



Analysis of Literature and Secondary Data for Recommendations Related to Transportation Models on the Avalon Peninsula

Community Based Research Project

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EXECUTIVE SUMMARY

This community based research aims to inform and support the Avalon Regional Council of the Rural Secretariat in the development of policy recommendations and advice to the Government of Newfoundland and Labrador on the development of local transportation models for the Avalon Peninsula. Government of Newfoundland and Labrador has committed to allocate one million dollars to enhance transportation for seniors by partnering with community organizations (PC Party of Newfoundland & Labrador, 2011). The need for affordable and reliable transportation for seniors, as well as other groups of transport disadvantaged, has been stressed in several local studies.

Based on the specific criteria identified by this research, development of a subsidized demand responsive door-to-door transportation service (DRT) is recommended to address this need. DRT is an optimal solution for areas with a low passenger demand, as it operates only when booked in advance. It offers a more individually tailored service, compared to the conventional transit service, which is especially appreciated by seniors.

In particular, this research recommends developing a centrally coordinated Volunteer Driver scheme. This scheme provides a very personalized service with flexible pick up and drop off points. Volunteer Driver scheme can optimize the existing volunteers' input and open up this service to a greater number of users. Being the least expensive of the DRT schemes, however, it might not be able to address all the needs due to a limited availability of the volunteers. Thus, it is recommended to combine the Volunteer Driver scheme with semi-flexible or semi-scheduled types of DRT. These types still offer the convenience of being picked up at home (or another indicated location), but the destination points are limited to certain locations, such as a grocery store, hospital or medical center, seniors' day care center, recreational facility, etc. These schemes can be offered once or twice a week in order to increase patronage. This research also recommends other categories of the transport disadvantaged into provision of transportation services

in the region. This could have a positive impact on the social and economic development of the area and further increase the patronage.

While Volunteer Driver scheme utilises volunteers' own vehicles, the semi-flexible or semi-scheduled schemes would need a designated vehicle(s). This research recommends exploring the three options for the vehicle allocation: contracting a local taxi (a car or a minivan) or mini-bus operator; purchasing a vehicle (a minivan or a mini-bus) and supplement its use by chartering it to local organizations if sufficient demand exists; or purchasing a vehicle (minivan or mini-bus) to be used jointly by two or three neighbouring Zones, serving each of them on a selected day(s) of each week and providing coordinated trips to St. John's. However, the ownership option inevitably implies expenses on maintenance, insurance and driver' salary. It also needs a back-up option.

Further research on defining and estimating the travel needs of local seniors and other transport disadvantaged groups, as well as an inventory of existing transportation services is required to finalize the choice for the most suitable transportation model and optimal vehicle allocation. This report recommends developing a partnership or a working group consisting of the representatives from local organizations, targeted population groups, transport operators and funding bodies to facilitate this preliminary research, develop, implement and operate a transportation model. Based on the geographical layout of the Avalon Peninsula, travel patterns of its residents and optimal scale for the partnership, this research recommends implementation of a local transportation model in each Economic Zone with possible coordination of the occasional trips to St. John's or between the Zones.

PURPOSE OF THE RESEARCH

Transportation is an essential component of the senior lifestyle. A number of studies (e.g. Active Age, 2008; M-RON, 2006; Transport Canada, 2006) have stressed the vital effect of mobility on maintaining the health, independence and social inclusion of seniors. For seniors living in rural areas this mobility largely depends on access to a personal automobile. A number of studies have demonstrated the preference of rural seniors to use a personal vehicle, or a social network of family and friends, for their transportation needs over other transit services (Transport Canada, 2006; Halseth & Ryser, 2004).

Although a personal automobile is the most common method of transportation in rural communities, not all seniors have access to one. Furthermore, the ability and willingness of seniors to drive for long distances or on a highway, especially in poor road or weather conditions, often diminishes with age. Women tend to retire their licences sooner than men. Additionally, some older women in rural communities might never have had their own license, thus with the loss of their husbands they also lose access to a personal vehicle (M-RON, 2006; Herold et al., 2002).

There is little alternative available to a personal automobile in rural communities. Seniors on the Avalon Peninsula, as well as other rural areas throughout Canada and internationally, continue to experience a lack of access to public transportation. Conventional public transportation, i.e. large fixed-route scheduled buses generally is not practical in rural areas due to the higher per capita costs of service delivery, larger distances and lower population densities (Halseth & Ryser, 2004). A combination of these factors makes the operation of conventional transportation either too expensive for passengers or commercially unsustainable (Vanseveren, 2000).

The lack of public transit in rural areas can place seniors who do not have access to a private vehicle in a vulnerable position (Eastern Health, 2007). It creates dependency on a private automobile among rural residents and inevitably sets apart

those with vehicle access, – residents who are thus able to access services, jobs, recreational activities, etc., – from those without, i.e. the “transport disadvantaged” (Herold et al., 2002). The situation has been further exacerbated due to the centralization of services that tends to occur in rural areas. As a result, rural seniors must travel further and for longer periods in order to access health, educational and social services, in comparison to their urban counterparts (Herold et al., 2002). In general, seniors living in rural areas, as well as rural youth, the mobility challenged, women, low income and unemployed individuals tend to fall into this category of the “transport disadvantaged”.

According to Transport Canada (2006) the level of provision of public transit service in rural and small communities across Canada is significantly lower when compared to urban areas. In Newfoundland and Labrador particularly local public transport services¹ are offered only in the St. John’s metro region (*Access to Travel*, website). In comparison to other Atlantic Provinces, these services are available in 26 communities in New Brunswick, in 12 communities in Nova Scotia, and in 9 communities in Prince Edward Island. Although, some authors argue that the actual numbers are lower, as not all of these services are accessible (e.g. Hansen, 2008). Due to public transit options being virtually unavailable in the rural communities of the Avalon Peninsula, a personal vehicle or network of family and friends who own an automobile, represent the primary mode of transportation. The exception is the St. John’s metro area, where Metrobus (conventional bus service) and Wheelway and GoBus (local accessible transport services for persons with disabilities) are in operation (*Access to Travel*, website).

Local studies and community groups have identified the need for an affordable, reliable and accessible transport system for seniors, as well as for other transport disadvantaged individuals such as persons with disabilities, low income, unemployed and youth (Eastern Health, 2007, 2010). The provincial Healthy Aging policy framework (Government of Newfoundland and Labrador, 2007) stressed the importance of providing seniors with access to educational, cultural,

¹ Accessible ground transportation services within cities and towns across Canada (*Access to Travel* website).

spiritual and recreational resources; promoting the independence and social inclusion of seniors; ensuring their safety and security, and treating their diverse needs equally. For this purpose Government of Newfoundland and Labrador is planning to establish a transportation fund of \$ 1 million to partner with community organizations to improve transportation for seniors (PC Party of Newfoundland & Labrador, 2011).

The goal of this community-based research is to inform and support the Avalon Regional Council in the development of policy recommendations and advice to the Government of Newfoundland and Labrador on implementation of transportation system for seniors within the Avalon Peninsula region. The research will analyze transportation models for seniors and other transport disadvantaged groups in various national and international jurisdictions and identify models most appropriate for the region.

AVALON PENINSULA CONTEXT

Local Transportation Needs

In the context of the Avalon Peninsula, the need for a transportation system for seniors and other transport disadvantaged groups has been well documented. The Transportation Study for Baccalieu Trail region (M-RON, 2006) identified the need for affordable, accessible and reliable transportation among the region's seniors. This need was particularly highlighted in more remote rural areas of the region as most of these areas have no bus or taxi connection to large towns. The most common mean of transportation in such situations is family members or friends with a car access. The study had raised a concern regarding the inability of seniors, who for many reasons no longer operate their own vehicles, to access everyday services, medical appointments, social events, etc.

Similar concerns regarding access to transportation have been voiced in a series of the Community Health Needs Assessment studies conducted recently by Eastern

Health (2010, 2007). The Eastern Health study (2007) pointed to the absence of public transportation from Cape Shore communities to Placentia or from Placentia to Carbonear. It also identified that 26% of the Southern Shore (Economic Zones 18 and 20) residents responded to the telephone survey identified the lack of public transportation as a major problem in their community. Road conditions, long distances to services and lack of public transportation were identified among the six challenges facing Southern Avalon residents and communities (Eastern Health, 2007).

Another issue affecting access to transportation services is a low income. People with low income often have no personal automobile and may live in areas where public transportation options are limited or too costly. Although some categories of these individuals (income support recipients) receive financial assistance for transportation, there are still challenges to overcome (Eastern Health, 2007).

Several communities in the Southern Shore and Cape Shore areas are making efforts to address social exclusion of local seniors by establishing new social support networks. For example, the community of Branch (Zone 18) has developed a free meal service and social get-together for older adults – *The Singing Kitchen*. The efforts of the seniors in Trepassey (Zone 20) are particularly remarkable in this regard. They assist their fellow seniors in getting out to events, taking part in activities and providing the necessary support. They have also developed an inventory of seniors and volunteers who are able to assist with the senior needs (Eastern Health, 2007).

These studies (Eastern Health, 2010, 2007) also pointed to a great reliance of the area's residents on family and friends for their transportation needs. However, with the significant out-migration of younger people, some seniors are losing these family/friends networks.

While the vast majority of seniors are either themselves driving or relying on family and friends, it is important to provide them with suitable alternative transportation option to the private car. The need for such alternative is emphasized

in communities where friends and family members may have out-migrated or be absent from the community for long periods of time due to long distance commuting.

Local Characteristics

The geographical scope of this project covers the Avalon Peninsula Rural Secretariat region. The proportion of seniors in the Avalon Peninsula region is growing. The overall population of Newfoundland and Labrador is aging faster than any other Canadian province and in 2006 seniors constituted 14% of the province's total population (Turcotte & Schellenberg, 2007). On the Avalon Peninsula, this percentage was even higher – 16% to 17%, with the only exception being the North-East Avalon where data is greatly biased by the St. John's metro area (Table 1). The Southern Avalon area is projected to become the “oldest” on the Avalon Peninsula with the share of seniors reaching 30% of the total population by 2021 (Eastern Health, 2007).

The region consists of about 9,100 square km, with a population of 243,500 inhabitants in 2006. The population in the region is dispersed unevenly, with approximately 70% or 164,405 people in 2006 being concentrated in the provincial capital – St. John's – and in a surrounding cluster of towns: Mount Pearl, Conception Bay South, Paradise, Portugal Cove-St. Philip's and Torbay. These towns plus Bay Roberts, which is located some 50 km west of St. John's, are the only communities in the region with more than 5,000 residents. The rest of the region's 188 communities are much smaller in size and have less than 1,000 inhabitants (Rural Secretariat).

The region is divided into four economic zones: Mariner Resource Opportunities Network Inc. (Zone 17), Avalon Gateway Regional Economic Development Inc. (Zone 18), Northeast Avalon Regional Economic Development Board (Zone 19) and the Irish Loop (Zone 20).

Zone 17 or the Baccalieu Trail Region is located on the Bay de Verde Peninsula, the largest peninsula making up part of the Avalon Peninsula. The majority of its 68 communities are stretched along the coast line on both sides of the Peninsula (Trinity Bay and Conception Bay). The region features both rural and urban type of settlements with majority being rural. Essential services tend to be concentrated in the regional service hubs such as Old Perlican, Carbonear, Bay Roberts and Whitbourne (M-RON, 2008). This creates a geographical asymmetry of services allocated in the region with towns in the Conception Bay area enjoying better access to commercial and social services. In contrast, the majority of towns in the Trinity Bay area do not have service stations, supermarkets or financial institutions.

The Avalon Gateway Region or Economic Zone 18 is located on the Southwest Avalon Peninsula. The region covers a large geographical area, however, in terms of population it is the smallest among the four considered in this study. The region is made up of 24 communities located along the east shores of Placentia Bay and the west and north shores of St. Mary's Bay. These communities are predominantly small rural settlements dependent on fisheries or industry outside the Zone's boundaries. The largest town – Placentia is located in Placentia Bay and is a regional service hub. Placentia has a population of 4,300 people, which is more than a half (60%) of the region's total. The population of the next three largest communities is approximately 500 people (AGRED Inc., 2009). Residents of the communities located closer to the base of the Peninsula, i.e. around the town of Placentia and on the north shore of St. Mary's Bay, have better access to services located in Placentia, St. Mary's and Witbourne in comparison to those living on the tip who require substantial driving to reach those services.

Table 1 Some Characteristics of the Economic Zones

Economic Zone	Population, 2006	Seniors (65+) population, 2006	% 65 +	# of communities
Zone 17	39,850	6,375	16%	68
Zone 18	7,310	1,270	17%	24
Zone 19	188,265	22,000	12%	27
Zone 20	8,410	1,230	17%	19

Source: Community Accounts, Zone 17, 18, 19 and 20 General Profiles; Seniors Profiles.

The Northeast Avalon (Zone 19) is also located on a peninsula. The region is the smallest in terms of geographical area but has the largest population as it includes the metro St. John's area. The region has approximately 27 communities ranging from small rural, as Chapel's Cove with a population of 395, to the St. John's agglomeration of 100,645 in 2006 (CCDA, 2008). Following the traditional settlement pattern, communities are mainly located along the shore lines: the south shore of Conception Bay and along the Atlantic Ocean on the other side of the peninsula. The region also includes Bell Island, located in Conception Bay and connected by ferry service to the town of Portugal Cove.

The Irish Loop region (Zone 20) is located on the southern portion of the Avalon Peninsula. The region covers a large geographical area and has a relatively small population of 8,410 as of 2006 data (Community Accounts, Zone 20 General Profile). The region's 19 communities are located along the coast (Irish Loop website). The majority of communities (15) are located on the north-east part of the region from Bay Bulls to Renew-Cappahayden, which is located in close proximity to St. John's. This area features two regional service centers: Witless Bay and Ferryland. Another service hub is St. Mary's. The communities situated at

the tip of the peninsula (Southern Shore) are the most remote from St. John's and the region's service centers.

Traveling patterns indicated in the transportation study for the Baccalieu Trail region (Zone 17) (M-RON, 2006) and replicated in consultations with the Avalon Council, demonstrate that seniors tend to make the bulk of their trips between their home communities and the nearest regional service hub. These trips are primarily made within one economic zone. However, even within one zone, a trip to the regional service town can be long. In addition to local trips, seniors also occasionally travel to St. John's for medical appointments and other needs.

A survey of the transportation needs of seniors and persons with disabilities residing in the Baccalieu Trail region (M-RON, 2006) identified very low interest in a commercial fee-for-service type of transportation system. The survey demonstrated that only 9% (114 people) of the respondents would use such service if it were available. Further development of this idea revealed an interest among local transport operators, however the costs associated with running a commercially sustainable transportation service were found to be very high (particularly the insurance cost), which would make the fee for service too costly to be used by local residents (personal communication).

Based on the context of the Avalon Peninsula this research delineated several basic criteria a potential transportation model should meet: 1) the model should operate in similar geography, i.e. serve a number of small rural communities dispersed over a large territory; 2) it should be viable even if passenger demand is low; 3) it should address similar transportation needs, i.e. the majority of trips are made between local communities and regional service hub town with occasional trips made to a major regional center (St. John's); 4) it should be affordable. However, a more detailed study is required to more deeply understand of the travel needs, patterns and level of passenger demand in the Avalon Peninsula Region.

DEMAND RESPONSIVE TRANSPORTATION (DRT)

Why DRT?

A review of national and international literature related to transportation models which serve the needs of rural and urban transport disadvantaged seniors suggests an alternative to the conventional transit option – *Flexible, Intermediate or Demand Responsive Transport (DRT)* services. DRT services are designed to fill the gap between a personal automobile and conventional public transportation (Ambrosino et al., 2003). DRT provides service only when it is “demanded,” i.e. booked by passengers, and uses a vehicle, or a fleet of vehicles, to pick up and drop off people according to their needs (Grosso et al., 2002). DRT is perceived as an intermediate form of public transport, positioned between a taxi and a conventional bus service (Laws et al., 2009). DRT resembles a taxi by offering individualised transport service, while charging affordable fares similar to or slightly higher than conventional buses. A combination of trips is key to offsetting the high costs of individualised services. A trip combination starts from a shared taxi scheme, which normally can accommodate two to three passengers per car. The more trips are combined, – the larger the vehicle required and the closer the scheme gets to a conventional bus (Engels & Ambrosino, 2003).

Generally, trips are required to be booked with a coordination/dispatch center in advance (24-48 hours) by phone or on-line. Booking in advance is sometimes perceived as a disadvantage of the DRT². The journey cannot be made spontaneously as in the case of a taxi or conventional bus. However this is a necessary measure to keep costs low. Travel routes are planned for each day according to requests. Passengers are picked up at the indicated locations and dropped off at their destinations, i.e. door-to-door service. Although this approach can result in longer journey times than a direct point-to-point service (e.g. taxi), it brings many benefits to its passengers, such as affordability and accessibility, and for some could be the only means of transportation (ActiveAge, 2008).

² Larger DRT schemes serving areas with high passenger demand tend to use reservation and communication with vehicle software, which allows for accommodation of travel requests on a short notice (CTA, 2003).

The flexibility of the DRT approach allows for tailoring services to the needs of seniors, thus maximizing the number of users (Chhay et al. 2008). Door-to-door service addresses the mobility barriers associated with walking to and waiting for a bus at a bus stop. Accessible vehicles make boarding easier for seniors and can accommodate persons with wheelchairs or walkers. Low fares provide an affordable and independent way of getting around.

DRT can effectively operate in rural areas with low population density or in urban areas in times of low demand when conventional buses would not be sustainable (ActiveAge, 2008). The DRT approach means that a vehicle (minibus, taxi or car) is shared by a number of different passengers with similar requests within a given area. Greater cost effectiveness is achieved, as the DRT scheme operates a vehicle only when a trip is requested. More advanced schemes have a fleet of several vehicles of different sizes, which allows demand level to be matched with vehicle size. For example, the introduction of a demand responsive Zone bus in Oakville, ON which operation during low demand periods (evenings and Sundays) exceeded the previous ridership with seven fewer fixed route vehicles, while the cost of operating this service was approximately one third the cost of operating a conventional fixed route service in the same area (Dillon Consulting Limited, 2011).

DRT models have been in operation for as long as conventional scheduled services, particularly in the UK, where they have historically been used to address social exclusion (Enoch et al., 2004). Many existing schemes grew up from Community Transport (CT)³ (Enoch et al., 2006). The popularity of this approach has expanded widely in the past decade due to its flexibility, enabling provision of transport services in a wide range of rural and urban types of settlements where the implementation of conventional buses often is not viable. This approach has also improved accessibility in comparison to conventional buses and taxi services (low

³ A range of non-profit passenger transport services developed in rural or urban areas by local people who recognize the needs of the transport disadvantaged residents of their community usually referred to as Community Transport (CT) (CTA, 2003)

floor, wheel chair accessible); increased comfort (door-to-door, rides are not shared with complete strangers); and sparked government interest in improved social service transport and the reduction of social exclusion (Laws et al., 2009; Engels & Ambrosino, 2003). DRT is increasingly seen as an alternative transport model viable at times or in areas of weak passenger demand, and has the potential to fill niche markets, such as hospitals, shopping, commuting and leisure (Laws et al., 2009). The need for a “community bus” type of services is expected to grow as the population ages and as the proportion of seniors increases (KFH Group, 2001).

DRT encompasses a number of service models, ranging from a less formal Community Transport approach to a highly organized service network operating on a large scale (Engels & Ambrosino, 2003). Some authors consider CT separately from DRT, as CT is normally targeted to a particular group (or a number of groups) of the transport disadvantaged rather than the general public as does DRT (CTA, 2003). CT tends to have lower passenger demand in comparison to DRT as it limits the availability of its service to particular groups. Low demand can be handled effectively without the modern software route booking and planning applications that are employed in larger DRT schemes and necessary for managing a high volume of requests. This makes CT schemes slower in terms of responsiveness, i.e. requires booking in advance (24 to 48 hours on average), while larger DRT models use specially designed software which can accommodate booking on a much shorter notice, similar to booking a taxi. Despite these slight differences, CT and DRT share the same underlying principles and often complement each other (CTA, 2003). For the purpose of this paper we will include CT in the context of DRT schemes.

Components of DRT

Examples of DRT can be found in nearly all Canadian provinces, the USA, the UK and other European countries, as well as in Australia and Asian countries. This research identified several reports which evaluated various aspects of the DRT implementation and operation in a number of national and international

jurisdictions. The analysis of the collected information was focused on the identification of effective transportation models matching our selection criteria, as well as the inventory of the most popular DRT schemes and components.

Within the variety of DRT models, four main types can be identified: fully flexible, semi-flexible, semi-scheduled and feeder services (CTA, 2003; Engels & Ambrosino, 2003):

The *fully flexible type* allows passengers to be collected from their agreed individual pick-up points and transported to the destination of their choice (family, friends, prescription pick up, medical appointments, etc.). With this type of service, the vehicle route is formed solely by passenger request. Pick-up and drop-off locations can be located anywhere within a service area (CTA, 2003). With fully flexible type of service, passengers specify a time window they need to be picked up or dropped off. This type of service is also known as Dial-a-Ride.

The *semi-flexible type* also collects passengers at their agreed individual pick-up locations, but the destination points are fixed (i.e. medical center, shopping, social or recreational facilities, etc.) (CTA, 2003).

The *semi-scheduled* is a more structured type of service. It is similar to the semi-flexible type in terms of collecting passengers at their individual pick-up locations, while the destination point(s) are fixed. Semi-scheduled scheme normally has a fixed arrival and departure time to and from the destination(s). Under the semi-flexible scheme the vehicle (for example, a minibus or taxi-bus) operates along a more defined route or corridor and deviates from it to pick up passengers who have requested a ride at their locations and transport to a common fixed destination (CTA, 2003).

The *feeder type* of services connects residents of an area to mass transit, such as train, intercity bus, etc. With this type of service it is important to coordinate arrival time at the connection point with the schedule of a mass transit. Passengers

can stay inside the feeder vehicle until the arrival of a mass transit for maximum comfort and safety.

DRT models can comprise of one or a combination of the above types of services depending on passenger need and available resources. For example, the Rural Lift program in the Northern Ireland operates several semi-scheduled demand responsive routes and a fully flexible Dial-a-Ride scheme. The Trans County Transportation Society program in the province of Nova Scotia, provides daily semi-scheduled trips to Halifax and semi-flexible transportation service for seniors' day care center and for the County School Board who provides for students with special requirements.

The choice of vehicle depends on a number of factors, such as the level of expected passenger demand, the frequency and type of service, accessibility requirements and available resources. The type of vehicle allocation in DRT models varies. As there are models which combine types of services, there are also models which use several vehicle schemes. The vehicle schemes most suitable for serving rural areas are listed below:

Volunteer Car or Social Car Scheme

The volunteer car or Social Car scheme uses volunteers' own cars. Volunteer drivers usually provide transportation to medical appointments for a particular group of riders, such as seniors or persons with disabilities. The main difference from the transportation assistance offered by family and friends is that the volunteer scheme is centrally organized. This opens up access to transportation service even for those transport disadvantaged who do not have their own social network, as well as optimizes the utilization of volunteers. Central organization may consist of a call center that receives requests for trips from passengers and matches them with available volunteers. Volunteer schemes usually require booking to be made in advance. For faster and easier booking, passengers often need to be registered as members. When booking a trip, the members can simply indicate their trip details. If the same trip happens regularly, a member can do a

block booking, i.e. call the centre only when the trip is cancelled. Volunteers are also encouraged to register as members. They are normally screened for driving records, and also undergo a security check. Many models reimburse volunteers for mileage if sufficient funding is available, provide them with training, or appreciate volunteer' input in other ways. Burkhardt & Kerschner (2005) stressed the need to provide some kind of incentive, especially mileage compensation, when transportation programs depend on volunteer drivers.

The ultimate advantage of this scheme is its low operational costs. Burkhardt & Kerschner (2005) estimated that the average budget for a small informal volunteer driver scheme with some paid administrative staff, limited reimbursement of volunteer mileage costs, and a relatively small (less than 8,000 trips per year) number of rides (for a not very long distances), might be between \$15,000 to \$20,000 per year.

The Volunteer drivers' scheme is one of the most popular and can be found in a number of models. It can operate on its own or in combination with other DRT schemes. For example, the Charlotte County Dial-a-Ride (New Brunswick, Canada) model uses only volunteers and their vehicles, while in Kings County the Alternative Transportation Services Society (NS, Canada) volunteer scheme complements other semi-flexible transportation options.

Local taxi or mini-bus operators

Local taxi or mini-bus operators can be contracted to provide vehicles and drivers. A DRT operator collects requests for trips through a call center, with booking usually required to be done one day in advance. At the end of a day, the operator plans a route and timing for the following day and communicates this information to a vehicle's operator. The vehicle operator then delivers the transportation service and collects service fees if applicable. The amount of the service fee is established by a DRT operator to ensure that the service is affordable for passengers. Taxi or mini-bus operators are subsidised for the difference by a DRT operator.

Contracting a local taxi or mini-bus operator is a cost effective options in times of low or uncertain passenger demand. A taxi or mini-bus can be reserved for only a certain time during the day, or even once a week. If no trips are booked, there is no need for a vehicle. Taxi or mini-bus operators can continue working in their normal mode. This scheme is also used as a backup option for other DRT schemes. However, local taxi or mini-bus operators might not have accessible vehicles with low floors or suitable for wheelchairs and walkers.

Contracting a local taxi or mini-bus operator is common for the semi-scheduled type of service and is sometimes referred to as a “taxi-bus” or “PlusBus”. The Fare Car model (Devon, UK) is a good example of contracting a local taxi operator. The Rural Lift model (Northern Ireland) also started its program using local mini-bus operators.

DRT Owned Vehicle

DRT schemes can operate their own vehicles. The types of vehicles vary from minivans to minibuses with different capacity. DRT models primarily own vehicles that are accessible for wheelchairs. Owning a vehicle is associated with maintenance costs and driver salary. Most of the DRT schemes which operate their own vehicles seek to maximize their use. Optimization options include lending the vehicle(s) to local community groups and organizations, consolidation of transportation services (including school transportation and employees charters), contracts for small parcels delivery, etc. Some models have paid drivers, some have volunteer drivers, and some use a combination of both, as volunteers might not be available in certain times.

A number of DRT models use their own vehicles including Community Wheels (NS, Canada), Rural Lift (Northern Ireland), the Independent Transportation Network (ITN) (Maine, USA), Kings County Alternative Transportation Services Society (NS, Canada).

Car Sharing and Van Pooling

Car or van pooling is another option for DRT. It also requires centralized organization in order to match passengers with drivers. This scheme can use volunteer drivers and their vehicles or provide its own vehicles and drivers (CTA, 2003).

School Buses

A publicly funded transportation system for children attending schools exists in many jurisdictions, including Newfoundland and Labrador. Hansen (2008) pointed out the underutilization of this system as it generally operates only twice per day, 10 months per year. Some innovative DRT models in Europe, particularly in Sweden, Finland and the UK have approached this underutilization from the opposite perspective: using rural local transit to provide transportation for public schools (Hansen, 2008; Enoch et al., 2004). These models overcome regulatory barriers associated with the public school transportation services to combine the transportation needs of school children, adolescents, commuters, older and disabled passengers. The Swedish model went as far as to adjust school' start time in order to accommodate the transportation needs of adults commuting to work (Hansen, 2008).

Fees, Funding and Partnership

Affordability of transportation is an important factor for seniors, who often live on fixed incomes, and can directly affect their willingness to use it. DRT models tend to keep their fees close to conventional bus fees or slightly higher. A number of innovative approaches that keep transportation services affordable can be found in the Independent Transportation Network (ITN) (Maine, USA). This includes CarTrade, Shop&Ride, Healthy Miles and gift certificate options (see Appendix 2 for more details). Another model - Community Wheels (NS, Canada) – employs a pay-what-you-can scheme. This donation scheme also allows for the reduction of insurance costs.

The Active Age Report (Active Age, 2008) stressed the operation of a DRT model on a sustainable commercial basis is unrealistic. DRT models require external funding to cover the difference between the actual costs of service provision and collected revenue. The amount of the required subsidy per passenger depends on the fee for service and the number of passengers sharing a ride. The funding for local transportation models is usually obtained from a wide array of sources, including different levels and departments of government, donations and fundraising. A diversity of funding sources is critical for maintaining transit system in rural and small communities (Transport Canada, 2006). This diversity can be secured by establishing a strong partnership between a broad range of stakeholders. Unlike typical urban transit models with municipal funding, the development of rural models greatly relies on the support of local partners, such as employers, retailers, local governments, private transportation companies, schools, hospitals, health and social service organizations, churches, chambers of commerce, hotels and other tourism industries, and private citizens (Transport Canada, 2006; Scotland. Scottish Exec. Dev. Dept, 2001). The Canadian Centre on Disability Studies Report (Canadian Centre on Disability Studies, 2009) suggested that the optimal form to engage a wide range of stakeholders in the decision-making process is an advisory or working group.

Engagement of the stakeholders allows for cross-institutional coordination. Such coordination helps to avoid the duplication of separate transport services that are supported by different public bodies in addition to making their provision more effective, comfortable and accessible for passengers (Enoch et. al, 2004; Herold et. al., 2002). Enoch et al. (2006) noted that DRT is less costly compared to the available alternatives, such as individual taxis or specialist health authority vehicles. Particularly, collaboration between local transit providers and health care authorities to coordinate planning of transport provision with health care appointments can lead to a better service (Audit Scotland, 2011).

Engagement of the stakeholders directly relates to the question: Who is the targeted population for a local transit model? It has been stressed in literature that a

clear definition of a DRT model user is very important. Many transportation services in rural America, which are now open to the general public, originated as senior transportation programs (Kerschner, 2006). A similar trend can be observed in the UK (Enoch et. al., 2006). In other European countries there is a mix of DRT models which target a specific population (elderly, persons with disabilities) and those which are open to the general public. The choice of the user category to be served by a transportation model reflects the political, business and social demands of a locality (Engels& Ambrosino, 2003). However, by maximising the number of potential passengers, the DRT model can minimize service costs while increasing passenger convenience. DRT models which serve the general public can also include a scheme targeted to a certain segment of the population.

Opening access to transportation services to other categories of the transport disadvantaged, or even to the general public, helps small and rural communities address social exclusion issues; ensures equitable access for employment, educational and medical services; and helps to retain employers and residents (Transport Canada, 2006). The provision of affordable local transit services to underemployed and unemployed can expand the workforce supply available to local employers (Enoch et al., 2004). Some DRT models offer employers the opportunity to purchase seats on the DRT vehicle in order for their employees to access a work site. This is a kind of creative benefit, which helps employers to compete for entry-level service workers (Burkhardt & Kerschner, 2005). Overall, the increased mobility will stimulate local economic activity (Engels& Ambrosino, 2003).

Legal Issues

The provision of public transit is associated with legal issues, such as vehicle licensing and liability insurance (CTA, 2003; Scotland. Scottish Exec. Dev. Dept, 2001). Regulation of these issues varies across jurisdictions. However with the flexibility of the DRT model composition, there are ways to overcome these barriers. For example, the Community Wheels model (NS, Canada) chose to

operate on a donation scheme in order to offset the high cost of insurance. Contracting the delivery of transportation services to local taxi or mini-bus operators is another way to avoid these costs (Fare Car, Devon, UK).

The need for liability insurance can arise with a volunteer driver scheme as well. Overall, this is the most simple and the least expensive scheme, yet the cost of insurance can hamper its viability. When considering implementing a volunteer driver scheme, it is important to decide who will assume the risks of offering trips – the DRT program or the drivers themselves through their auto or homeowner insurance policies (Burkhardt & Kerschner, 2005). The DRT program can obtain a volunteer insurance policy, which would cover accident, personal liability, and excess auto liability, as well as commercial general liability and non-owned automobile insurance coverage. However, Burkhardt & Kerschner (2005) pointed out that if a vehicle is owned by the driver, then the driver's insurance is primary and the program's is secondary in the event of a claim. Some DRT models developed special "risk sharing" tools to protect their volunteer drivers, such as waivers, indemnification and agreement-to participate forms (KFH Group, 2001).

DRT MODELS

Charlotte Dial A Ride, New Brunswick

Fully flexible service

Charlotte Dial A Ride, or County Dial A Ride (CCDR), is a fully flexible door-to-door volunteer driver scheme. It originated in 2004 as a pilot project funded by the government of New Brunswick aimed to improve access to services for transport disadvantaged residents of the county. The model uses volunteers' vehicles and reimburses drivers for mileage. CCDR is targeted to seniors, but not limited to them only. The purpose of a ride can include medical appointments, employment, grocery shopping and even visit friends.

Charlotte County has a population of 26,898 and very small density of 7.8 per square km. There are approximately 148 communities in the county ranging in size from 70 to 2,000 residents. The model operates on the membership base and all members are entitled to vote at the annual meeting. Currently CCDR has 94 individual and group members and 21 volunteer members. Booking office operates from 8:30 a.m. to 5 p.m. weekdays only and requires 48 hours booking in advance. Passengers pay a fee for each ride ranging from \$4 to \$8, depending on the distance traveled.

In 2010 CCDR provided over 6,000 trips, of which 2,495 were for medical purposes, 1500 were for work, 830 for errands, 605 for social visits or activities and 167 for school or courses. The model is managed by the Charlotte County Alternative Transportation Association. The total budget is unknown but the mileage reimbursement costs in 2010 were approximately \$50,000. Funding for the model is obtained from various sources: provincial government and municipalities, donations and fundraising.

This model developed an excellent drivers-passengers network and in 2007 it received the Disability Awareness Week New Brunswick Award for "demonstrating how active volunteers and small rural communities can work

together to offer affordable transportation services for seniors, persons with disabilities, and others in need”⁴.

Potential Application for the Avalon Peninsula

This model is simple, flexible and inexpensive. It is considered being easily transferable and some other rural locations in New Brunswick already expressed interest in implementing it (Hansen, 2008). CCDR offers affordable and accessible way of transportation that is designed to meet various individual needs of residents of the rural area. It is the cheapest DRT scheme, as it does not involve vehicle purchase and maintenance. However, this model solely relies on the volunteer driver’ availability, which might not always match the passengers’ needs.

This scheme can easily adapt to a low passenger demand and large distances, typical for rural areas. It can operate within each economic Zone, as well as on the regional scale, i.e. provide occasional trips to St. John’s and between the Zones. Taking into account volunteer efforts that are already taking place in various communities across the Avalon Peninsula, implementation of such model has a potential for success. A model, similar to CCDR, can effectively coordinate the existing volunteers’ efforts, expand the number of current volunteers and passengers by offering rides beyond the family-friends network, and also arrange funding resources to recognise the volunteers’ work.

Resources:

Charlotte Dial A Ride website, <http://www.charlottedialaride.com/>.

Volunteer Transportation Guide: A Screening Tool (Volunteer Canada) <http://www.volunteer.ca/volunteer/pdf/Transportation.pdf>.

⁴ <http://www.charlottedialaride.com/about.php>.

Community Wheels, Nova Scotia

Semi-flexible service

Community Wheels is an example of a partnership, which unites a number of local organizations who aim to address the need for transportation in the region. As recommended in literature, the concept of this model has been developed in partnership, and has been based on the identified needs and available resources of a locality.



Source: <http://www.aspotogan.org/wheels.htm>

Community Wheels project started in 1994. It provides transportation services to all residents of the Municipality District of Chester, Lunenburg County, Nova Scotia, which includes approximately 30 communities and has a population density of approximately 7.5 per square km.

Community Wheels delivers fully flexible, often door-to-door, service twice a week. This service addresses all kinds of transportation needs: grocery shopping, medical appointments, prescription pick-up, banking, and socializing. The model also offers monthly trips to Halifax and two other regional centers, with an emphasis on medically related appointments and services.

Community Wheels operates its own accessible bus: a 14 passenger mini-bus, but plans to buy a second smaller and more cost-effective vehicle for low demand and back up: an accessible 2011 Ford Transit Connect Wagon XLT Premium. The mini-bus is operated by a paid driver. This vehicle is also available for charters to local organizations and includes daytrips to youth, daycares and family resource centers at affordable rates.

A seat on the bus (for the twice a week service) has to be booked roughly one week in advance. Passengers can be picked up at their individual locations. There is no

fixed fee for this service but the average amount of the donation is \$3 per rider per trip, although for regional trips, such as Halifax, a donation of \$10 is required.

Community Wheels successfully operates on a pay-what-you-can donation basis in order to avoid the high costs of insuring public transit system. The amount of the donations (including corporate donations) approximately equals the amount of fees generated by chartering the vehicle to local community groups. The program is funded jointly by the Municipality of Chester, the Aspotogan Heritage Trust, Service Nova Scotia and Municipal Relations, the South Shore Community Service Association and the United Way of Lunenburg County. Administrative and operational spaces are provided by the host organization Bonny Lea Farm, a local organization that serves disabled adults. Additionally, funding from the provincial government is provided to help offset the operational costs and assist with the purchase of an accessible vehicle. The annual budget of the Community Wheels model is approximately \$52,000. The model provides approximately 2,245 one-way trips a year (or 21,351 km).

This model is considered to be successful. It managed to expand its services to include monthly trips to regional centers in addition to the purchase of a new vehicle. The service is highly valued by local seniors.

Potential Application for the Avalon Peninsula

The Community Wheels model has the potential to address the transportation needs of seniors and the general public who reside on the Avalon Peninsula. It offers accessible, reliable local transportation services and it is affordable for everyone. The service type is flexible enough to address individual transportation needs. This model, if implemented in the Avalon Peninsula context could operate on the economic zone scale and provide occasional trips to St. John's. A charter option would address the transportation needs of groups of seniors or other local groups. The facilitation of this model would be guided by local partnership, thus ensuring that the needs of various categories of local residents are addressed and the use of the available resources is coordinated.

A limitation of this model concerns the ownership of the vehicle and the need to utilize it at a full capacity in order to achieve cost effectiveness. In the event of low

or uncertain passenger demand when the vehicle is not used all the time, it might be difficult and costly to recruit and retain a driver. In addition, operating a model with only one vehicle creates the risk of failing to provide reliable service in the event that the vehicle breaks down. Besides, the service operates only twice a week, which might leave transport needs that local residents might have on the other days, unmet. These shortcomings can be addressed by a combination of this model with another scheme, for example, the volunteer drivers one.

Resources:

Community Wheels website: <http://www.aspotogan.org/wheels.htm>.

Annual Report of Bonny Lea Farm, Center for Independent Living, and South Shore Work Activity Program, (2011):

<http://bonnyleafarm.ca/Annual%20Report%20June%202011.pdf>.

Community Transportation Assistance Program (CTAP), Government of Nova Scotia:

<http://www.gov.ns.ca/snsmr/muns/infr/ctap.asp>.

Accessible Transportation Assistance Program (ATAP), Government of Nova Scotia:

<http://www.gov.ns.ca/snsmr/pdf/ans-muns-accessible-transportation.pdf>.

Fare Car, Devon, UK

Semi-scheduled service

Fare Car is organized by the local government body – the Devon County Council. Population density in the county varies between 160 and 170/square km. Fare Car provides transportation service for the general public in remote rural areas of Devon County. It was designed to provide a more effective alternative to large conventional buses.

The model started in 2002. Fare Car is operated by local taxi operators in formal agreement with the Devon County Council. The service is semi-flexible, with arrival times and departures from towns being at fixed times, and journeys only taking place at passenger request. Fare Car has 11 routes covering various areas of the county. Each route operates in a designated rural area and serves specific points in the nearest main town, such as supermarket, hospital and leisure centre. Some of the vehicles are wheelchair accessible and drivers are trained to assist passengers in getting into and out of the vehicle.

Passengers are required to book in advance, usually a day before the trip. Passengers are given an approximate pick-up time and can be picked up at their indicated locations (flexible pick-up points). Passengers book and pay separately. The fare charged varies by zones (how far from the destination a passenger is picked up) from £2.5 to £3.5. This is slightly above the conventional bus fare for the distance travelled. Children under 5 years old can travel for free.

Trips are booked through local Community Transport offices, which also can verify taxi claims and thus reduce fraud. Both taxi operators and the booking



Source: <http://www.devon.gov.uk/fare-car-f5.pdf>

service operate under contract. Fare Car became a part of the involved taxis' normal operational pattern. Taxi drivers know the schedule for the next day and are therefore free to take other bookings. Fare Car does not operate on Saturday nights to avoid competition with a regular taxi service.

This model started with the help of the government Rural Bus Challenge funding and now is funded by the Devon County Council. The annual operation budget is approximately £ 20,000 per vehicle. Each vehicle provides 300-400 passenger trips per month. The targeted level of subsidy was £4 per passenger, however in reality it is £10. The increase in the subsidy level is linked to the relatively low ridership intensity – 1.25 passengers per car on some of the routes. With a higher number of passengers per vehicle the level of subsidy decreases. Fare Car was originally operated on a membership base, i.e. serving only local residents, but these restrictions are no longer applied.

Customer surveys of the model demonstrate satisfaction with the service, especially the door-to-door component. Knowing the drivers was also mentioned as an advantage.

Potential Application for the Avalon Peninsula

Fare Car is suggested as a cost effective model to serve remote rural areas (Enoch et al., 2004). It is capable of delivering accessible, reliable and affordable mode of transportation to seniors and the general public by linking small rural communities within each economic Zone to the nearest service town. This type of service could also connect the Zones with St. John's. The advantages of this model include absence of the capital costs associated with purchasing, maintaining and licencing of a vehicle, in addition to relatively low operational costs, as a vehicle only runs when a trip is requested. The flexibility of this model allows for easy adaptation when operated under an uncertain level of passenger demand.

However, this model might not be able to address some individual transportation needs, as it operates on a semi-scheduled basis, i.e. not fully flexible. A

combination of the semi-scheduled type of service with a more flexible one (for example, the volunteer drivers) can address this shortfall. Implementation of a model similar to the Fare Car might also encounter lack of taxi, especially wheelchair accessible, in rural communities and even towns. However, overall, this model matches all the criteria identified by this study.

Resources:

Enoch et al., 2004. INTERMODE: Innovations in Demand Responsive Transport, final report, Department for Transport UK. Appendix A – Detailed DRT Case Studies.

Fare Car website:

http://www.devon.gov.uk/index/transport/public_transport/buses/services-4/fare-car.htm.

Best practice: working with operators. Local Government: Improvement and Development website:

<http://www.idea.gov.uk/idk/core/page.do?pageId=20451946>.

Rural Lift, Northern Ireland

Mix of services, mix of vehicles

The Rural Lift transportation project was established in South West Fermanagh, Northern Ireland with the aim to provide affordable and accessible transportation. It is targeted to older persons, lone parents, disadvantaged youth, people without access to a car and long-term unemployed. The area served is very rural with the largest town having a population of 1,000. Total areas' population was 21,000 in 2004 and density of 14 square km, 20% of its population were seniors (65 years and over), 34% of the households did not own a car. The region has been struggling in terms of economic development, experienced out-migration and population decline.



Source: <http://www.communitytransport-ni.com/ctani-operator-rural-lift.php>.

The Rural LIFT Transport Working Group management committee was formed from a large number of representatives: local development groups, regional government, development boards, women's groups, Bus Eireann (Irish National Bus Company), Translink (Northern Irish National Bus Company), Health Board, community groups and private bus operators. It was decided to build the project upon existing resources. Therefore, private bus operators were involved in the initial decision-making process and contracted for routes operation. The project began in 1999 and started with one full-time staff member and one part-time administrative worker. The funding was provided by the Rural Transport Fund.

The Rural Lift model started with 6 licensed demand responsive routes, which connect residents from outlying areas to local villages for basic service purposes and to towns to access national bus service. Each route operated once a week, except for one operating twice a week in summer. These routes were semi-scheduled with both: defined pick-up stops along the routes and short-distance

deviations from the route to pick up passengers upon request. Bookings were accepted by phone by 4:30 p.m. on an evening before travel.

In 2000 a total of 4,236 journeys were taken on the Rural Lift with nearly a half being made by pensioners and persons with disabilities, who hold a government Free Travel Pass.

Later, with changes made to government funding policy, Rural Lift expanded and modified its services. In 2000 the 6 routes have been substituted with a fully flexible Dial-a-Lift scheme and other schemes have been added:

- Dial a Lift
- Social Car scheme
- Group hire (with or without a driver)
- 5 Bus!

These services utilise a mix of vehicles: 7 accessible minibuses, voluntary cars and taxis.

The Dial a Lift and Social Car schemes provide fully flexible door-to-door transportation, either in Rural Lift own accessible minibuses or by a volunteer driver's car. These services are available from 8 a.m. to 6 p.m. daily except for public holidays, when they operate on a special hours. Both scheme require membership registration and are available for socially excluded rural residents without access to conventional transportation. Membership is free for individuals and \$20 for groups per year. The fees for Dial a Lift depends of the distance traveled and vary from £2.00 to £5.00. The Dial a Lift scheme has over 800 members and is fully funded through the government Rural Transport Fund.

Group hire is available for group members at affordable rates. The Rural Lift now has more than 157 group members. Seven 16 seats minibuses are available for this service.

The 5 bus! scheme is available to anyone with a limited or no access to personal automobile and also requires a membership registration. It operates on each school day evening. A seat has to be booked by 3 p.m. on the day of travel. The bus picks up passengers at their indicated locations within the area's school town and drops

off at their homes. It is ideal for students doing afterschool activities. The cost of this service is £2.50.

Potential Applicability for the Avalon Peninsula

The current stage of the Rural Lift model with its mix of schemes and vehicles represents a nearly ideal system to deliver affordable, accessible and reliable transit services in rural area with low density of population. Such a variety of schemes allows for finding a cost effective solution for every trip, increases reliability of the service and expands the types of passengers able to utilize the service. However, implementation of this model requires a strong knowledge of the passenger needs, patterns of travel and level of demand, significant investment into the fleet of vehicles, and organisational efforts.

Nevertheless, even the initial stage of the Rural Lift model with several semi-scheduled routes which operate once or twice a week has the potential to address the transportation needs of rural seniors and other transport disadvantaged residents of the Avalon Peninsula. Contracting mini-bus operators could help to avoid the high costs of the purchase of a vehicle, fuel, insurance and licencing, and is similar to contracting a taxi operator (the Fare Car example). However, finding a mini-bus operator interested in such kind of work in rural area, could be more difficult, as mini-bus operators might not be as flexible as taxi.

Resource:

Grimes, 2003.

Rural Lift for South West Fermanagh new website, <http://www.rurallift.com/Home.html>.

Community Transport Northern Ireland website, <http://www.communitytransport-ni.com/ctani-operator-rural-lift.php>.

Video introduction to the Rural Lift services: <http://www.youtube.com/watch?v=P-fX1Ms6rYE>.

SUMMARY

The idea of providing subsidized demand responsive door-to-door transportation service (DRT) has the potential to address the identified need for affordable, accessible and reliable transportation expressed by the seniors residing in the Avalon Peninsula. Among the four identified types of DRT services, the fully flexible, semi-flexible and semi-scheduled types appear to be the most relevant to the Avalon Peninsula context. The forth, feeder type of service, might be considered for the North East Avalon area in terms of connecting a local transportation system with the existing Metrobus or GoBus services. The fully flexible door-to-door service is the ideal option as it provides the most individualized service, i.e. the closest to taxi. However, it is also the most expensive option due to its reduced ability to combine trips. Volunteer driver scheme is the least expensive way to provide this type of services. Although volunteers might not be able to address all the transportation needs.

The semi-flexible and semi-scheduled types are less individualized, compared to the fully flexible, but represent a more cost effective option due to a higher potential for the trips combination. Limiting service provision to once or twice per week could further increase the patronage and, thus, reduce the amount of subsidy required per passenger.

Each type of the DRT services has its own advantages and shortcomings. Therefore, a combination of several types could bring the most optimal result. The final choice should be informed by the strong knowledge of travel needs and patterns as well as the available resources.

The vehicle allocation choice also largely depends on the level of passenger demand and available resources. Volunteers' vehicles and subcontracted taxis represent the most flexible options in times of low or uncertain demand. If the service is not demanded on certain occasions, it implies no extra costs to the model in comparison to the situation when the vehicle is owned by the model. When choosing the size of the vehicle, it is important to remember that filling it up to the

full capacity reduces the amount of subsidy required per each passenger. Thus the size should reflect the level of demand. Another aspect of the vehicle allocation is its reliability. Ideally, a combination of various vehicles is desired to provide a backup in case of break down or peak demand.

Based on the geographical layout of the Avalon Peninsula, the level of passenger demand generated solely by the seniors might be not sufficient to run models large than a volunteer drivers' scheme at a cost effective level. Additional demand could be generated by opening up the service to other categories of transport disadvantaged residents. Particularly, transportation service supporting employment needs of persons with disabilities and job seekers without access to a personal automobile can benefit both potential employees and employers, and have an overall positive impact on the local economy.

This research has identified the four DRT models, which have the potential to address the transportation needs of seniors and other transport disadvantaged residents of the Avalon Peninsula. However, the final choice of the most appropriate model should be guided by the strong knowledge of the local transportation needs and available resources, and be built upon existing transportation services and other local assets. Therefore, the development of a partnership or a working group which would include all interested parties could provide a good starting point for building a successful DRT model.

RECOMMENDATIONS

- This research recommends developing a partnership or a working group consisting of representatives from local organizations, targeted population groups, transport operators and funding bodies to facilitate preliminary research, develop, implement and operate a transportation model. Such a partnership could be formed approximately within each Economic Zone.
- Based on the geographical layout of the Avalon Peninsula, travel patterns of its residents and the optimal scale for partnership, this research recommends the implementation of a local transportation model in each Economic Zone with possible coordination of occasional trips to St. John's or between Zones.
- Implementation of a centrally coordinated Volunteer Driver (Dial-a-Ride) scheme is strongly recommended. The coordinated approach could optimize the existing volunteers' input and could make this service available to a greater number of users. This research also recommends to support the Volunteer Driver scheme with provision of some form of incentives to the drivers, such as reimbursement for mileage, training, insurance coverage, etc.
- Development of a semi-flexible or semi-scheduled door-to-door type of service is another suitable option in the context of the Avalon Peninsula geography and small population size of its communities. These types of transportation services can be effectively complimented by the Volunteer Driver scheme.
- In terms of the vehicles allocations, this research recommends exploring three options. First, contracting a local taxi (a car or minivan) or mini-bus operator (similar to Fare Car, UK). Second, purchasing a vehicle (minivan or mini-bus) and supplement its use by chartering it to local organizations if sufficient demand exists (similar to Community Wheels, Nova Scotia and Rural Lift, Northern Ireland). Third, purchasing a vehicle (minivan or mini-bus) to be used jointly by two or three neighbouring Zones, serving each of

them on a selected day(s) of each week and providing coordinated trips to St. John's.

- The low population density in the area suggests that services solely targeted to seniors have the potential to encounter a very low patronage. We suggest exploring the possibility of including other groups of the transport disadvantaged residents into a user category for a potential local transportation model.
- Further research on defining the travel needs of local seniors and other transport disadvantaged groups, as well as the estimation of their potential patronage, is required to guide the development of the most suitable transportation model.

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Appendix 1 Recommended DRT Models

Charlotte County Dial-A-Ride, New Brunswick, Canada

Name of the Organization	Charlotte County Dial-A-Ride (CCDR)
Website	http://www.charlottedialaride.com/index.php
Location	Charlotte County, New Brunswick
Population of the Location	26,898 (148 communities from 70 to 2,000) Density: 7,8
Percentage of Seniors in the Population	
Type of Organization	Not-for-profit (The Charlotte County Alternative Transportation Association)
Year Started	2004
Source of Funding	Funding from the provincial government and municipalities, donations and fundraising
Annual Operation Budget	\$ 50,000 (2010) mileage costs. There are other expenses as well.
Service Area	Rural
Targeted Population	Seniors, but not limited to them only
Purpose of Rides	Designed to improve the quality of life for people with no access to affordable transportation. Friendly, safe, door-to-door transportation services are provided making it possible for people to make medical appointments, access places of employment, do grocery shopping and even visit friends.
Cost of Ride	Membership fee vary from \$25 to \$1000 per year and entitled to vote at annual meeting. Clients pay \$4-\$8 for each ride, depending on its length
Annual Number of Riders Served /Annual Number of Rides	94 individual and group members. Provide 300 trips per month (3600 per year).
Operation Hours	8:30 a.m. – 5 p.m. Weekdays only. 48 hours booking in advance
Type of Drivers	volunteer
Type of Service	21 cars. This model uses existing vehicles and pays driver mileage
Other Notes	This is a semi-formal model. The service requires registration and membership; excellent volunteer network and valuable relationships developed between drivers and riders stimulates the expansion of the network and growth of the number of clients. It originated from community support pilot project funded by the NB government and after the success was adopted by other rural areas in

	<p>the province.</p> <p>Disability Awareness Week New Brunswick Award May, 2007 received for demonstrating how active volunteers and small rural communities can work together to offer affordable transportation services for seniors, persons with disabilities, and others in need.</p>
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Community Wheels, Nova Scotia, Canada

Name of the Organization	The Aspotogan Heritage Trust
Website	http://www.aspotogan.org/wheels.htm
Location	Aspotogan region, NS
Population of the Location	Population 11,000; area 1,400 square kilometres
Percentage of Seniors in the Population	
Type of Organization	Non-profit
Year Started	Approximately 2006
Source of Funding	<p>donation-based model of service delivery (to avoid the high costs associated with insuring a public transit system), charter fees, plus funding grants and sponsorship (both corporately and the local service clubs/businesses). The program is funded jointly by the Municipality of Chester, the Aspotogan Heritage Trust, Service Nova Scotia and Municipal Relations, the South Shore Community Service Association and the United Way of Lunenburg County.</p> <p>Administrational and operational spaces are provided by the host organization (Bonny Lea Farm that serves disabled adults), plus \$1.60 per capita from the provincial government to help offset the operational costs and have access to accessible vehicle funding support through provincial program (CTAP and ATAP).</p>
Annual Operation Budget	<p>about \$52,000. "We have always managed to operate within budget and have generated the funds needed to sustain and expand the service".</p> <p>2010/11: donations \$3,709; charter fees \$3,212; \$10,000 from Aspotogan Heritage Trust.</p>
Service Area	Municipality of the District of Chester, Lunenburg County, Nova Scotia (approximately 30 communities)
Targeted Population	residents of municipality
Purpose of Rides	Grocery, medical appointments, prescription pick-up, banking, socialization. Monthly trips to Halifax and two regional centers with emphasis on medical related appointments and services. Offers charter service.
Cost of Ride	Pay-what-you-can (average of \$3 per rider per trip), a donation of

	\$10 is requested for regional trips (Halifax and others)
Annual Number of Riders Served /Annual Number of Rides	21,351 km or 2,245 one-way trips.
Operation Hours	Twice a week plus charters
Type of Drivers	paid
Type of Service	A seat on the bus has to be booked roughly one week in advance. 14 passenger mini-bus (planning to buy second smaller and cost-effective vehicle for low demand and back up: accessible 2011 Ford Transit Connect Wagon XLT Premium.
Other Notes	Starting as a pilot with uncertain future funding sources, in 2-3 years the program has become such a success it has grown to include monthly rotating trips into Halifax, Bridgewater and Kentville.

Fare Car, Devon County, UK

Name of the Organization	“Fare Car” organized by Devon County Council
Website	http://www.devon.gov.uk/index/transport/public_transport/buses/services-4/fare-car.htm
Location	Devon , UK
Population of the Location	Honiton 11,822; Density of Devon county 170 /km2
Percentage of Seniors in the Population	
Type of Organization	Local government - County Council
Year Started	2002
Source of Funding	Rural Bus Challenge
Annual Operation Budget	Around £ 20,000 per vehicle
Service Area	Rural areas in Devon county. 11 routes
Targeted Population	Everyone
Purpose of Rides	any
Cost of Ride	£3.5. The fare charged is slightly above the normal bus fare for the distance travelled. This is a subsidised fare. There are no further

	reductions for National Bus Pass holders, children or other categories, except children under 5 who travel free.
Annual Number of Riders Served /Annual Number of Rides	300-400 per week per car
Operation Hours	Does not operate on Saturday night; bookings are made by 4 pm each day
Type of Drivers	Taxi drivers
Type of Service	shared public transport service operated by Private Hire cars.
Other Notes	Fare Car is operated by local taxi operators by formal agreement with Devon County Council. The service is semi-flexible, with arrival times and departures from towns being at fixed times, and journeys only taking place when passengers request.

Rural Lift, Northern Ireland

Name of the Organization	Rural Lift by Transport Working Group
Website	http://www.rurallift.com/Home.html
Location	South West Fermanagh, Northern Ireland
Population of the Location	21,000; density 14 people per sq. km. majority of settlements are under 1000 people. One regional center.
Percentage of Seniors in the Population	20%
Type of Organization	Community partnership
Year Started	1999
Source of Funding	funded through the Rural Transport Fund
Annual Operation Budget	n/a
Service Area	South West Fermanagh, Northern Ireland
Targeted Population	Socially excluded rural residents
Purpose of Rides	any
Cost of Ride	Varies from £2.00 to £5.00 according to the distance. Also accepts conventional bus passes.
Annual Number of Riders Served /Annual Number of Rides	4,236 trips in 2000.

Operation Hours	7 days per week, from 8am to 6pm. bookings by 4:30pm the evening before travel
Type of Drivers	Private bus operators
Type of Service	6 licensed demand responsive routes. These six routes each operate one day a week (one route operates two days per week during the summer months).
Other Notes	

APPENDIX 2

Other DRT Models

Independent Transportation Network (ITN)

Name of the Organization	ITN
Website	http://www.itnamerica.org/
Location	Portland , Main, USA
Population of the Location	
Percentage of Seniors in the Population	
Type of Organization	Non-profit
Year Started	1995
Source of Funding	Self-sustainable (Car Trade program ⁵ , Car Donations ⁶ , fundraising, gift certificates); local merchants provide input through Shop&Ride program ⁷ ; health providers contribute through Healthy Miles program ⁸ ; community organizations ⁹ ; public funds ¹⁰ .

⁵ Automobiles depreciate in value and when an older person has a vehicle they can no longer drive, the ITN CarTrade program helps them convert this depreciating capital asset into a fund to pay for their rides. In a way, CarTrade allows people to continue to benefit from their automobiles. Participation in CarTrade is a benefit of ITN membership, and there is no charge.

⁶ Car Donation and CarTrade are the primary ways ITN acquires vehicles for service.

⁷ Merchants such as super markets and shopping malls help to pay for rides. The payment is electronically integrated into ITNRides technology so there are no stamps or stickers for consumers to collect. It is a consumer-friendly paperless system.

⁸ Health providers help to pay for rides. It is similar to Ride & Shop.

⁹ Once a month, ITN sends a statement to the organization to pay for the rides that the members take. This is a way for community organizations to supplement the transportation services they already provide.

¹⁰ ITN affiliate communities may use up to 50 percent public funds in the first 5 years of service. Because ITN does not want to compete with public transportation for scarce tax payer dollars, it seeks to supplement public transportation by working directly with seniors, their families, and their communities to access private resources.

Annual Operation Budget	
Service Area	Within a 15-mile radius of Portland, Maine.
Targeted Population	Seniors and visually impaired
Purpose of Rides	Available for any type of ride within the service area, with no limitations on ride purpose.
Cost of Ride	Rides are prepaid through the Personal Transportation Account ¹¹ . Rides may be booked at any time; discounts are applied for shared rides and advance notice.
Annual Number of Riders Served /Annual Number of Rides	650 clients. Approximately 1,200 rides per month
Operation Hours	Available 24 hours a day, 7 days a week.
Type of Drivers	75 volunteer drivers and 5 paid drivers
Type of Service	Volunteer's own cars and 4 company vehicles
Other Notes	<p>The main goal of the ITN was to build a non-profit transportation system that was sustainable and could be replicated in other areas.</p> <p>ITN provides rides with door-to-door, arm-through-arm service to thousands of seniors nationwide. It's a truly innovative solution with unique programs that allow older people to trade their own cars to pay for rides, and enable volunteer drivers to store transportation credits for their own future transportation needs. ITN's Road Scholarship Program¹² converts</p>

¹¹ ITN is a cashless system. Seniors who ride establish prepaid personal accounts and receive a statement once a month detailing the rides they have taken. When they patronize Ride & Shop and Healthy Miles destinations, their transportation credits from these co-payments appear on their monthly statement. Volunteer drivers also have personal transportation accounts to store their credits and receive statements detailing their accumulated balances.

¹² Independent Transportation Network ® (ITN) volunteer drivers store transportation credits for their volunteer efforts. These credits may be used to plan for their own future transit needs or they may use these credits to help pay for rides for members of their family or for low income seniors through the Road Scholarship Program™. ITN transportation credits are honored at any ITN in the country. Municipalities, non-profit organizations or other groups

	<p>volunteer credits into a fund for low-income riders, and the gift certificate program helps adult children support their parents' transportation needs from across the street or across the nation.</p> <p>ITN America's goal is to provide the expertise, tools and state-of-the-art technology that will allow small organizations to serve more and more people without additional resources or funds. ITNRides software system enables us to leverage our expertise and to simplify operations for all our affiliates. It connects every ITN affiliate community (about a dozen is expected by 2011¹³) into one effective centralized national network that manages the logistics of the senior transportation service, including member and volunteer management and ride scheduling.</p> <p>The impact to the local business community of one ITN affiliate is between \$300,000 and \$500,000 per year.</p>
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can recruit volunteers and those volunteers put their credits into their group's community account to help pay for rides for low income seniors in that community (Community Road Scholarship Program).

¹³ ITNAmerica's first affiliate communities include Charleston, S.C.; Chicago, Ill.; Portland, Maine; Orlando, Fla; Los Angeles, Calif.; Lexington, Ky; San Diego, Calif.; Enfield, Middlesex, Middletown, West Hartford, Westport and Fairfield County, Conn.; Sarasota, Fla.; the Quad Cities of Iowa; Cincinnati, Ohio; Las Vegas, NV; Racine, WI; St. Charles, MO; Memphis, TN; Boston, MA; Monterey, CA.