



Digital On-Demand Transit

Feasibility Study Summary Report and Service Strategy

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1.1 Introduction

Digital On-Demand (DoD) transit allows customers to request transit service in a specific service area using a smartphone app. DoD transit gives operators the ability to alter their routes based on where the demand is, rather than following a fixed route and schedule. In 2021, BC Transit and consultants from Left Turn Right Turn Ltd. and Watt Consulting conducted a feasibility study on digital on-demand transit as a solution for transit systems across B.C. The study areas were the Kelowna Regional Transit System and Cranbrook Transit System as they represent the range of communities BC Transit serves, and have several transit scenarios common to DoD. BC Transit has used the feasibility study results and additional research to develop a service strategy for DoD transit, and plans to roll out this service type to one or two communities starting in 2023, with a view to add more communities in future years, based on the success of the initial phase. This report provides an executive summary of the feasibility study results, as well as the service strategy for implementing DoD at BC Transit.

2.1 Digital On-Demand Benefits & Challenges

Digital on-demand services can have benefits for customers including reduced wait times and trip length. Types of DoD service vary, and can be delivered using smaller vehicles in a curb-to-curb pick up format, or using larger conventional buses and bus stops. BC Transit currently has some phone-based on-demand services across the province. A digital on-demand service type fits into BC Transit's [Strategic Plan](#), *Transforming your Journey*, aligning with several focus areas including delivering a positive customer experience, providing safe, responsive delivery and enabling technology.

DoD can have benefits for customers and transit agencies, but there are also challenges with this type of service. Though DoD can gain efficiencies, it is not always possible to accurately estimate demand for a new service type and the opposite could occur, requiring more resources or seeing escalating costs. If converting an existing Local Transit Network service, there are complexities to changing routes to DoD and the change needs to be well communicated to customers in advance. Changing fixed routes with low ridership to DoD also risks losing overall system ridership, if the DoD service is not used by the same customers and they choose alternative travel modes. Though digital booking is a service enhancement for some customers, it may pose a barrier for others and be a service use deterrent, so a call-in number is required during all operational hours. Putting a DoD service in place, then having to scale it back or remove it, will not be well received by customers that have begun to rely on it. This is likely why so many communities opt to begin with a pilot service with a 1-2 year duration to start.

3.1 Digital On-Demand Transit Objectives

Below is a summary of the primary objectives of any digital on demand service:

- A responsive service type intended to improve the transit experience
- Designed to be a scalable solution
- Provides flexibility, decreased wait times and greater convenience for customers
- Increases ridership and transit mode share
- Enhances data collection for demand-based services
- Leverages technology for integration with transportation providers and within the BC Transit bus network

4.1 Peer Agency Review

In examining DoD, BC Transit engaged with several transit agencies in various stages of implementing this type of service, and a peer agency review was completed as part of the feasibility study. Many transit agencies in Canada, the U.S. and around the world have initiated a DoD service in recent years, and provided valuable insight on lessons learned. The peer review found that nearly every jurisdiction tailored the service to their community's needs and the vast majority implemented a stop-to-stop model, rather than a door-to-door service. The services examined used a combination of physical stops and virtual stops. Most peer agencies integrated their DoD service with their conventional service, and only a few agencies integrated their DoD service with custom transit. Key performance indicators ranged, but several trends include short customer wait times of under 15 minutes and very high customer ratings through the app. Peer agencies also found the service requires a phone-in number for customers who do not have a smartphone or do not want to book online.

5.1 Feasibility Study Results

The feasibility study looked at four scenarios common to DoD transit. These include service improvement, replacement of fixed routes with low ridership, expansion to new areas and improving the efficiency of custom transit. These were then applied in the context of the Kelowna Regional Transit System and Cranbrook Transit System.

1. Replacing Low Performing Fixed Routes

Several service options were explored in the feasibility study that can be implemented for this scenario and will result in improvements for customers.

2. Service Improvement

This scenario has several feasible options and analog on-demand services exist that could benefit from integrating a digital option.

3. Expansion to New Area

This scenario has some feasible options, including providing service to rural areas and areas not currently served by transit, however these options require expansion hours/funding so will need to be considered for a longer term implementation.

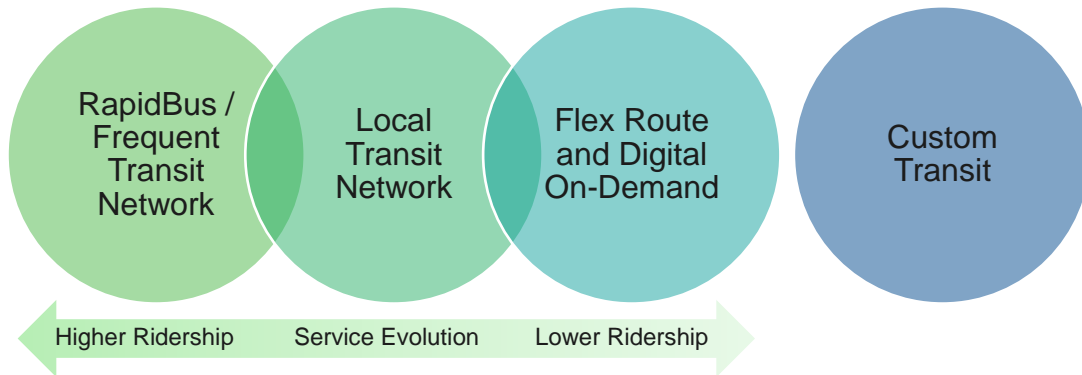
4. Improving Custom Transit Efficiency

There are more challenges to integrating DoD with custom transit, both for customers and due to the funding model. While it was explored in the feasibility study, it should be considered separately and this is reflected by peer agencies as most have not integrated custom transit with DoD service.

The study found several feasible options, and ranked them in terms of high feasibility, moderate feasibility and low feasibility. The most feasible options for short-term implementation within are converting low ridership fixed routes to DoD. This option could use existing fleet and service hours so would be the quickest to implement as no expansion resources would be required.

Providing a service improvement, such as converting an analog on-demand service to include a digital component is also a feasible option, however based on the upfront technology cost, it may be better to combine this with another DoD service area. Expansion of DoD to new areas not currently served by transit is also a feasible option, however requires approved expansion hours and funding, therefore taking longer to implement. The final scenario, improving custom transit efficiency was explored but presented more challenges in terms of the registration required for customers and a different funding model.

6.1 BC Transit Service Spectrum



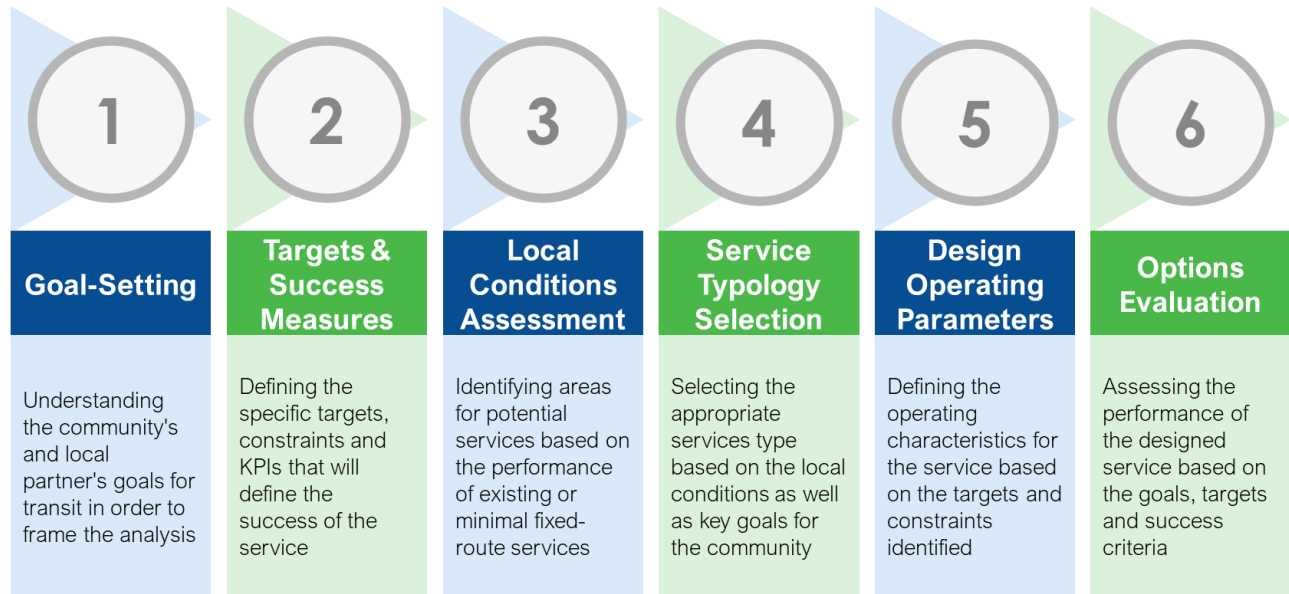
BC Transit offers a variety of options covering a spectrum of transit services including both conventional and custom transit. RapidBus and Frequent Transit services are designed as a frequent service that does not require schedules. They provide service along main corridors in larger urban centres. Local Transit Network services provide introductory levels of service on fixed-routes and schedules and feed into the RapidBus/Frequent Transit Network. Flex routes and on-demand services provide service with dynamic routing and scheduling based on demand. DoD can be considered for replacement of routes with low ridership, however there are other factors besides ridership to consider, including cost per hour, cost per passenger, growth potential, geography of roads and accessibility.

7.1 Costs

Analysis from the feasibility study revealed there are several scenarios to deliver DoD transit service for similar operating costs compared to existing fixed route services. A cost-benefit analysis was undertaken for the scenarios in Kelowna Regional and Cranbrook, to provide insight into the total estimated cost to deliver the service, as well as the impacts to the customer experience. The quantitative and qualitative evaluation looked at schedule reliability, customer travel time, average customer wait time, maximum wait time and average service frequency between any current service and flex routes or DoD options explored.

There is a cost to implementing the technology. The full technology cost would be determined by issuing a Request for Proposals (RFP), but based on other contracts between vendors and transit agencies, may range from \$150,000 - \$350,000 for the initial setup depending on the scale of the service, and number of buses. There is also typically an annual licensing cost for DoD software, and a per vehicle cost for software licensing. This can range from \$50,000-\$70,000 per year. It is important to note these are estimates based on the assumption of using existing buses, operators, planning, scheduling and customer service staff. Municipalities may be able to apply for the federal [Rural Transit Solutions Fund](#) to develop transit solutions such as on-demand in rural communities.

8.1 Planning Framework for Digital On-Demand

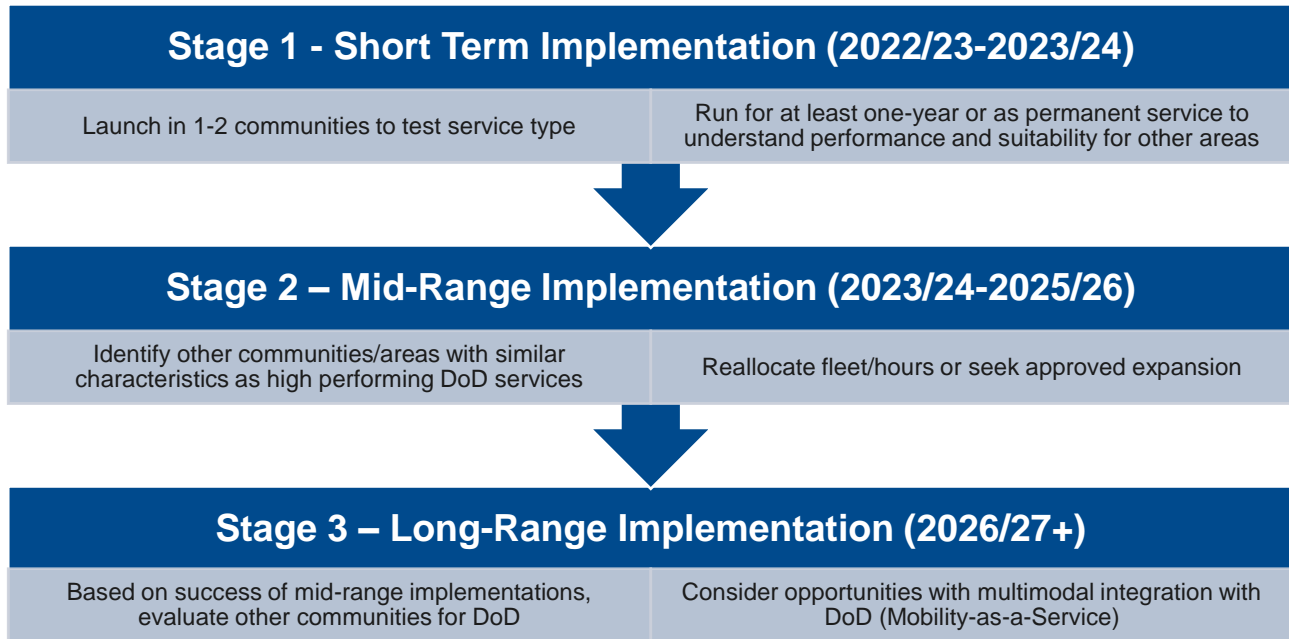


9.1 Success Measures for Digital On-Demand

Below is a summary of the measures that will be used to determine the performance of DoD services. These measures are similar to what other transit agencies have used to measure their performance:

- Ridership for the service, and overall system ridership increases
- High customer ratings through the app and positive feedback from partners
- Service performs on budget and is delivered at a similar cost to current service
- Service is accessible and inclusive for all riders
- Requests to expand the service to other areas and communities

10.1 Digital On-Demand Implementation Timeline



11.1 Next Steps

As BC Transit has decided to pursue this service type, the next steps include recruiting the necessary resources to manage the implementation and determining the service scenarios to be undertaken in one to two communities. Public engagement will be conducted for any selected communities, to understand current customer use of fixed routes, reception for DoD and identify any further considerations. Further steps include the procurement of the technology and then a marketing and communications campaign will be developed to help customers understand this new service, and how it differs from current service. Prior to launch, testing and training will be conducted and then the DoD service will begin operations.

12.1 Conclusion

DoD transit is still a developing and maturing service typology. Starting to implement the service with a small roll-out in one or two communities will allow BC Transit to understand how the service performs, how customers use the service and further inform future DoD service areas. To read the full feasibility study or if your transit system is interested in being considered for the Stage 1 implementation of DoD, please contact your Government Relations Manager or Regional Operations Manager. BC Transit has asked for interested partners in the past, and is keeping the list up to date to plan for future phases. The selection process for transit systems for the initial DoD service will be based on an evaluation matrix that includes, but is not limited to, existing transit service meeting the service levels required to meet the digital solution, access to consistent and reliable cellular data in the community and Operational staffing and fleet availability.