



**TITLE:** Alternative Transit Delivery Options and Feasibility Assessment

**PREPARED BY:** Ron Fraser

**DEPARTMENT:** Engineering and Development Services

**PURPOSE:** To provide Council with the final report on Alternative Transit Delivery for the City of Cranbrook.

### **RECOMMENDATION BY STAFF**

That Council receive the Alternative Transit Delivery Options and Feasibility Assessment report dated November 15, 2021 for information.

### **BACKGROUND INFORMATION:**

In the fall of 2019 City staff initially considered doing a review of the services provided by BC Transit. This was due to concerns over steadily increasing annual costs, perception of low ridership, and lack of responsiveness from BC Transit. In 2020 it was decided to hire a transit analyst to support staff in reviewing the effectiveness of BC Transit delivery and to consider alternative service models including 'on-demand' transit. Erin Toop with WSP was hired through the RFP process to undertake that work.

The study included an evaluation of both the City's current operational efficiency as well as the experience in other comparative communities. On Demand transit implementation was reviewed in various locations, including service analysis and high level costs.

Key findings included concluding that some fixed routes in Cranbrook are certainly inefficient and have low ridership and could be replaced by 'on-demand' transit. Two fixed routes in particular, Routes 1 and 5, are heavily used and should remain conventional. The cost structure with BC Transit is such that delivery by alternative providers is unfeasible due to the high subsidization by the provincial government.

Going forward, staff will work closely with BC Transit and their ongoing analysis of both the system in Cranbrook and 'on-demand' in general, to effect positive change, and to encourage 'on demand' where feasible. Additionally, due to the complexities of the transit operations, the study concluded that its essential that either a 0.5 FTE be provided for a Transit Coordinator with the City, or the same service provided by a contractor.

### **ALTERNATIVE:**

City contracts with an alternative provider to provide a transit service with on demand components as well as keeping the fixed routes that have high ridership.

### **BUDGETARY IMPACT:**

0.5 FTE or \$50,000 per annum for contracted services, for a City Transit Coordinator function.

### **POLICY IMPLICATION:**

Provision of a Transit Coordinator to provide closer contact with BC Transit will help promote mobility and accessibility by sustaining public transit as per our OCP, and the Integrated Community Sustainability Plan. It is also referred to in the Housing Needs Report.

**STRATEGIC PLAN ALIGNMENT:**

Supports 3.3, Thriving Community.

**ATTACHMENTS:**

[Cranbrook Alternative Transit Service Options Feasibility Assessment - FINAL20211115](#)

**Approved By:**

Ron Fraser, Director of Engineering and Development Services

Marnie Dueck, City Clerk/Corporate Officer

Mark Fercho, Chief Administrative Officer

**Status:**

Approved - 15 Nov 2021

Approved - 17 Nov 2021

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CITY OF CRANBROOK

# ALTERNATIVE TRANSIT DELIVERY OPTIONS AND FEASIBILITY ASSESSMENT

NOVEMBER 15, 2021



# REVISION HISTORY

## FIRST ISSUE

November 15, 2021	Final Report for City Council			
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## ACKNOWLEDGMENTS

Thank you to the on-demand transit technology vendors and experienced transit operators for their contributions to this study and feasibility assessment.

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# 1 EXECUTIVE SUMMARY

This report summarizes the work completed in April through October 2021 by WSP and Leading Mobility, to understand Cranbrook's transit system and assess opportunities for an alternative service delivery model in Cranbrook.

## Why did we do this study?

- The City is seeing steadily increasing transit operating costs,
- The City was feeling of lack of control around the performance and operation of its transit system,
- There is a perception of empty or under-filled buses pointing to cost inefficiency and unnecessary emissions and wear and tear on pavement,
- There is concern over how well the Cranbrook transit system serves residents and the community,
- There is a perception that alternative service models or on-demand transit could help improve the transit system efficiency, and
- There is a perception that BC Transit has not been historically attentive to Cranbrook's concerns and requests for opportunities to realize service efficiencies, in light of escalating costs and declining ridership.

## Study Scope

- Review of previous BC Transit reports and correspondence,
- Review of other jurisdictions with on-demand or hybrid service models,
- Ongoing engagement with BC Transit,
- Engagement with on-demand technology vendors,
- Engagement with experienced transit operators,
- Analysis of performance of Cranbrook's Transit Routes,
- Development of preliminary transit service guidelines,
- Development of potential transit service options in the context of Cranbrook's constraints, and
- Evaluation of alternative transit service options and assessment of costs.

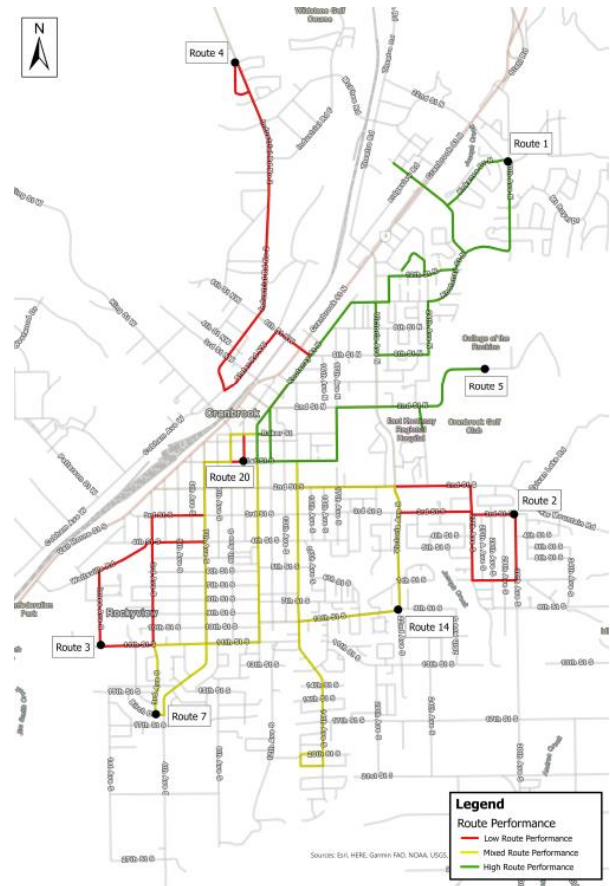
## What did we learn?

- There is a history of recommendations in BC Transit Service Review reports from 2013 and 2018 that have not been implemented in Cranbrook. There has been no prior investigation around the decline in transit users in Cranbrook over the last seven years.
- Through working with the City on this study, we have noticed a lack of staff time available to the public transit portfolio, compared to other Canadian jurisdictions, and that the transit role in Cranbrook has previously been quite scattered amongst several municipal staff. There is an opportunity to consolidate the City's transit function into a Transit Coordinator role.
- There are several concurrent and upcoming transit review processes led by BC Transit including: a study of on-demand transit opportunities across BC, with Cranbrook as a case study, and a Cranbrook Transit Service Review. The outcomes of these studies are not guaranteed but offer an opportunity for the City to participate and lobby for its goals and transit needs.
- Canadian communities that have implemented on-demand transit in the last three to four years are happy with the service, appreciate the flexibility to tailor service to real time passenger demands, and have found cost savings compared to running fixed routes in low ridership areas or at low ridership times of day.
- On-demand transit is an applicable service model for Cranbrook, particularly for the use case of replacing underperforming fixed routes.

- Cranbrook has multiple under-performing fixed routes, which are good candidates for on-demand transit service. There are two high performing routes, Route 1 and Route 5, which are the anchors of Cranbrook’s transit system; they are not candidates for on-demand service.
- The current shared governance and funding model for Cranbrook’s transit system makes the introduction of on-demand transit in Cranbrook challenging, unless it is operated by BC Transit. We developed and evaluated two hybrid fixed-route and on-demand transit options for Cranbrook, where the City would implement the on-demand service and found that the cost to Cranbrook would be between 60% and 80% higher than the current system.

**What do we recommend?**

- The City of Cranbrook include a Transit Coordinator function to its Staff, which can be achieved with 0.5 FTE. This position should report to a Director for any urgent decisions. The position would be expected to:
  - provide system oversight and service performance management, which will be particularly important if the City incorporates on-demand transit in the future,
  - address customer service issues and complaints,
  - coordinate with BC Transit on service planning and adjustments,
  - provide oversight and input on any BC Transit communication and public engagement in Cranbrook,
  - coordinate within the City departments to address transit operational and infrastructure issues such as bus stop fixes and bus detour requirements, and
  - develop reports and updates for senior management and Council.
- The City continue to lobby BC Transit for implementation of on-demand transit in Cranbrook, and a thorough review of existing transit routes to ensure service is aligned with passenger demand.
- The City lobby BC Transit for and collaborate on the development of Transit Service Standards for Cranbrook, which will provide the framework for ongoing monitoring and measurement of Cranbrook’s transit system.



# 2 BACKGROUND

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## 2.1 BACKGROUND AND PURPOSE OF THIS REPORT

The City of Cranbrook retained WSP and our subconsultant, Leading Mobility, to serve as transit advisors and analysts beginning in April 2021. This report summarizes the work we have completed to date, with a focus on responding to two of the City's hypotheses, as noted in the focus questions identified below, about its transit system. Although BC Transit, the City's current transit planner and operator, has been involved and kept abreast of this scope of work, the intent of the work was to provide a third party perspective. The analysis of Cranbrook's transit system reflects the City's goals and objectives. This is important because it establishes some preliminary reference points for the City as part of the shared governance structure with the Province. According to the BC Transit Act, the City is responsible for determining its own transit needs.

**This scope of work focused on two questions:**

- **Is the Cranbrook Transit service currently serving passengers and residents efficiently in terms of service and costs?**
- **Is the on-demand transit model applicable and viable in Cranbrook, and in what service contexts?**
  - **If yes to the above, what would the impact be to the City with deploying on-demand transit specifically on cost, customer experience and operations?**

The City of Cranbrook is in BC Transit's Municipal Systems program, and there is shared governance over Cranbrook's transit system. To date, the City has relied heavily on BC Transit for its transit system planning and operations. As such, there were several inputs to our scope of work that we had to take as given:

- The service levels on the City's existing fixed-routes can either be revised, removed or retained, but the physical characteristics of the routes are assumed to be fixed. Changes to the fixed-route system has been identified as an area of further study for BC Transit, in partnership with the City.
- The City is generally happy with its custom transit service (HandyDart) from BC Transit, and therefore our analysis has focused on the conventional transit system (fixed routes).
- While BC Transit has commenced its own feasibility process for digital on-demand transit utilizing Cranbrook and Kelowna as case studies, they will not commit to operating on-demand transit in Cranbrook in the near term.
  - To assess the cost of adopting on-demand transit in Cranbrook, we have assumed that a third-party operator would be hired to operate the on-demand part of the system, similar to service delivery approaches deployed in comparable sized cities elsewhere in Canada.
  - The provincial transit operating subsidy would not apply should the City initiate an on-demand transit service that is operated by a third party without BC Transit's involvement.
- The City has no current in-house transit functions, including: coordination, planning, scheduling, operating, maintenance, storage. It does not own transit fleet vehicles, the current fleet is leased from BC Transit.

Finally, given that the scope of this work is to investigate current operation and the technical feasibility of on-demand transit service, there would be additional questions to answer later or separately. Some of these questions must be answered by City Council or through public engagement, and would inform the City's path forward. These are:

- What is the value to the City of retaining more control and accountability over its transit system?
- What is the value to the City of piloting the on-demand transit service model ahead of BC Transit's timeline for implementation, if BC Transit adopts on-demand transit as a service delivery model in the future?
- What do residents of Cranbrook and current transit users think about the opportunity, benefits, and risks of changing the City's transit service delivery model?
- How would a City-led on-demand transit service interface with BC Transit's fixed-route operation?

- What are the detailed operating parameters and considerations for an on-demand transit service model in Cranbrook, considering the constraints and complexity of the operating environment?

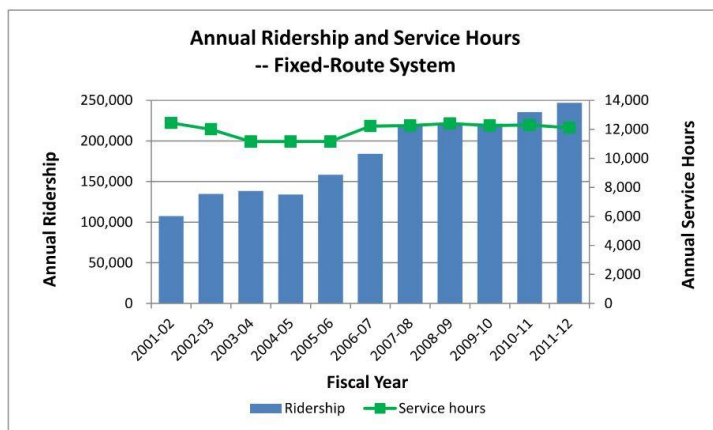
## 2.2 TRANSIT PLANNING AND RIDERSHIP IN CRANBROOK

Prior to investigating BC Transit’s previous reporting on the Cranbrook Transit system, we obtained an understanding from City Staff that there are often complaints from residents about empty buses circulating in Cranbrook, and questions of the effectiveness of the transit system. Our review of historical reports from BC Transit reveals that Cranbrook’s transit service has been static over the last 20 years since the system’s launch in 2000, despite changes in Cranbrook’s population and development in the community. Population in Cranbrook has slowly but steadily increased. According to Statistics Canada, in 2011, the City’s population was 19,310, in 2016 it was 20,047 and according to the Province, by 2020 it was over 21,000.

Some high-level characteristics of Cranbrook’s transit users are:

- A majority of riders are grade school students, Post-Secondary students, Seniors, Transit-dependent users. The U-Pass program is an incentive for College of the Rockies students.
- Riders travel mainly to the College, Walmart and Tamarack Mall (Routes 1 and 5).
- Riders travel for shopping, amenities and to attend school (both grade school and College).
- Riders travel during the daytime and at grade school bell times.

In 2013 BC Transit released a Cranbrook Transit System Service Review report, noting that 1.6% of the city’s working population used public transit and a trend of declining annual ridership. The historical comparison of annual transit service hours and ridership shows a concerning relationship of consistent increases in transit investment, with a decrease or stagnation in ridership. **Figure 2-1** provides a summary comparison of annual ridership to annual service hours by fiscal year from the 2013 report.



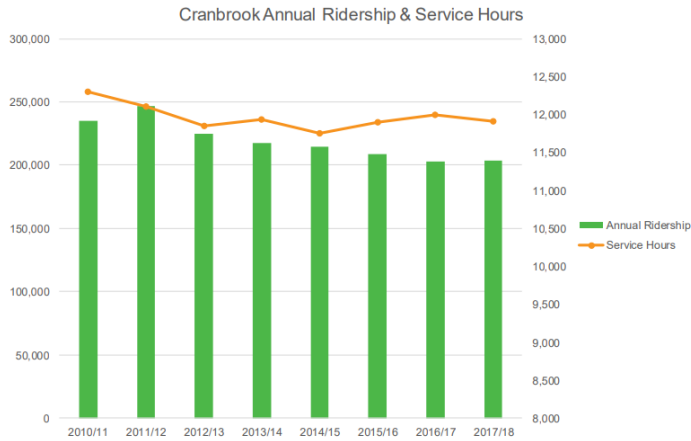
**Figure 2-1 2013 Annual Ridership and Service Hours Summary**

Recommendations outlined in the 2013 BC Transit report include:

- Service additions and routing adjustments to Route 4 Slaterville: Working with BC transit, as vehicle replacement plans and other opportunities arise, to examine introducing a mix of community-sized vehicles to the Cranbrook Transit System’s fleet over time, pending review of ridership and capacity needs; and,
- Additional review of fares to include a Semester Pass program and formation of a working group with BC Transit, Sun City Coach Line and College of the Rockies to review and explore marketing strategies.

The latest Cranbrook Transit System Service Discussion document was published in July 2018, noting a decline in the working population utilizing public transit to 1.19%. This is a decrease from 1.6% in 2013. The same concerning relationship between annual transit service hours and ridership is maintained, with transit service being increased or

maintained, and transit ridership declining. **Figure 2-2** shows the comparison of annual ridership to annual service hours by fiscal year.



**Figure 2-2 2018 Annual Ridership and Service Hours Summary**

With a clear trend of declining ridership in Cranbrook over a seven-year period, we would expect to see a detailed investigation of this trend to understand why it is occurring, and whether the transit service hours are used effectively.

Recommendations outlined in the 2018 Service Discussion report include both service and policy changes which are summarized in **Table 2-1**.

**Table 2-1 2018 BC Transit Service and Policy Recommendations**

SERVICE CHANGE OPTIONS	IMPLEMENTATION TIMELINE	RESOURCE IMPLICATIONS
Bus Stop & Timing Point Optimization,	Within 1 year	No additional resources
Route 14 14 <sup>th</sup> Avenue routing changes	1-3 Years	250-500 Service Hours
Weekday evening service increase	1-3 Years	600-800 Service Hours
Re-design service to southwest Cranbrook	1-3 Years	No additional resources
Add Industrial Road 1 to Route 4 Slaterville	3-5 Years	100-200 Service Hours
Increase regional connectors	5-10 Years	TBD
Connect Route 4 Slaterville to Supercentre	5-10 Years	TBD
PROPOSED POLICY OR STRATEGY CHANGE	IMPLEMENTATION TIMELINE	RESOURCE IMPLICATIONS
Additional weekday service	1-2 Years	1000 Service Hours, 1 Bus
Introduce custom registration	TBD	TBD
Pursue funding partnerships	TBD	No additional resources, any savings will be reinvested
Improve vehicle allocation	Less than 1 Year	None

To date, we understand that none of these recommendations have been implemented. With the impact of the COVID pandemic, it is expected that BC Transit will revisit these recommendations in a forthcoming Cranbrook transit service review.

## 2.3 CRANBROOK TRANSIT SERVICE AND COSTS

In 2021/22 the City of Cranbrook is expected to pay \$749,000 for conventional transit service and another \$146,000 for custom transit service. For this budget, BC Transit sets service specifications at 12,000 revenue service hours for conventional transit and 4,700 service hours for custom transit (the City's paratransit service). Total system costs are also shown for reference, and these are shared with BC Transit. The City of Cranbrook receives all of the revenue collected from the City's transit systems, which helps to offset some of its share of the system costs. While a review of custom transit is generally out of scope, the operating cost details are provided in **Table 2-2** for completeness and to give a full picture of the City's share of transit operating costs.

**Table 2-2 Operating Cost Details**

2021/22 OPERATING AGREEMENT	TOTAL COST (OPERATING + LEASE)	CITY OF CRANBROOK SHARE OF COST	TOTAL REVENUE SERVICE HOURS	TOTAL COST / SERVICE HOUR	CITY OF CRANBROOK COST / SERVICE HOUR
Conventional Transit	\$1,670,780	\$748,556 (45% of total operating cost)	12,000	\$139.20	\$62.40 (45%)
Custom Transit	\$454,101	\$145,654 (32% of total operating cost)	4,700	\$96.60	\$31.00 (32%)

Translating the aggregated costs above into costs per transit service hour shows that the City pays \$62.40 per conventional service hour and \$31.00 per custom service hour. Total system costs per service hour are significantly higher, at \$139.20 for conventional service and \$96.60 for custom service.

## 2.4 BC TRANSIT DISCUSSIONS AND PROCESS

Throughout 2020 and 2021, the City of Cranbrook has had several meetings and discussions with BC Transit, requesting that the provincial agency provide on-demand service in the community to address the perception that transit buses are circulating empty on certain routes, and at certain times of day. Considering annual operating costs continuously escalating, the City has asked BC Transit for a more cost-efficient service, focused on serving customers when they need to travel. The City’s perception is that on-demand transit service could be an effective tool to customize transit service levels to ridership, particularly in areas where Cranbrook’s existing fixed-route service is providing neighbourhood coverage rather than serving high-demand travel patterns.

To date, BC Transit has made no firm commitments about deploying on-demand transit service throughout BC communities. However, BC Transit has commenced a process of exploring a provincial framework for providing digital on-demand transit service, in which they are using the City of Cranbrook as a case study. BC Transit’s digital on-demand feasibility study is looking at four primary use cases for on-demand transit in BC communities:

- Replacement of low performing fixed routes with on-demand service,
- Expansion of digital on-demand services to new areas and time periods not currently served by transit or improving service to First Nations,
- Improvement of headways and accessibility for standard service, and
- Improving efficiency for HandyDART.

BC Transit’s most recent Strategic Plan cites the implementation of digital on-demand transit service as a priority. Though the Province has not committed to digital on-demand transit in Cranbrook, the prospect of the province providing digital on-demand transit service has become more tangible since spring 2021 and throughout the course of this City-led transit feasibility study. Based on our many meetings and discussions with BC Transit Staff, we anticipate an implementation timeline for digital on-demand transit in BC communities to occur between 2023 and 2026. This timeline would be contingent on issues like BC Transit and municipalities agreeing on implementing on-demand transit per BC Transit’s framework, developing a change management program for transit systems, third party providers and customers, and contracting with a third-party technology vendor.

BC Transit was consulted throughout our City of Cranbrook study process and in option development. They also provided the City with costing to provide a reduced amount of fixed-route service in Cranbrook (see Section 6.3) should the City wish to pursuing transitioning low ridership routes to on-demand service.



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## 2.5 CITY GOALS

The City of Cranbrook had the following goals to consider in assessing its existing transit delivery model and in developing alternative options:

1. Balance transit costs and benefits - ensuring that the City is focusing its funding for transit on service that is being used by community members.
  - a. System efficiency and right-sizing - aligning the amount of transit service with ridership.
2. Improved customer experience - considering opportunities to broaden access to transit, reduce wait times and travel times, and better align service with customer needs.
3. Operational flexibility - the flexibility to change the amount of transit service the City is providing to respond to varying levels of demand.
4. Accountability for Transit Decision-making - increasing the City's oversight over its transit system through accountability for transit decisions with planning, operations, and finance.

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## 2.6 A NOTE ON COVID-19

Municipalities around the world have seen a decrease in transit ridership due to COVID-19. Recent statistics from a study of Toronto and Vancouver transit riders found that in March 2020, 63% of transit users had stopped riding transit, and by March 2021, 70% of those who stopped had returned to riding transit. While transit ridership in these cities is now rebounding since the initial disruption of the pandemic, there remains uncertainty about whether and when ridership will fully recover to 2019 levels.<sup>1</sup>

Maintaining a base level of transit service has been crucial throughout the pandemic, to ensure equitable access to transportation and maintain transit rider behaviour. Continuing transit service has been especially important for people who are dependent on transit to move around their communities. This population is disproportionately made up of students, seniors, low-income individuals, women and essential workers. Even so, municipalities have scaled-down transit service to better respond to the abrupt and significant change in travel behaviour, and to reflect a decrease in ridership. Many transit agencies (ex. Medicine Hat, Durham Region, York Region) have also accelerated the deployment of on-demand transit because of the reduction in ridership experienced during the pandemic. Now, with a return to in-person grade school and post-secondary education in Fall 2021, many municipalities are scaling their transit service back up to 2019 levels. The fluctuation in transit demand over the last two years has helped demonstrate the benefit of flexibility in transit service delivery models and transit modes, to respond to changing demand and fare revenue.

For example, through the COVID-19 pandemic, the City of Edmonton adopted their Saturday transit service level for weekdays (a significant reduction in weekday service). During this same period, Edmonton acted on pre-pandemic plans and launched on-demand transit service in several neighbourhoods. In fall 2021, they are now scaling service back up to near 2019 levels.

In Cranbrook, BC Transit has required that the City provide 99.6% of its 2019 transit service (12,000 annual service hours) in 2020 and 2021, through the pandemic, to retain its access to Safe Restart Funding.

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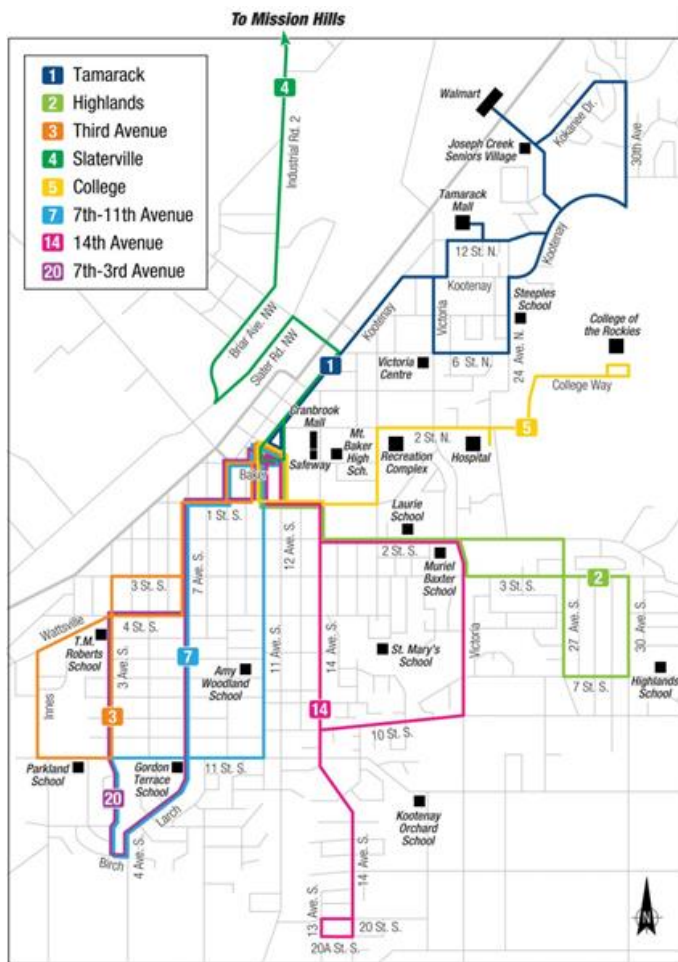
[https://tspace.library.utoronto.ca/bitstream/1807/106676/1/The%20Public%20Transit%20and%20COVID-19%20Survey%20Wave%202%20Results\\_Final.pdf](https://tspace.library.utoronto.ca/bitstream/1807/106676/1/The%20Public%20Transit%20and%20COVID-19%20Survey%20Wave%202%20Results_Final.pdf)

# 3 EXISTING TRANSIT SYSTEM

This section of the report characterizes Cranbrook’s existing transit system, including a brief description of each route and service frequency. Many of Cranbrook’s transit routes are neighbourhood and coverage services (described further in **Section 5**). Two routes serve key trip generators such as the mall, Walmart and the College of the Rockies. The transit system includes extra trips to accommodate grade school bell times on the neighbourhood and coverage routes. All of Cranbrook’s transit routes connect to the transit hub at 12<sup>th</sup> Avenue and Baker Street to facilitate transfers between routes. Cranbrook’s transit service is heavily interlined, meaning that buses seamlessly switch from one route to another at the transit hub, which results in a very efficient use of vehicle time and service hours.

## 3.1 ROUTE DESCRIPTIONS

Cranbrook is also connected to the region, with daily regular regional transit services from Kimberley and services from other communities like Creston, which operate only on Tuesdays and Thursdays. These regional services are not in the scope of this study, as they are entirely funded by the municipalities in which they originate. BC Transit’s 2021 Cranbrook route map is shown below in **Figure 3-1** and the summer 2021 weekday service frequencies are shown in **Table 3-1**.



**Figure 3-1 Cranbrook Transit System Map**

**Table 3-1 Weekday Cranbrook Transit Frequency Table**

Route	Span of Service	AM Peak	Mid-day	PM Peak	Early PM	Comments
1	7:15AM-8:57PM	30	30	30	60	Schedule fluctuates from 15 to 60 minutes Certain trips adjust for school days and Fridays
2	7:30AM-6:58PM	30	60	30	45	Schedule fluctuates from 15 to 60 minutes Certain trips adjust for school days and Fridays Certain trips do not operate from July to August 31
3	7:45AM-6:43PM	30	60	45	-	Schedule fluctuates from 15 to 60 minutes Certain trips operate from Labour Day until end of April Certain trips operate Friday only
4	7:45AM-5:21PM	135	120	150	-	
5	7:45AM-6:28PM	15	30	15	-	Certain trips operate from Labour Day until end of April Certain trips operate Friday only
7	8:00AM-7:58PM	30	45	30	60	Schedule fluctuates from 15 to 60 minutes Certain trips operate from Labour Day until end of April Certain trips operate Friday only
14	7:30AM-8:13PM	30	30	30	60	Schedule fluctuates from 15 to 60 minutes Certain trips adjust for school days and Fridays Certain trips operate from Labour Day until end of April
20	-	-	-	-	-	

### 3.1.1 ROUTE 1: TAMARACK

Route 1 (Tamarack) is a fixed route service between the downtown and north area of Cranbrook. Key destinations along this route include, Tamarack Mall, Walmart, and the downtown core. Based on Cranbrook Transit’s interactive map, this route provides two functions; service to key destinations as noted above, and residential coverage near these locations.

Route 1 takes a total of 25 minutes to complete a single service loop.

Alternative or additional service includes:

- Two (2) trips on weekdays at Steeples School and Kootenay Christian Academy bell times (AM & PM),
- A single (1) trip operates Monday to Thursday ONLY
- Four (4) trips operate Friday ONLY in the evening

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### 3.1.2 ROUTE 2: HIGHLANDS

Route 2 (Highlands), provides a fixed route service between the downtown core and southeast area of Cranbrook. Key stop destinations along this route include, Laurie School, Muriel Baxter School, and Highlands School, before returning to the downtown core.

Route 2 takes a total of 13 minutes to complete a single service loop.

Alternative or additional service includes:

- A single (1) trip on weekdays meets Laurie Middle School’s AM bell,
- A single (1) trip does not operate from July to August 31, and
- A single (1) trip operates Friday ONLY

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### 3.1.3 ROUTE 3: THIRD AVENUE

Route 3 (Third Avenue), provides a fixed route between the downtown core and southwest area of Cranbrook. Key stop destinations along this route include, T.M. Roberts School, and Parkland School, before returning to the downtown core.

Route 3 takes a total of 13 minutes to complete a single service loop. This route only operates during the weekdays (Monday – Thursday) and Saturday’s.

Alternative or additional service includes:

- A single (1) trip operates after Labour Day to the end of April
- A single (1) trip operates Friday ONLY.

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### 3.1.4 ROUTE 4: SLATERVILLE

Route 4 (Slaterville), provides a fixed route between the downtown core and Mission residential neighbourhood in the northwest corner of Cranbrook. Key route destinations include connecting the industrial area of northwest Cranbrook, and the residential neighbourhood of Mission with the downtown core.

Route 4 takes a total of 21 minutes to complete a single service loop. This route only operates during the weekdays (Monday - Thursday).

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### 3.1.5 ROUTE 5: COLLEGE

Route 5 (College), provides a fixed route between the downtown core and College of the Rockies. Key route destinations include, the Aquatic Centre / Western Financial Place, East Kootenay Regional Hospital and the downtown core.

Route 5 takes a total of 12 minutes to complete a single service loop.

Alternative or additional service includes:

- Eleven (11) trips dispersed throughout the day operate after Labour Day to the end of April
- A single (1) trip operates Friday ONLY

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### 3.1.6 ROUTE 7: 7 – 11 AVENUE

Route 7 (7<sup>th</sup> – 11<sup>th</sup> Avenue), provides a fixed route between the downtown core and south area of Cranbrook. Key destinations along this route include Amy Woodland School and Gordon Terrace School and the downtown core.

Route 7 takes a total of 13 minutes to complete a single service loop. This route only operates during the weekdays (Monday – Thursday) and Saturday.

Alternative or additional service includes:

- Six (6) trips operate after Labour Day to the end of April
- Two (2) trips operate Friday's ONLY

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### 3.1.7 ROUTE 14: 14 AVENUE

Route 14 (14<sup>th</sup> Avenue), provides a fixed route between the downtown core and south area of Cranbrook. Key destinations along this route include, Laurie School (also captured within Route 2), St. Mary's School and the downtown core.

Route 14 takes a total of 13 minutes to complete a single service loop.

Alternative or additional service includes: Three (3) trips operate after Labour Day to the end of April

- A single (1) trip, on school days, routes directly to Mount Baker Secondary at 08:25
- Two (2) trips operate Friday ONLY

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### 3.1.8 ROUTE 20: COMBO

Route 20 (Combo), provides a fixed route between the downtown core and the south/southwest neighbourhoods of Cranbrook. This service is only provided on Sunday's. As such, Route 20 takes a total of 15 minutes to complete a single service loop.

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## 3.2 TRANSIT SERVICE LEVELS

Revenue service hours for all Cranbrook Transit routes were provided by BC Transit for the September 1, 2019 – March 31, 2020 period, to provide an understanding of pre-COVID levels of service, in which to base future scenarios from. Revenue service hours have been derived from schedule line summaries and represent the amount of time (in hours) each day that a transit vehicle is scheduled in service on a route. The revenue hours shown in **Table 3-2** do not include recovery or layover time (time waiting at stops or the station), or deadhead to and from the garage (travelling between the garage and the start of service). Revenue service is 196 service hours per week during the fall and winter, while total service hours (including non-revenue service) are 237 per week.

According to the CUTA 2019 Conventional Transit Statistics, there were a total of 12,055 annual transit service hours provided in Cranbrook, in 2019. This is slightly up from 12,010 in 2018.

**Table 3-2 Revenue Transit Service Hours by Route – Fall / Winter 2019**

Route	Service Hours by Route (Fall/Winter 2019)								Weekly Total by Route	Percent of Total
	Mon	Tues	Weds	Thurs	Fri	Sat	Sun			
<b>1</b>	8.97	8.97	8.97	8.97	10.22	8.58	5.67	60	31%	
<b>2</b>	3.25	3.25	3.25	3.25	3.47	2.17	1.73	20	10%	
<b>3</b>	2.60	2.60	2.60	2.60	2.82	1.95		15	8%	
<b>4</b>	1.75	1.75	1.75	1.75	1.75			9	4%	
<b>5</b>	6.43	6.43	6.43	6.43	6.65	3.55	1.73	38	19%	
<b>7</b>	3.90	3.90	3.90	3.90	4.33	2.82		23	12%	
<b>14</b>	4.75	4.75	4.75	4.75	5.18	3.47	1.73	29	15%	
<b>20</b>							2.00	2	1%	
<b>Total by Day</b>	32	32	32	32	34	23	11	196		
<b>Percent of Total</b>	16%	16%	16%	16%	18%	11%	6%			

Based on the above, Route 1 represents the most transit service hours in Cranbrook’s system, at 31% of the weekly total hours. Route 5 is next at 19%. Together, Route 1 and Route 5 represent 50% of Cranbrook’s transit service hours, which is important because these two routes serve Cranbrook’s key destinations and are the city’s highest ridership services, as discussed in **Section 6**.

### 3.3 TRANSIT VEHICLES

Cranbrook’s transit system has five vehicles in operation on a typical weekday peak period, and there is one spare vehicle available. Of the five active vehicles, two are 30-foot (22 seat) buses, and three are 35-foot (30 seat) low-floor conventional buses. These five buses were purchased by BC Transit in 2017 and leased to the City of Cranbrook. The two 30-foot buses have a planned replacement date of late 2027 and the three 35-foot buses have a planned replacement date of early 2028. BC Transit notes that planned replacement dates will be revisited closer to, in an aim to balance maintenance costs with capital costs.

# 4 ON-DEMAND TRANSIT OVERVIEW

To understand what on-demand transit is, it is helpful to define conventional transit. Conventional transit uses fixed schedules, routes, and stops—passengers must plan their trips according to the schedules and routes that transit agencies have determined, typically based on ridership and demand. This is the transit service model most of us are familiar with. On corridors where there is predictable and high demand for transit, conventional service using high-capacity vehicles is an efficient and effective transportation option. On-demand transit comes in several forms, but its key distinction is that there is no fixed schedule for service, and often no fixed routes or stops either. Instead, passengers within a defined on-demand transit service area book trips as they require them. Vehicles do not make trips when/where there is no demand for transit, and vehicles are typically smaller, such as sedans, minivans, and shuttle buses. Repurposed conventional buses from fixed route services can also be utilized to provide on-demand transit service.

## 4.1 HOW DO PASSENGERS GET AROUND USING ON-DEMAND TRANSIT?

On-demand transit comes in several forms, each with different levels of flexibility for passengers. The most common forms are hub to hub, curb to hub, and curb to curb as shown in **Table 4-1**.

**Table 4-1 Typical On-demand Transit Models**

<b>Hub to Hub</b>	<b>Curb to Hub</b>	<b>Curb to Curb</b>
Passengers are picked up from a “hub” within the service area. A hub might be a bus stop, municipal building, or a regional transit station. Passengers are then dropped off at another hub within the service area. This option is the least flexible with regard to route, but still offers full flexibility when it comes to trip scheduling. This option provides cost savings in low-demand scenarios, but does not address first/last mile mobility.	Passengers are picked up at any curb within the service area, often at a virtual stop. They are then taken to a hub within the service area, such as a bus stop. This option is moderately flexible, with passengers able to get from anywhere in the service area to any hub within the service area. After disembarking at the end of a trip, last mile mobility solutions are still required. The existing Downtown transit terminal at 12 <sup>th</sup> Avenue South/Baker would serve as the hub for this on-demand transit model.	Passengers are picked up at any curb within the service area, often the end of their driveway, similar to the existing HandyDart service. They are then taken to any other curb within the service area. This is a highly flexible option for getting to a place of work, doing errands, attending an event, making a social call, or meeting any mobility need within the service area. First/last mile mobility needs are fully met by this option.

There are additional service models that combine aspects of the three shown here. For example, an intermodal, multi-segment trip might look like this: an on-demand vehicle picks you up at your location and drops you off at a conventional transit stop, you ride conventional fixed-route service to another transit stop near your destination, then another on-demand vehicle picks you up and brings you the last kilometre from conventional transit to your destination. This service option offers first/last kilometre mobility for scenarios where a passenger needs to make a longer trip, especially one that starts in one on-demand service area and ends in another. Another service model involves flex stops, which means on-demand vehicles offer trips anywhere along fixed routes, and passengers do not need to board/depart at specific stops.

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## 4.2 WHAT IS THE TECHNOLOGY BEHIND ON-DEMAND TRANSIT?

Each of the above service models relies on dynamic, back-of-house booking software otherwise known as autonomous dispatch and routing. Transit users can book trips using a smartphone app or by calling in to a booking agent, and the software automatically combines trips in the most efficient way possible, minimizing trip times for riders and operating costs for transit providers. A tablet on board the transit vehicle informs the operator of the route and requested pick up locations. Depending on the specifics of the service, booking might be required days or minutes in advance. Payment can be made with cash or conventional tickets and passes, but integrated, in-app trip planning and payment is the next step towards a seamless mobility experience.

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## 4.3 HOW DO ON-DEMAND TRANSIT AND CONVENTIONAL TRANSIT WORK TOGETHER?

On-demand transit is typically offered alongside conventional transit, with the respective service models filling different roles within the overall transit network. Conventional service runs along busier corridors, while on-demand service is offered in areas with low demand. On-demand transit often fills in gaps where conventional service is not offered, thereby expanding the overall geographic coverage of the transit network without incurring the cost of providing expensive conventional service across the entire service area. On-demand transit is ideal for newer areas within a municipality that do not yet have sufficient population to warrant conventional transit service. On-demand transit also works well in rural areas where transit demand is low, but mobility options are limited for those without access to a private car. An added bonus of using on-demand transit in rural areas is that curb to curb service cuts out the need for bus stop infrastructure such as benches, shelters, and signage, thereby saving taxpayer dollars. Finally, some conventional routes see low demand during off-peak time periods, making on-demand a viable solution at certain times of day.

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## 4.4 ON-DEMAND TRANSIT JURISDICTIONAL SCAN SUMMARY

To understand more about on-demand service deployments in Canada and, where possible, in British Columbia, several jurisdictions were reviewed: Powell River, BC, Cochrane, AB, Airdrie, AB, Medicine Hat, AB, Innisfil, ON, and Stratford, ON. On-demand transit has been introduced in each of these jurisdictions, which vary in scale geographic area and technology vendor. The service hours and area depend on the specific context of the jurisdiction. Although on-demand transit is introduced for different reasons, all jurisdictions indicated cost savings as a key objective. Other considerations include the selection of the service provider and integration with user-friendly software. Overall, most jurisdictions have experienced success with on-demand service and value the flexibility to increase or decrease service based on fluctuations in demand. The full Jurisdictional Scan was provided to the City as a separate report. Key considerations for Cranbrook are as follows.

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### 4.4.1 OPERATING COST AND UTILIZATION

Many jurisdictions either replaced fixed-route transit with on-demand or added on-demand service, as a compliment to fixed-route during off-peak hours or in geographic areas with low ridership, to form a hybrid system as a strategy to improve cost recovery. The minimum ridership targets for on-demand service, cited by different municipalities, ranged from 4 to 6 passengers per hour; this range is carried forward as a recommendation for Cranbrook **in Section 5 (Transit Service Guidelines)**. This minimum ridership target is different than the maximum threshold for on-demand transit, which we have assumed is 8 passengers per hour for the purposes of the optimization analysis in **Section 6**.



Stratford, ON reported significant diesel fuel cost savings with the change from fixed-route to on-demand when compared to conventional transit. Medicine Hat found cost savings by converting five underutilized fixed routes to on-demand service, with only three buses. They have found that on-demand service is allowing them to retain coverage transit service at a 25% cost reduction. As each service is deployed uniquely, a specific cost-recovery ratio indicator has not been identified to transition from fixed-route to on-demand. Labour cost savings after switching to on-demand service are also notable, due to some jurisdictions contracting with private service providers for the on-demand portion of their system.

It is important to note that Cranbrook is in a more complex transit operating situation than most municipalities and relies fully on BC Transit for its current transit service. The operating cost efficiency cited by other jurisdictions would not necessarily translate in Cranbrook under the current operating paradigm, as BC Transit is not willing to operate on-demand transit service currently, and the City would have to procure on-demand transit services from another operator at full cost. However, in a paradigm where BC Transit were to operate on-demand service in lieu of fixed routes, in low ridership areas or at low ridership times of day, operating cost efficiency would be expected. BC municipalities are in a unique position, where the Province contributes heavily to transit operating costs. This is not the case in other provinces.

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#### **4.4.2 SERVICE PROVIDER**

The importance in selecting an experienced service provider and integration between the provider and the software were mentioned several times throughout interviews. Airdrie indicated that their service shortcomings in 2018/2019 while partnered with a third-party operator was likely a result of being early adopters and that more options exist in today's market. This was confirmed with Cochrane who is currently partnered with the same operator and is very satisfied with the service and software app. Integration between the on-demand transit service and software providers ensure greater efficiency and responsiveness when changes are made to the system. It was also indicated by many jurisdictions that it was important to have a user-friendly app that could produce easily accessible data to measure the operations of the service.

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#### **4.4.3 SERVICE MODEL**

Service models range between fully on-demand, hybrid on-demand and fixed-route systems. The model applied varies based on ridership profiles, geographic area and origins-destinations. In most cases on-demand services are deployed to meet demand of non-commute trips. On-demand also replaced fixed-routes where the trip time can be reduced significantly by removing a transfer. Although all jurisdictions interviewed indicated flexibility with on-demand services, the ridesharing transit model in Innisfil, ON provided by Uber was found to provide the greatest flexibility.

The ridesharing transit model meets the needs of residents in a low-density town with an extremely large service area. For highly dispersed destinations and travel patterns, this service model is flexible and adaptable as operational costs change with the number of trips taken. However, the downside of the ridesharing model is the potential to succeed or grow into cost-failure, where it becomes unsustainable to subsidize an ever-increasing number of rides. This model may also be a challenge in British Columbia due to differences in vehicle for hire regulations.

A theme from the communities interviewed is the intent to scale-up existing on-demand routes with higher ridership to fixed-routes, thereby achieving a hybrid on-demand and conventional system. A hybrid on-demand and conventional system appears to be the most cost-sustainable for adapting to both ridership growth and decline.

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#### **4.4.4 DESIGNATED STOP MODEL**

In most of the jurisdictions reviewed, designated stop models were the most common. This designated stop model is compatible with scaling up and down between fixed-route and on-demand service, as described in the previous section, as the bus-stop network can remain in place regardless of the type of transit service operating. The designated stop systems allow the software to create routes more efficiently for users travelling in the same

direction. This model can also be used to track frequently used routes, and has potential for informing future fixed route service, if appropriate.

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#### 4.4.5 PARA-TRANSIT

The incorporation of existing paratransit for users with mobility impairments was noted in both Airdrie and Powell River. As both municipalities had existing accessible door-to-door service, the on-demand model provided a similar option for all users, regardless of their unique mobility needs. The opportunity to merge paratransit with on-demand transit service for all customers was also noted by Medicine Hat, to leverage excess capacity in the paratransit system when there is lower utilization by its customer base. Many regular users of the door-to-door transit service are residents with mobility restrictions.

The potential to merge on-demand transit with para-transit (called custom transit in Cranbrook) will be an important longer-term consideration for the City of Cranbrook, and could be an opportunity for efficiency across both services.

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### 4.5 HOW CAN ON-DEMAND TRANSIT BE APPLIED IN CRANBROOK?

There are several potential use cases for on-demand transit in Cranbrook, however, given the City's primary goal to balance transit costs and benefits, and right-size the transit system, our analysis has focused on identifying underperforming fixed-routes, which are candidates for replacement with on-demand service. This is directly aligned with one of the on-demand use cases identified in BC Transit's framework for on-demand transit service. For this study, we did not focus on service expansions or integrating on-demand transit with the City's custom transit system, because these questions were out of scope of improving the efficiency of the existing conventional transit system.

Because of the City's concern that many of its transit routes are underutilized, there is an opportunity to leverage the data collected through an on-demand transit application to inform updates to the fixed routes. Regardless of the timeline in which on-demand transit is launched in Cranbrook (either by the City's own initiative, or when BC Transit is prepared to launch service) the robust data collected through the on-demand transit application should be used to understand local travel patterns and inform planning new fixed routes or re-planning any of the existing fixed routes.

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### 4.6 SUMMARY OF BENEFITS AND RISKS IN CRANBROOK

Due to Cranbrook's current transit operating conditions and with the City considering on-demand transit ahead of BC Transit's timelines, there are several risks and benefits associated with both maintaining the current state or status quo, and with adopting on-demand transit in Cranbrook ahead of BC Transit's timeline. **Table 4-2** summarizes the key risks and benefits with each approach. Unfortunately for Cranbrook, the major concern around adopting on-demand transit early is the financial risk. This will be assessed in detail in **Section 7**.

**Table 4-2 Risks and Benefits of Near-term On-Demand Transit Adoption**

<b>Transit Delivery Scenario</b>	<b>Current State</b>	<b>Adoption of On-Demand Transit in Cranbrook ahead of BC Transit Timeline</b>
<b>Risks</b>	<p>BC Transit willingness to change service delivery model</p> <p>Uncertain BC Transit timeline for on-demand implementation</p> <p>Ongoing perceptions from Cranbrook residents that public transit is being underutilized</p>	<p>Unknown on-demand service costs and unlikely subsidy from BC Transit if the City deploys On-Demand transit on its own</p> <p>Unknown cost to introduce a new on-demand transit operator</p> <p>Interface issues between existing BC Transit service and on-demand service</p> <p>Reliability may be impacted for school trips on fixed-routes that are converted to on-demand.</p> <p>Impacts to customers require significant communication and public engagement</p> <p>City assumes significant start-up costs, when BC Transit may be willing to launch on-demand service in next 2 to 5 years.</p>
<b>Potential Benefits</b>	<p>Subsidized transit service costs</p> <p>All transit planning is outsourced to BC Transit</p> <p>BC Transit may be willing to plan and launch on-demand service in next 2 to 5 years.</p>	<p>Ability to customize on-demand service level to ridership</p> <p>Data about on-demand service is collected to support future on-demand and fixed-route service planning</p> <p>Opportunity to share or merge on-demand system with custom transit</p> <p>Transit service cost subsidy would remain for fixed routes</p>

# 5 CRANBROOK TRANSIT SERVICE GUIDELINES

Transit service standards are basis of the contract between the transit service provider and its customers, and the standards that define whether transit service is performing as intended or should be adjusted. Standards and guidelines also assist City decision-makers with metrics and standards to inform issues like service frequency and coverage, bus stop locations, ridership levels, customer experience. For example, most transit service standards set ridership performance targets, and establish timelines for adjusting service when the targets are consistently missed. To date, the City of Cranbrook does not have transit service standards or any basis for measuring the performance of its system. Under the City's current transit operating agreement, it would be the responsibility of BC Transit to initiate the process of developing of local transit service standards, but responsibility for developing the content in the service standards would be shared between BC Transit and the City of Cranbrook. BC Transit has expressed intent to develop transit service standards for Cranbrook in the future.

This section is not a comprehensive transit service standard, but it suggests some transit service guidelines for Cranbrook, as a starting point, to inform the development of transit service standards in the near future. These service guidelines draw on existing practice from other municipalities in North America and BC Transit's own service standards for other regions in BC. Some communities we reviewed include:

- Belleville, ON provides a nightly on-demand service for its community. Belleville has established a minimum ridership target of 5 rides/trips per hour for its on-demand transit service to maintain a reasonable cost/benefit. Other jurisdictions reviewed in the previous scan also use a target of 4 – 6 passengers per hour for their on-demand service. Given this, we have carried forward a suggested minimum ridership threshold of 4 passengers per hour for Cranbrook's on-demand service.
- Arlington, TX provides an on-demand transit service for low density/low demand area, applying a first-mile, last-mile approach to connect riders to major centers and transportation hubs. Their service operates Monday-Saturday (~6AM to 9PM) and they have a target wait time of 12 minutes or less. This wait time is the lower end of the range we have seen in other communities and is very dependent on the technology vendor and service contract. In Cranbrook, on-demand vendors anticipated a wait between 10 and 30 minutes (see **Section 7.1**) depending on the number of vehicles used in-service and time of day.
- Burlington, NH provides fixed-route service to a population of approximately 40,000. The major urban/urban local fixed-route service types aim for ridership of 15 – 20 passengers per hour. These service types are defined as highly utilized routes which operate along major arterials, and offer a simple, straight and direct service. Both connect passengers to the downtown. This fixed-route performance target is slightly lower than what is seen in Canadian examples, but is informative for the lower range of ridership targets in Cranbrook
- BC Transit, in Central Okanagan provides transit service standards and performance guidelines. There are two relevant fixed-route types in the Central Okanagan, which apply to Cranbrook. Local Transit (Ridership) is a fixed-route service geared toward higher ridership destinations, with 30 minute service all day and a performance target of 25 passengers per hour. Local Transit (Coverage) is a fixed-route service intended to provide coverage of neighbourhoods and less frequented destinations. This service would run approximately every 60-minutes all day and target 15 passengers per hour. These ridership performance targets are incorporated into the ridership ranges suggested below for Cranbrook's transit routes.

The aim of this section is to characterize and categorize Cranbrook's existing transit routes into service types, and to assign some tentative parameters to each type: service span, headway, and passengers per hour. As this is only meant to provide a starting point for developing Cranbrook's future transit service standards, there are several other issues like bus stop spacing, detailed service span analysis and reliability standards that are left for future work.

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## 5.1 CRANBROOK CONVENTIONAL TRANSIT SERVICE TYPES

Drawing on examples from other jurisdictions we have characterized Cranbrook's existing conventional fixed routes into three different categories:

- **Anchor Routes** provide service between high-demand destinations and operate at a reasonable frequency which can be relied upon by customers all day. Route 1 is an anchor route serving Cranbrook's commercial areas and Route 5 is an anchor route when the College of the Rockies is in full session. Route 5 currently operates as an Anchor Route year-round, however, we recommend reviewing service frequencies for the summer months.
- **Neighbourhood Routes** provide coverage within neighbourhoods and connect to the anchor routes at the downtown transit hub. The neighbourhood routes provide all day service but operate at lower frequency during off-peak times. They provide important coverage of the City's schools during grade school bell times. Routes 7 and 14 are the primary neighbourhood routes.
- **Coverage Routes** provide a low level of transit service to parts of Cranbrook not covered by the Anchor or Neighbourhood routes. These routes may operate at only certain times of the day or provide low-frequency service all day. Routes 2, 3, 4 and 20 are the City's existing coverage routes. With the availability of on-demand transit service, it is possible that coverage routes will become obsolete, unless ridership is expected to surpass the threshold for effective on-demand service.

In addition to the three existing service types, there are two new service types to consider:

- **On-Demand** transit is best-suited to providing coverage in lower demand areas and at low demand times of day. It provides an opportunity to scale-down fixed route service that is not meeting its ridership performance targets, or to expand transit service to new areas until ridership patterns are established and ridership justifies scaling-up to a fixed-route. In Cranbrook, conventional on-demand service is assumed to be stop-based, using either virtual or existing physical bus stops, but if merged with custom transit, custom transit users could continue to request door-to-door service. Zones for on-demand service should be designed to minimize the need to transfer between on-demand buses within the community, and to avoid cannibalizing ridership from the Anchor Routes.
- **Regional Connectors** are regional transit routes developed in partnership with neighbouring communities and population centres. The City is currently exploring the idea of a regional transit service, in partnership with Aq'am, St Eugene Resort and Casino, and the Cranbrook Airport (operated by the City).

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## 5.2 CONVENTIONAL TRANSIT SERVICE GUIDELINES

To establish some basic guidelines for Cranbrook's conventional transit system, we have focused on parameters for three basic service characteristics described below. Other characteristics such as stop spacing, reliability standards, and route design are left for future work, to be led by BC Transit.

**Ridership:** the number of passenger boardings on a transit route or service, measured in boardings per service hour. It is important to monitor ridership on transit routes and services to understand whether too much or too little service is being provided, and to indicate when adjustments to service plans are required. When ridership consistently exceeds targets.

**Headway:** the time between vehicles arriving at a given stop on a transit route, measured in minutes. For on-demand transit service headway is akin to the wait time for a pick up. Headway is a measure of the frequency of transit service, and it varies according to the function of a route. Where the goal is reliable and regular service that residents can count on throughout the day, then headways of at least 30 minutes are important to achieve a dependable service. Where the goal is coverage and simply providing transit as an option, the headways of 60 minutes or greater are appropriate.

**Service Span:** the time period on a given day which the transit service is available to passengers. Service span should match the travel patterns associated with the destinations that a transit route or service is covering. For routes accessing key amenities with all-day demand, a longer service span is appropriate. For routes that are aligned to

specific travel times such as commuting to work or school, then a narrower or more peak oriented service span is appropriate. Typically, service spans need to be robust enough that people feel confident that they can get home again at the end of their errand, work day or school day.

The current practice and advice around establishing a ridership threshold for on-demand transit ridership remains vague. Several jurisdictions are using a minimum passenger target of 4 to 6 passengers per hour, while an upper threshold is likely 8 to 10 passengers per hour, depending on the number of pooled rides and whether demand is concentrated in some key corridors. In **Table 5-1**, we have used a range of 4 to 10 passengers per hour, but recommend that, as ridership on on-demand service approaches 8 passengers per hour, the service is reviewed to determine whether a fixed-route may be appropriate. Inversely, when a Neighbourhood or Coverage route’s ridership performance is consistently below 10 passengers per hour (always, or during a specific time period), it is recommended that the route be reviewed as a candidate for on-demand service.

**Table 5-1 Preliminary Cranbrook Transit Service Guidelines**

	ANCHOR ROUTES	NEIGHBOURHOOD ROUTES	COVERAGE ROUTES*	ON-DEMAND	REGIONAL CONNECTORS
Ridership Target (Passengers per Hour)	15 – 30	15 – 20	10 - 15	4 - 10	TBD based on funding model and service goals
Headway (Wait time for On-Demand)	15 – 30 mins in peak periods, 30 minutes outside of peak periods	30 mins in peak periods, 60 mins outside of peak periods	60 – 120 mins	10-30 mins, may be longer during peak periods.	TBD based on destinations served
Service Span	Weekdays and Weekends, All Day	Weekdays, All Day Weekends, Varies based on demand	Weekdays and Saturdays, Varies based on demand	Weekdays and Weekends, All Day	TBD based on destinations served

*\*Coverage Routes currently exist but would likely be phased-out with the implementation of on-demand service in Cranbrook*

# 6 TRANSIT RIDERSHIP OPTIMIZATION ANALYSIS

Our ridership optimization analysis of Cranbrook’s existing transit routes is based on fall /winter 2019/2020 ridership data, provided by BC Transit in July 2021. The pre-COVID time period was chosen to remove the impact of the pandemic and to illustrate a recent “best case” scenario for transit ridership in Cranbrook. The optimization analysis is an assessment of whether Cranbrook’s existing fixed routes are meeting a minimum threshold of 8 passengers per hour, to justify their performance as a fixed route. A summary of average system-wide ridership is shown in this section, to establish overall transit use trends, and analyses of each route are provided in the following section.

Ridership data include boardings per hour per route, for each day of transit service in the period. The transit schedule in Cranbrook is the same on Monday through Thursday, and then the amount of service differs on each of Friday, Saturday, and Sunday. There are more trips on Friday than the other weekdays. In our route-by-route assessment we treated Mondays through Thursdays as similar and looked at the average ridership of each of these days together, as they have the same service schedules. As shown in the overall system ridership analysis in **Table 6-1**, Thursdays have the lowest average ridership of all the weekdays, while Mondays and Tuesdays have the highest. Given this, it is possible that the individual routes may perform slightly worse on Thursdays, as compared to the average of Monday through Thursday.

**Table 6-1** illustrates the average ridership on Cranbrook’s transit system for each hour of service for each day of the week. Mondays and Tuesdays are the highest ridership days in Cranbrook, while Saturdays achieve about half the weekday ridership, and Sundays achieve about a quarter of the weekday ridership. On weekdays, 2PM to 4PM are the highest ridership times, in alignment with school bell times, while on weekends noon to 3PM is the peak ridership time period. On weekdays, ridership sharply declines at 5PM with another significant drop at 8PM. On weekends, ridership also sharply declines at 5PM.

**Table 6-1 Average System-Wide Ridership by Hour and Day of Week**

Average Daily Ridership by Hour									
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Weekly Total	Percent of Total
Route Hour (in 24hr clock)	All	All	All	All	All	All	All		
5	0	0	0	0	0	0	0	0	0%
6	29	30	28	32	20	0	0	140	3%
7	70	67	74	67	44	0	0	323	7%
8	67	66	86	60	59	23	4	364	8%
9	47	46	53	45	45	28	19	282	6%
10	51	59	54	40	49	32	20	304	7%
11	57	66	58	45	59	44	21	350	8%
12	63	59	61	49	74	45	20	371	8%
13	67	64	62	58	72	47	30	400	9%
14	106	101	100	82	82	42	28	541	12%
15	81	87	80	65	70	38	28	450	10%
16	62	62	52	47	49	34	12	318	7%
17	24	25	22	18	26	12	8	136	3%
18	29	31	30	29	16	13	15	163	4%
19	32	30	26	21	15	9	5	137	3%
20	9	11	8	1	7	1	0	37	1%
21	4	6	5	7	7	0	0	29	1%
22	10	6	11	6	6	0	0	38	1%
23	6	0	0	0	0	0	0	6	0%
24	0	0	0	0	0	0	0	0	0%
Average by Day	813	814	811	672	702	367	209	4388	1.00
Percent of Weekly Total	19%	19%	18%	15%	16%	8%	5%		

## 6.1 ROUTE RIDERSHIP ANALYSIS

The summary tables for each route, below, show the average, minimum and maximum number of boardings per hour of service, which corresponds to time of day, for all the days in the fall 2019/winter 2020 ridership period. The



final column, titled “Count” is the percentage of total days in the data, in which boardings exceeded eight passengers. The tables are colour-coded to assist with interpretation. A value of 8 and above is colour coordinated green, while below 8 is red. The percentage in the count column is shown as:

- red when there are fewer than 10% of days with 8 or more passengers per hour,
- yellow when there are between 10% and 30% of days with 8 or more passengers per hour, and
- green when more than 30% of days achieve at least 8 passengers per hour.

Hours that indicate an N/A do not have any recorded boardings.

Using 8 passengers per hour as a threshold between on-demand and fixed-route transit, the route-by-route analyses shown below demonstrates, on average, whether there are time periods in which Cranbrook’s existing fixed-routes are not optimized, from a ridership perspective, and may be candidates for on-demand transit.

### 6.1.1 ROUTE 1: TAMARACK

Route 1 is the highest ridership route in Cranbrook. On average, passenger volumes justify fixed-route service every day of the week. However, on weekdays after 6PM and weekends after 5PM there may be an opportunity to scale back to on-demand service.

On weekdays, passenger volumes on Route 1 range from zero to 104 passengers per hour, with average ridership exceeding 20 passengers per hour for several of the mid-day hours. On weekends, passenger volumes range from zero to 66 passengers per hour, with average ridership exceeding 20 passengers per hour on Saturdays and hovering between 10 and 20 passengers per hour on Sundays.

Monday-Thursday					Friday					Saturday					Sunday				
Ridership Boardings					Ridership Boardings					Ridership Boardings					Ridership Boardings				
Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count
5	0.00	0.00	0.00	0.0%	5	0.00	0.00	0.00	0.0%	5	N/A	0.00	0.00	N/A	5	N/A	0.00	0.00	N/A
6	7.49	0.00	21.00	41.7%	6	5.61	0.00	25.00	26.8%	6	N/A	0.00	0.00	N/A	6	N/A	0.00	0.00	N/A
7	11.62	1.00	36.00	78.0%	7	10.00	2.00	24.00	59.2%	7	0.00	0.00	0.00	0.0%	7	0.00	0.00	0.00	0.0%
8	12.88	0.00	32.00	81.2%	8	14.10	4.00	30.00	79.6%	8	10.57	0.00	27.00	77.6%	8	1.67	0.00	6.00	0.0%
9	16.42	0.00	39.00	87.1%	9	17.20	4.00	32.00	95.9%	9	15.02	4.00	28.00	89.6%	9	11.65	0.00	29.00	75.5%
10	13.88	1.00	43.00	83.2%	10	18.00	5.00	39.00	91.8%	10	16.04	3.00	30.00	95.9%	10	11.31	2.00	23.00	65.3%
11	20.19	1.00	48.00	94.3%	11	25.43	4.00	52.00	98.0%	11	23.88	10.00	63.00	100.0%	11	11.02	0.00	24.00	71.4%
12	20.20	3.00	66.00	95.5%	12	29.59	9.00	50.00	100.0%	12	29.57	7.00	63.00	98.0%	12	12.22	0.00	25.00	81.6%
13	22.27	1.00	53.00	94.2%	13	33.02	6.00	71.00	98.0%	13	26.39	7.00	54.00	98.0%	13	19.29	6.00	44.00	93.9%
14	21.88	0.00	57.00	89.1%	14	28.00	8.00	60.00	100.0%	14	22.69	4.00	60.00	93.9%	14	17.49	2.00	41.00	91.8%
15	28.77	1.00	79.00	94.2%	15	36.04	3.00	104.00	98.0%	15	21.63	5.00	46.00	98.0%	15	16.14	5.00	50.00	91.8%
16	18.42	1.00	47.00	83.1%	16	27.18	6.00	66.00	98.0%	16	20.65	4.00	66.00	89.8%	16	5.33	0.00	25.00	22.4%
17	6.38	0.00	62.00	19.2%	17	14.33	1.00	58.00	59.2%	17	5.33	0.00	15.00	20.4%	17	4.91	0.00	50.00	9.1%
18	5.39	0.00	33.00	19.4%	18	8.22	2.00	34.00	32.7%	18	5.53	0.00	24.00	24.5%	18	6.50	4.00	9.00	50.0%
19	8.56	0.00	20.00	56.0%	19	5.92	0.00	31.00	26.5%	19	1.94	0.00	13.00	8.2%	19	2.50	2.00	3.00	0.0%
20	1.69	0.00	14.00	7.7%	20	0.80	0.00	10.00	3.3%	20	0.00	0.00	0.00	0.0%	20	N/A	0.00	0.00	N/A
21	N/A	0.00	0.00	N/A	21	2.50	0.00	5.00	0.0%	21	0.00	0.00	0.00	0.0%	21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A	22	4.00	4.00	4.00	0.0%	22	N/A	0.00	0.00	N/A	22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A

### 6.1.2 ROUTE 2: HIGHLANDS

Route 2 poorly performs most of the time. On weekdays, the morning and afternoon school peak hours see in the range of 8 to 10 passengers per hour. Passenger volumes range from zero passengers per hour to 41 passengers per hour in the morning peak hour, with greater than 8 passengers per peak hour occurring on 50% to 60% of operating days.

On weekends, average passenger volumes range from zero to three riders per hour, with loads greater than 8 riders per hour occurring very infrequently.

Route 2 is a candidate for on-demand service every day, provided that there are measures taken to increase capacity during grade school bell times.

Monday-Thursday					Friday					Saturday					Sunday				
Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count
5	0.00	0.00	0.00	0.0%	5	N/A	0.00	0.00	N/A	5	N/A	0.00	0.00	N/A	5	N/A	0.00	0.00	N/A
6	2.08	0.00	11.00	1.4%	6	1.80	0.00	7.00	0.0%	6	N/A	0.00	0.00	N/A	6	N/A	0.00	0.00	N/A
7	8.29	0.00	41.00	53.0%	7	4.22	0.00	20.00	23.9%	7	0.00	0.00	0.00	0.0%	7	N/A	0.00	0.00	N/A
8	3.57	0.00	15.00	15.7%	8	2.98	0.00	24.00	4.7%	8	0.00	0.00	0.00	0.0%	8	0.14	0.00	2.00	0.0%
9	2.25	0.00	25.00	3.4%	9	2.20	0.00	6.00	0.0%	9	1.13	0.00	4.00	0.0%	9	1.02	0.00	10.00	2.1%
10	3.42	0.00	15.00	5.4%	10	2.54	0.00	7.00	0.0%	10	2.38	0.00	9.00	4.3%	10	1.37	0.00	6.00	0.0%
11	2.88	0.00	11.00	2.4%	11	2.91	0.00	12.00	4.3%	11	3.32	0.00	10.00	4.9%	11	1.27	0.00	6.00	0.0%
12	2.96	0.00	8.00	1.5%	12	2.48	0.00	6.00	0.0%	12	2.79	0.00	8.00	4.2%	12	0.81	0.00	9.00	2.1%
13	2.52	0.00	11.00	5.7%	13	3.34	0.00	12.00	10.6%	13	2.84	0.00	8.00	2.0%	13	2.25	0.00	6.00	0.0%
14	10.70	0.00	34.00	64.1%	14	7.76	0.00	23.00	38.8%	14	3.65	0.00	10.00	10.2%	14	2.25	0.00	9.00	2.1%
15	5.20	0.00	16.00	23.4%	15	4.33	0.00	10.00	11.6%	15	2.35	0.00	8.00	2.0%	15	2.23	0.00	10.00	4.5%
16	4.36	0.00	16.00	18.4%	16	3.08	0.00	11.00	10.4%	16	1.62	0.00	11.00	6.7%	16	1.90	0.00	10.00	2.0%
17	1.48	0.00	12.00	7.4%	17	1.80	0.00	14.00	6.1%	17	1.49	0.00	7.00	0.0%	17	0.50	0.00	1.00	0.0%
18	2.18	0.00	12.00	10.5%	18	0.83	0.00	5.00	0.0%	18	0.38	0.00	2.00	0.0%	18	0.00	0.00	0.00	0.0%
19	2.67	0.00	6.00	0.0%	19	0.00	0.00	0.00	0.0%	19	1.86	0.00	4.00	0.0%	19	1.00	1.00	1.00	0.0%
20	0.24	0.00	2.00	0.0%	20	1.67	0.00	5.00	0.0%	20	N/A	0.00	0.00	N/A	20	N/A	0.00	0.00	N/A
21	0.00	0.00	0.00	0.0%	21	0.00	0.00	0.00	0.0%	21	N/A	0.00	0.00	N/A	21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A	22	0.00	0.00	0.00	0.0%	22	N/A	0.00	0.00	N/A	22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A

### 6.1.3 ROUTE 3: THIRD AVENUE

Route 3 performs poorly most of the time. Average weekday passenger volumes do not exceed eight passengers per hour, however on approximately 40% of days, ridership exceeds this threshold during the commuter and grade school peak hours. On weekday peak hours, volumes up to 37 passengers per hour have been recorded.

On Saturdays Route 3 rarely exceeds 8 passengers per hour and is an excellent candidate for on-demand service. Route 3 is a candidate for on-demand service on weekdays, provided that there are measures taken to increase capacity during grade school bell times.

Monday-Thursday					Friday					Saturday				
Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count	Hour	Avg	Min.	Max.	Count
5	0.00	0.00	0.00	0.0%	5	N/A	0.00	0.00	N/A	5	N/A	0.00	0.00	N/A
6	7.26	0.00	18.00	46.2%	6	5.41	1.00	16.00	22.2%	6	N/A	0.00	0.00	N/A
7	4.47	0.00	23.00	12.4%	7	3.75	0.00	9.00	12.2%	7	N/A	0.00	0.00	N/A
8	2.92	0.00	9.00	1.8%	8	2.03	0.00	7.00	0.0%	8	1.38	0.00	6.00	0.0%
9	2.89	0.00	16.00	6.8%	9	2.71	0.00	7.00	0.0%	9	1.21	0.00	7.00	0.0%
10	2.64	0.00	18.00	3.0%	10	2.30	0.00	8.00	3.3%	10	1.63	0.00	8.00	2.1%
11	3.06	0.00	13.00	5.5%	11	3.84	0.00	20.00	6.8%	11	2.74	0.00	8.00	2.6%
12	2.78	0.00	13.00	3.9%	12	2.77	0.00	8.00	4.2%	12	2.48	0.00	6.00	0.0%
13	2.81	0.00	21.00	2.9%	13	3.17	0.00	14.00	4.9%	13	2.36	0.00	7.00	0.0%
14	6.76	0.00	37.00	44.6%	14	4.47	0.00	17.00	21.1%	14	2.60	0.00	13.00	8.3%
15	3.73	0.00	15.00	8.9%	15	3.00	0.00	12.00	4.4%	15	2.55	0.00	8.00	6.1%
16	2.94	0.00	10.00	5.1%	16	2.37	0.00	10.00	2.2%	16	1.59	0.00	9.00	2.2%
17	4.68	0.00	11.00	36.8%	17	1.62	0.00	10.00	4.3%	17	0.11	0.00	2.00	0.0%
18	2.75	0.00	7.00	0.0%	18	1.50	0.00	3.00	0.0%	18	0.00	0.00	0.00	0.0%
19	2.88	0.00	7.00	0.0%	19	0.50	0.00	1.00	0.0%	19	0.89	0.00	3.00	0.0%
20	N/A	0.00	0.00	N/A	20	0.43	0.00	2.00	0.0%	20	0.00	0.00	0.00	0.0%
21	N/A	0.00	0.00	N/A	21	N/A	0.00	0.00	N/A	21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A	22	N/A	0.00	0.00	N/A	22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A	23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A	24	N/A	0.00	0.00	N/A

### 6.1.4 ROUTE 4: SLATERVILLE

Route 4 poorly performs. Average passenger volumes tend to be fractions of a passenger, and only extremely infrequently does ridership exceed the threshold of 8 passengers per hour. Route 4 is an excellent candidate for on-demand service.

Monday-Thursday				
Ridership Boardings				
Hour	Avg	Min.	Max.	Count
5	N/A	0.00	0.00	N/A
6	0.00	0.00	0.00	0.0%
7	0.21	0.00	2.00	0.0%
8	0.54	0.00	4.00	0.0%
9	0.91	0.00	4.00	0.0%
10	1.49	0.00	6.00	0.0%
11	0.73	0.00	6.00	0.0%
12	0.64	0.00	4.00	0.0%
13	1.19	0.00	14.00	1.3%
14	1.57	0.00	5.00	0.0%
15	0.64	0.00	5.00	0.0%
16	0.97	0.00	7.00	0.0%
17	0.50	0.00	1.00	0.0%
18	1.00	0.00	3.00	0.0%
19	0.40	0.00	1.00	0.0%
20	N/A	0.00	0.00	N/A
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Friday				
Ridership Boardings				
Hour	Avg	Min.	Max.	Count
5	0.00	0.00	0.00	N/A
6	0.29	0.00	3.00	0.0%
7	0.09	0.00	1.00	0.0%
8	0.62	0.00	2.00	0.0%
9	1.00	0.00	3.00	0.0%
10	1.34	0.00	7.00	0.0%
11	0.00	0.00	0.00	0.0%
12	0.06	0.00	1.00	0.0%
13	0.62	0.00	5.00	0.0%
14	0.50	0.00	1.00	0.0%
15	0.56	0.00	3.00	0.0%
16	1.57	0.00	7.00	0.0%
17	1.00	1.00	1.00	0.0%
18	0.00	0.00	0.00	0.0%
19	1.00	1.00	1.00	0.0%
20	N/A	0.00	0.00	0.0%
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

### 6.1.5 ROUTE 5: COLLEGE

Route 5 performs well on weekdays, with average passenger volumes above 8 passengers per hour for most of the weekday operating hours. However, after 7PM on weekdays, Route 5 may be a candidate for on-demand service.

On weekends, ridership tapers off significantly, and indicates that the Route 5 is a candidate for on-demand service on these days. Average weekend passenger volumes do not exceed 8 passengers per hour, however, additional capacity may be required on some weekends: on approximately 25% of Saturdays ridership reaches 15 to 25 passengers per hour.

Monday-Thursday				
Ridership Boardings				
Hour	Avg	Min.	Max.	Count
5	0.00	0.00	0.00	0.0%
6	4.61	0.00	17.00	20.1%
7	17.46	0.00	75.00	77.3%
8	28.71	0.00	75.00	78.9%
9	14.42	0.00	44.00	75.7%
10	18.63	0.00	63.00	74.8%
11	18.63	1.00	67.00	78.5%
12	18.31	0.00	47.00	76.1%
13	22.08	0.00	61.00	81.4%
14	21.41	0.00	54.00	88.2%
15	23.62	0.00	66.00	84.5%
16	17.44	0.00	60.00	68.5%
17	3.24	0.00	29.00	16.0%
18	10.51	0.00	45.00	51.4%
19	9.41	0.00	35.00	50.0%
20	1.21	0.00	19.00	5.1%
21	5.43	0.00	15.00	14.3%
22	8.18	0.00	12.00	63.6%
23	2.20	0.00	9.00	10.0%
24	N/A	0.00	0.00	N/A

Friday				
Ridership Boardings				
Hour	Avg	Min.	Max.	Count
5	0.00	0.00	0.00	0.0%
6	3.05	0.00	9.00	5.3%
7	9.42	0.00	37.00	47.9%
8	24.45	1.00	70.00	75.5%
9	12.48	0.00	33.00	70.0%
10	14.58	2.00	43.00	70.0%
11	16.29	0.00	38.00	79.6%
12	24.04	0.00	60.00	83.7%
13	18.90	1.00	41.00	82.0%
14	13.78	2.00	37.00	73.5%
15	11.96	0.00	46.00	61.2%
16	6.94	0.00	27.00	34.0%
17	2.48	0.00	13.00	8.0%
18	1.09	0.00	4.00	0.0%
19	1.77	0.00	7.00	0.0%
20	0.31	0.00	3.00	0.0%
21	1.00	0.00	4.00	0.0%
22	1.00	1.00	1.00	0.0%
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Saturday				
Ridership Boardings				
Hour	Avg	Min.	Max.	Count
5	N/A	0.00	0.00	N/A
6	N/A	0.00	0.00	N/A
7	N/A	0.00	0.00	N/A
8	3.77	0.00	17.00	6.3%
9	4.22	0.00	13.00	21.7%
10	4.67	0.00	23.00	14.6%
11	5.73	1.00	17.00	28.6%
12	5.52	0.00	15.00	20.8%
13	5.39	0.00	13.00	26.5%
14	5.69	0.00	26.00	24.5%
15	3.98	0.00	11.00	14.6%
16	2.59	0.00	10.00	6.5%
17	1.00	0.00	8.00	2.1%
18	3.60	0.00	8.00	10.0%
19	2.43	0.00	7.00	0.0%
20	N/A	0.00	0.00	N/A
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Sunday				
Ridership Boardings				
Hour	Avg	Min.	Max.	Count
5	N/A	0.00	0.00	N/A
6	N/A	0.00	0.00	N/A
7	N/A	0.00	0.00	N/A
8	2.08	0.00	7.00	0.0%
9	1.88	0.00	5.00	0.0%
10	3.27	0.00	9.00	8.3%
11	3.31	0.00	9.00	8.3%
12	1.10	0.00	9.00	4.2%
13	3.76	0.00	16.00	10.2%
14	2.71	0.00	8.00	2.0%
15	3.84	0.00	11.00	20.4%
16	0.73	0.00	5.00	0.0%
17	0.33	0.00	1.00	0.0%
18	1.50	1.00	2.00	0.0%
19	0.00	0.00	0.00	0.0%
20	N/A	0.00	0.00	N/A
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

### 6.1.6 ROUTE 7: 7 – 11 AVENUE

Route 7 is a mixed performer. On weekdays, during grade school bell times, it sees an average of 18 to 20 passengers per hour. However, during mid-days, evenings and on Saturdays, average ridership hovers below 8 passengers per hour and rarely exceeds this threshold.

Ridership on Route 7 could easily exceed the capacity of an on-demand transit system during the grade school peak hours, but the route may be a candidate for on-demand service outside these peak hours.

Monday-Thursday				
Hour	Avg	Min	Max	Count
5	0.00	0.00	0.00	0.0%
6	0.43	0.00	7.00	0.0%
7	20.01	0.00	43.00	67.1%
8	8.89	0.00	37.00	48.4%
9	3.36	0.00	19.00	10.0%
10	6.67	0.00	40.00	17.6%
11	4.41	0.00	29.00	14.1%
12	4.80	0.00	24.00	15.7%
13	4.76	0.00	28.00	15.7%
14	18.40	0.00	54.00	72.7%
15	5.74	0.00	31.00	26.1%
16	5.36	0.00	18.00	26.0%
17	3.98	0.00	29.00	12.9%
18	3.92	0.00	14.00	26.3%
19	3.07	0.00	13.00	13.3%
20	4.20	0.00	8.00	10.0%
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Friday				
Hour	Avg	Min	Max	Count
5	0.00	0.00	0.00	0.0%
6	0.31	0.00	5.00	0.0%
7	10.50	0.00	41.00	27.5%
8	5.83	0.00	15.00	30.4%
9	2.74	0.00	14.00	4.9%
10	5.35	0.00	31.00	26.1%
11	3.66	0.00	12.00	10.6%
12	5.76	0.00	27.00	22.4%
13	4.47	0.00	13.00	20.4%
14	14.54	1.00	47.00	58.3%
15	4.38	0.00	16.00	15.4%
16	3.51	0.00	12.00	12.2%
17	2.65	0.00	18.00	4.1%
18	2.34	0.00	21.00	4.3%
19	3.92	0.00	12.00	25.0%
20	2.00	0.00	7.00	0.0%
21	3.00	3.00	3.00	0.0%
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Saturday				
Hour	Avg	Min	Max	Count
5	N/A	0.00	0.00	N/A
6	N/A	0.00	0.00	N/A
7	0.00	0.00	0.00	N/A
8	1.91	0.00	10.00	2.1%
9	1.87	0.00	6.00	0.0%
10	2.53	0.00	9.00	4.2%
11	2.94	0.00	17.00	2.0%
12	4.47	0.00	10.00	18.8%
13	3.65	0.00	11.00	8.2%
14	3.44	0.00	12.00	12.2%
15	3.29	0.00	10.00	8.3%
16	3.35	0.00	10.00	8.7%
17	2.17	0.00	12.00	6.3%
18	1.78	0.00	7.00	0.0%
19	0.98	0.00	8.00	14.3%
20	N/A	0.00	0.00	N/A
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

### 6.1.7 ROUTE 14: 14 AVENUE

Route 14 is a mixed performer. On weekdays, during grade school bell times, it sees an average of 10 to 16 passengers per hour. However, during mid-days, evenings and on Saturdays, average ridership hovers below 8 passengers per hour and rarely exceeds this threshold.

Ridership on Route 14 could easily exceed the capacity of an on-demand transit system during the grade school peak hours, but the route may be a candidate for on-demand service outside these peak hours.

Monday-Thursday				
Hour	Avg	Min	Max	Count
5	0.00	0.00	0.00	0.0%
6	8.10	0.00	24.00	44.5%
7	7.55	0.00	29.00	41.4%
8	12.44	0.00	45.00	71.4%
9	7.42	0.00	28.00	30.9%
10	4.49	0.00	13.00	12.1%
11	6.57	0.00	26.00	33.8%
12	7.76	0.00	31.00	47.3%
13	6.92	0.00	26.00	41.6%
14	16.65	0.00	40.00	75.2%
15	10.58	0.00	30.00	65.6%
16	6.64	0.00	28.00	34.1%
17	2.60	0.00	23.00	8.5%
18	4.95	0.00	12.00	24.6%
19	1.11	0.00	2.00	0.0%
20	3.00	3.00	3.00	0.0%
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Friday				
Hour	Avg	Min	Max	Count
5	0.00	0.00	0.00	0.0%
6	3.89	0.00	16.00	13.2%
7	6.27	0.00	24.00	33.3%
8	9.21	2.00	25.00	53.2%
9	6.82	0.00	22.00	36.0%
10	4.48	0.00	18.00	14.0%
11	7.14	0.00	24.00	38.8%
12	9.78	0.00	18.00	71.4%
13	8.98	2.00	19.00	61.2%
14	13.29	1.00	31.00	75.5%
15	10.20	1.00	24.00	62.0%
16	4.30	0.00	15.00	14.0%
17	1.96	0.00	12.00	4.0%
18	2.41	0.00	10.00	4.1%
19	1.43	0.00	9.00	6.5%
20	1.75	0.00	7.00	0.0%
21	0.00	0.00	0.00	0.0%
22	1.00	1.00	1.00	0.0%
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Saturday				
Hour	Avg	Min	Max	Count
5	N/A	0.00	0.00	N/A
6	N/A	0.00	0.00	N/A
7	0.02	0.00	1.00	0.0%
8	4.92	0.00	14.00	12.2%
9	4.10	0.00	9.00	6.1%
10	4.61	0.00	14.00	14.3%
11	5.42	0.00	15.00	27.1%
12	4.28	0.00	16.00	19.4%
13	6.10	1.00	12.00	34.7%
14	4.37	0.00	11.00	10.2%
15	4.39	0.00	17.00	16.3%
16	3.78	0.00	19.00	18.4%
17	1.98	0.00	13.00	4.2%
18	1.40	0.00	10.00	4.2%
19	1.25	0.00	5.00	0.0%
20	1.00	0.00	2.00	0.0%
21	0.00	0.00	0.00	0.0%
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

Sunday				
Hour	Avg	Min	Max	Count
5	N/A	0.00	0.00	N/A
6	N/A	0.00	0.00	N/A
7	N/A	0.00	0.00	N/A
8	0.00	0.00	0.00	0.0%
9	3.09	0.00	7.00	0.0%
10	2.94	0.00	12.00	4.2%
11	3.48	0.00	11.00	6.3%
12	3.77	0.00	14.00	12.5%
13	2.92	0.00	8.00	2.0%
14	3.41	0.00	12.00	10.9%
15	3.21	0.00	18.00	6.3%
16	2.41	0.00	9.00	4.1%
17	2.50	2.00	3.00	0.0%
18	5.00	5.00	5.00	0.0%
19	1.00	1.00	1.00	0.0%
20	N/A	0.00	0.00	N/A
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

### 6.1.8 ROUTE 20: COMBO

Route 20 poorly performs. Average passenger volumes range from zero to three passengers per hour, and only extremely infrequently does ridership exceed the threshold of 8 passengers per hour. Route 20 is an excellent candidate for on-demand service.

**Sunday**

Hour	Ridership Boardings			Count
	Avg	Min.	Max.	
5	N/A	0.00	0.00	N/A
6	N/A	0.00	0.00	N/A
7	N/A	0.00	0.00	N/A
8	N/A	0.00	0.00	0.0%
9	0.96	0.00	2.00	0.0%
10	1.04	0.00	4.00	0.0%
11	2.07	0.00	8.00	2.1%
12	2.44	0.00	11.00	4.2%
13	1.83	0.00	8.00	2.0%
14	2.06	0.00	6.00	0.0%
15	2.94	0.00	15.00	4.2%
16	1.38	0.00	7.00	0.0%
17	0.14	0.00	2.00	0.0%
18	1.75	0.00	7.00	0.0%
19	0.00	0.00	0.00	0.0%
20	0.00	0.00	0.00	N/A
21	N/A	0.00	0.00	N/A
22	N/A	0.00	0.00	N/A
23	N/A	0.00	0.00	N/A
24	N/A	0.00	0.00	N/A

## 6.2 OPTIMIZATION RESULTS

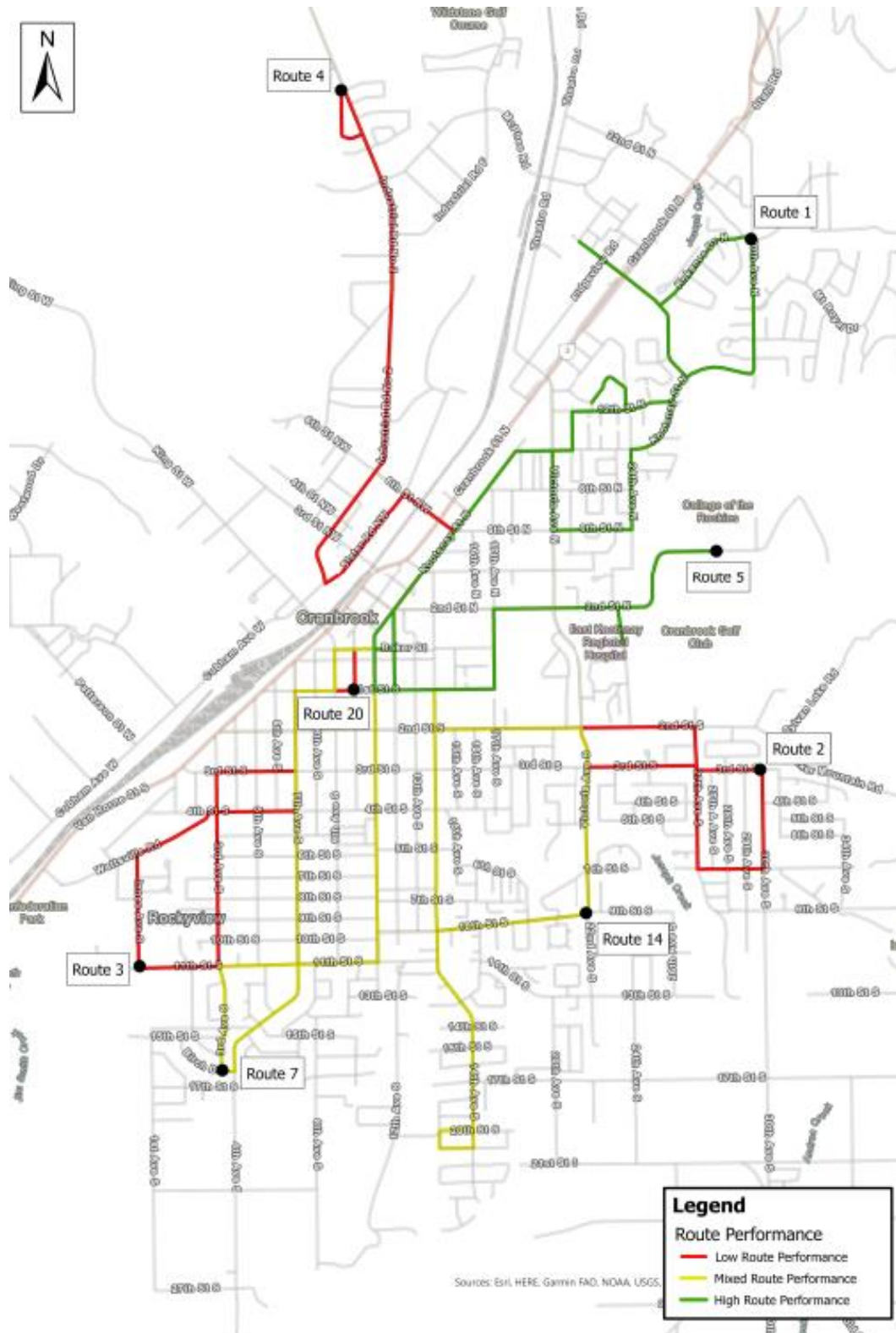
In general, the results show that Route 1 and Route 5 perform well, Routes 7 and 14 have mixed performance, and Routes 2, 3, 4, and 20 perform poorly. The generalized results for weekday performance are summarized in the **Figure 6-1**. Considering ridership is an important part of optimizing the amount of transit service provided, however there are other factors to balance including customer experience and legibility, and operability of the system.

Customer experience and legibility requires consistency in scheduling and service, which means minimizing the amount of toggling between fixed-route and on-demand service throughout the day and maintaining some consistency between routes on weekdays and weekends. For example, having a consistent service window on both Routes 1 and 5 on weekdays. It also means that service must be intuitive, and there should be clear opportunities to transfer between fixed-route and on-demand services.

Operability means that there must be some consistency and predictability in transit vehicle allocation and driver scheduling. An on-demand zone must also be a manageable size to allow for wait times and trip distances to fall within an acceptable range.

An important note on the ridership optimization results is that we tested the sensitivity of using the upper on-demand transit capacity threshold of 8 passengers per hour by using 10 passengers per hour instead. The results using a 10 passenger per hour threshold did not change the trend of performance of any route and showed the same trends around candidate routes and times of day for on-demand transit service.

Figure 6-1 Cranbrook Transit Route Performance Summary



# 7 ALTERNATIVE TRANSIT DELIVERY OPTIONS

Based on the results of the optimization analysis, we developed two alternative transit delivery options, which incorporate on-demand transit. A fully on-demand transit system for Cranbrook has been ruled out due to the high ridership on Routes 1 and 5, and high peak ridership on Routes 7 and 14. The amount of ridership on these routes could not be reasonably accommodated with an on-demand transit model.

The two on-demand alternative delivery options were created to assess, at the conceptual level, the feasibility of changing the City’s service model. We have also carried forward two core options which do not include on-demand transit, to provide the City with as robust an evaluation as possible, and a lower investment and lower disruption alternative to improving its transit system.

The following sections describe each of the core transit options in more detail and include the feedback and parameters we received from the group of on-demand transit vendors we consulted about the options. The section is divided into “Core Options” which are discrete and distinguishable from each other and “Ancillary Options” which are compatible with multiple core options. The Ancillary Options are not evaluated but noted as issues the City has deemed important throughout this study.

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## 7.1 CORE OPTIONS

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### 7.1.1 OPTION 1 – STATUS QUO

To provide a baseline from which to measure the impacts of each option, the status quo is retained as Option 1. This assumes no change to the existing conditions of Cranbrook’s transit system, as described in the previous chapters of this report.

This option has no impact on any of the City’s goals for its transit system in the future.

Key statistics about the status quo are shown below.

	<b>Option 1: Status Quo</b>
<b>Operator Assumption</b>	BC Transit
<b>Transit System Components</b>	All Existing Fixed Routes
<b>Annual Service Hours</b>	12,000
<b>Number of Vehicles Required</b>	5 + 1 spare
<b>City of Cranbrook Transit Coordinator</b>	N/A

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### 7.1.2 OPTION 2 – OPTIMIZED BC TRANSIT SERVICE + CRANBROOK TRANSIT COORDINATOR

The main difference between this option and the status quo is that it includes a transit coordinator position, which we have assumed to be approximately one half of a full time equivalent (FTE) position. This half FTE would be in

addition to the ongoing financial oversight provided by the Director of Finance and direction provided by the Director of Engineering and Development Services.

Through working with the City on this study, we have noticed a lack of staff time available to the public transit portfolio, compared to other Canadian jurisdictions, and that the transit role in Cranbrook has previously been quite scattered amongst several municipal staff. In the last two years, a more focused effort has been made at the City Director level to lobby BC Transit for solutions to the perceived transit system inefficiencies, but the effort at the Director level is likely not sustainable with the other commitments of the role.

In BC, municipal transit staff models vary, and some jurisdictions take the same approach as Cranbrook where Directors or CAOs are responsible for coordinating and liaising with BC Transit. This model tends to be less effective from both the municipal and BC Transit perspectives, as these individuals are very busy on many major portfolios and do not have the time to dedicate to transit issues, or to participating in future transit planning processes. In several other municipalities, a more dedicated junior staff person is responsible for coordinating public transit, and this often dovetails into a broader role of “sustainability coordinator” or “municipal planner”.

In Cranbrook, a half FTE dedicated to public transit would be expected to, at minimum:

- provide system oversight and service performance management, which will be particularly important if the City incorporates on-demand transit in the future,
- address customer service issues and complaints,
- coordinate with BC Transit on service planning and adjustments,
- provide oversight and input on any BC Transit communication and public engagement in Cranbrook,
- coordinate within the City departments to address transit operational and infrastructure issues such as bus stop fixes and bus detour requirements, and
- develop reports and updates for senior management and Council.

Ideally, the person hired to this position has some experience or expertise in public transit, and/or an understanding of municipal planning issues related to public transit. Experience developing and leading public engagement and communicating with Council would be an asset. To be most effective, this position would report to a Director, to ensure direct lines of communication and that issues may be resolved quickly.

When this position is hired, the expectation is that they work closely with BC Transit on all upcoming planning initiatives for Cranbrook, including the upcoming Transit Future Plan, which is likely to include some consideration for on-demand transit and implementation timelines. It is also an opportunity to look at the City’s existing routes to identify potential improvements or schedule adjustments to better reflect the ridership patterns. As well, they would have a key role in the development of transit service standards for Cranbrook, when BC Transit begins that process.

This option will have the biggest impact on the City’s goal around accountability for transit decision-making, increasing the City’s oversight over its transit system and accountability for transit decisions, specifically with planning, operations and finance.

Key statistics about this option are shown below.

	<b>Option 2: Optimize BC Transit Routes + Transit Coordinator</b>
<b>Operator Assumption</b>	BC Transit
<b>Transit System Components</b>	Optimized Fixed Routes
<b>Annual Service Hours</b>	12,000
<b>Number of Vehicles Required</b>	5 + 1 spare
<b>City of Cranbrook Transit Coordinator</b>	0.5 FTE



**7.1.3 OPTION 3 – HYBRID FIXED ROUTE AND ON-DEMAND**

To assess the feasibility of on-demand transit in Cranbrook, the project team developed two hybrid transit service alternatives with on-demand transit. There are several potential on-demand transit scenarios for Cranbrook. The options in this section are posed to reflect a low and high amount of on-demand service, based on the number of fixed routes retained in each option.

To develop statistics for each option BC Transit was engaged and provided with the fixed routes and service spans. They developed preliminary cost estimates and service hour estimates for the fixed route service retained in each option.

On-demand transit technology vendors were also engaged in assessing the feasibility of these options and providing parameters around the number of vehicles required for on-demand service and expected performance parameters. The consultant team and City staff met virtually with five existing On-demand technology providers. Each of the invited vendors provide On-demand technology to various transit agencies across Canada. Each vendor was allotted one hour to discuss best practices and case studies from Canadian deployments, a live demonstration of the product along with a discussion of how On-demand transit technology could work in the Cranbrook context. Each vendor was provided existing service and ridership data along with the following two service options detailed below.

In this option, the 0.5 FTE Transit Coordinator position is included as it would be critical to providing management and oversight of city-led contracts with a third-party transit operator and a technology vendor.

For this option, the number of vehicles estimated by the on-demand vendors in addition to the fleet required to run the retained fixed routes requires a net increase of at least 1 vehicle, over the current Cranbrook fleet requirement of 5 buses. Given this, additional fleet and service hours above Cranbrook’s current transit operating budget will be required to implement an on-demand transit service, and this is detailed in **Section 7.3**.

**7.1.3.1 OPTION 3A – BC TRANSIT ROUTES 1,5,7,14 + ON-DEMAND**

In this hybrid option, Routes 1, 5, 7 and 14 are retained, with a slight reduction in evening service span when ridership is lower. Only Route 1 operates on the weekends. The schematics below show when the fixed routes would operate (shown in blue) and the conceptual on-demand service zones, which would replace Routes 2, 3, 4 and 20. On-demand service would operate from 07:00 to 21:00 on weekdays and 08:00 to 20:00 on weekends. This would amount to a slight increase in overall service, compared to the service spans on the eliminated routes.

	Monday to Friday				Saturday	Sunday
Route	1	5	7	14	1	1
Hour						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						



Technology vendors provided information about this service scenario, detailing how the technology application would assemble trips, how trips would connect to scheduled fixed route transit and how the product communicates with customers about the trip (e.g. providing a vehicle arrival ETA or guaranteed scheduled pick up). Vendors estimated that 2 to 3 vehicles would be required to provide an on-demand service for this option, with an average customer waiting time ranging between 10-20 minutes, which is a significant improvement over the existing scheduled off-peak frequency of 30-60 minutes. Average trip time for customers would range between 10-15 minutes which is comparable to Cranbrook’s existing fixed route service.

While requiring additional resources and funding, this option would positively affect several of the City’s goals for its transit system including system efficiency and right-sizing, improving customer experience, achieving operational flexibility and accountability for transit decision-making.

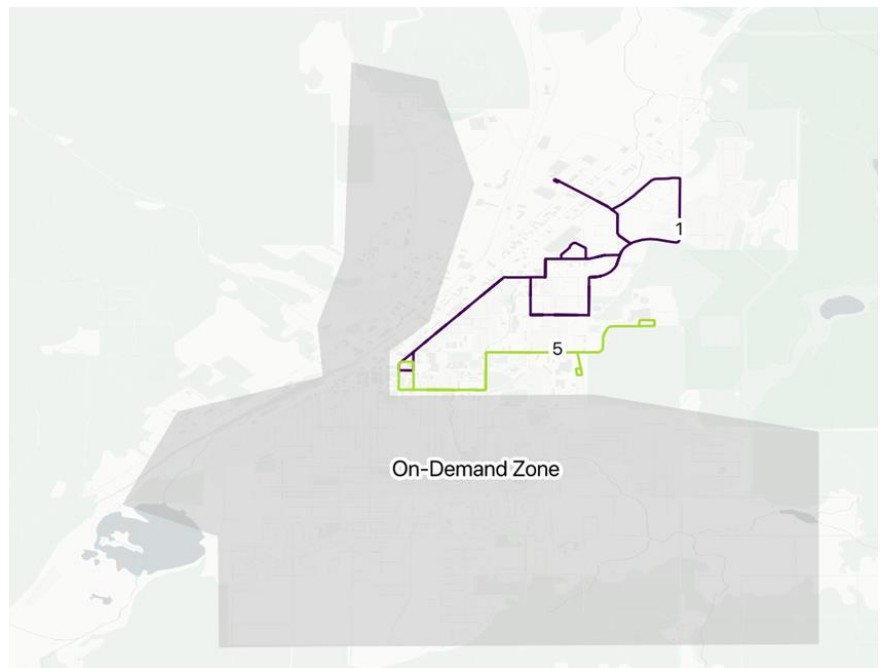
Key statistics about this option are shown below.

	<b>Option 3A: Hybrid with Routes 1, 5, 7, 14</b>	
<b>Operator Assumption</b>	BC Transit	Third Party Operator
<b>Transit System Components</b>	Weekday: Routes 1, 5, 7, 14 Weekend: Route 1	On-Demand: Weekday 0700 - 2100 Weekend 0800 - 2000
<b>Annual Service Hours</b>	10,000	up to 4,900 per vehicle estimated 7,000 total
<b>Number of Vehicles Required</b>	3 + 1 spare	2-3
<b>City of Cranbrook Transit Coordinator</b>	0.5 FTE	

### 7.1.3.2 OPTION 3B – BC TRANSIT ROUTES 1,5 + ON-DEMAND

In this hybrid option, Routes 1 and 5 are retained, with a slight reduction in evening service span when ridership is lower. Only Route 1 operates on the weekends. The schematics below show when the fixed routes would operate (shown in blue) and the conceptual on-demand service zones, which would replace Routes 2, 3, 4, 7, 14 and 20. On-demand service would operate from 07:00 to 21:00 on weekdays and 08:00 to 20:00 on weekends. This would amount to a

	Monday to Friday		Saturday	Sunday
<b>Route</b>	<b>1</b>	<b>5</b>	<b>1</b>	<b>1</b>
<b>Hour</b>				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				



slight increase in overall service, compared to the service spans on the eliminated routes.

Technology vendors simulated this service scenario, detailing how the technology application would assemble trips, how trips would connect to scheduled fixed route transit and how the product communicates with customers about the trip (e.g. providing a vehicle arrival ETA or guaranteed scheduled pick up). Vendors estimated that 3 to 4 vehicles would be required to provide an on-demand service for this option, with an average customer waiting time ranging between 10-30 minutes, which is a significant improvement over the existing scheduled off-peak frequency of 30-60 minutes. Average trip time for customers would range between 10-20 minutes, which is comparable to Cranbrook’s existing fixed route service.

While requiring additional resources and funding, this option would positively affect several of the City’s goals for its transit system including system efficiency and right-sizing, improving customer experience, achieving operational flexibility and accountability for transit decision-making.

Key statistics about this option are shown below.

	<b>Option 3B: Hybrid with Routes 1, 5</b>	
<b>Operator Assumption</b>	BC Transit	Third Party Operator
<b>Transit System Components</b>	Weekday: Routes 1, 5 Weekend: Route 1	On-Demand: Weekday 0700 - 2100 Weekend 0800 - 2000
<b>Annual Service Hours</b>	7,500	up to 4,900 per vehicle estimated 11,500 total
<b>Number of Vehicles Required</b>	2 + 1 spare	3-4
<b>City of Cranbrook Transit Coordinator</b>	0.5 FTE	

## 7.2 ANCILLARY OPTIONS

The ancillary options below were each of interest to City Staff as various options were discussed throughout this study. They are briefly described below for completeness but are not evaluated as part of the core options.

### 7.2.1 ON-DEMAND PILOT + RE-PLANNING FIXED ROUTES

Should the City decide to introduce on-demand service, there are several ways in which to test the service before fully committing to one of the hybrid options described in Option 3. A pilot period would need to be at least one year for residents and transit customers to adapt to and adjust their travel patterns around a new service. When pilot periods are too short, community members are less likely to change their travel behaviour to suit a service that may cease to exist. Some possibilities for on-demand pilot scenarios are outlined below.

- Introduce city-wide on-demand service on weekends, to gather trip data and to test operation in Cranbrook.
- Introduce on-demand service as in Option 3B, above, where Routes 1 and 5 remain fixed and recognizing that additional service hours will be required to satisfy the demand in South Cranbrook during grade school bell times. Using the data collected about trips taken on the on-demand service, the City may find a more optimal fixed route alignment to revise Routes 7 and 14.

Operate the interim on-demand service for at least one year, or until enough trip data are obtained to enable the planning of new fixed routes, based on the trip bookings seen in the on-demand system.

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## 7.2.2 TAXI COMPANY PARTNERSHIPS

Taxi company partnerships have not been considered as a core solution for Cranbrook's transit system in this study, however the City could consider leveraging local taxi companies during the lowest demand times of day – typically later evenings. This option would involve partnering with taxi companies to introduce a subsidized fare in lieu of running the transit system in the low demand hours.

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## 7.2.3 FLEET ELECTRIFICATION

Fleet electrification is increasing in importance for many transit systems. This is a current priority for BC Transit, with a request for proposal issued in spring 2021 for an electrification implementation strategy and framework. The City of Cranbrook's transit system was not in the initial list of transit systems considered for electric bus implementation, but on the list for longer term implementation.

As well, there are multiple federal grant programs available for electric transit fleet and infrastructure, including the Rural Transit Solutions Fund, Zero Emission Transit Fund and Zero Emission Vehicle Infrastructure Program. The Rural Transit Solutions Fund offers a baseline amount of funding for conventional transit but includes an extra \$2 million in capital for zero-emission transit solutions.

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## 7.2.4 OPTIONAL ADDITIONAL SERVICE TO AQ'AM AND AIRPORT

In October 2021, we assisted the City with developing an application for the planning stream of the Rural Transit Solutions Fund to support a feasibility study of a transit route connecting Cranbrook Airport, Aq'am and St Eugene Resort and Casino. The proposed project would include a technical feasibility assessment, but a significant portion of the scope would be dedicated to consulting with the Aq'am community and representatives of the Airport and St Eugene Resort and Casino, to determine travel needs and level of interest in a transit service.

At this stage, this potential transit service is assumed to be fixed-route as it is longer distance and more regional in nature, and this is typically most conducive to fixed-route transit.

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# 7.3 EVALUATION OF CORE OPTIONS

The evaluation of core options is based on the City's goals for undertaking this feasibility assessment: improved customer experience, operational flexibility, system efficiency and right-sizing, City accountability for transit decision-making, and financial impact to the City.

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## 7.3.1 A NOTE ON ON-DEMAND COST ESTIMATES

In this evaluation, costs are estimated for the City to take charge of its own on-demand transit system. As discussed previously in this report, the assumption is that a third-party operator would need to provide this service in the interim, before BC Transit is ready to launch on-demand transit within its own operations.

Costs for on-demand transit service provided by a third-party operator are highly variable and depend on several factors and business decisions, which can only truly be assessed by the operator themselves. In addition to establishing an on-demand transit service span for each day of the week, to allow operators to assume the number of transit vehicles and in-service hours required, some of the factors that may be clarified in an on-demand transit operating agreement or request for proposals include:

- Who owns the transit vehicles and equipment?
- Who maintains the transit vehicles and equipment?
- What are the transit system performance expectations, such as reliability, maximum wait times and maximum travel times for customers?

For the purposes of this feasibility assessment, costs to provide transit service in Cranbrook are based either on real estimates provided by BC Transit for the fixed-routes, or an estimate of on-demand transit technology subscription, on-demand service hours and an aggregated hourly rate provided by an experienced transit operator.

The aggregated hourly rate for on-demand transit operation includes:

- Operator wages and benefits
- Fuel
- Vehicle capital costs
- Dispatch, Supervision and Training
- Vehicle insurance premiums
- Vehicle maintenance
- Vehicle cleaning
- Vehicle facilities or parking
- Administration and profit

There are two key categories of costs in the list above that have a significant impact on the per service hour cost provided by a third-party operator. The first is fuel costs. When fuel is paid by the operator, the operator prices fuel to reduce risk to themselves. Many jurisdictions who contract transit service to a third-party agree to pay the fuel costs themselves, to remove the risk of fuel price fluctuation from the contract. The second is vehicle capital costs. When municipalities assume the capital cost of the vehicles, then the third-party operator does not transfer an amortized capital cost through the contract. Often, when a third-party operator provides fleet, they need to manage the risk of purchasing new vehicles for a new operation, which may not be useful to them beyond the duration of the transit contract.

At this feasibility assessment level, the cost estimates are intended to compare options at a high level and identify any which may be prohibitive or particularly attractive for Cranbrook. These costs should not be taken as the true costs of operating an alternative transit delivery model in Cranbrook, given that true costs are very dependent on the transit operating entity and specific on-demand transit technology provider. To understand the detailed and true cost of operating an alternative transit system in Cranbrook, an open request for information or proposals will be required.

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### 7.3.2 OPTION EVALUATION

The results of the option evaluation show that the hybrid on-demand transit options would most significantly impact the City's goals (see **Table 7-1**), however implementing either of the hybrid options would come at a significant additional annual cost to the City (60% increase for Option 3A and 80% increase for Option 3B), as shown in **Table 7-2**.

Given the significant increase in cost to the City to adopt on-demand transit prior to BC Transit's timelines, it appears that Option 2 is the best opportunity to positively affect Cranbrook's transit system in the near-term, while limiting additional City investment in the system. Adopting Option 2 will allow the City more accountability for transit decision making while continuing to engage with BC Transit and participating in the agency's planning processes for on-demand transit. If the likelihood of BC Transit launching on-demand service in Cranbrook becomes a bigger question in the next year, then the City can reconsider the value in piloting on-demand transit service on its own.

**Table 7-1 Evaluation of Cranbrook Transit Options**

	<b>Option 1: Status Quo</b>	<b>Option 2: Optimize BC Transit Routes + Transit Coordinator</b>	<b>Option 3A: Hybrid with Routes 1, 5, 7, 14</b>	<b>Option 3B: Hybrid with Routes 1, 5</b>
<b>Improved Customer Experience</b>	<p><b>No Change</b></p> <ul style="list-style-type: none"> <li>- low and mixed-performing routes offer limited frequency with long waits between buses.</li> <li>- customers confined by routing and schedules.</li> </ul>	<p><b>Limited</b></p> <ul style="list-style-type: none"> <li>- Opportunity to conduct public engagement and improve existing routes based on findings.</li> <li>- Limitations of fixed route transit system remain</li> </ul>	<p><b>Likely</b></p> <ul style="list-style-type: none"> <li>- On-demand improves customer experience on low-performing routes.</li> <li>- Potential to offer stops closer to destinations, reduce wait times to 10-20 minutes.</li> <li>- Risk of longer wait times for customers if fewer than 3 on-demand buses operate on weekends.</li> </ul>	<p><b>Likely</b></p> <ul style="list-style-type: none"> <li>- Increased on-demand service improves customer experience on low-performing and mixed-performing routes.</li> <li>- Potential to offer stops closer to destinations, reduce wait times to 10-30 minutes.</li> <li>- Risk of longer wait times for customers if fewer than 4 on-demand buses operate during school peaks.</li> </ul>
<b>Operational Flexibility</b>	<p><b>No Change</b></p> <ul style="list-style-type: none"> <li>- Fixed routing and schedules remain constant for months at a time.</li> </ul>	<p><b>Low</b></p> <ul style="list-style-type: none"> <li>- Fixed routing and schedules remain constant for months at a time.</li> </ul>	<p><b>Medium - High</b></p> <ul style="list-style-type: none"> <li>- On-demand capability allows for operation to adjust to level of demand. On-demand service can be adjusted without significant planning.</li> <li>- Data about on-demand service support future service planning</li> </ul>	<p><b>High</b></p> <ul style="list-style-type: none"> <li>- On-demand capability allows for operation to adjust to level of demand. On-demand service can be adjusted without significant planning.</li> <li>- Data about on-demand service support future service planning</li> </ul>
<b>System Efficiency and Right-sizing</b>	<p><b>No Change</b></p> <ul style="list-style-type: none"> <li>- Existing fixed-route system is efficiently scheduled but several fixed-routes are low performing.</li> <li>- Potential to review right-sizing of fleet during Service Review</li> </ul>	<p><b>Low - Medium</b></p> <ul style="list-style-type: none"> <li>- Existing fixed-route system is efficiently scheduled.</li> <li>- Opportunity to re-allocate service hours to areas with higher demand and examine routing.</li> <li>- Potential to review right-sizing of fleet during Service Review</li> </ul>	<p><b>Medium</b></p> <ul style="list-style-type: none"> <li>- Low-performing routes are replaced with on-demand and vehicles only operate when there is demand.</li> <li>- Consider appropriately sized vehicles for on-demand service.</li> <li>- Opportunity to share or merge on-demand system with custom transit.</li> </ul>	<p><b>Medium - High</b></p> <ul style="list-style-type: none"> <li>- Low- and mixed-performing routes are replaced with on-demand and vehicles only operate when there is demand.</li> <li>- Consider appropriately sized vehicles for on-demand service.</li> <li>- Opportunity to share or merge on-demand system with custom transit.</li> </ul>
<b>City Accountability for Transit Decision-making</b>	<p><b>No Change</b></p> <ul style="list-style-type: none"> <li>- Limited oversight over BC Transit operation and processes.</li> <li>- Constrained by BC Transit's processes and timelines</li> </ul>	<p><b>Medium</b></p> <ul style="list-style-type: none"> <li>- Transit Coordinator is in regular contact with BC Transit and provides oversight over Cranbrook system.</li> <li>- Transit Coordinator is engaged in planning and service reviews, co-leads community engagement.</li> </ul>	<p><b>Medium - High</b></p> <ul style="list-style-type: none"> <li>- Hiring on-demand operator gives City full oversight over on-demand system.</li> <li>- Interface with BC Transit fixed-routes still required.</li> <li>- Transit Coordinator is in regular contact with BC Transit and provides oversight over both systems.</li> </ul>	<p><b>Medium - High</b></p> <ul style="list-style-type: none"> <li>- Hiring on-demand operator gives City full oversight over on-demand system.</li> <li>- Interface with BC Transit fixed-routes still required.</li> <li>- Transit Coordinator is in regular contact with BC Transit and provides oversight over both systems.</li> </ul>

**Table 7-2 Summary of Annual Transit Costs**

<b>Estimated Financial Impact to Cranbrook (Annual)</b>	<b>Option 1: Status Quo</b>	<b>Option 2: Optimize BC Transit Routes + Transit Coordinator</b>	<b>Option 3A: Hybrid with Routes 1, 5, 7, 14</b>	<b>Option 3B: Hybrid with Routes 1, 5</b>
<b>Fixed Route Transit Cost</b> <i>(includes revenue, excludes Provincial contribution)</i>	\$749,000	\$749,000	\$669,000	\$514,000
<b>Supplementary On-Demand Transit Cost</b> <i>(includes revenue and on-demand technology subscription)</i>	N/A	N/A	\$465,000	\$790,000
<b>Cranbrook Transit Coordinator Cost</b>		\$50,000	\$50,000	\$50,000
<b>Total Estimated Annual Cost to Cranbrook</b>	<b>\$749,000</b>	<b>\$800,000</b>	<b>\$1,184,000</b>	<b>\$1,354,000</b>

# 8 CONCLUSIONS AND RECOMMENDATIONS

Given various success stories from other municipalities in Canada that have implemented on-demand transit in the last three years, the technology was of particular interest to the City of Cranbrook as a solution for the perceived under-performance of its fixed route transit system. The City's hope was that replacing some fixed-routes with on-demand transit could provide better value for the same cost.

This work has confirmed that several of Cranbrook's transit routes do under-perform, and that these under-performing routes are candidates for on-demand transit service. However, the transit operating context in Cranbrook makes the viability of on-demand transit as a cost-saving or cost-efficiency measure unlikely, unless the on-demand transit service is operated by BC Transit. In our assessment of costs of the City implementing on-demand transit ahead of BC Transit's timelines, we have found that it is likely to be a 60% to 80% increase in annual operating cost, depending on the hybrid transit option.

The City of Cranbrook has been advocating to BC Transit for on-demand transit service over the last few years, and this has led BC Transit to consider the City of Cranbrook as a case study as part of developing a framework for on-demand transit across the province. Timelines for launch of on-demand service in BC municipalities remains unclear, but we understand this to be a strategic priority for the Provincial agency, and over the course of this study have heard increasing commitment toward implementing on-demand transit in Cranbrook.

We have understood one of the City's goals to be an increase in accountability for transit decision-making in Cranbrook. Through working with City Staff and understanding Cranbrook's transit history, we have come to see that providing a City Staff resource dedicated to public transit would significantly increase the municipality's ability to monitor and measure the transit system performance, participate in BC Transit-led processes, advocate for Cranbrook's needs, and regularly report to City leadership and Council. It is difficult for the Directors, who are currently tasked with running their departments as well as liaising with BC Transit, to focus on the transit system in the way that a dedicated part-time FTE could. A half FTE represents less than 7% of Cranbrook's annual contribution to its transit system, and would magnify the City's voice, especially during a time where BC Transit is contemplating considerable shifts in transit delivery models and technology.

Given the above, we recommend that:

- The City of Cranbrook include a Transit Coordinator function to its Staff, which can be achieved with 0.5 FTE. This position should report to a Director to ensure it has access to authority for any urgent decisions. The position would be expected to:
  - provide system oversight and service performance management, which will be particularly important if the City incorporates on-demand transit in the future,
  - address customer service issues and complaints,
  - coordinate with BC Transit on service planning and adjustments,
  - provide oversight and input on any BC Transit communication and public engagement in Cranbrook,
  - coordinate within the City departments to address transit operational and infrastructure issues such as bus stop fixes and bus detour requirements, and
  - develop reports and updates for senior management and Council.
- The City continue to lobby BC Transit for implementation of on-demand transit in Cranbrook, and a thorough review of existing transit routes to ensure service is aligned with passenger demand.
- The City lobby BC Transit for and collaborate on the development of Transit Service Standards for Cranbrook, which will provide the framework for ongoing monitoring and measurement of Cranbrook's transit system.
- The City take an unconstrained view of the transit system through the Official Community Plan and Transportation Master Plan updates, to consider the role of transit in Cranbrook as part of the broader transportation system, and how to enable an increase in transit ridership.



