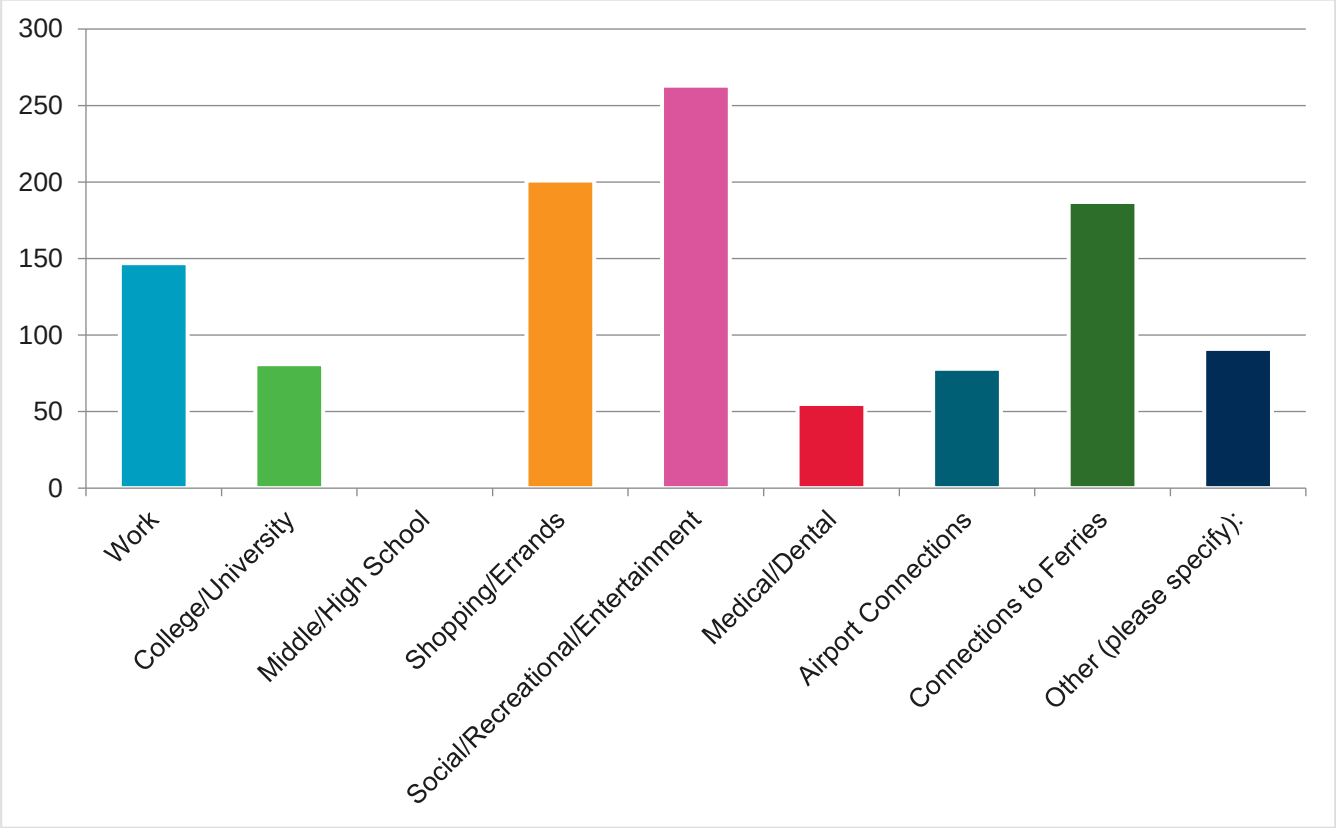

Figure 11: Trip purpose

Transit service designed with trip times throughout the day serves the population traveling daily for work and school while providing flexibility to those traveling for social or recreational activities, errands, and other appointments. A wide service span throughout the day can meet the demands of many different kinds of passengers, providing the ability to travel to their destination and remain in the region during the day or for a few hours, before returning home. Future service improvements can include early morning service and evening service as non-discretionary (or

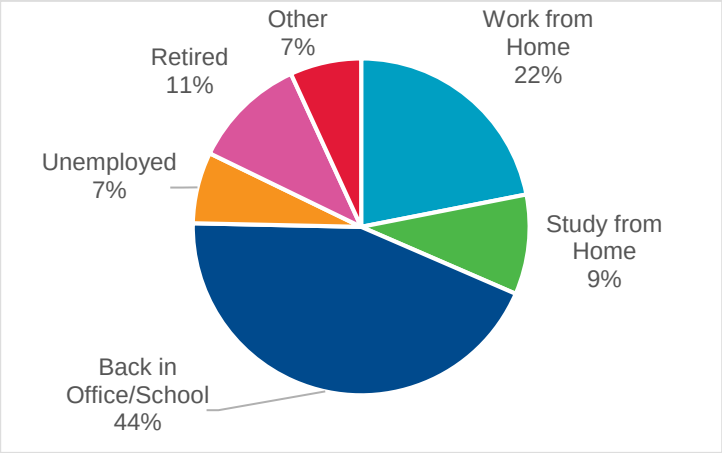

Figure 12: Work or study status during COVID-19 pandemic

commuter travel) returns, the route matures, and demand increases. Sunday service can also be explored. COVID-19 Impact on the Commuter Market

The 2015 Market Research Report identified travel to VIU as the main market for interregional service design. The 2020 engagement however indicates a transit market that differs from this with only 8 per cent responses indicating college/ university as their main trip purpose. This is likely due in part to the COVID-19 pandemic as at the time of the survey, VIU is closed for most in-person classes, the majority of instruction has been moved to online platforms, and the date for resumption of in-person classes is undecided. Many employees are also working from home.

Of the 60 per cent of participants who responded to the *Impact of COVID-19 on Transit Use* portion of the survey, about 32 per cent were working or studying from home as indicated in Figure 12.

6.2.3. Nanaimo Routing Options

Trips originating in Downtown Nanaimo and with a terminus at Downtown Nanaimo were preferred by participants over the option of originating and terminating at Vancouver Island University (Nanaimo Campus) as shown in Figure 13. Transfers onto the RDN Transit system to VIU, Nanaimo Regional General Hospital, Departure Bay Ferry and other destinations can be made easily from the Downtown Nanaimo Transit Exchange.

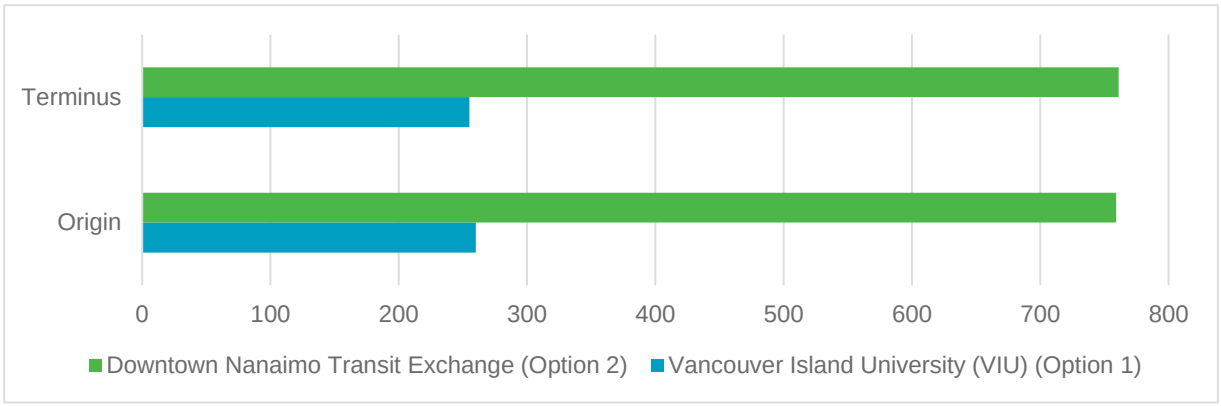

Figure 13: Preferred trip origin and terminus

6.2.4. Fares

Close to 50 per cent of participants prefer the price range of $5.00 – $7.49 for a one-way fare. Table 3 below was provided for reference of similar services across the province. About 30 per cent of participants prefer a fare between $2.50 and $5.00, while about 16 per cent of participants support fares of $7.50 to $9.99

Interregional Service	Route	Length	Cash
Duncan to Victoria	66 Duncan Commuter	60 km / 80 min	$10.00
Shawnigan Lake to Victoria	99 Shawnigan Lake Commuter	45 km / 60 min	$10.00
Kelowna to Vernon	90 UBCO Connector	50 km / 55 min	$5.00
Chilliwack to Langley	66 Fraser Valley Express	65 km / 70 min	$5.00
Burns Lake to Prince George	161 Burns Lake/ Prince George	230 km / 170 min	$5.00
Smithers to Burns Lake	162 Smithers/Burns Lake	140 km / 180 min	$5.00
Pemberton to Whistler	99 Pemberton Commuter	35 km / 40 min	$4.50
Kimberley to Cranbrook	21 Kimberley/Cranbrook 22 KC Commuter	30 km / 45 min	$3.00

Table 3: BC Interregional Service Fare Table

6.3. Public Engagement Observations, Impacts, and Implications

Table 4 summarizes the main themes observed in the public engagement responses, their impact to the project, and their implications for the service design and delivery.

Observations	Impact	Implications
Most participants (75 per cent) live in Nanaimo, Ladysmith, or Duncan	Most population density and travel demand between these three commercial and residential centres	Service should be designed to connect these three centres with limited stops in between
A majority of participants are from the CVRD and aged 25-74	Travel purposes for this age group are varied and may be multi-modal, and have various destinations in each region	Demand for travel throughout the day with connections to Regional Transit Systems, employment centres, and active transportation networks
The majority of participants own or have regular access to a personal vehicle	Interest in service due to reasons other than lack of transportation options	Service should be direct, cost-effective, and convenient to compete with automobile and contribute to personal and government climate and traffic congestion goals
Travel demand peaks during the middle of the day	Justification to provide service all day rather than at peak-only, particularly in light of COVID travel patterns	Service should offer service throughout a large span of the day with options for return trip at various times of day
Travel for social, recreational activities, entertainment, shopping, and errands is the most popular followed by connections to BC Ferries and then work	More direct service from commercial centre to commercial centre is justified	Connections to regional systems should be legible, simple, and encouraged Service should allow for transfers to the Cowichan Commuter Service in the medium to long term to facilitate travel to Victoria Regional Transit System
Most participants currently drive this route, get rides from friends and family, or use a private transit operator	Higher traffic volumes, increased dependence on loved ones, increased travel costs Service is desired to increase independence, and reduce personal greenhouse gas emissions and costs	Strong support for implementation of service
Accessibility, Ferries, and VIU were among the most commonly mentioned themes	Support for service originating and terminating in transit exchange locations with connections to those destinations	Service most useful if between Downtown Nanaimo and core area of Duncan Connections to destinations can be improved without unnecessarily elongating interregional route
Participants indicated desire to arrive in RDN between 7 am and 3 pm and in the Cowichan Valley between 7 am and 6 pm.	Supports a larger service span than peak-only service would provide	Service should span between 6 am (first trip departure) to 5 pm (last trip departure)
Most participants prefer a fare between $5.00 - $7.49 for a one-way ticket	One-way fares of $5.00-7.49 encourage ridership, while higher prices risk diminishing return	Service seen as a premium to local service, but should remain cost-effective to the user in order to increase ridership

Table 4: Public engagement observations, impacts, and implications table

7. Proposed Service Design

This section describes the proposed service design for the CVRD-RDN interregional transit service including service days, routing, vehicle type, and infrastructure. This section also describes the different options in terms of service levels; the frequency of trips, the number of trips per day, and the span of service. These proposals were developed through public engagement, detailed analysis of market demand, and ongoing feedback from the project working group.

7.1. Service Days

The primary markets for this service are daily commuters and people traveling for social, shopping, or other appointments. Proposed service options are for Monday to Saturday travel, excluding statutory holidays. Additional service options to provide Sunday service in the future, increased service at peak times and the extension of the service span into the early morning and evening, have also been developed.

7.2. Routing & Stops

The proposed routing will run between Village Green Mall Exchange in Duncan to the Downtown Transit Exchange in Nanaimo. This allows for access to the major commercial centres as well as transfers from and onto the regional transit systems on either end at each of the transit hubs. The majority of the route follows the Trans-Canada Highway, with short deviations at key stops. Figure 14 shows the proposed routing. This route is 53.2 km long and is expected to take approximately 59

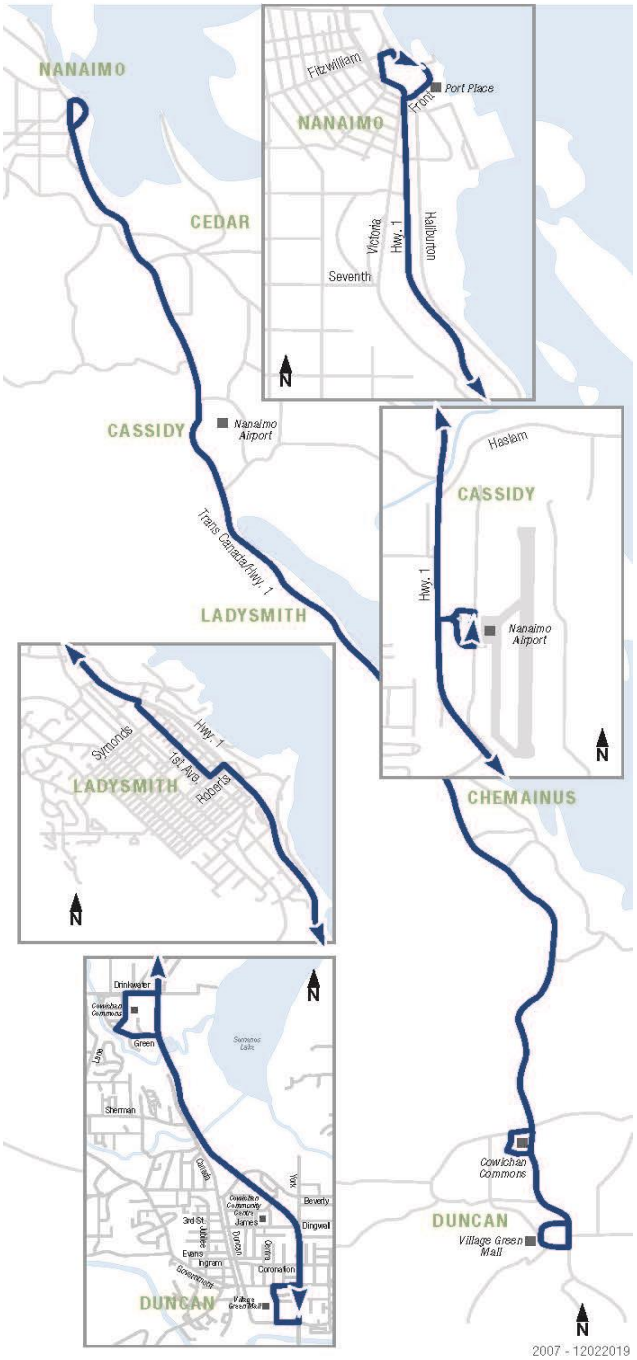

Figure 14: Proposed Cowichan Valley to RDN interregional route

minutes by bus, not accounting for layover or recovery.

To remain competitive with the private automobile in terms of travel time the service has been designed with limited stops. The location of the proposed stops are indicated on Figure 10 and further detailed in the infrastructure section of this report. All of the stops indicated exist within their respective systems; however there are opportunities to introduce additional stops once Park & Ride locations are developed along the route

7.3. Vehicle

Choosing the correct vehicle type is important to provide an enjoyable, safe, and effective service. As the vehicle would be traveling at highway speeds it is recommended that there be no standees present as it may pose a safety hazard. Similarly, as the trip length is expected to be approximately 59 minutes, it is recommend that there be enough seating for all passengers to be comfortable.

Based on projected ridership, it is recommended that this service utilize a heavy duty (12.2 m or 40') bus, which seats 35-36 people. This permits appropriate physical distancing during the COVID-19 pandemic and ensures adequate seats as ridership demand grows along the route. Note that at the time of writing, BC Transit vehicle occupancy was limited to 66 per cent of total vehicle capacity to allow for physical distancing. This is equal to approximately one full seated load, as described above.

All vehicles in the BC Transit fleet are accessible for people with physical disabilities.

7.4. Service Level & Resources

The service options described below differ based on frequency, peak buses, service span, and number of round trips completed per day. These three variables are interrelated and together form the level of service.

- **Frequency** is how often a bus comes to a given stop, typically measured in minutes.
- **Peak Buses** are maximum number of buses in service at any given time.
- **Service Span** is the hours of the day in which the service operates.
- **Round Trips per Day** is the number of round trips completed each day.
- As any of these variables increase, the level of service also increases as does the amount of resources required to provide that service.
- **Annual Hours** is the number of service hours required in a given year to operate the service.
- **Estimated Annual Revenue** is the revenue collected from estimated fares and ridership for the service.

- **Estimated Annual Total Cost** is the total cost of providing the service.

Estimated Annual Municipal Share is the total cost of providing the service minus the provincial share of the cost (46.6 per cent). The costs presented in this report are not divided between regional districts.

7.5. Service Options

All hours are estimated. Further refinement is required during detailed implementation planning. Additional buses may be required beyond the expansion buses listed to maintain the required spare ratio and the effective operation of the system. These hours will shift dependent on the system chosen for operation and what route re-alignments and interlining occurs. Cost fluctuation may occur.

Once the interregional service is operational, post-implementation engagement and data analysis can determine how and when demand from VIU and other commuter markets could impact the need for service changes.

Option 1 (Preferred) provides weekday service with three round trips each in the AM and PM peaks at a frequency of 45 minutes and one round trip during the midday (same as Option 2). This option also provides 6 round trips on Saturday for all day service.

This option most closely resembles the level of service proposed by the combined Transit Improvement Programs of the CVRD and RDN. It benefits many discretionary trips and has the greatest potential to attract commuters as they return to the transit market following the decline in ridership associated with the COVID-19 pandemic. This option is the most strongly supported by the results of public engagement and provides the greatest benefit to users and therefore has the greatest likelihood of success upon implementation.

Option 2 provides weekday-only hourly peak service plus a midday round trip. It features three round trips each in the AM peak and PM peak for a total of seven round trips per weekday.

This service is focused on the commuter with some opportunities for day trips between the regions.

Option 3 provides weekday-only service throughout the day throughout a 12-hour period. It features six round trips per day at a frequency of 135 minutes.

This option does not provide typical peak service and represents a minimal level of all-day service to connect the two regions for discretional travel and a minimal level of commuter travel.

Option	1	2	3
Weekday Round Trips/ Day	7	7	6
Sat Round Trips/ Day	6	0	0
Weekday Service Span	6 am-8 pm	6 am-8 pm	6 am-7 pm
Sat Service Span	6 am-7 pm	N/A	N/A
Frequency peak (min)	45	45-60	135
Frequency midday (min)	120-240	120-240	135
Peak Buses	3	2	1
Annual Weekday Hours	4900	4900	4200
Annual Sat Hours	900	0	0
Total Annual Hours	5800	4900	4200
Est. Annual Revenue	$ 243,600	$ 205,800	$ 176,400
Est. Annual Total Costs	$ 1,167,074	$ 969,806	$ 804,537
Est. Annual Net Muni Share	$ 463,111	$ 375,078	$ 294,771

Table 5: Proposed service options

7.6. Additional Service Options

7.6.1. Additional Peak Service

COVID-19 patterns of travel in most systems around the province have seen a “flattening” of travel peaks throughout the service day and lower, yet sustained travel demand throughout the day. It is anticipated that as employers reopen offices and the university increases face-to-face instruction, demand for peak travel will increase. Additional peak service can be added as demand from VIU and other commuter markets increase

To meet additional peak demand, frequency and number of trips can be increased on weekdays. This would increase the number of peak round trips to four each in the AM and PM at a frequency of 15-30 minutes and utilize three to four peak buses. With two midday trips, this service would provide a total of ten weekday round trips as indicated in Option 4 in Table 6.

7.6.2. Sunday Service

Similar to the proposed Saturday service, Sunday service would utilize one bus, making a return trip between Duncan and Nanaimo all day. This would provide four round trips over the course of a nine-hour day at a frequency of 135 minutes as shown in Option 5 in Table 6.

Option	4	5
Weekday Round Trips/Day	10	10
Sat Round Trips/Day	6	6
Sun Round Trips/Day	0	6
Weekday Service Span	6 am - 7 pm	6 am - 7 pm
Sat Service Span	6 am - 7 pm	6 am - 7 pm
Sun Service Span	N/A	6 am - 7 pm
Frequency peak (min)	15-30	15-30
Frequency midday (min)	135	135
Peak Buses	4	4
Annual Weekday Hours	7000	7000
Annual Sat Hours	900	900
Annual Sun Hours	0	900
Total Annual Hours	7900	8800
Est. Annual Revenue	$ 331,800	$ 369,600
Est. Annual Total Costs	$ 1,610,612	$ 1,763,612
Est. Annual Net Muni Share	$ 651,765	$ 695,529

Table 6: Additional service options

7.6.3. Extended Route Service Option

While the Market Research Report did not identify a market for northbound travel from locations south of Duncan to Nanaimo, the working group determined the value of an extended route option to the Valleyview Park & Ride, which could provide access to the service for residents of the south Cowichan area.

The available census commuting data indicates that the potential for ridership would be extremely low Public engagement confirms this with less than 9 per cent of participants indicating living in areas south of Duncan.

As an alternative to beginning/ending the route at Valleyview Park & Ride, it is recommended that CVRD local routes connecting the electoral areas south of Duncan be improved to allow for connections to Duncan and the proposed new service.

8. Infrastructure

This section identifies the infrastructure considerations related to this service including bus stops, exchanges, Park & Rides, transit priority, and operations and maintenance facilities. Final infrastructure details will be determined through the implementation planning process, which will proceed if funding for the service is approved. Generally, local approval is required for any infrastructure improvements within a given jurisdiction. For example, bus infrastructure improvements on Highway 1 requires MOTI approval, and on local roadways requires the approval of the relevant local authority.

8.1. Bus Stops

To remain competitive with the private automobile in terms of travel time the service has been designed with limited stops. The location of the 15 proposed stops upon implementation are indicated on Table 7. All stops indicated exist within their respective systems; however there are opportunities to introduce additional stops once Park & Ride locations are developed along the route. These additional future stops could be located near the Crofton (Mt. Sicker Road) and Chemainus (Henry Road) intersections with the Trans-Canada Highway 1.

Stop ID	Bus Stop Description	Direction	Existing Conditions and *Recommended Improvements*	Connections
104033	Central at Cowichan (NB)	NB and SB	Shelter, bench, garbage can	Local routes, and connections to Victoria
106131	Beverly at Duncan	NB	Pole and sign *Shelter, bench*	VIU Cowichan
108229	Canada at Beverly	SB	Pole and sign *Shelter, bench*	VIU Cowichan
108001	Cowichan Commons	NB	Shelter, bench, garbage can	Local routes, Friendship Trail
109134	Cowichan Commons	SB	Shelter, bench	Local routes, Friendship Trail
106069	1st Ave at Gatacre	NB	Pole and sign	Southern areas of Ladysmith
106052	1st Ave at Gatacre	SB	Bench, garbage can	Southern areas of Ladysmith
106050	1st Ave at Symonds St	SB	Shelter, bench, garbage can	Local routes
136329	1st Ave at Warren St	NB	Bench, garbage can *Shelter*	Local routes
104775	Nanaimo Airport	NB/SB	Pole and sign *Shelter, bench*	Cassidy
104194	Schoolhouse at Morden	NB	Pole and sign	South Wellington, Cedar
104195	South Wellington at Morden	SB	Pole and sign	South Wellington, Cedar
104776	Lawlor Rd at Eleventh	SB	Pole and sign	Cedar, Chase River, The Parkway Trail
110157	Lawlor Rd at Eleventh	NB	Pole and sign	Cedar, Chase River
109873	Downtown Nanaimo Exchange Bay	NB/SB	Pole and sign	Local routes, VIU, NRGH, Departure Bay Ferry, Woodgrove

Table 7: Proposed Bus Stops for interregional route at implementation

Some bus stops noted above may serve as Pick-up or Drop-off only, depending on route direction and travel demand at specific locations. These types of stops facilitate fare payment in each region and can reduce delays by enabling faster boarding/alighting along the route.

Passenger amenities provided at individual bus stops varies, and often depends on local conditions including existing infrastructure, land use, ridership, and weather. At a minimum, a bus stop pole/sign, lighting, a passenger landing pad, a wheelchair landing pad and a curb letdown in the vicinity of the bus stop should be provided, regardless of the land use.

8.2. Park & Rides

No formal Park & Ride locations exist between Duncan and Nanaimo. However, both regions' Transit Future Plans have identified locations for future Park & Rides, listed below:

- Duncan
- Trans-Canada Highway at Highway 18
- Chemainus
- Ladysmith
- Cedar (Trans-Canada Highway at Highway 19)
- Sandstone

While Park & Rides are not required for implementation of the interregional service, developing these Park & Ride locations would support the service and increase the potential market for the service and other local transit services in both regions.

8.3. Transit Operations and Maintenance Facilities

Determining an operations facility for this service is dependent on the outcome of the route's operations agreement. Vehicle fuel type, facility capacity, interlining with local routes, and costs will be considered during this phase of implementation.

Image 2: Cowichan Valley Regional Transit System Operations and Maintenance Facility

Image 3: CNG bus at RDN Operations and Maintenance Facility

9. Fares

This section provides a brief overview of fares for the interregional service. The final decision on a fare strategy will be made with the operating agreement. More information on current fares in each regional transit system and BC Transit Fare guidelines can be found in Appendix A.

9.1. Discussion on Fares

The following is an early look at potential fares for the proposed interregional transit service. The following options and suggested fares in Table 8 follow the BC Transit Fare Guidelines and align with the expected fare structures for next generation fare collection equipment (Electronic Fare Collection).

Product	BC Transit Pricing Guidelines	Option 1	Option 2
Cash	Base Fare	$5	$10
Tickets	9 Times Base Fare	$45	$90
Monthly	20 to 30 times Base Fare	$100	$200
Discount Monthly	Adult Monthly Pass less 15 per cent	$85	$170

Table 8: Comparison of Potential Fare Structures

Two options are being proposed with either a $5.00 or $10.00 base cash fare. Generally transit elasticity (demand relative to pricing) indicates that higher fare prices will generate higher revenues and a decrease to ridership.

Operating in the opposite direction connecting the Cowichan Valley Regional Transit System and Victoria Regional Transit System is the Cowichan Valley Commuter. The below pie charts in Figure 15 show the 2018/19 split of revenues and ridership detailing that the largest portions are from monthly passes

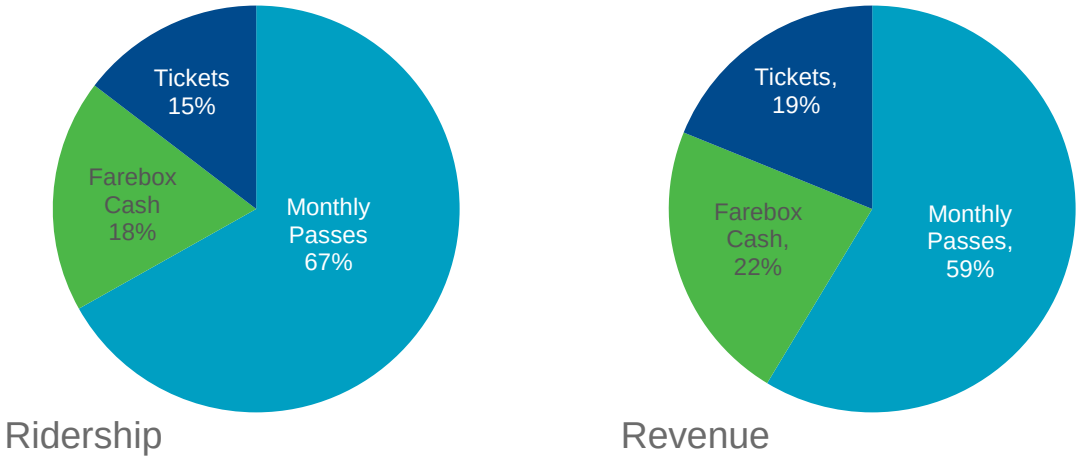

Figure 15: Cowichan Valley Commuter comparable ridership and revenue splits

One of the other major factors in determining revenue and ridership is the interconnectivity of the proposed system to the conventional transit networks on each end (Cowichan and Nanaimo). BC Transit would recommend that the service is either a stand-alone such as the Fraser Valley Express (users must purchase unique Fraser Valley Express passes) or some level of connectivity with the terminus communities such as the Cowichan Valley Commuter has with Victoria. Depending on the pass purchased, Cowichan Valley Commuter monthly passes are valid on the Cowichan Conventional and Commuter, or the Cowichan Conventional, Commuter, and Victoria Conventional.

10. Governance

Before implementing an interregional transit service, a decision regarding governance structure needs to be made by the participating local partners. During Working Group meetings, it became clear that a Long-Term Agreement is preferred by both regional districts to implement the service. A transit commission model was considered similar to the governance model employed by the Victoria Regional Transit Commission, but given the time and resource commitment from the

respective regional district boards, establishing the service under a Long-Term Agreement and monitoring performance and success was desired. As noted below, the transit commission model is unique and would require provincial approval to establish. As interregional initiatives throughout the South Island progress, the commission model can be explored at that time.

Finalized governance structure, operations, and fares will be discussed with the working group as part of implementation planning work in 2021. The following information is provided for context and background only.

Currently, there are two basic types of governance models that could be used in this instance: a long-term agreement between the local government partners or establishing a transit commission.

10.1. Long-Term Agreement

A Long-Term Agreement between CVRD and RDN would include the following items:

- A cost sharing agreement outlining responsibility for both capital and operating costs
- Development of a fare strategy including fare structure and revenue sharing agreement specifically related to interregional service. Appendix A includes information to be considered when developing the fare strategy. This could include recommendations that an integrated interregional service be administered by only one Regional District under a separate Annual Operating Agreement (AOA) for both cost and revenue purposes
- Development of an operational plan to deliver the service including where the service would be administered, who would operate the service, where the fleet would be maintained and identification for development and maintenance of associated infrastructure such as transit stops and Park & Rides
- Developing a long term agreement (5 to 10 years) prior to implementation to ensure the stability of the service

10.2. Transit Commission

The only transit commission in BC today is the Victoria Regional Transit Commission (VRTC), which provides service to municipalities in the Capital Regional District. Decisions about fares, routes and service levels are made by the Commission, based on information and planning provided by BC Transit. In addition, the VRTC is responsible for the local share of funding. This funding comes from the fare revenue, property taxes, and a motor fuel tax.

A commission represents transit service areas designated by BC Transit, and must provide the necessary clerical and technical resources to enable it to carry out its responsibilities. The transit service area may encompass a partial, complete, or more than one regional district. Transit commission members are appointed by the Lieutenant Governor in Council from persons holding

elected office on a municipal council or regional district board. Additionally, the minister must designate the chair of each regional transit commission.

The following are steps to enacting a commission:

1. Expression of interest: Formal expression of interest from each of the local governments wishing to participate in a Commission (or a joint expression) to the BC Transit Board of Directors would initiate the process.
2. Joint Team: A joint region/BC Transit planning team would be established to collaboratively develop a detailed service plan, funding and governance proposal for the regional transit commission
3. Local confirmation: Once the proposal was finalized, local confirmation of the proposal would be sought from participating local authorities
4. BC Transit Board approval: The BC Transit Board would approve the proposal to designate the Transit Service Area and Regional Transit Commission, and recommend appropriate regulations to the Provincial government
5. Provincial Government regulation: The Provincial government would enact regulations to appoint the Commission members
6. Commission Initiation: The Regional Transit Commission would be initiated. The Commission would approve a service plan, tariff, taxation strategy and related regulations and make recommendations to the BC Transit Board regarding capital and operating budgets
7. Provincial Government regulation / legislation: The Provincial government would approve taxation regulations for the Regional Transit Commission and if appropriate make legislative changes to the Motor Fuel Tax Act to implement fuel tax surcharge for the Commission area.

10.3. Governance Model Options Analysis

Table 9 summarizes some of the key trade-offs between the two primary governance models.

Governance Model	Benefits	Challenges
Long-Term Agreement	• Flexibility of the more informal steering committee in terms of the ability to meet/ conference call at short notice in addition to making standing regular meetings • Local service decisions remain with the local governing bodies	• Lack of decision-making capability of the steering committee • Multiple layers of decision making to gain approvals for any changes • Requires agreement/consensus by two different governing bodies
Transit Commission	• Streamlined and simplified governance structure and decision making with only one body involved • A fully regional approach to decision making • Reduces work efforts/duplication	• Agreeing on fair representation for local partners • Balancing local/regional priorities – local decisions at the regional level • Agreeing on an appropriate cost sharing model

Table 9: Key Trade-offs between Long-Term Agreements and Transit Commissions

It is recommended that the CVRD and RDN pursue a Long-Term Agreement in order to establish the interregional route by September 2022. The flexibility afforded by the Long-Term Agreement to hold meetings with the working group as needed to establish a governance and operations agreement allows for adherence to the June 2021 TIPs deadline for ordering vehicles. As noted above, discussion with the Working Group indicate preference to proceed with the Long-Term Agreement. The establishment of a commission can be pursued as interregional connections with Comox Valley Regional District and Alberni-Clayoquot Regional District are developed.

10.4. Cost Sharing

Within BC Transit communities, cost sharing arrangements are used in the following situations:

- where transit services are extended into jurisdictions adjacent to the local partner holding the partnership with BC Transit (E.g. a bordering municipality, regional district, or First Nation); or
- between member municipalities and electoral areas within a Regional District.
- Cost sharing is determined in a variety of ways throughout BC Transit communities, and parameters used in other communities include:
- service hours by area
- route length by area
- number of stops by area
- passenger activity by area
- population by area
- property assessment by area

Further discussions with the working group will determine the cost-sharing agreement for this service.

11. Next steps

If the CVRD and the RDN wish to pursue delivery of the preferred service option, next steps would be as follows[2]:

It should be noted that the establishment of a long term agreement will need to occur before any expansion is included in the Transit Improvement Program (TIP). For implementation in September 2022, this means the operations agreement must be signed by June 2021.

1. Before service can be implemented, an agreement between CVRD and RDN will be reached which includes the following items:
2. A service plan and implementation timeframe as well as the mechanism for changing service levels in the future.

[2] Subject to provincial funding.

3. A long-term agreement to ensure the stability of the service and sets out the roles, and responsibilities of each partner;
4. A cost sharing agreement outlining responsibility for both capital and operating costs.
5. An operational plan to deliver the service including where the service would be administered, who would operate the service, where the fleet would be maintained and identification for development and maintenance of associated infrastructure such as transit stops and Park & Rides.
6. A fare strategy including fare structure and revenue sharing agreement specifically related to interregional service. This could include recommendations that an integrated Inter- regional service be administered by only one Regional District under a separate Annual Operating Agreement (AOA) for both cost and revenue purposes.
7. BC Transit creates an Implementation Agreement for sign off by the Regional Districts. This Memorandum of Understanding document outlines the detailed process and enables the development of detailed transit trip schedules, fare strategy and vehicle and driver assignment options.
8. The RDN, CVRD, and BC Transit sign the Implementation Agreement (MOU).
9. Detailed schedules and routes are developed with opportunity for input by front line transit staff. Preliminary vehicle and driver assignments and division of operational functions is created and discussed based on these initial trip schedules. An infrastructure plan is developed, along with development of any temporary strategies necessary to meet implementation.
10. A formal progress report goes to local governments outlining proposed schedules, functional divisions and cost impacts.
11. A “Sneak Peek” process is held, enabling front line transit staff, existing transit customers and the public to view and comment on proposed schedules and routings.
12. Schedules, routes, division of operational functions, infrastructure needs and cost impact are confirmed and presented for final approval to the RDN and CVRD.
13. BC Transit creates Amendments to the Annual Operating Agreements to reflect the new service and structure.
14. Revised marketing and operational materials are created, staff training is held, prerequisite infrastructure created as required and the new service is implemented.
15. The new service is monitored, with an initial “Immediate Impacts” letter report provided to the RDN and the CVRD at six months of operation and a more detailed letter report provided after 12 months of operation.

12. Timeline

Table 10 below contains the estimated timeline and major milestones for a September 2022 implementation of interregional service.

Date	Milestone
December 2020	Transit Improvement Program memorandum of understanding signed by local governments and returned to BC Transit interregional transit service for implementation in September 2022.
April 2021	Governance, operations, revenue and cost-sharing agreement(s) signed by local governments.
April 2021	Transit Improvement Program memorandum of understanding to local governments for review. Interregional service rolled forward from Year 2 to Year 1 (2022/2023). This includes a commitment and approval to order the required buses.
June 2021	Transit Improvement Program memorandum of understanding signed by local governments and returned to BC Transit.
February 2022	Provincial budget finalized and projects for 2022/2023 fiscal year confirmed.
March 2022	Detailed planning, scheduling, and marketing work beings for implementation of interregional service.
September 2022	Interregional service between the Cowichan Valley Regional District and Regional District of Nanaimo begins.

Table 10: Timeline for September 2022 Implementation

13. Recommendation

Option 1 (Recommended): That the board direct staff to pursue establishment of a long term agreement governance model and next steps to implement the preferred service option.

Option 2: That the board direct staff to delay the implementation of the service to allow BC Transit and the local government partners to pursue a governance structure based on a transit commission.

Prepared By: Ericka Amador Date: December 16, 2020

Title: Transit Planner

Appendix A Fare information

Existing Fares

Table 11 below outlines the existing fare structures within the CVRD and RDN Transit Systems.

Service Type		Cash	DayPASS	Tickets (10)	Monthly Pass: Adult	Monthly Pass: Student/Senior
Local: Trips within a community's regional limits	CVRD	$2.25	$4.50	$20.25	$50.00	$38.00
	RDN	$2.50	$5.00	$22.50	$65.00	$50/$40
Interregional: trips to and from Victoria (VRTS)	CVRD: Cowichan Valley Commuter (CVC)	$10.00	-	$90.00	Zone A: CVC and CVRD $204.00 Zone B: CVC and VRTS $246.00	-

Table 11: Existing Fares

Fares are set at the discretion of the local government partner. BC Transit recommends that fares align with the BC Transit Fare guidelines below in Table 12:

Fare Product	Audience	BC Transit Fare Guideline
Cash	Adult	Base Fare
	Discount	Base Fare
Tickets (10)	Adult	9 times Base Fare
	Discount	9 times Base Fare
DayPASS	Adult	2 times Base Fare
	Discount	2 times Base Fare
Monthly Pass	Adult	20 - 30 times Base Fare
	Discount	Adult Monthly Pass less 15%
Semester Pass	Student	4 times Discount Monthly Pass Less 20%
Transfers**	All	No Transfers (DayPASS-on-Board instead)
Fare Zones***	All	No Zones

Table 12: BC Transit Fare Guidelines

Appendix B Market Research Report

SNC·LAVALIN

MARKET RESEARCH REPORT – POTENTIAL RIDERSHIP MARKETS BETWEEN KEY REGIONAL CENTRES ON VANCOUVER ISLAND

November 6th, 2015

This is intentionally blank.

Contents

This is intentionally blank.

1.0 Introduction

1.1 Background

BC Transit has recently completed Transit Future Plans for all of Vancouver Island. Public input was solicited during that process, and inter-regional transit (IRT) had been a common request from some of the communities. Some common themes were:

- Residents wishing to access employment or educational institutions in a neighbouring, larger centre. This group will henceforth be called the 'commuter market'. This group typically travels during the morning and afternoon peaks.
- Residents without the ability to drive, or who do not own private vehicles, wishing to access shopping and services in a neighbouring, larger centre. This group will henceforth be called the 'captive market'. This group typically travels during mid-day. Within this group is a smaller sub-group who wishes to access very specific medical services at a designated medical centre. Those needing access to dialysis machines and cancer treatment are common to this sub-group, because their ability to drive is impaired after treatment.

While there are others who may fall outside these groups but still desire IRT, these two groups represent the typical IRT demand.

1.2 Study Area

The study area includes the most populous regions of Vancouver Island, along the Highway 1/19/19A corridor, but excluding the Victoria area because that inter-regional transit demand is known. A service already exists between Duncan and Victoria.

The study area includes:

- Campbell River (CR)
- Comox Valley Regional District (CxVRD[1])
- Regional District of Nanaimo (RDN)
- Cowichan Valley Regional District (CwVRD[2])

These are illustrated in Figure 1.1.

[1] Actual acronym is CVRD but CxVRD used in this report to avoid confusion with Cowichan Valley Regional District.
[2] Actual acronym is CVRD but CwVRD used in this report to avoid confusion with Comox Valley Regional District.

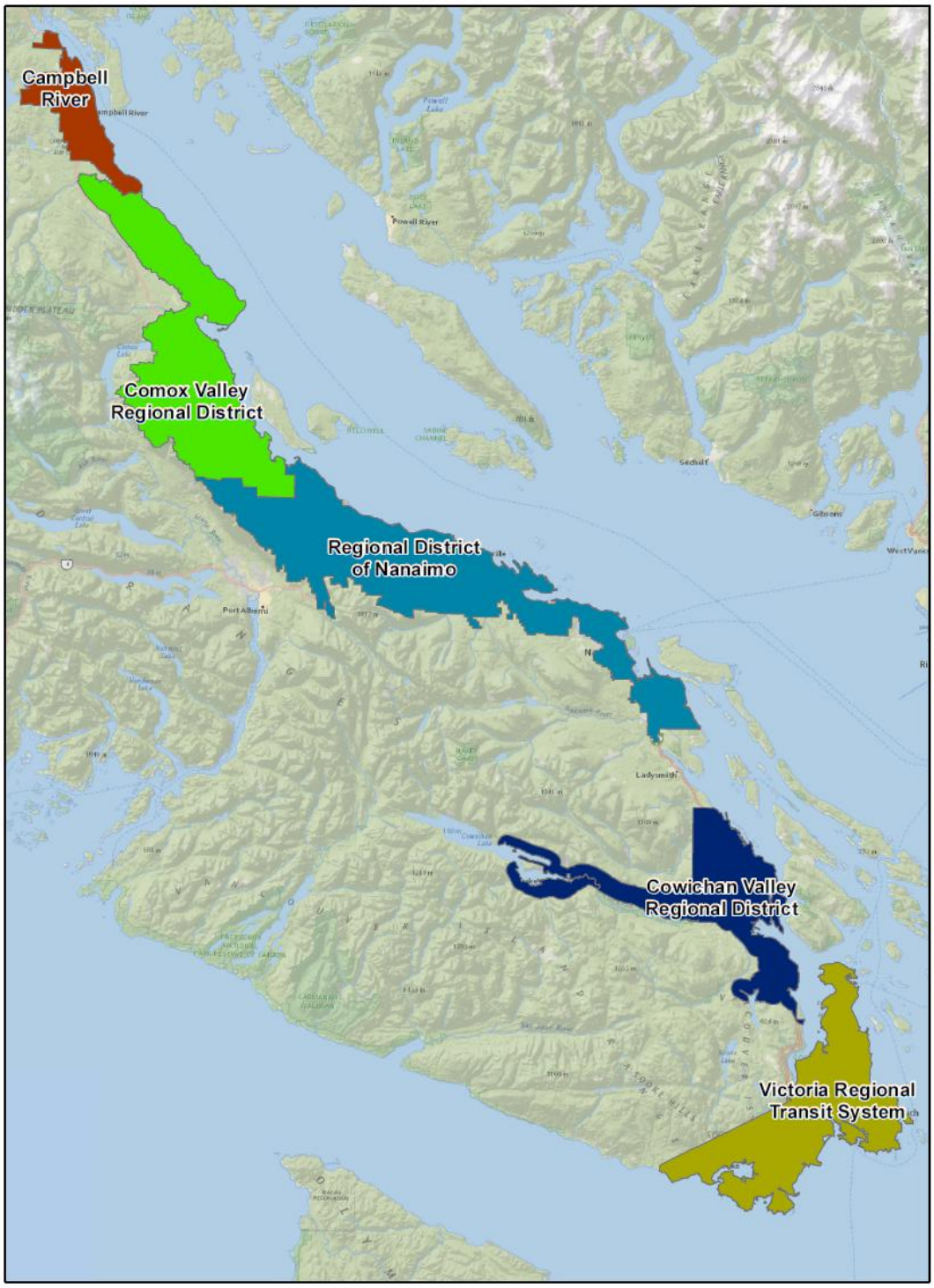

Figure 1.1 – Study Area

1.3 Objective

The objective of this study is to estimate the market potential for inter-regional transit across each of the three transit region boundaries, from Cowichan Valley Regional District to Campbell River.

The results of this study are intended to be order-of-magnitude only, separating the hopeful cases from the hopeless cases. From this, more detailed service analysis of the hopeful cases will be required to confirm the ridership estimates.

1.4 Report Format

Each subsequent chapter discusses the inter-regional transit market across one of the regional boundaries. Inter-regional trips crossing multiple boundaries were also studied; that market is minimal and the results presented in the Conclusions.

Travel demand in the context of this study is always stated in the peak direction and during the AM peak (inbound), unless otherwise noted.

1.5 Methodology

Transit ridership is difficult to estimate accurately where a service does not yet exist. Pilot projects are the best method, and transit models are the next best. Neither of these methods was available for this study.

For this study, the potential inter-regional transit market is disaggregated into commuter and captive markets, yielding two distinct estimation processes. The commuter market is defined as those travelling to/from work or school. Student commuters are usually those attending post-secondary institutions, because primary and secondary schools are typically located to minimize the commute distances for their students, by design. The captive market comprises those who must rely on transit for longer-than-walking-distance trips for a variety of reasons, including:

- Inability to drive due to age or physical capacity
- Lack of access to alternatives such as private vehicle
- Lack of access to alternatives due to physical capacity or safety concerns (e.g. cycling)

Commuter Market Methodology

Three methodologies for estimating the commuter market were tested. These methods were based on:

1. Proportioning total vehicle volume on the corridor (collected from BC Ministry of Transportation and Infrastructure) by using mode split data (derived from Canada Census).
2. Proportioning commuter travel demand by using mode split data (both from Canada Census). The inter-regional commuter travel demand from this source is illustrated in Figure 1.2.

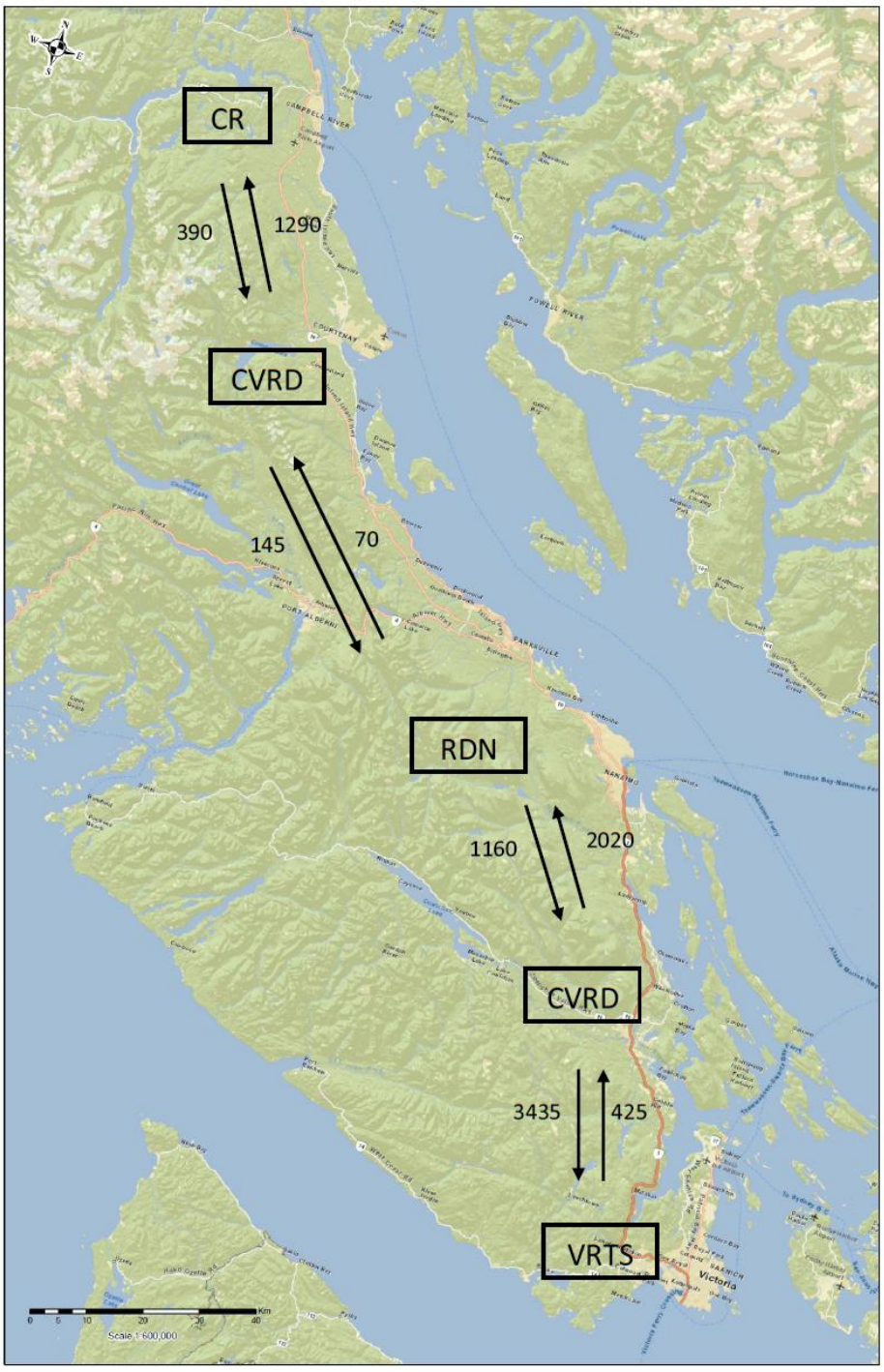

Figure 1.2 – Inter-Regional Travel Demand – AM/Inbound
(data source: Canada Census)

3. Proportioning the employee and student travel patterns of major employers and post secondary institutions within the study area. Major employers and post-secondary institutions along the east coast of Vancouver Island were surveyed, from which employees' and students' domicile postal codes were collected. The postal codes identify the inter-regional travel demand for these select groups, and then the demand can be scaled to synthesize the component of transit ridership by using mode split data. Figure 1.3 identifies those sources from which information was received[3].

After testing, the third methodology was deemed to be the most reliable, for the purposes of transit planning. For this reason, only the results of the third methodology are reported in the body of this report. Each of the three methodologies is presented in greater detail in Appendices A, C, and D.

Captive Market Methodology

Unlike the commuter market, the captive market is difficult to survey. Therefore surrogate measures were used to identify the potential for this market within each Census subdivision – these surrogate measures are listed below and a discussion of each follows. A detailed explanation of the methodology for identifying the captive market, utilizing these measures, is presented in Appendix B.

- age group
- population density
- employment density
- ratio of employment to population
- income level

Age Group

This factor comprises the youth and the elderly, because these groups are either unable to drive or less able to drive.

The youth group would typically range from 12 through 16. At this age, children tend to be active (needing transportation) and independent (old enough to travel alone or with friends), but not old enough to drive. However, due to limitations of the Census data, the youth group was represented by ages 6 to 17 in this study.

[3] Vancouver Island Health Authority (VIHA) was amongst the employers contributing staff data. Of all the VIHA facilities, only the Campbell River, Nanaimo, and Cowichan District Hospitals are illustrated in Figure 1.3 and discussed in the body of this report. All other facilities were either too small to contribute to the inter-regional transit market (order of magnitude less staff), or located beyond the study boundaries.

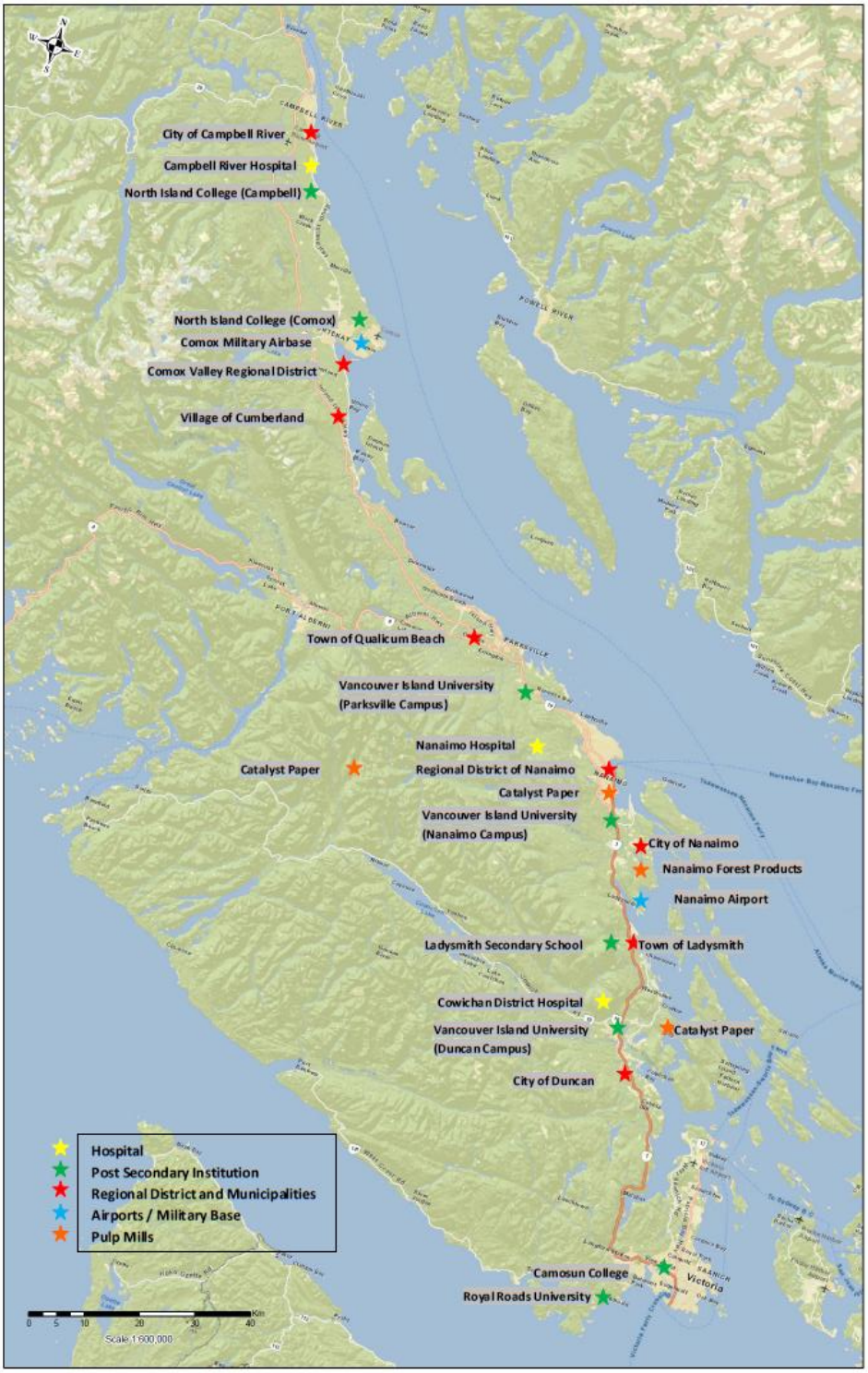

Figure 1.3 – Surveyed Employers and Post Secondary Institutions

The elderly group would ideally include those 75 and over because one's ability to drive and desire to drive typically declines after this age. However, due to limitations of the Census data, the elderly group was represented by people age 65 and over in this study.

Population Density

High population density improves the feasibility of transit service by improving its efficiency. BC Transit typically uses an informal rule of 1000 residents / km2. However, this very study is intended to identify inter-regional travel, of which a component is expected to include rural residents who live outside a transit regional boundary while the shopping and services they need to access lie in the adjacent region. In addition, larger Census subdivisions can obscure small pockets with high population density. For these reasons, a population density threshold of 600 was selected for this study (see Appendix B).

Employment Density

High employment density improves the feasibility of transit service by improving its efficiency. BC Transit typically uses an informal rule of 1000 jobs / km2. For similar reasons as explained for population density, an employment density threshold of 600 was selected for this study (see Appendix B).

Ratio of Employment to Population

This factor can indicate a high exit migration of workers during morning peaks, where the ratio is low. When combined with a high proportion of youth and seniors, this factor can indicate a lack of amenities within that Census subdivision, and therefore a high potential for captive trips.

To identify the threshold values, one can look to isolated communities that would need to be self-sufficient in terms of employment and amenities, for its population. Alert Bay, Port McNeill, and Port Hardy, have employment/population ratios that are approximately 40 % to 50%. By inference, zones with a lesser ratio combined with a high proportion of youth and seniors, have more potential for a captive market. For this study, a 35% ratio was selected as a threshold.

Income Level

The higher the income, the less likely one is to take transit, for a few reasons. First, vehicle ownership is higher. Second, higher income usually translates to a higher monetary value of time, and therefore transit use would be considered only when it saves time and/or improves convenience. This factor was evaluated based on the Census median income of each subdivision. A threshold level was set to include the Census subdivisions with median incomes in the bottom 25% of Vancouver Island

This is intentionally blank.

2.0 Regional District of Nanaimo / Cowichan Valley Regional District

2.1 Introduction

The Regional District of Nanaimo is located mid-island and is the second most populous region on Vancouver Island. It has a population of 149,000 (2011 Census), or 40% of the Greater Victoria area. Its major employment, service, retail, and population centre is the City of Nanaimo, with a population of 84,000 (2011 Census).

Cowichan Valley is the one region that is located between the Nanaimo and Greater Victoria Regions. Its population is 80,000 (2011 Census) with only 5000 living in Duncan, its most urban centre. It is perhaps due to its location, between the two larger regions, that its population is so dispersed. The traffic generated by the CwVRD is drawn toward its nearest urban centre; toward Greater Victoria in southern CwVRD, toward Duncan in central CwVRD, and toward Nanaimo in northern CwVRD. Victoria and Nanaimo are such large attractors and relatively short distance, that they compete with Duncan for provision of major services, retail, and employment.

For this reason, the northern portion of CwVRD has potential for inter-regional travel demand toward Nanaimo. The southern portion of CwVRD has already demonstrated inter-regional travel demand toward Victoria, which is currently serviced by BC Transit.

2.2 Combined Commuter & Captive Transit Demand

The commuter and captive markets for inter-regional transit between CwVRD and RDN are listed in Table 2.1 below. This estimate comprises almost entirely Nanaimo VIU population (students and staff). For this reason, any new service should be initially designed around that specific market, with opportunity to grow and accommodate the other markets later.

A potential captive market from Ladysmith to Nanaimo has been identified, with the logic that Ladysmith is closer to Nanaimo than to Duncan, and Nanaimo offers more amenities. This market may 'piggyback' on any new commuter service route(s) discussed above.

Table 2.1 Inter-Regional Transit Market (Peak Direction, Northbound)

	Rating / Ridership (daily, one way)
Commuter Market	
post-secondary school (VIU)	300
secondary school (Ladysmith Secondary)	0 by fall 2016
other major employers (Nanaimo Hospital)	low (20)
Captive Market	
Ladysmith	medium
other Census subdivisions	low

NOTES

- Commuter demand estimates developed based on survey of employees and students' domicile postal codes.
- Commuter demand estimates excluded trips crossing multiple regional boundaries.
- Only hospitals and post secondary institutions are shown because they have the most potential to service and convert to transit. Other major regional employers were also studied but their results are not shown because of their low ridership estimates.
- VIU Nanaimo mode split assumed to be 30%, based on Camosun College experience in Victoria.
- VIU Duncan and Parksville mode split assumed to be 15%, based on Camosun College experience and consideration of more rural environment.
- VIU trips adjusted for part time / full time student course load.
- Hospital mode split based on Victoria General Hospital's experience.

2.3 Commuter Market

Overall Transit Demand – All Surveyed Employers and Institutions

Potentially 300 transit riders per day in the northbound direction during the morning and reverse during the afternoon, is possible. This represents the high end of the estimate spectrum, with the benefit of all the right supporting programs, with cooperation from all the stakeholder agencies, and with the benefit of time to establish the ridership. The transit demand for each surveyed employer who responded is illustrated in Figure 2.1[4]. Of these, transit demand equal to 20 trips or greater is illustrated in Figure 2.2 for the AM peak period.

[4] VIHA data was received toward the end of this study. Because that component turns out to be insignificant, Figure 2.1 was not revised to include the VIHA health care worker market.

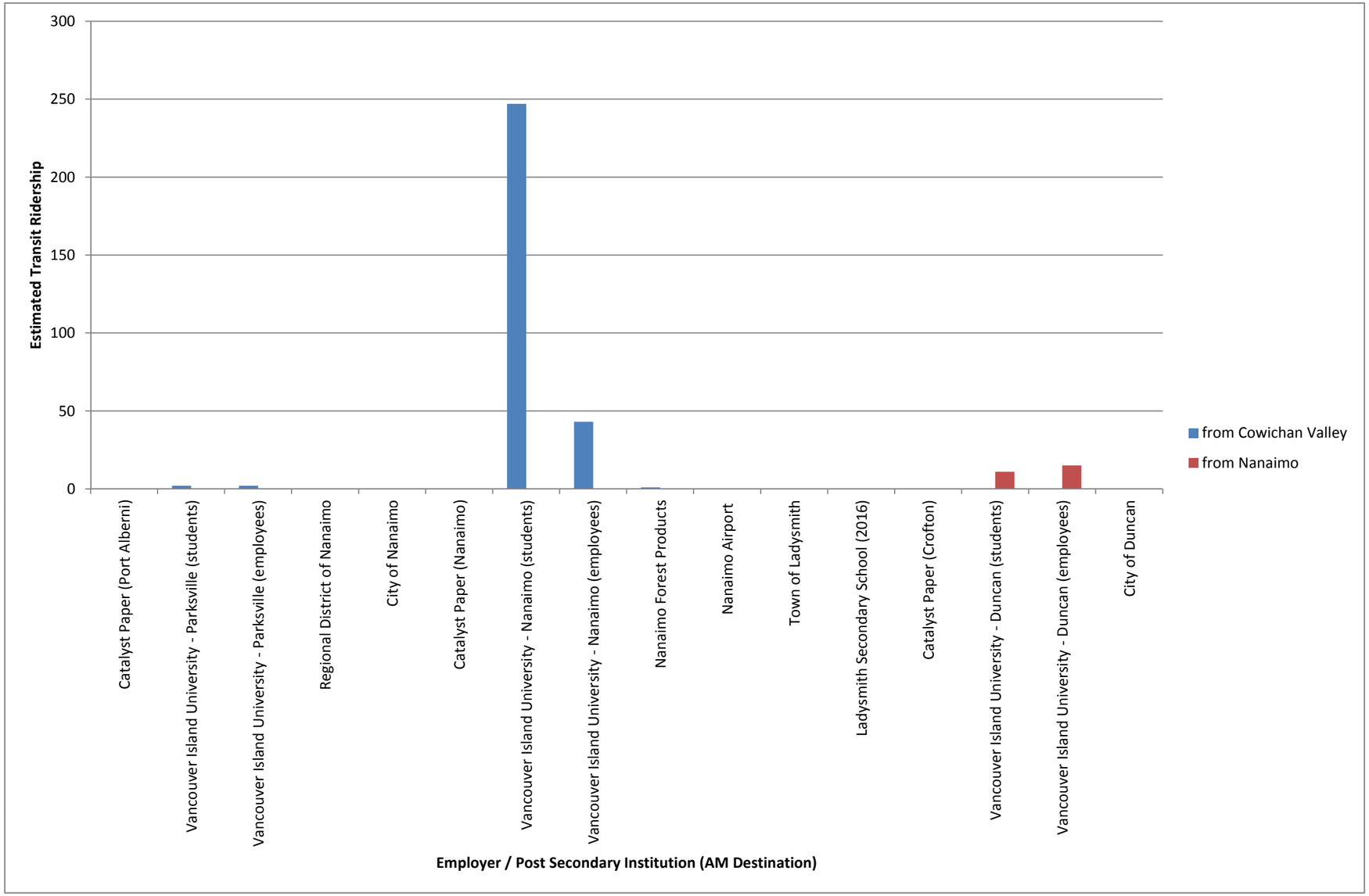

Figure 2.1 - Estimated Inter-Regional Transit Ridership to Surveyed Employers and Post Secondary Institutions, between CwVRD and RDN

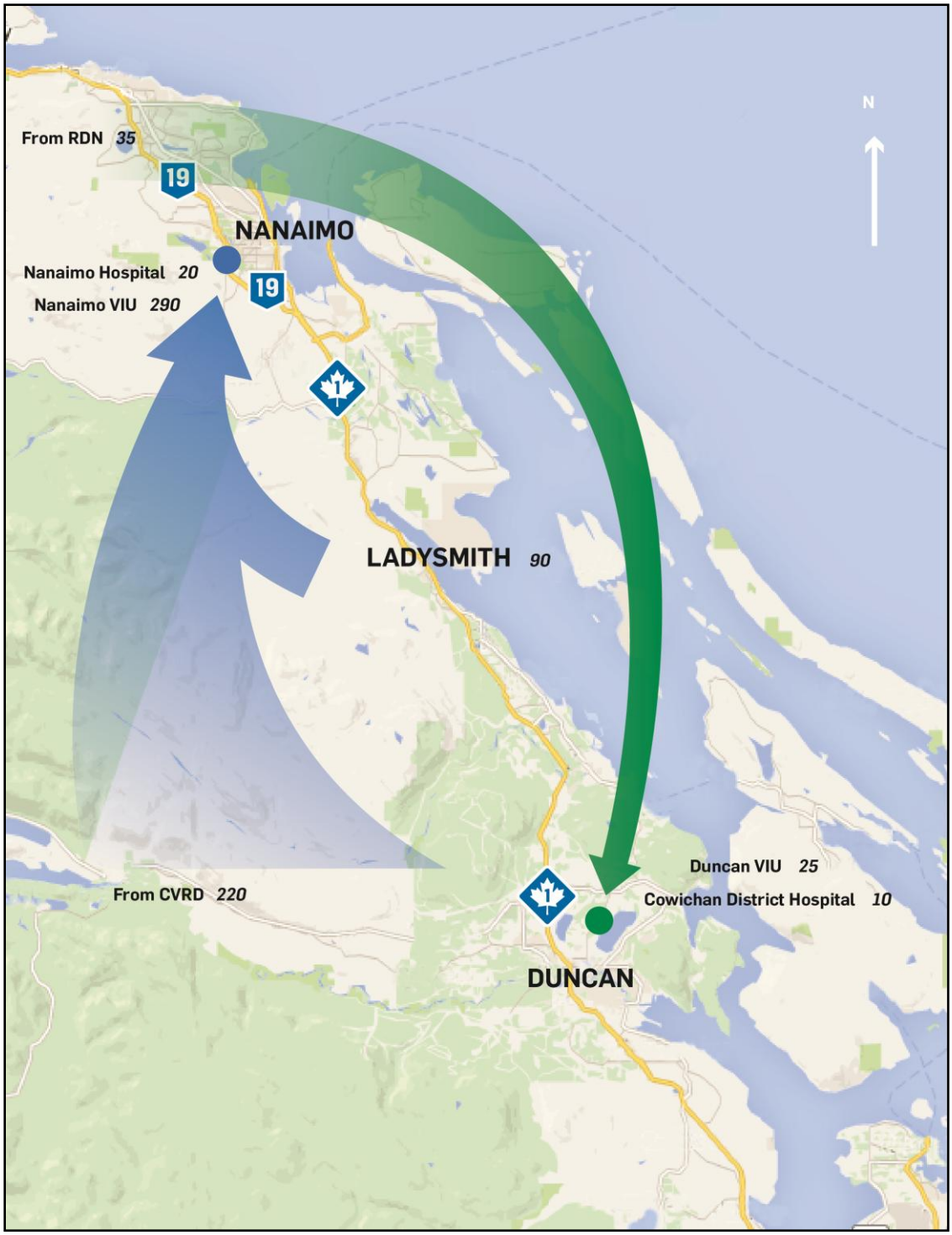

Figure 2.2 – Estimated Inter-Regional Transit Ridership to Hospitals and Post Secondary Institutions between Cowichan Valley and the Regional District of Nanaimo (AM Inbound)

Vancouver Island University Commuter Market

The Vancouver Island University (VIU) campus in Nanaimo dominates this potential transit market, making up almost all of the 300 riders. Of these, approximately 90 originate from Ladysmith. These results are highly dependent on mode split assumptions. VIU mode split was assumed to be 30%. By comparison, Camosun's Victoria campuses had a mode split of 40% in 2013, and 30% in 2008 through to 2015.

One potential challenge to achieving this level of ridership is the range in students' schedules. Unlike typical employment centres, students' start times can be varied, hindering the ability to schedule transit runs efficiently. Another potential challenge is classes being held at different campuses for students within one program. To achieve these levels, BC Transit and VIU would need to develop a strategy together involving parking controls, possible coordination of class times with transit schedules, and development of a U-Pass/Pro-Pass system for students and staff.

Nanaimo Hospital Commuter Market

A small component of the inter-regional ridership (5% or 20 trips) is destined to the Nanaimo Hospital. This is an employer with significant employee numbers, but much of that potential market is lost due several key factors:

- An employee population distribution that is more concentrated toward the work site. Unlike students, employees tend to have a longer term outlook with respect to domicile location. Employment permanency would steer workers toward a closer location, and therefore minimize the amount of inter-regional travel. This is actually good for everyone including transit, but simply does not yield any significant need for inter-regional transit.
- They are less price-sensitive to parking costs than students.
- Higher than normal amount of shift work compared to other sectors. The evening and night shifts are much less conducive to transit use due to security concerns and less frequency of service during those hours.
- A professional sector with high income levels for some. The higher income workers of that sector would have a lower tendency to use transit because their monetary value of time is higher.
- Some of the sector can be considered emergency workers who need the assurance of timely arrival that the private auto can offer.

The magnitude of this demand falls far short of justifying any inter-regional transit service on its own. However, it should be incorporated into any new service that may be contemplated for Vancouver Island University.

[5] Camosun College, Getting Here: Results of the Fall 2013 Transportation and Parking Survey

Assessment of the Potential Transit Service

Comparing the potential service between Cowichan Valley and the RDN, to the existing inter-regional service between Cowichan Valley and Victoria, there are some advantages and disadvantages:

- Parking is more restricted in the Victoria area, increasing the attractiveness of transit.
- The commute to Victoria is more frustrating to drive and takes more time, particularly through the Malahat section, increasing the incentive to take transit.
- The Victoria service accesses areas of greater density and thus offers greater draw and utility to the transit rider.
- That same advantage is also a disadvantage, necessitating more stops and increased delays, due to the multiple destination points in Victoria.
- The Nanaimo service would be targeted toward one campus and therefore fewer stops. This efficiency should be leveraged to maximize ridership.
- Because there is only one institution to coordinate with, optimization of services to VIU is easier to achieve.
- Students have historically demonstrated greater participation in transit programs than workers.

If a pilot project is planned to test the Nanaimo VIU component, the route should pass through and stop at shopping and service areas. This would offer VIU students and staff the convenience of completing chores enroute home, as well as servicing any captive market during the mid-day. This strategy, in turn, would help alleviate the potential challenge of dispersed class start/end times.

Because the hospital is not far from the University, effort should be made to incorporate the hospital into any new route that might be contemplated between Cowichan Valley Regional District and the Regional District of Nanaimo.

Other Potential Commuter Markets

During the Transit Future Plan development, feedback from the community suggested a potential demand by students who had attended Cedar Secondary School. This school had closed, with the majority of its catchment reassigned to John Barsby Secondary School in Nanaimo, but a significant number of students (173) chose to attend Ladysmith Secondary School instead. However, the school trustees have recently reversed the previous decision and will re-open Cedar Secondary School by September 2016. Consequently, the secondary student market that exists today will disappear by fall of 2016.

2.4 Captive Market

Overall Analysis of Captive Market

Several Census subdivisions have ideal balances of the five surrogate measures, however, those are already well served by transit. It stands to reason that the prime transit markets have already been identified.

The challenge of this assignment is to identify the new markets that have not yet been identified. These markets would therefore be on the fringes of feasibility – not all of the factors may meet the ideal threshold levels. Under this circumstance, one would look for the best combination of these factors, in the zones not currently served by transit. Appendix B provides a list of the Census subdivisions and the five surrogate measures associated with each subdivision.

Based on a qualitative review of the factors, the only Census subdivision to qualify for consideration of inter-regional transit service is Ladysmith. Logic would support this case for inter-regional transit service because Ladysmith is closer to Nanaimo than to Duncan, and Nanaimo offers more amenities.

Potential for Undiscovered Captive Markets

In theory, this list may be expanded because it is based on qualitative judgment. However, population density is consistently the most challenging factor, falling below BC Transit's informal threshold value (1000 residents/km2) by 80% or worse for most of the remaining subdivisions. Figure 2.3 illustrates the population densities within the study area. A strong rationale would be needed to justify inter-regional transit service for the captive market of any other subdivision.

Some exceptions are possible in small communities where the mix of the five surrogate measures are ideal, but is obscured by the larger size of subdivision that it lies within, as explained under the population density section. Examples may include Cedar and Bowser. Such cases would need to be nominated individually, a data program developed to collect the necessary inputs, and then assessed.

One common way to overcome low population density is to provide park and ride lots, to increase transit efficiency of passenger pick up and drop off. However, the requirement to drive to the facility is counter to the needs of a captive market.

Figure 2.3 – Vancouver Island Population Density

Campbell River
Courtenay
Comox
Port Alberni
Qualicum Beach
Parksville
Nanaimo
Ladysmith
Lake Cowichan
Duncan
Cowichan Valley D
Cowichan Valley C
Sidney
Highlands
Langford
View Royal
Saanich
Oak Bay
Colwood
Victoria
Esquimalt

LEGEND

Population Density

Population / Area (Sq.Km)

- 0-100
- 100-200
- 200-400
- 400-600
- 600-800
- 800-1000
- >1000

0 5 10 20 30 40 Km

Scale 1:600,000

P:\LOBE\IAM-BC\Current Projects\SNC-Lavalin Transportation\627504 BCT Inter-regional Study\4.5 GIS and Drawings\GIS\MXD\627504_BC_Inter_Regional_Study_Vancouver_Island_Population_Density.mxd

3.0 Campbell River / Comox Valley Regional District

3.1 Introduction

The City of Campbell River (CR) located at the northern end of the study area, and represents the most northern urban centre of Vancouver Island. Its population is 32,000 (2011 Census), comprising 72% of the Strathcona Regional District, the highest ratio of urbanized / regional population on Vancouver Island. As such, it is the major employment, service, retail, and population centre for the region.

The Comox Valley Regional District (CxVRD) is located between the Regional District of Nanaimo and the Strathcona Regional District. It has a population of 64,000 (2011 Census), or 40% of the Regional District of Nanaimo. Its major employment, service, retail, and population centre is Courtenay/Comox, with a population of 38,000 (2011 Census).

Campbell River is located very close to the Comox Valley Regional District boundary compared to Courtenay/Comox, and consequently, directly impacts the apparent inter-regional travel patterns. Figure 1.2 illustrates that the inter-regional travel demand between Campbell River and Courtenay/Comox is predominantly northbound during the morning peaks, with a directional ratio of 3:1 (northbound:southbound) even though the Courtenay/Comox population to the south is larger by 15%. If the regional boundary was located midway between the two centres, the predominant direction would likely be southbound, with a directional ratio in the order of 1:1.15. The apparent northbound directional bias is an artifact of the relative proximity of each urban centre to the boundary, and does not reflect the actual strength of draw of each centre. Furthermore, much of the travel across this boundary is short distance and local in nature, being defined as inter-regional only because they cross the regional boundary.

A transit service currently exists between the two regions via Route 6 operating out of Campbell River and Route 12 operating out of Courtenay/Comox, where the two meet in Oyster River, providing an opportunity to transfer between the two transit systems. No data had been collected to specifically identify ridership between these two regions. However, using data collected for other purposes, one can deduce that such a demand is less than 10 in the peak direction during the AM peak.

3.2 Combined Commuter & Captive Transit Demand

The estimated commuter and captive markets for inter-regional transit between Campbell River and CxVRD are listed in Table 3.1 below.

The existing transit ridership between the two regions (10) is in the same order of magnitude as the transit market estimated in this study (35). The difference between the two is slight in the context of this high level study. Regardless, even with the higher estimate, the capacity of the existing service would still be adequate. This finding applies to the longer distance inter-regional trips.

However, there may be opportunity to capture additional short distance trips that happen to cross the Strathcona/Comox Valley regional boundary. Typically, regional boundaries and their associated inter-

regional transfer point (if they exist) are located approximately midway between major urban centres, where travel demand is smallest and therefore transfers minimized. In the current situation where the transfer point is located close to Campbell River, the number of trips inconvenienced by a transfer is potentially much greater. These inconvenienced trips are anticipated to be predominantly shorter trips, which are more conducive to transit. Relocating the transfer point further south and adjusting the service to better accommodate short distance trips toward the north may improve the overall transit ridership.

The coarseness of the zonal bases used in this study (Census subdivisions; three character postal code zones; BC Transit service regions) does not permit further refinement to address this question. Further detailed analysis of the local market near the boundary would be required.

Table 3.1: Inter-Regional Transit Market (Peak Direction, Northbound)

	Rating / Ridership (daily, one way)
Commuter Market	
post-secondary school (NIC in Campbell River)	low (25)
other major employers (Campbell River Hospital)	low (10)
Captive Market	
all Census subdivisions	low
Short Distance Inter-Regional Market	potential, unknown

NOTES

- Commuter demand estimates developed based on survey of employees and students' domicile postal codes.
- Commuter demand estimates excluded trips crossing multiple regional boundaries.
- Only hospitals and post secondary institutions are shown because they have the most potential to service and convert to transit. Other major regional employers were also studied but their results are not shown because of their low ridership estimates.
- NIC mode split assumed to be 15%, based on Camosum College experience, and consideration of more rural environment.
- NIC students are mostly part time. Assumed this 'overcount' is balanced off by the lack of accounting of staff trips. Staff is approximately 20% of the student population.
- Hospital mode split based on Victoria General Hospital's experience.

3.3 Commuter Market

Overall Transit Demand – All Surveyed Employers and Institutions

The investigation has demonstrated that the best potential for inter-regional ridership lies with post secondary institutions (see Figure 2.1 and Appendix A, Tables A-5 through A-7). Major health care institutes (hospitals) were also anticipated to have significant potential for the commuter market because of their large

workforce. For this reason, the discussions henceforth will concentrate on these two types of institutions. The potential transit trips they generate are illustrated in Figure 3.1 for the AM peak period. In addition, the Comox Military Base will also be discussed because it is such a significant employer in the area.

Transit ridership is estimated to be in the range of 35 per day in the northbound direction during the morning and reverse during the afternoon. Of this demand, 25 are generated by the North Island College in Campbell River, and another 10 are generated by the Campbell River Hospital.

The southbound transit ridership in the morning is estimated to be in the range of 30, all attributable to the North Island College campus in Comox.

These demands fall far short of justifying any additional inter-regional transit service.

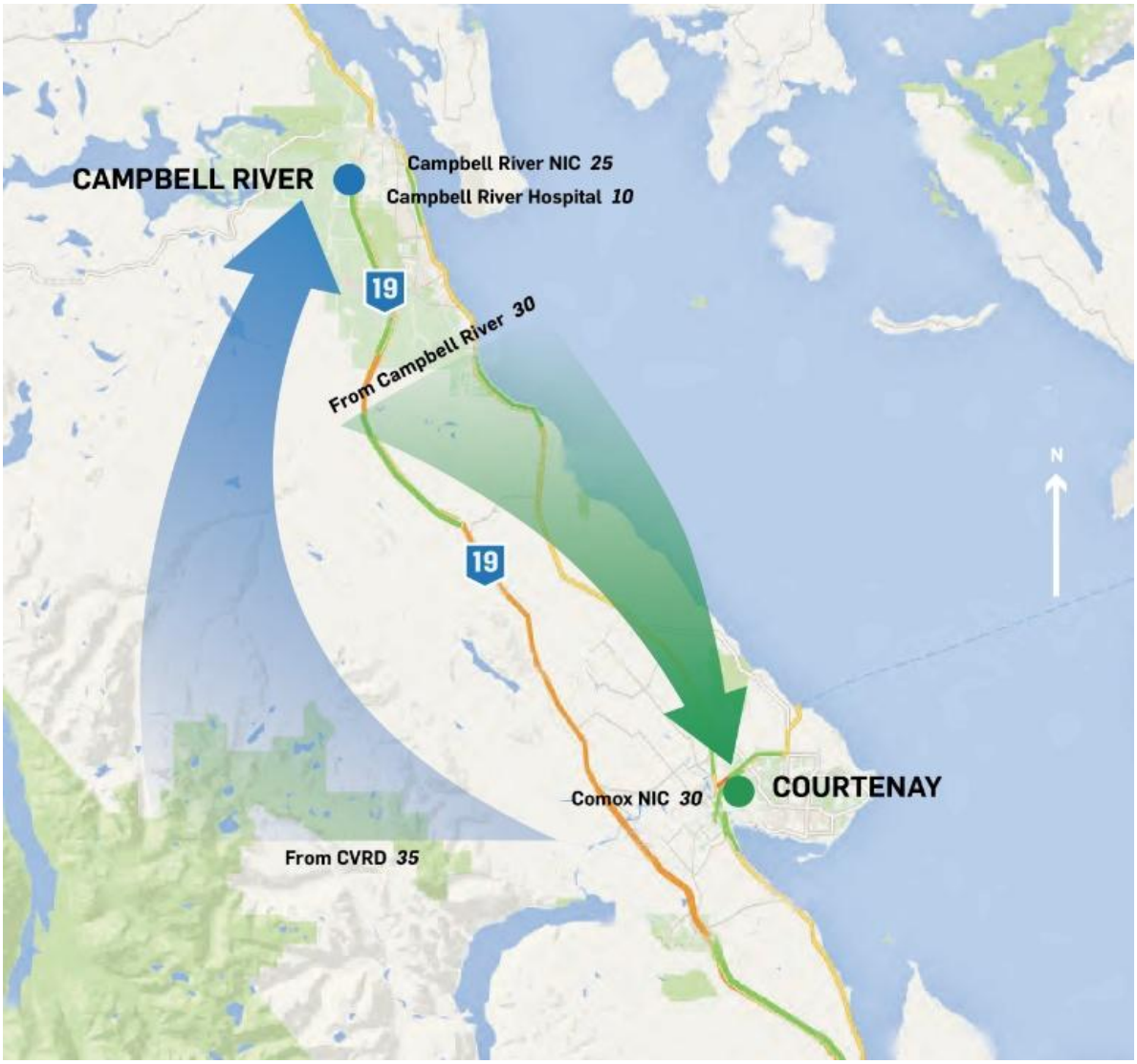

Figure 3.1: Estimated Inter-Regional Transit Ridership to Hospitals and Post Secondary Institutions between Comox Valley and Campbell River (AM Inbound)

North Island College Commuter Market

The potential inter-regional transit market in the northbound direction from Comox Valley to the North Island College (NIC) campus in Campbell River is estimated to be in the 25 range. The potential market in the southbound direction from Campbell River to the NIC campus in Comox is estimated to be 30. Several reasons can be attributed to these low volumes.

- The student enrollment at NIC's Campbell River campus is only 8% of the Vancouver Island University's Nanaimo campus. NIC's Comox campus has only 15% of the enrollment of VIU's Nanaimo campus.
- The college does not grant degrees, and functions as a ladder school to transition to other institutions. Consequently, most students are part time, generating less trips.
- Being located in a smaller and less urban centre, its mode split was assumed to be 15%, less than half of that of Camosun College in Victoria.

Campbell River Hospital Commuter Market

The inter-regional ridership destined to the Campbell River Hospital is anticipated to be in the range of 10. While the hospital estimate is low, the estimate is believed to be robust. Three different calculation methods were used and all three converged to the same magnitude of result. Further discussion of this is provided in Appendix D. The reasons for such a low number are listed below.

- The Campbell River Hospital has 1/3 the staff of the Nanaimo Hospital.
- An employee population distribution that is more concentrated toward the work site. Unlike students, employees tend to have a longer term outlook with respect to domicile location. Employment permanency would steer workers toward a closer location, and therefore minimize the amount of inter-regional travel. This is actually good for everyone including transit, but simply does not yield any significant need for inter-regional transit.
- They are less price sensitive to parking costs than students.
- Higher than normal amount of shift work compared to other sectors. The evening and night shifts are much less conducive to transit use due to security concerns and less frequency of service during those hours.
- A professional sector with high income levels for some. The higher income workers of that sector would have a lower tendency to use transit because their monetary value of time is higher.
- Some of the sector can be considered emergency workers who need that assurance of timely arrival that the private auto can offer.

Comox Military Base

The Comox Military Base was included in the survey of employers and their potential for inter-regional transit market was assessed to be minimal. It employs 1250 people (civilian and military combined), of which only 70 live outside of Courtenay, Comox, and Cumberland. It is unknown how many live outside of the Comox Valley Region. A generic mode split of 1.5% would generate only one potential inter-regional transit rider. The generous amount of free parking on the site detracts from this potential.

3.4 Captive Market

Several Census subdivisions have ideal balances of the five surrogate measures, however, those are already well served by transit. It stands to reason that the prime transit markets have already been identified.

The challenge of this assignment is to identify the new markets that have not yet been identified. These markets would therefore be on the fringes of feasibility – not all of the factors may meet the ideal threshold levels. Under this circumstance, one would look for the best combination of these factors, in the zones not currently served by transit. Appendix B provides a list of the subdivisions and the five surrogate measures associated with each subdivision.

Based on a qualitative review of the factors, none of the Census subdivisions within Campbell River or CxVRD qualify for consideration of additional long distance inter-regional transit service.

This is intentionally blank.

4.0 Comox Valley Regional District / Regional District of Nanaimo

4.1 Introduction

The Regional District of Nanaimo is located mid-island and is the second most populous region on Vancouver Island. It has a population of 149,000 (2011 Census), or 40% of the Greater Victoria area. Its major employment, service, retail, and population centre is the City of Nanaimo, with a population of 84,000 (2011 Census).

The Comox Valley Regional District is located between the Regional District of Nanaimo and the Strathcona Regional District. It has a population of 64,000 (2011 Census), or 40% of the Regional District of Nanaimo. Its major employment, service, retail, and population centre is Courtenay/Comox, with a population of 38,000 (2011 Census).

The boundary between these two regions is located just north of Bowser and Deep Bay. The midpoint between the two regional centres (Courtenay/Comox and Nanaimo) is located at approximately Qualicum Bay / Dunsmuir, south of Bowser and Deep Bay. Therefore travel time from Bowser/Deep Bay to Nanaimo is greater than to Courtenay/Comox. This time difference is amplified because the transit routing is via Highway 19A, a lower speed facility than Highway 19. These are the likely reasons for the Bowser / Deep Bay community preferring transit service to Campbell River over service to Nanaimo, as expressed during the Transit Future Plan process.

The distance between the Courtenay/Comox and Nanaimo centres is the greatest compared to all the other centres within the study area. It is about 2.5 times the distance between Campbell River and Courtenay/Comox. It is the only pair with a travel time greater than 1 hour. This manifests in the lowest inter-regional travel demand, as illustrated in Figure 1.2.

4.2 Combined Commuter & Captive Transit Demand

The commuter and captive markets for inter-regional transit between CxVRD and RDN are listed in Table 4.1. The peak demand direction is southbound from CxVRD to RDN. The magnitude of this demand is approximately 60, which is not sufficient to operate a regular service throughout the day, every day.

Table 4.1: Inter-Regional Transit Market (Peak Direction, Southbound)

	Rating / Ridership (one way)
Commuter Market	
post-secondary school (VIU in Nanaimo)	medium-low (55 pk dirn daily)
other major employers (Nanaimo Hospital)	low (2 pk dirn daily)
Captive Market	
all Census subdivisions	low (12 per week)

NOTES

- Commuter demand estimates developed based on survey of employees and students' domicile postal codes.
- Commuter demand estimates excluded trips crossing multiple regional boundaries.
- Only hospitals and post secondary institutions are shown because they have the most potential to service and convert to transit. Other major regional employers were also studied but their results are not shown because of their low ridership estimates.
- VIU Nanaimo mode split assumed to be 30%, based on Camosun College experience in Victoria.
- VIU trips adjusted for part time / full time student course load.
- NIC mode split assumed to be 15%, based on Camosum College experience, and consideration of more rural environment.
- NIC students are mostly part time. Assumed this 'overcount' is balanced off by the lack of accounting of staff trips. Staff is approximately 20% of the student population.
- Hospital mode split based on Victoria General Hospital's experience.

4.3 Commuter Market

Overall Transit Demand – All Surveyed Employers and Institutions

The investigation has demonstrated that the best potential for inter-regional ridership lies with post secondary institutions (see Figure 2.1 and Appendix A, Tables A-5 through A-7). Major health care institutes (hospitals) were also anticipated to have significant potential for the commuter market because of their large workforce. For this reason, the discussions henceforth will concentrate on these two types of institutions. The potential transit trips they generate are illustrated in Figure 4.1 for the AM peak period. In addition, the Comox Military Base will also be discussed because it is such a significant employer in the area.

Transit ridership is estimated to be in the range of 60 per day in the southbound direction during the morning and reverse during the afternoon. Practically all of this demand is generated by the Vancouver Island University (VIU) in Nanaimo. The northbound ridership during the morning, destined to North Island College (NIC) in Comox, is estimated to be 10. These demands generally fall far short of justifying any inter-regional transit service at this time.

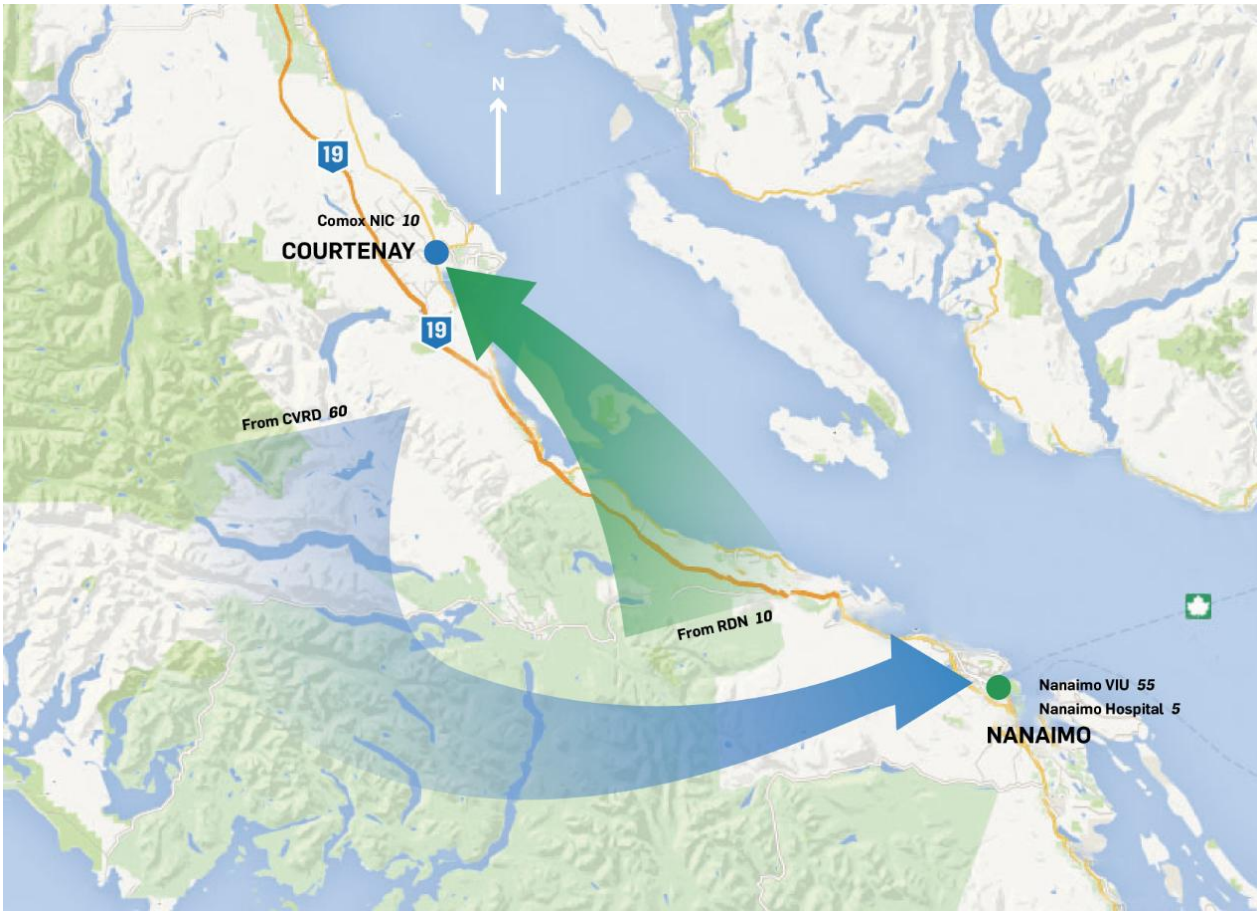

Figure 4.1: Estimated Inter-Regional Transit Ridership to Hospitals and Post Secondary Institutions between Comox Valley and the Regional District of Nanaimo (AM Inbound)

North Island College Commuter Markets

The potential inter-regional transit market from RDN to NIC in Comox is estimated to be low. Several reasons can be attributed to this low volume.

- The student enrollment is only 15% of the VIU in Nanaimo.
- The NIC does not grant degrees, and functions as a ladder school to transition to other institutions. Consequently, most students are part time, generating less trips.
- Being located in a smaller and less urban centre, its mode split was assumed to be 15%, less than half of that of Camosun College in Victoria.
- The distance between the Courtenay/Comox and Nanaimo centres is great.

Vancouver Island University Commuter Markets

The potential for inter-regional transit demand from the Comox Valley to VIU in Nanaimo is low primarily because the demand is oriented from the Cowichan Valley, and believed to be related to the great distance between the Courtenay/Comox and Nanaimo centres.

Nanaimo Hospital Commuter Market

The Nanaimo Hospital is anticipated to generate practically no inter-regional demand in the southbound direction (from Comox Valley to Nanaimo). Any inter-regional demand is almost entirely from the Cowichan Valley. This is believed to be related to the great distance between the Courtenay/Comox and Nanaimo centres.

Comox Military Base

The Comox Military Base was included in the survey of employers and their potential for inter-regional transit market was assessed to be minimal. It employs 1250 people (civilian and military combined), of which only 70 live outside of Courtenay, Comox, and Cumberland. It is unknown how many live outside of the Comox Valley Region. A generic mode split of 1.5% would generate only one potential inter-regional transit rider. The generous amount of free parking on the site detracts from this potential.

4.4 Captive Market

Captive Market based on Census Data

Several Census subdivisions have ideal balances of the five surrogate measures, however, those are already well served by transit. It stands to reason that the prime transit markets have already been identified.

The challenge of this assignment is to identify the new markets that have not yet been identified. These markets would therefore be on the fringes of feasibility – not all of the factors may meet the ideal threshold levels. Under this circumstance, one would look for the best combination of these factors, in the zones not currently served by transit. Appendix B provides a list of the subdivisions and the five surrogate measures associated with each subdivision.

Based on a qualitative review of the factors, none of the Census subdivisions within RDN or CxVRD qualify for consideration of inter-regional transit service.

Captive Market based on Travel Time

Despite the findings above, the communities of Deep Bay and Bowser may be considered for inter-regional service to Courtenay/Comox, by the simple logic of shorter travel distance compared to Nanaimo. The methodologies used above determine whether a new, undiscovered market might exist. It does not analyze whether an existing market should be realigned to a different region.

To determine whether such a realignment is warranted, a detailed operational analysis of the options in terms of travel time saving, market components, and service schedule is required.

This is intentionally blank.

5.0 Conclusions

The results of this study are intended to be order-of-magnitude only, separating the hopeful cases from the hopeless cases. From this, more detailed service analysis of the hopeful cases will be required to confirm the ridership estimates, and the practicality of implementing a new service.

Multiple Boundary Crossing

Figure 5.1, identifies the inter-regional commuter trips that cross multiple boundaries. As one might expect, this demand is very small. It is believed that multi-boundary trips (especially transit trips) would take too long to be acceptable on a regular commuting basis. Similarly, the captive market is anticipated to be very small; why cross multiple boundaries when the nearest urban centre can provide the necessary amenities?

Figure 1.2 supports this theory. The distance between the Courtenay/Comox and Nanaimo centres is the greatest compared to all the other centres within the study area. It is about 2.5 times the distance between Campbell River and Courtenay/Comox. It is the only pair with a travel time greater than 1 hour. This manifests in the lowest inter-regional travel demand despite the significance of Nanaimo as a regional centre.

The trip counts identified in Figure 5.1 (based on employee mailing address postal codes) are likely attributable to employees having mailing addresses that are not their residences. By this rationale, multi-boundary commuter trips have been excluded from the 'best estimate' of potential transit market identified in the outer columns of Figure 5.1.

Select Corridor Inter-Regional Transit Market

The overall inter-regional transit market for commuter trips, from Cowichan Valley to Campbell River, is summarized in Figure 5.1. The commuter market was investigated through a variety of methods and data sources. This study determined that for this study area, the most significant potential commuter markets are the post-secondary institutions. The major hospitals were anticipated to have significant potential for the commuter market, but this was not realized. For these reasons, only those two sectors are reported in Figure 5.1. Table 5.1 summarizes the commuter and captive market potential across each inter-regional boundary, from Cowichan Valley to Campbell River.

Table 5.1: Potential Transit Markets by Corridor

Corridor	Market Potential		Comment
	Commuter	Captive	
CwVRD to RDN (southbound)	Med/High	Medium (Ladysmith to Nanaimo)	• Most of the commuter demand comprises students attending the VIU campus in Nanaimo. • One third of the commuter demand originates from Ladysmith.
RDN to CwVRD (northbound)	Low	Low	
RDN to CxVRD (northbound)	Low	Low	• The existing captive ridership travelling between Deep Bay/Bowser and Nanaimo (Route 99) may be better served by diverting that service toward Courtenay/Comox instead of Nanaimo.
CxVRD to RDN (southbound)	Med/Low	Low	• Commuter market is estimated to be in the range of 60 per day. • Practically all the commuter demand is generated by travel to VIU.
CxVRD to Campbell River (northbound)	Further investigation required of the short distance inter-regional market. Need more refined dataset.		• The smaller communities within the Comox Valley Regional District, but close to Campbell River, may benefit from a direct 'local service' to Campbell River.
Campbell River to CXVRD (southbound)	Low	Low	

Figure 5.1 - Inter-Regional Transit Markets - Commuter, AM Peak Direction (Inbound)

NOTES

- trip patterns developed based on survey of staff and students' domicile postal codes
- Most reliable ridership estimates are the trips crossing one regional boundary.
- Only hospitals and post secondary institutions are shown because they have the most potential to service and convert to transit.
- Other major regional employers were also studied but their results are not shown because of their low ridership estimates.
- VIU Nanaimo mode split assumed to be 30%, based on Camosun College experience in Victoria
- VIU Duncan and Parksville mode split assumed to be 15%, based on Camosun College experience and consideration of more rural environment
- VIU trips adjusted for part time / full time student course load
- NIC mode split assumed to be 15%, based on Camosum College experience, and consideration of more rural environment
- NIC students are mostly part time. Assumed this 'overcount' is balanced off by the lack of accounting of staff trips. Staff is approximately 20% of the student population.
- hospital mode split based on Victoria General Hospital's experience

This is intentionally blank.

Appendix A - Commuter Market Estimation

Several methods of quantitative transit ridership estimation were employed. These methods are grouped as either macroscopic, or microscopic, and discussed below under these headings. In general, macroscopic methods utilize global or regional data, such as highway volumes and data from Canada Census. Microscopic methods trace specific trip origin-destination pairs by surveying specific/select places of employment or post secondary institutions.

Macroscopic Transit Ridership Estimation

Macroscopic transit ridership estimates were developed by the methods demonstrated in Table A-2. Table A-1 is simply a summary of 2011 Census data that is used as input into the Table A-2 calculations.

The Overall Transit method is based on simple proportioning of the highway volume to derive the transit ridership. This is considered to represent the top end of the estimate range because the method does not account the extra coordination, "luggage", and comfort that a traveler typically demands of longer distance trips. These factors will reduce the propensity to take transit.

Commuter Transit A method is based on proportioning only the inter-regional commuter volume, taken from Census data. The results from this method is seen to be more realistic than the Overall Transit method because the three detracting factors discussed above can be diminished when a routine is developed for commuter trips.

Table A-2 uses mode split from 2011 Census as well as from 2006 Census. This is intended to allow the reader to compare the changes in mode split between the two time periods. They are very similar except in Campbell River where the 2011 Campbell River mode split is approximately double that of 2006. Some explanations are listed below. Because these differences would not significantly affect the results (inter-regional transit ridership), the table was not updated to use 2011 mode splits only.

- 2011 Campbell River volumes were generated from areas selected by SNC, while the 2006 volumes were generated from areas selected by BCT. The areas chosen by SNC and BCT are likely different because the land area of the Campbell River zone is a small portion of the entire region, leaving much opportunity for differences. In comparison, the volume generating areas of the other regions comprise practically 100% of the region, leaving little room for differences.
- Strathcona and Comox regions were previously 1 single region during the 2006 Census. In 2008, the region was split into 2. Changing boundaries can increase the likelihood of area differences discussed above.

- Since the regional split, Campbell River (urbanized area) comprises 72% of Strathcona's regional population. A larger proportion of the population living in the urbanized area increases the mode split.

The Comox Valley Regional District to the Regional District of Nanaimo commuter volume is very low (145 trips, one direction) compared to the other inter-regional trips. The likely reason is the long distance and time between major centres (Coutenay/Comox and Nanaimo) compared to that between other regional centres. It is the only inter-regional trip between regional centres that is over an hour. Table A-3 demonstrates, by gravity model that using a distance power of 3.5 would yield very similar results to the 2011 Census data for commute trips. While a distance power of 3.5 is high, this may simply reflect the typical Vancouver Islander's attitude of favouring a more local lifestyle; that distance has greater influence than the mass size (population) in the gravity model.

This demand appears even smaller when compared to the commuter volume between Campbell River and the Comox Valley Regional District, especially considering the relative size of communities. In the latter case, the regional boundary is located close to Campbell River. This greatly increases the commuter volume count than if a screenline count was conducted midway between the two major centres. So that difference in commuter volume is partially explained by location of the count (regional boundary).

Commuter Transit B is not so much a transit estimate, as a verification of the mode split value using existing transit ridership, where BC Transit has an inter-regional service.

Microscopic Transit Ridership Estimation

Microscopic transit ridership estimates were developed using postal code data collected from select employers and post secondary institutions throughout the east coast of Vancouver Island. The methods of estimation are demonstrated in Tables A-4 through A-7. Some sources identified on the maps in Chapter 2.1 are not listed in the tables because those sources provided anecdotal information only. Those sources were always low volume generators anyways.

Table A-4 represents a simple proportioning of the transit share from the various commuter groups. Zone wide mode split values from 2006 Census data (Table A-2) is used because they are more conservative. A lesser mode split is believed to be more representative of inter-regional travel because it takes additional effort to coordinate such trips, compared to using an in-town service. The distance learning/online component of VIU students have been removed from the analysis.

VIU employee postal code data provided by the university was not sorted by campus. A broad assumption was made to distribute staff in the same proportion as the student proportion at each campus, without bias toward campus locations closer to the home of the employee. This results in greater inter-regional travel than would likely be the case. However, this turns out to be inconsequential due to the very low staff transit volumes at the Parksville and Duncan campuses.

Tables A-5 through A-7 captures only the commuter groups between Cowichan Valley and Nanaimo. The following institutions were excluded for the following reasons:

- Royal Roads University – very low volume across the Cowichan Valley / Nanaimo regional transit boundary; mostly distance learning; peak direction is counter to the market under study.
- CFB Esquimalt – believe postal codes registered in Nanaimo Transit Region are reporting to Nanoose Bay but could not confirm; peak direction is counter to the market under study.
- Ladysmith Secondary School – Cedar Secondary School will be reopening in 2016, intercepting this market.

Mode split for all other groups were manually adjusted using professional judgment. For the most part, zone wide mode splits were retained with a few exceptions. VIU's Nanaimo campus mode split was adjusted upward to 30%, based on Camosun's current mode split of 40%. The mode split for the Duncan and Parksville campuses were adjusted to 15% based on their less central locations and more parking options. Forest product / pulp mill mode splits were reduced by half for the same reasons.

Table A-5 represents all VIU students, full time and part time, equally. Table A-6 represents the full time VIU student complement only. The former is intended to represent a "busy" day at VIU and the latter, a "slow" day at VIU.

Table A-7 proportions the VIU students based on 100% full time students + 40% part time students. This assumed formula was based on the definition that a part time student carries a 60% course load or less. Table A-7 is intended to represent a typical day at VIU, and what we consider the best conservative estimate. It is conservative because it excludes all other commuters not surveyed and excludes the captive market. However, because the results indicate an overwhelming bias toward VIU students, any new service should be initially designed around that specific market, with opportunity to grow and accommodate the other markets later. Therefore that estimate, though conservative, is likely not overly conservative during the initial stages of implementation.

Based on Tables A-5 through A-7, the transit commuter ridership can range from 200 to 400 in each direction per day, from Cowichan Valley to Nanaimo, with a typical ridership of 300. This is almost completely dependent on the success of converting the commuting habits of the Nanaimo VIU population (student and staff).

Table A-1: COMMUTER VOLUME (from 2011 Census)

Home\Work	Capital Regional District	Cowichan Valley Regional District	Regional District of Nanaimo	Comox Valley Regional District	Campbell River (aka SRD)	sum
Capital Regional District	136385	425	125	20	0	136955
Cowichan Valley Regional District	3435	18990	2020	0	0	24445
Regional District of Nanaimo	140	1160	39520	70	40	40930
Comox Valley Regional District	80	0	145	17915	1290	19430
Campbell River (aka SRD)	35	0	25	390	10380	10830
sum	140075	20575	41835	18395	11710	232590

Table A-2: ESTIMATED TRANSIT RIDERSHIP - VARIOUS MACROSCOPIC METHODS

DATA SOURCE	Overall Transit							Commuter Transit A				Commuter Transit B		
	MoTI			Stats Can 2011	Stats Can 2006		calculated	Stats Can 2011			calculated	Stats Can 2011	BCT	calculated
	Highway 1 volume (vpd)	Highway 19 volume (vpd)	Highway 19A volume (vpd)	vehicle occupancy	mode split	mode split (based on avg between regions)	transit riders	mode split (based on total commuters)	mode split (based on avg between regions)	inter-regional commuters (based on OD matrix)	transit riders	commuters	transit riders	mode split
Campbell River				1.11	2.5%			5.8%						
		3938	no data	1.09		2.1%	90		3.7%	1290	48	1290	7	1%
Coutenay Comox				1.07	1.7%			1.7%						
		4722.5	3349	1.07		2.2%	190		2.3%	145	3			
Nanaimo				1.07	2.7%			2.9%						
	12409.5			1.07		1.9%	246		2.2%	2,020	45			
Cowichan Valley				1.07	1.0%			1.6%						
	11248.5			1.07		5.6%	671		6.2%	3435	214	2030	140	6.9%
Victoria				1.07	10.1%			10.9%						

Route 6 (2013/2014); Route 12 (2014)

Route 66&99 service area only

Route 66&99 (2012)

Table A-3: GRAVITY MODEL CHECK

distance (km)	travel time (minutes)	population (internet various sources)	population year	gravity force (using 1/d^2)	gravity force (using 1/d^3.5)	ratio of gravity force (1/d^3.5)	ratio of inter-regional commuters (based on OD matrix)
		31,186	2011				
40	25			3,170,394	25,363		
		63,538	2011			9.05	8.90
103	73			1,747,611	2,802		
		146,574	2011			0.12	0.07
51	43			6,368,081	22,584		
		80,332	2011			0.69	0.59
60	50			11,567,808	32,719		
		360,000	2011				

3.5

Table A-4: ORIGIN - DESTINATION MATRIX of SURVEYED EMPLOYERS

WORK	Comox Military Airbase			Catalyst Paper (Port Alberni)			Vancouver Island University - Parksville (students)			Vancouver Island University - Parksville (employees)			Regional District of Nanaimo			City of Nanaimo			Catalyst Paper (Nanaimo)			Vancouver Island University - Nanaimo (students)			Vancouver Island University - Nanaimo (employees)			Nanaimo Forest Products			Nanaimo Airport			Town of Ladysmith			Ladysmith Secondary School (2016)			Catalyst Paper (Crofton)			Vancouver Island University - Duncan (students)			Vancouver Island University - Duncan (employees)			City of Duncan			Royal Roads Univeresity (Employee)			Royal Roads University (Students)			CFB Esquimalt			Total	
HOME	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	transit riders
Campbell River	27	2.5%	1	4	2.5%	0	5	2.5%	0	1	2.5%	0	2	2.5%	0	4	2.5%	0	6	2.5%	0	175	2.5%	4	6	2.5%	0	10	2.5%	0	0	2.5%	0	0	2.5%	0		2.5%		2	2.5%	0	8	2.5%	0	1	2.5%	0	0	2.5%	0	0	2.5%	0	2	2.5%	0	7	2.5%	0	260	7
Coutenay Comox	1199	1.7%	20	2	1.7%	0	7	1.7%	0	3	1.7%	0	6	1.7%	0	2	1.7%	0	0	1.7%	0	225	1.7%	4	21	1.7%	0	9	1.7%	0	20	1.7%	0	0	1.7%	0		1.7%		5	1.7%	0	4	1.7%	0	4	1.7%	0	0	1.7%	0	0	1.7%	0	4	1.7%	0	215	1.7%	4	1726	29
Nanaimo	10	2.7%	0	313	2.7%	8	828	2.7%	22	114	2.7%	3	506	2.7%	14	599	2.7%	16	11	2.7%	0	4620	2.7%	125	923	2.7%	25	426	2.7%	12	53	2.7%	1	14	2.7%	0	0	2.7%	0	75	2.7%	2	130	2.7%	4	177	2.7%	5	0	2.7%	0	4	2.7%	0	7	2.7%	0	60	2.7%	2	8870	239
Cowichan Valley	1	1.0%	0	1	1.0%	0	34	1.0%	0	24	1.0%	0	21	1.0%	0	35	1.0%	0	4	1.0%	0	1120	1.0%	11	193	1.0%	2	104	1.0%	1	20	1.0%	0	73	1.0%	1		1.0%	0	527	1.0%	5	1203	1.0%	12	37	1.0%	0	35	1.0%	0	7	1.0%	0	3	1.0%	0	196	1.0%	2	3638	36
Victoria	6	10.1%	1	2	10.1%	0	17	10.1%	2	6	10.1%	1	7	10.1%	1	5	#####	1	0	#####	0	251	10.1%	25	45	10.1%	5	7	#####	1	1	#####	0	0	#####	0		10.1%		18	#####	2	57	10.1%	6	9	10.1%	1	0	10.1%	0	401	#####	41	139	10.1%	14	1994	10.1%	201	2965	299

Table A-5: ESTIMATED TRANSIT RIDERSHIP BETWEEN COWICHAN VALLEY and NANAIMO - MICROSCOPIC METHOD, VIU PEAK DAYS (full time + part time students)

WORK	Comox Military Airbase			Catalyst Paper (Port Alberni)			Vancouver Island University - Parksville (students)			Vancouver Island University - Parksville (employees)			Regional District of Nanaimo			City of Nanaimo			Catalyst Paper (Nanaimo)			Vancouver Island University - Nanaimo (students)			Vancouver Island University - Nanaimo (employees)			Nanaimo Forest Products			Nanaimo Airport			Town of Ladysmith			Ladysmith Secondary School (2016)			Catalyst Paper (Crofton)			Vancouver Island University - Duncan (students)			Vancouver Island University - Duncan (employees)			City of Duncan			Royal Roads Univeresity (Employee)			Royal Roads University (Students)			CFB Esquimalt			Total		Comments
HOME	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	transit riders	
Nanaimo Cowichan Valley				1	1.0%	0	34	1.0%	0	24	1.0%	0	21	1.0%	0	35	1.0%	0	4	1.0%	0	1120	1.0%	11	193	1.0%	2	104	1.0%	1	20	1.0%	0	14	2.7%	0	0	2.7%	0	75	2.7%	2	130	2.7%	4	177	2.7%	5	0	2.7%	0									396 1556	11 16	Mode splits based on existing, zone wide value.
Nanaimo Cowichan Valley				1	1.0%	0	34	15.0%	5	24	15.0%	4	21	1.0%	0	35	1.0%	0	4	0.5%	0	1120	30.0%	336	193	30.0%	58	104	0.5%	1	20	2.0%	0	14	2.7%	0	0	25%	0	75	0.5%	0	130	15.0%	20	177	15.0%	27	0	1.0%	0									396 1556	47 404	Mode splits selectively chosen. VIU Nanaimo mode split based on Camosun.
Nanaimo sub-zone Ladysmith sub-zone													15	1.0%	0	28	1.0%	0	2	0.5%	0	339	30.0%	102	58	30.0%	18	57	0.5%	0	20	2.0%	0	14	2.7%	0	0	25%	0																									14 519	0 120	

Table A-6: ESTIMATED TRANSIT RIDERSHIP BETWEEN COWICHAN VALLEY and NANAIMO - MICROSCOPIC METHOD, VIU OFF PEAK DAYS (full time students only)

WORK	Comox Military Airbase			Catalyst Paper (Port Alberni)			Vancouver Island University - Parksville (students)			Vancouver Island University - Parksville (employees)			Regional District of Nanaimo			City of Nanaimo			Catalyst Paper (Nanaimo)			Vancouver Island University - Nanaimo (students)			Vancouver Island University - Nanaimo (employees)			Nanaimo Forest Products			Nanaimo Airport			Town of Ladysmith			Ladysmith Secondary School (2016)			Catalyst Paper (Crofton)			Vancouver Island University - Duncan (students)			Vancouver Island University - Duncan (employees)			City of Duncan			Royal Roads Univeresity (Employee)			Royal Roads University (Students)			CFB Esquimalt			Total		Comments
HOME	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	transit riders	
Nanaimo Cowichan Valley				1	1.0%	0	1.14	1.0%	0	0.81	1.0%	0	21	1.0%	0	35	1.0%	0	4	1.0%	0	626	1.0%	6	108	1.0%	1	104	1.0%	1	20	1.0%	0	14	2.7%	0	0	2.7%	0	75	2.7%	2	31.9	2.7%	1	43.4	2.7%	1	0	2.7%	0									164 920	4 9	Mode splits based on existing, zone wide value.
Nanaimo Cowichan Valley				1	1.0%	0	1.14	15.0%	0	0.81	15.0%	0	21	1.0%	0	35	1.0%	0	4	0.5%	0	626	30.0%	188	108	30.0%	32	104	0.5%	1	20	2.0%	0	14	2.7%	0	0	25%	0	75	0.5%	0	31.9	15.0%	5	43.4	15.0%	7	0	1.0%	0									164 920	12 222	Mode splits selectively chosen. VIU Nanaimo mode split based on Camosun.
Nanaimo sub-zone Ladysmith sub-zone													15	1.0%	0	28	1.0%	0	2	0.5%	0	189	30.0%	57	33	30.0%	10	57	0.5%	0	20	2.0%	0	14	2.7%	0	0	25%	0																									14 344	0 68	

Table A-7: ESTIMATED TRANSIT RIDERSHIP BETWEEN COWICHAN VALLEY and NANAIMO - MICROSCOPIC METHOD, VIU TYPICAL WEEKDAY

WORK	Comox Military Airbase			Catalyst Paper (Port Alberni)			Vancouver Island University - Parksville (students)			Vancouver Island University - Parksville (employees)			Regional District of Nanaimo			City of Nanaimo			Catalyst Paper (Nanaimo)			Vancouver Island University - Nanaimo (students)			Vancouver Island University - Nanaimo (employees)			Nanaimo Forest Products			Nanaimo Airport			Town of Ladysmith			Ladysmith Secondary School (2016)			Catalyst Paper (Crofton)			Vancouver Island University - Duncan (students)			Vancouver Island University - Duncan (employees)			City of Duncan			Royal Roads Univeresity (Employee)			Royal Roads University (Students)			CFB Esquimalt			Total		Comments
HOME	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	mode split	transit riders	commuters	transit riders	
Nanaimo Cowichan Valley				1	1.0%	0	14.3	1.0%	0	10.1	1.0%	0	21	1.0%	0	35	1.0%	0	4	1.0%	0	823	1.0%	8	142	1.0%	1	104	1.0%	1	20	1.0%	0	14	2.7%	0	0	2.7%	0	75	2.7%	2	71.1	2.7%	2	96.9	2.7%	3	0	2.7%	0									257 1175	7 12	Mode splits based on existing, zone wide value.
Nanaimo Cowichan Valley				1	1.0%	0	14.3	15.0%	2	10.1	15.0%	2	21	1.0%	0	35	1.0%	0	4	0.5%	0	823	30.0%	247	142	30.0%	43	104	0.5%	1	20	2.0%	0	14	2.7%	0	0	25%	0	75	0.5%	0	71.1	15.0%	11	96.9	15.0%	15	0	1.0%	0									257 1175	26 295	Mode splits selectively chosen. VIU Nanaimo mode split based on Camosun.
Nanaimo sub-zone Ladysmith sub-zone													15	1.0%	0	28	1.0%	0	2	0.5%	0	249	30.0%	75	43	30.0%	13	57	0.5%	0	20	2.0%	0	14	2.7%	0	0	25%	0																									14 414	0 89	

Appendix B - Captive Market Identification

Table B-1 has been colour coded in the manner described below, to facilitate interpretation.

Population Density and Employment Density:

1009	1000 < population / km^2 (meets or exceeds BC Transit's threshold)
874	800 < population / km^2 < 1000
709	600 < population / km^2 < 800
457	400 < population / km2 < 600

Youth and Elderly:

44%	40% < youth + elderly population
35%	35% < youth + elderly population < 40%
34%	30% < youth + elderly population < 35%

Employment/Population:

16%	employment/population ratio < 25%
29%	25% < employment/population ratio < 30%
31%	30% < employment/population ratio < 35%

Median Income:

22189	median income of the subdivision is within the lowest 25% of Vancouver Island

By inspection of Table B-1, one can conclude that all the subdivisions that meet the BC Transit threshold of 1000 population/ km^2 are urban centres and are already well served by transit. Furthermore, subdivisions with population densities as low as 200 are also served by transit currently. The lower end of the range tends to be less frequent, local service in rural communities. The population density threshold for this study has

been selected to be 600 (mid point in that range) because inter-regional transit services are less cost effective by nature, and is presumed to be unacceptable to BC Transit when compounded with densities lower than 600.

The subdivisions to be considered for inter-regional transit services can be selected based on the following filters:

- Population density > 600,
- Exclude urban centres (because they are already well served and not part of this inter-regional transit study),
- Also qualify for two “coloured cells” in any of the four remaining criteria, and
- Located further from its home region’s urban centre, than it is to one outside of its home region.

Based on these filters, the only subdivision to qualify for consideration of inter-regional transit service for a captive market is Ladysmith.

Table B-1: Qualitative Assesment of Potential Captive Markets for Transit

Census Subdivision	Population Density	Employment Density	Youth + Elderly	Employment / Population	Median Income ($)
North Saanich	296	84	36%	28%	36154
Sidney	2088	902	44%	43%	30947
Central Saanich	381	147	34%	39%	38409
Saanich	1009	295	30%	29%	34013
Oak Bay	1663	479	38%	29%	39977
Victoria	3907	3273	23%	84%	30177
Esquimalt	2259	1308	25%	58%	31720
Colwood	906	146	28%	16%	37689
Metchosin	63	8	29%	13%	37274
Langford	709	218	23%	31%	35078
View Royal	627	264	27%	42%	37038
Highlands	57	1	28%	2%	42325
Sooke	199	28	28%	14%	31015
Capital H	19	1	28%	3%	30071
North Cowichan	141	37	34%	26%	28309
Duncan	2153	1870	38%	87%	22189
Cowichan Valley D	194	23	35%	12%	34329
Cowichan Valley G	7	0	33%	0%	26170
Lake Cowichan	304	55	33%	18%	20749
Cowichan Valley H	27	0	33%	0%	26978
Ladysmith	656	201	35%	31%	30009
Cowichan Valley I	2	0	27%	3%	22436
Cowichan Valley A	87	22	33%	25%	32585
Cowichan Valley B	26	2	25%	6%	34294
Cowichan Valley C	211	50	42%	24%	33355
Cowichan Valley E	28	10	27%	35%	30456
Nanaimo	874	365	31%	42%	27620
Lantzville	133	13	31%	10%	34461
Nanaimo A	112	18	29%	16%	26984
Nanaimo C	2	0	30%	7%	32027
Parksville	789	339	45%	43%	27942
Qualicum Beach	457	117	54%	26%	28740
Nanaimo E	75	7	39%	9%	32076
Nanaimo F	27	4	27%	14%	26123
Nanaimo G	142	12	42%	8%	28871
Nanaimo H	12	1	36%	10%	24729
Comox	795	298	38%	37%	32193
Courtenay	795	357	34%	45%	26383
Cumberland	110	24	28%	22%	27130
Comox Valley A	14	2	34%	14%	26107
Comox Valley A	14	2	34%	14%	26107
Comox Valley C	7	1	29%	7%	29966
Campbell River	207	81	30%	39%	28329
Sayward	70	7	24%	10%	30703
Strathcona D	2	0	27%	7%	31887
Port Alberni	859	318	34%	37%	24888
Alberni-Clayoquot B	5	0	34%	9%	25188
Alberni-Clayoquot D	1	0	27%	11%	29448
Alberni-Clayoquot E	129	4	36%	3%	26461
Alberni-Clayoquot F	10	1	35%	9%	26544
Alert Bay	260	127	32%	49%	32094
Port McNeill	188	74	27%	39%	37381
Port Hardy	101	43	25%	42%	30275

Appendix C – North Island College Inter-Regional Transit Market

The NIC inter-regional transit demand was estimated using a 15% mode split, as was applied to the VIU Parksville and Duncan campuses. This is based on Camosun College's Victoria campus achieving 30% in 2008 through to 2013, and achieving 40% in 2013. The reduction is to account for the less urban environment, which challenges the effectiveness of transit. This rate assumes a comprehensive package of incentives is implemented with the support and cooperation of agency stakeholders (see Section 2.3).

The college does not grant degrees, and functions as a ladder school to transition to other institutions. Consequently, most students are part time, generating less trips. No explicit calculation was done to account for this, but is assumed to be offset by not accounting for staff commuting, which is approximately 20% of the student enrollment.

	North island College Students (Campbell River)	mode split	ridership NB
Nanaimo Regional	31	15%	5
Cowichan Valley Regional	4	15%	1
Victoria Regional	7	15%	1
Comox Valley Regional	161	15%	24
Campbell River Regional	368		
Other	57	15%	9
Total	628		39

	North island College Students (Comox Valley)		ridership NB	ridership SB
Nanaimo Regional	80	15%	12	
Cowichan Valley Regional	3	15%	0	
Victoria Regional	8	15%	1	
Comox Valley Regional	741			
Campbell River Regional	199	15%		30
Other	90	15%		
Total	1121		14	30

NOTES:

total # of staff =	399
total # of students =	2139
staff / student ratio =	19%

most students are part time therefore assume staff offsets part time nature of students' commute

Appendix D – Health Care Institutions' Inter-Regional Transit Market

The domicile postal code (first 3 characters only) for Vancouver Island Health Authority's employees were analyzed. Only three sites within the study area generated sufficient commuter traffic to warrant detailed analysis within this study. These were the Nanaimo Hospital, Cowichan District Hospital, and Campbell River Hospital. The remaining sites were either out of the study area, or significantly smaller in terms of staff size. The results of the analysis are presented in Tables D-1 through D-3.

This analysis estimated the potential ridership in three different ways, by using three different mode splits calculated from the Victoria General Hospital's transit ridership data and the VIHA's employment data. Each of the 3 calculations generated results that converged to the same order of magnitude, improving the confidence level of these estimates.

The calculations made various assumptions; some of which applied to all the calculations, and some applied to only one or two of the calculations. The more significant assumptions are listed below.

- Staff earning greater than $80,000 per year were excluded from the transit group.
- Only day shift workers would take transit. Due to concerns for safety and transit scheduling, evening and night shift works would not take transit.
- Only half of 12 hr shift workers who are on day shift would be eligible to take transit due to mismatching schedules with transit service.
- Only half of part time workers who are on day shift would be eligible to take transit due to mismatching schedules with transit service.
- All 8 hr shift workers who are on day shift are eligible to take transit.

Table D-1: Campbell River Hospital

	incomes up to $80,000		avg. weekday day shift		avg. weekday all shifts		by total staff	
	adj.trips*	trip %	workers	ridership est.	workers	ridership est.	workers	ridership est.
Campbell River	432	67%	252					
Comox Valley	101	16%	252	11	371	10	645	9
RDN	18.5	3%	252	2	371	2	645	2
Cowichan Valley	10.5	2%	252	1	371	1	645	1
Greater Victoria	1	0%	252	0	371	0	645	0
other	29	4%	252	3	371	3	645	3
total	592	92%						

Table D-2: Cowichan District Hospital

	incomes up to $80,000		avg. weekday day shift		avg. weekday all shifts		by total staff	
	adj.trips*	trip %	workers	ridership est.	workers	ridership est.	workers	ridership est.
Campbell River	0	0%	215	0	343	0	644	0
Comox Valley	1	0%	215	0	343	0	644	0
RDN	116.5	18%	215	10	343	10	644	11
Cowichan Valley	415.5	65%						
Greater Victoria	25	4%	215	2	343	2	644	2
other	7	1%	215	1	343	1	644	1
total	565	88%						

Table D-3: Nanaimo Hospital

	incomes up to $80,000		avg. weekday day shift		avg. weekday all shifts		by total staff	
	adj.trips*	trip %	workers	ridership est.	workers	ridership est.	workers	ridership est.
Campbell River	3	0%	747	0	1140	0	1993	0
Comox Valley	19	1%	747	2	1140	2	1993	2
RDN	1513	76%						
Cowichan Valley	172	9%	747	17	1140	17	1993	16
Greater Victoria	18	1%	747	2	1140	2	1993	2
other	17	1%	747	2	1140	2	1993	2
total	1742	87%						

mode split - avg weekday all shifts	17%
mode split - avg weekday day shift	27%
mode split - by total staff	9%