

Trent University

Route Planning for Public Transit in Haliburton County

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Executive Summary

Remote and rural residents in Ontario face limited access to specialized health services and social events due to a lack of public transport options. Ageing and affordability are among the key barriers that prevent many rural residents from using personal vehicles for transportation, which heightens the need for a public transit system. This is certainly the case for Haliburton County, a small community in central Ontario that is faced with a growing senior population. Two of the most common barriers preventing older residents from driving in Haliburton County are lack of a driver's license or physical restrictions. Other younger residents have cited vehicle affordability as a barrier, which prevents them from accessing employment in the area. Surveys conducted by Trent University student researchers reveal that a public transportation system connecting major townships in Haliburton County would benefit both older and younger residents by providing improved access to health and social services, recreational and social activities, and employment opportunities. This project explores the elements necessary when planning a rural public transit route including stopping locations to pick-up and drop-off users for Haliburton County. Research was undertaken to determine the potential travel routes and patterns within Haliburton County using data collected from the County Roads department and Haliburton Highlands Health Services. Maps were produced displaying medical and commuter routes for transportation in Haliburton County, building upon previous research carried out by Rural Transportation Options. These maps help inform a potential public transit route system in Haliburton County with stopping points. Three recommendations are being proposed to Rural Transportation Options based on the results of this report. Firstly, partnerships should be considered between local government, businesses, organizations, and volunteer groups in order to leverage the expertise of each stakeholder so that an effective transit system can be delivered.

Secondly, route flexibility and efficiency both need to be considered, which factors into the type of transportation model used such as a ridesharing or van-style service. Thirdly, sustainability needs to be considered to ensure that the transit service complies with local, provincial and federal environmental policies. These considerations can help guide the development of Haliburton County's public transit service and address the existing service gaps.

1 Introduction

This community-based research project explores the elements that go into planning a public transportation network for Haliburton County with stopping locations to pick-up and drop-off users. Data were provided by the County Roads department and Haliburton Highlands Health Services, Community Support Services' transportation program in order to help identify travel patterns among both commuters and medical clients. Two maps have been produced using this data, one for medical purposes and the other for commuter purposes. These maps will build on the previous research carried out by Rural Transportation Options and help inform the County on potential routes that could be used for a public transit system.

Rural Ontario communities face challenges with the lack of public transportation options, including access to specialized health services and social events as well as affordability barriers. Based on the latest population projections for Ontario, the number of seniors aged 65 or older is expected to increase from 2.3 million in 2016 to 4.6 million by 2041 (Ontario Ministry of Finance, 2017). According to the Age-Friendly Master Plan for Haliburton County, the average age in the County is 52 years, and seniors make up 32% of the total population (Hall & Associates, 2017). An ageing population coupled with a lack of public transit services will be a growing issue for rural communities in the years to come, especially if seniors are unable to drive the long distance to medical facilities in larger towns or cities. In addition, a lack of

transportation prevents individuals from attending social events or participating in social activities. A survey conducted by Nguyen in 2012 shows that approximately 29.4% of respondents in Haliburton County indicated that a lack of transportation prevents accessibility to various social events (Nguyen, 2012). Social interaction and participation is highly valued in Haliburton County communities and cannot be fostered without the availability of alternative transportation options. Furthermore, rural communities tend to be demographically characterized by lower-income populations, which makes private vehicle ownership less feasible. In Haliburton County, the median family income is \$61,525 as compared to the median provincial income of \$69,156, with more than 4,000 families living in poverty (Rural Transportation Options, 2012). Affordability is a major barrier to vehicle ownership in rural regions, and other modes of transportation like cycling or walking are not as practical for remote communities as they are for larger, urban centres.

2 Background Information

2.1 Rural Transportation Programs in Haliburton County and Other Municipalities

Haliburton County has a notable history of public transportation initiatives that date back to the late 1990s. In 1996, the provincial government launched the Community Transportation Action Plan (CTAP) whose mandate was to provide funding for improving the coordination of local transportation services in municipalities by reducing inefficiencies and service gaps (Rural Transportation Options, 2012). This led to the formation of a pilot program in 1998; however, due to low ridership, the program was unsuccessful and eventually folded. Another issue, which was later identified by Community Living Haliburton County, was that some riders were clients of social services, meaning that sharing rides with others in a rideshare or shuttle van service could potentially be distressing or set off negative behaviours (Rural Transportation Options,

2012). Other municipalities that started grassroots transportation programs via the CTAP are either no longer functioning or evolved into new programs. For example, one such program in the North Dumfries area was called Get Up and Go, which now no longer exists, but was later replaced by the PATER program, an entirely separate ridesharing service (Rural Transportation Options, 2012). Rural municipalities across the province have attempted to introduce public transit options to its residents in one form or another, but very few have had lasting momentum.

A report on various ridesharing models in North America produced by Rural Transportation Options describes how acquaintance-based ridesharing has become well-engrained within Haliburton County, and offer some explanation for why previous transit programs in the area have not been entirely successful. The report has broken down this acquaintance-based model into the following categories:

- The **“fampool”**: Families that provide carpooling services to one another, particularly for their children’s sporting activities and events (Loucks, 2012).
- The **“worship commute”**: Ridesharing for church-goers who are no longer able to drive (Loucks, 2012).
- The **“co-worker carpool”**: Ridesharing between employees of the same organization (Loucks, 2012).

These informal networks between local residents have worked successfully even without internet applications or incentives (Loucks, 2012). This implies that a successful rural transit program does not necessarily require either of these functions or structures.

The District of Muskoka’s Corridor 11 Bus is one good example of a local transportation program that leveraged existing strengths and opportunities to become successful. Among the opportunities, researchers had identified priority populations in the area, which included seniors

and low-income individuals, as well as underserved areas such as Georgian Bay that would benefit from a transportation program (Caldwell, 2014). Identifiable assets included a strong volunteer base and close geographic proximity between existing transportation agencies that could lead to a “pooling of resources” (Caldwell, 2014). It was decided by the District’s Community Services Commissioner to develop and test an inter-town bus service that would travel twice daily between Huntsville and Barrie during the week. This led to the debut of the Corridor 11 Bus in the fall of 2012, which has now been operating for over five years. The Community Services Commissioner noted that public use of the service was key to its success, particularly among students attending Georgian College (Caldwell, 2014). Additionally, medical appointment usage is expected to rise, which can be accommodated through continual promotion of the service (Caldwell, 2014). In order to develop a sustainable transportation program in Haliburton County, assets and opportunities must be identified. For instance, service providers must have a firm understanding of the priority populations and the specific areas that will be serviced. In addition, identifying assets such as potential funding opportunities, a strong volunteer network, momentum from previous transportation initiatives, or a commitment to finding solutions are all essential for developing an effective program.

One local municipality in particular is looking to integrate technology into its transportation solutions. Last fall, the Cavan Monaghan Township council expressed interest in developing a public transit service for the Village of Millbrook using fully-autonomous vehicles. Public transportation recently became an issue after the closure of the local TD Canada Trust branch, which will now force residents to travel farther for banking services (Anderson, 2017). In addition, much like Haliburton County, Millbrook faces similar issues with an ageing population that may require alternative transportation options to access health or social services.

Mayor Scott McFadden has recognized that the costs of a traditional public transit system for Millbrook are not feasible based on population size and potential use (Anderson, 2017). This led to a co-investment between Dr. Josipa Petrunic of the Canadian Urban Transit Research and Innovation Consortium (CUTRIC) and Millbrook to begin industry trials for a low-carbon, on-demand vehicle automated service in the community. This type of localized service combined with a ride-sharing app would be ideal for municipalities like Haliburton County that are underserved and limited by their population sizes to justify large-scale, public transit. Moreover, the service would eliminate the need for volunteers or private workers to function, which was a major shortcoming for previous ridesharing services since they struggled with volunteer burnout (Rural Transportation Options, 2012). Local politicians from Haliburton County should keep up to date with the industry trials in Millbrook as it may provide an answer to local transportation issues.

2.2 Transportation Needs in Haliburton County

Prior community-based research by Trent students has determined the major transportation needs in Haliburton County. Huong Nguyen's 2012 survey of Haliburton residents identified the specific transportation needs in each township within Haliburton County. The results show that Algonquin Highlands faces the greatest number of issues from a lack of transportation options as they were the second highest township with limited accessibility to employment opportunities and recreational/social activities, as well as the highest township with poor accessibility to health services (Nguyen, 2012). Dysart et al also faces similar issues as they were the second highest township with limited accessibility with health services and the highest township with poor accessibility to education and recreational/social activities (Nguyen, 2012). Interestingly enough,

the same survey also reveals that these two townships were the most willing to share rides with strangers if they were going to the same destination (Nguyen, 2012). Nguyen's study shows that Haliburton County's most vulnerable townships in terms of health, employment, education, and social accessibility would be willing to, at the very least, experiment with rideshare options for transportation. Both Algonquin Highlands and Dysart et al would greatly benefit from this service.

Furthermore, the preliminary results from Webber and Suthaskaran's analysis of transportation needs in Haliburton County reveal some of the target demographics who would benefit most from a transportation service as well as some of the existing service gaps. The largest age ranges affected by a lack of public transportation options were the elderly, or people ages 65 and up, and people ages 30 to 44 (Webber & Suthaskaran, 2018). Among the activities that these two age groups are unable to partake in, the biggest ones were shopping, health services, social events, and employment. In terms of the identifiable service gaps, the student researchers find that the cost of transportation was common among both the elderly and people ages 30 to 44. This includes the combination of costs associated with taxi service, private vehicle ownership, vehicle maintenance, vehicle insurance, and gas (Webber & Suthaskaran, 2018). Among the elderly, the most common issue is the lack of a driver's license, which prevents them from attending the previously mentioned activities. This issue coincides with the second most prevalent issue cited among the elderly, which were physical restrictions such as an ailment that prevents them from driving (Webber & Suthaskaran, 2018). Based on the results from Webber and Suthaskaran's analysis, a cheap, publicly-funded transportation system is needed in order to service these two target groups. Client surveys further revealed that if such a service existed, a large number of people would use it on a weekly basis for shopping, on a daily basis for

employment and occasionally for health services (Webber & Suthaskaran, 2018). The data shows significant demand for a public transit system of some kind, whether it be in the form of a ridesharing or van-style service.

2.3 Elements to Consider When Planning Rural Transit Systems

A presentation by Rural Transportation Options in late 2013 identifies the conditions for success for rural transit systems as well as the costs and benefits of various transportation models.

According to the presentation slides, there are three main conditions for success: support from local government, coordination between all regional transportation programs and geographical proximity to at least one hub community (Rural Transportation Options, 2013). These conditions were also important in the Corridor 11 Bus case. For Haliburton County, additional factors influencing the local transportation program's success include route flexibility and community partnerships.

Route flexibility addresses the inherent variation in service needs. For example, when some service users may be more remote than others or when certain roads are not cleared for snow in the wintertime. The type of transportation model is also likely to be dependent on demand. For instance, if demand is lower, a car-sharing or ride-sharing model might make the most sense. However, if demand is higher, then a van-style service would be more suitable. The type of demand also determines the model used, especially if demand is from individuals who require specialized transit such as wheelchair access.

Community partnerships have also been identified in the literature as a major element for consideration when developing rural transport networks. As described by Andrew Wear, the "one-size fits all" solutions prescribed by central governments for rural issues are ineffective

because they fail to capture the unique local conditions of these communities (Wear, 2009). Instead, Wear proposes an approach where relevant community actors collaborate to develop and deliver transport solutions together. Local actors such as businesses, organizations, volunteer groups, and government each possess a unique capacity and knowledge that can be coordinated to find innovative and cost-effective solutions for transport and accessibility issues (Wear, 2009). The inclusion of local residents in this decision-making process is another important element to consider since they may have a comprehensive knowledge of the area that could be vital for a transportation program. However, Wear recommends that resident inclusion be dealt with on a case-by-case basis for some partnerships because attaining an accurate resident representation can be challenging (Wear, 2009). A partnership approach should be highly considered in Haliburton County since there are already resources available from a variety of sectors that can be leveraged to deliver an effective local transit service.

3 Research Approach

The main deliverable of this research was a set of maps that displayed potential public transit routes and patterns within Haliburton County. This was accomplished by finding and collecting relevant data from a variety of community sources including the Public Works Department and Haliburton Highlands Health Services. GIS layers were collected from Land Information Ontario (LIO) via the Maps, Data and Government Information Centre (MaDGIC) in downtown Peterborough. Next, both the data and layers were incorporated into GIS software for analysis and display where the Network Analyst extension was used to calculate the quickest route between all of the townships. Additionally, consultation with the literature and existing research help guide the accuracy of this report.

3.1 Collection of Existing Transportation Data

The County of Haliburton Public Works Department provided traffic volumes data from between 2010 and 2016, which summarized the AADT (Average Annual Daily Traffic), SADT (Summer Annual Daily Traffic) and WADT (Winter Annual Daily Traffic) for each year. One of the roads with the highest traffic volumes for each category was County Road 1, one of a few main roads that runs through town. The AADT, SADT and WADT were within the range of 3,000-5,000 vehicles for 2010, 2013 and 2016. County Road 21 was another high-volume route with the number of vehicles reaching as high as 10,340 just 200 metres east of Wallings Road in 2015. This data remains consistent with the preliminary analysis conducted by Breanna Webber and Viyanka Suthaskaran, who both found that Haliburton Village had the highest population in the county and was also the most popular destination for shopping, recreation and health services (Webber & Suthaskaran, 2018). Other roads that had fairly high traffic volumes within the 1,000-2,000-vehicle range included County Roads 7, 121, 503, and 648, while many of the smaller roads had less than 1,000. Initially, the intention was to visualize this information in a map to display how traffic flow has changed over the years in Haliburton County. This would allow us to see which roads would be ideal for a transit system and potentially which ones would not. Unfortunately, this data was typed up in a format that was not conducive for exporting into ArcGIS, which made a historical traffic flow map infeasible at this time. However, the opportunity to create such a map will be available shortly as the Public Works department is looking to enter this traffic data into Excel by next summer according to Engineering Assistant, Brian Mulholland.

The other data set that was collected prior to creating the maps came from the Community Support Services branch of Haliburton Highlands Health Services, which has a

volunteer-driven transportation service for its clients. This service is available to both seniors and adults with illnesses or disabilities who need to attend medical appointments when either relatives or friends are unable to assist (Haliburton Highlands Health Services, 2018). The service is also available to clients for shopping or for attending social or recreational events if needed (Haliburton Highlands Health Services, 2018). The collected data was recorded between 2002 and 2017, and shows the client's origin municipality, the client's destination, and the trip date among other variables. A data summary was also provided, which shows that over 68,000 trips have been taken with the transportation service since 2002. The majority of these trips originated from Minden Hills, Dysart et al and Highlands East with the primary destination being either in Haliburton Village or Minden Township; however, there were some outlier destinations in either the Greater Toronto or Kawartha Lakes regions. Since the data was so extensive, only the service trips with origins and destinations in Haliburton County from 2017 were selected to narrow the scope.

4 Results

The final maps display transit routes for both medical and commuter demand with the most popular origins and destinations of Haliburton County as stopping locations. Figure 1 displays a potential transportation route to be used by clients of Haliburton Highlands Health Services and Figure 2 displays a transportation route for commuters in Haliburton County. The featured routes were calculated using the Network Analyst extension in ArcGIS, which helps find the quickest and shortest route between multiple locations depending on the impedance that is being solved for. In both cases, time and distance were chosen as impedances; however, other barriers could be included to create more extensive maps such as construction sites, traffic at certain times of the day, or detours.

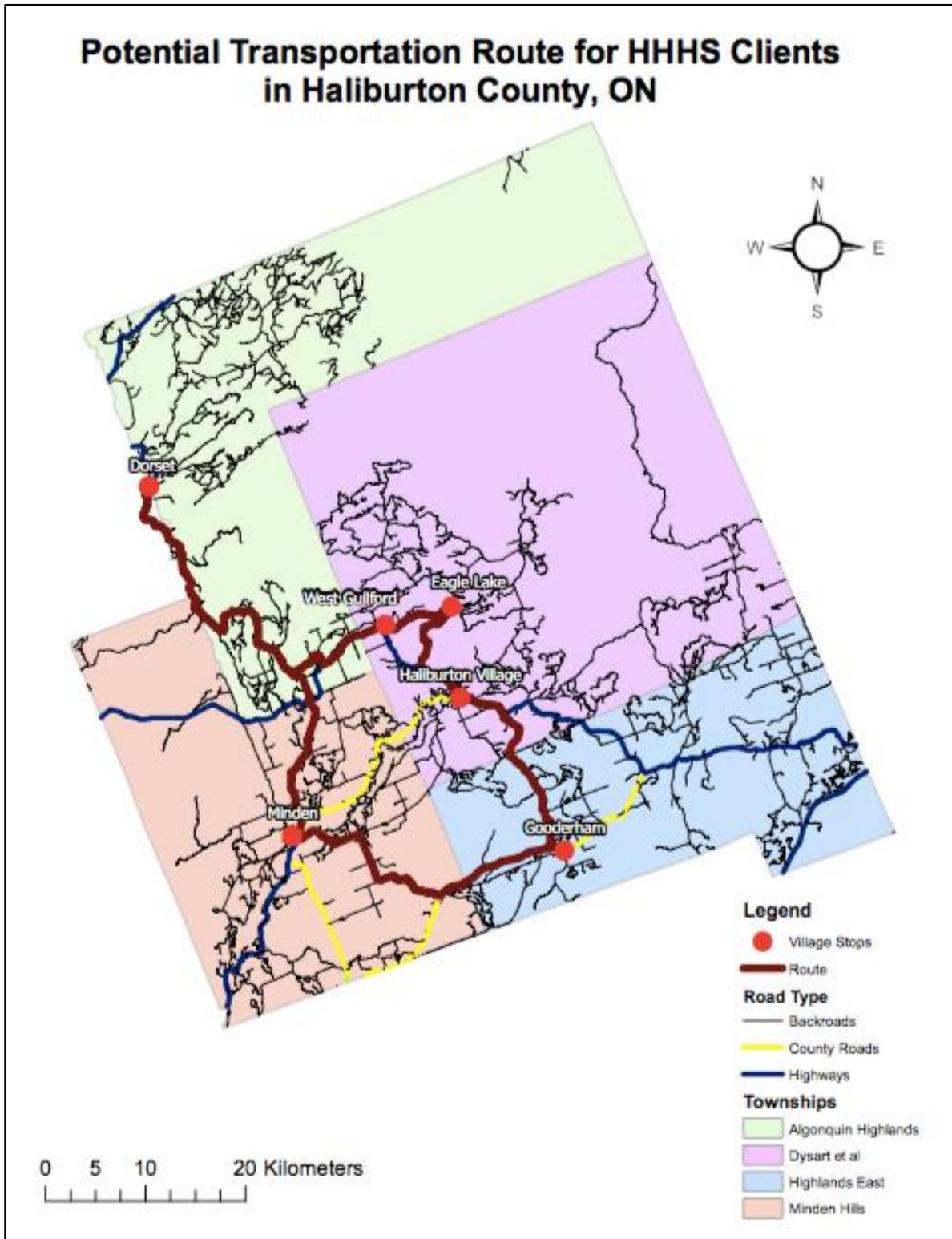


Figure 1 – Map of Potential Transportation Route for Haliburton Highlands Health Services Clients in Haliburton County, Ontario

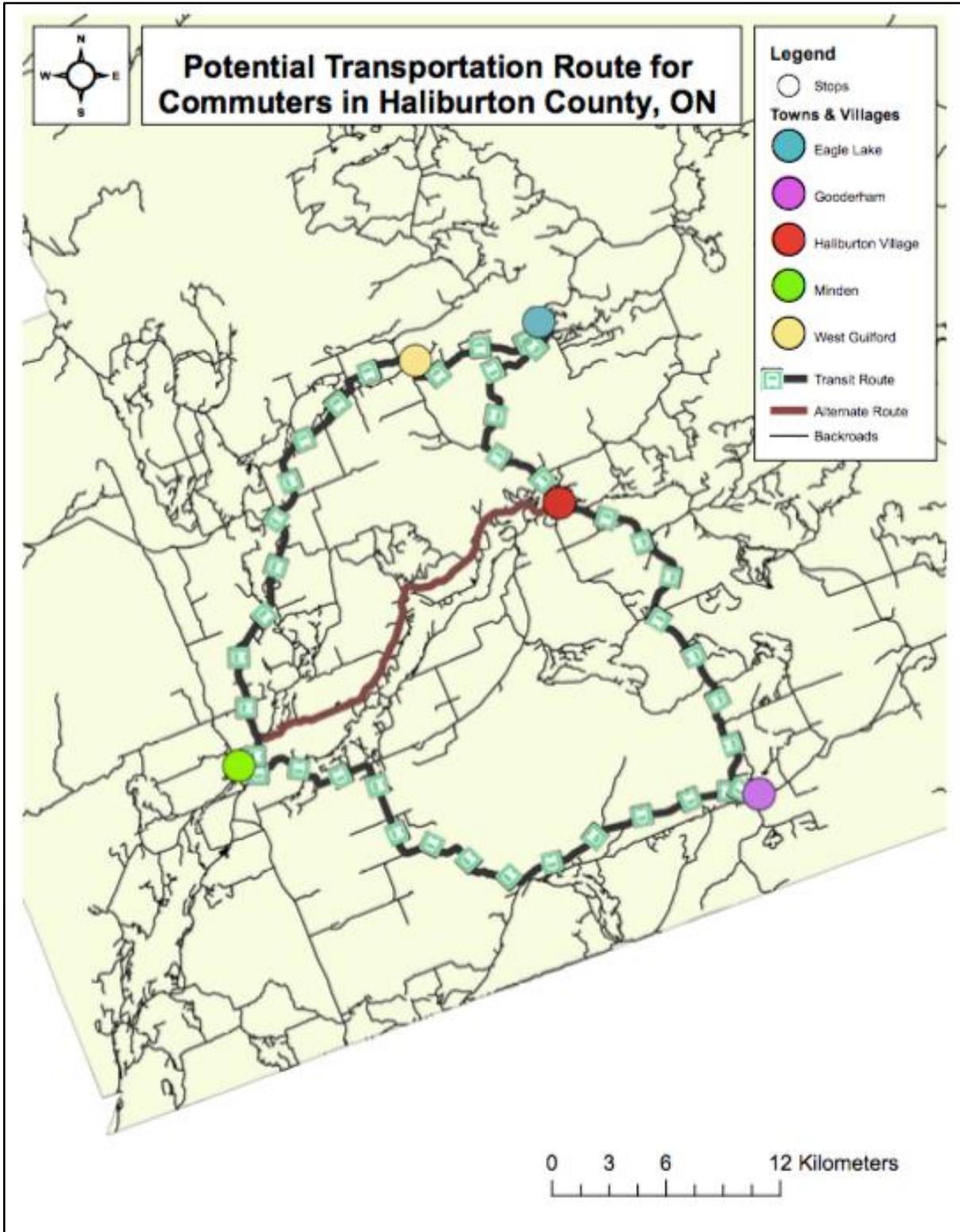


Figure 2 – Map of Potential Transportation Route for Commuters in Haliburton County, Ontario

4.1 Future Work

4.1.1 Partnerships with Local Stakeholders

One of the key research goals of this project was to determine what elements are necessary for planning a public transit system in a rural community like Haliburton County. Based on the information gathered in the literature review, one of the major elements for consideration is coordination between the local government, local businesses and organizations, as well as volunteer groups in order to deliver a rural transit service effectively. Local stakeholders can focus their efforts on what they do best by applying their unique capacities to develop a transportation service the community can be proud of. This, in contrast to a program delivered solely by the central government, would be more effective at capturing the needs of the community. Future research should be undertaken to explore potential partnerships between local transportation providers, businesses, government, and volunteer groups to pool resources and plan a new program together.

4.1.2 Route Flexibility and Efficiency

In addition, route flexibility and efficiency both need to be considered for when some service areas are more remote than others or when certain roads are not cleared for snow during winter. According to the two maps, the roads that were selected for the potential routes are major highways or county roads, thus snow clearance should not be an issue in the wintertime.

However, efficiency is something to consider for this transportation program, especially since Algonquin Highlands is not in a geographically convenient area and the township faces some of the strongest transportation needs. In other words, how frequent should the service run?

According to recent surveys, some residents claim they will use a transportation service on a

daily and weekly basis, thus the service would need to run frequently to meet demand. This then begs the question as to what kind of transportation model would be suitable for the county. For instance, a ridesharing model would be convenient for people going to the same place (i.e. grocery store, social event) and several vehicles could be used to accommodate multiple people. In comparison, a van-style service would likely parallel the traditional transit buses and would not likely be as flexible as ridesharing since more people would need to be accommodated; however, this is merely speculation. Opportunities for future research include identifying the appropriate transportation model for the county and subsequently determining the costs associated with such a service and whether or not it should be funded via private or public bodies.

4.1.3 Sustainability

Finally, ensuring that the new transportation service is aligned with local, provincial and national sustainability policies should be a major priority for Haliburton County. Local organizations like Environment Haliburton! (EH!) can help advocate for a sustainable transportation model at the local level through their “Haliburton in Transition” working group. Further research can be undertaken to evaluate sustainable transportation options that are cost-effective, realistic and manageable for Haliburton County.

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