

Report

Date

January 18, 2023

File:

Subject

Implementation Plan for Automation of Curbside Collection

PURPOSE

To review the Curbside Automation Implementation Plan and consider whether to include the transition to an automated collection system in the 2023 budget.

BACKGROUND

In the fall of 2021, staff implemented the communication and engagement plan to obtain public feedback for an automated truck curbside system for solid waste collection.

- The first goal of the engagement was to provide residents with an overview of the existing manual system, outline the potential limitations, and provide an overview, including costing and potential benefits of an automated system.
- The second goal was to invite residents' feedback and offer the community an opportunity to ask questions and discuss the project.

There were over 2300 responses to a 13-question survey that was prepared. Over 65% of respondents indicated that they were interested in a change to automated collection, and 58% indicated an interest in a new yard waste collection system. Some of the comments in opposition to the automated service included the increase in costs, difficulty of cart storage and accessibility challenges.

In December 2021 Council recommended that staff prepare an implementation plan for a transition to automated collection and that the plan and associated costs be considered in the 2023 budget. The implementation plan would outline the types of trucks (including electric trucks options), cart sizes, recycling options, scheduling/phasing, communications, yard waste disposal, contracting out the service and cost for the program.

In early 2022, staff contracted Morrison Hershfield (MH) to assist with the implementation plan to transition to an automated truck collection system.

- The project's first phase was to investigate the rationale for contracting out the curbside collection system as part of the transition to automation.
- The second phase of the project is the implementation plan to move to automated collection.

In August 2022, staff presented an in-camera report to Council on the advantages and disadvantages of an in-house vs. contracted curbside collection service. The report compared the annual user rates for collection services for 14 communities on Vancouver Island. The user fees were used as a proxy for collection costs as the majority of the curbside programs are delivered on a cost recovery basis, similar to North Cowichan's program. MH determined that the service model delivery does not influence user fees significantly. Instead, the collection method is more important. The variation in user fees is

impacted by other factors such as the size of the cart, automated or manual collection and the collection of yard waste or food waste. Council authorized staff to proceed with the automated curbside collection implementation plan with in-house garbage and organics services and a recycling collection contractor.

DISCUSSION

Plan Overview

The implementation plan considers all the factors for the transition to an automated curbside collection system. As part of the plan, staff and the consultant have made recommendations on the size, scope and type of system for North Cowichan. A detailed analysis of the proposed system is included in Appendix A and the consultants report (Attachment 1). Outlined below is an overview of the recommended system, estimated costs and scheduling.

Automated Curbside Service Phasing

- Phase 1 of the project will be the automated collection of organics and garbage. In 2023 new trucks will be ordered, new carts in 2024 and commencement of service in 2025.
- Phase 2 of the project will be the automated collection of recycling material. The timing of this phase is after the end of the current contract in 2024, but likely not until 2026 at the earliest.

Transition to Commingled Organics (Kitchen and Yard Waste)

Staff recommend moving forward with the collection of yard waste as part of the program, as 58% of respondents were in favour of yard waste collection. The Cowichan Valley Regional District (CVRD) is working toward a facility that would accept this material.

Cart Sizes

With over 40% of respondents recommending a large cart size, staff recommend a default size for organics and garbage carts of 100 litres. This is a 30% increase over the current 77 litre size. An upsize bin of 240 litres will be available for residents with larger families or those who are currently using the extra bag tag system with the manual collection. For both organics and garbage, there will be an increase in the volume of material collected. Costs for this increase have been incorporated into the proposed garbage fee.

Work Place Injuries

The existing manual collection system has resulted in significant costs to North Cowichan from injuries to staff. Since 2018 there have been 7 WorkSafeBC claims resulting in 216 lost days through short-term disability and an additional 200 plus days lost due to reassignment to light duties. Automation would realize other benefits in addition to reducing injuries, including retaining an aging workforce, increasing the labour pool size for waste collection staff and creating opportunities to diversify the workforce.

Electric Garbage Truck

There is an opportunity to purchase a fully electric truck as part of the new fleet. In 2021, the fleet represented the largest source of municipal emissions (53% of 735 tonnes CO₂-e), and the four garbage trucks accounted for 120 tonnes of these emissions (16% of fleet emissions). Two other local governments in the lower mainland are trialling an electric garbage truck, and North Cowichan's investment would demonstrate climate leadership. Factoring in the rebates, reduced maintenance and energy costs and charging station requirements, there is a rationale for an electric automated collection truck.

There will be an additional cost to purchase an electric truck compared with a diesel truck. An electric truck costs \$910,000 compared with \$550,000 for a diesel. This premium of \$360,000 can be reduced to \$110,000 with available grant incentives of \$250,000. Annual operating costs for a diesel truck of \$50,000 (fuel and maintenance) can be reduced by \$35,000 a year for the electric truck - \$20,000 in fuel and \$15,000 in maintenance savings. The cost to implement an electric garbage truck would increase the garbage fee by approximately \$4 per household per year; however, staff are instead proposing to use a Climate Action and Energy Plan (CAEP) Reserve Fund loan to cover this difference of \$110,000. This loan will be paid back over 4-years at \$27,500/yr.

To accommodate charging requirements of the electric truck, phase 2 of the fleet electric vehicle charging roadmap outlined by ChargeFWD in 2022 would need to be advanced in parallel with the charging outlined for light fleet. Phase 2 would require power supply upgrades and the installation of a level three charging unit at a cost of up to \$250,000. As this level three unit can be used by other fleet vehicles and gains us electrical capacity, the charger is applicable to many units coming on stream through the electric conversion strategy. External grants will be pursued to reduce the costs. A grant of up to \$250,000 will be provided from the CAEP Reserve Fund (\$185,852) and Local Government Climate Action Program (\$64,148).

Other Considerations

There are several components associated with the transition to automation that will require further development in 2023/2024, including:

- Waste Collection Bylaw
- Route Balancing
- Retired Carts
- Walk up Service
- Communications

Financial Implications

The Municipality of North Cowichan's (MNC) curbside program operates on a cost-recovery basis, and all residents pay an annual collection fee for the three-stream collection service. The 2021 per-household user fee was \$111 per year. This was raised in 2022 to \$125 per year to cover the increased cost of leasing collection trucks and to fund the implementation plan development for an automated collection service.

Automated collections typically involve having a base fee using carts with larger capacities than carts used in manual collections. The cart capacity is the main factor in determining user fees. It costs more to dispose of a larger amount of waste from a larger-capacity container. The tipping fees for each collected waste stream also influence the costs. The capital investment required for automated collection will also result in higher user fees than the current manual collection.

Staff estimate that the automated curbside collection service for phase 1 will cost \$183 for the default 100-litre carts per household per year, averaged over the next twelve years. These costs were developed based on the MNC collecting organics and garbage using automated trucks and a contractor collecting recycling using manual trucks (phase 1 of implementation). The table below presents the plan's main factors when estimating the service costs and user fees.

Item	Cost	Details
Capital Items		
Collection trucks	\$2,312,250	Three diesel trucks and one electric truck
Carts	\$981,000	21,800 total 100-litre carts for organics and garbage
Cart delivery	\$261,600	Includes freight and distribution
Implementation	\$200,000	Coordinator position for two years
Communication	\$50,000	For launch, pre-launch and post launch information
Operational Items		
Tipping fees	\$905,601	Each year for organics and garbage
Recycling	\$335,680	Contractor
Maintenance / Fuel	\$213,800	Including insurance for four4 trucks
Reserve	\$115,000	For the trucks
Admin / Wages	\$307,342	Including operators
Cart repairs	\$54,000	Includes some replacements

The above table shows the average operational costs for the ten years for phase 1. In addition to the costs outlined above are; borrowing, inflation, growth rates increases and contingencies. There is a \$1,200,000 reserve that will go against the purchase of the trucks and approximately \$480,000 in annual revenue from Recycle BC that has been incorporated in the proposed garbage fee.

Staff estimate the cost for phase 2 of the service, including automated collection of recyclables, will be \$210 per household per year. This cost includes an additional automated truck bringing the total to five, an additional refuse packer staff position bringing the total to four, and 11,800 240-litre recycle carts.

Outlined in the below table are costs for automated collections systems from other local governments on Vancouver Island.

Table: Cost for automated collection

Area	Households	Services	Type	Annual User Rate
Nanaimo	29000	Garbage, Yard, Recycle	Auto	\$216
Port Alberni	7000	Garbage, Yard, Recycle	Auto	\$170
Lake Cowichan	1300	Garbage, Food, Recycle	Auto	\$188
Victoria	14000	Garbage, Food	Auto	\$200
Saanich	33100	Garbage, Yard	Auto	\$204
View Royal	4,000	Garbage, Food	Auto	\$191
Nanaimo RD	29,000	Garbage, Food, Recycle	Auto	\$165
			Average	\$191

OPTIONS

Option 1 (Recommended Option)

THAT Council direct staff to:

- (1) Proceed with the Automated Curbside Collection Implementation Phase 1 Plan in 2025, including the purchase of four fully automated trucks (three diesel and one electric truck), organics including yard waste collection and utilizing a default cart size of 100 litres;
- (2) Increase the garbage fee in 2023 from \$125 per year to \$183 for phase 1 of the Automated Collection Program;
- (3) Allocate a \$110,000 loan to cover the electric premium for the electric fully automated truck funded from the Climate Action and Energy Plan Corporate Reserve Fund; and,
- (4) Allocate up to \$250,000 on electrical upgrades and one level three charging station from the Climate Action and Energy Plan Corporate Reserve Fund and Local Government Climate Action Program grant.

Option 2

THAT Council direct staff to:

- (1) Proceed with the Automated Curbside Collection Implementation Phase 1 Plan in 2025, including the purchase of four fully automated trucks (four diesel trucks), yard waste collection and a default cart size of 100 litres; and,
- (2) Increase the garbage fee in 2023 from \$125 to \$183 for phase 1 of the Automated Collection Program.

Option 3

THAT Council direct staff to continue with the existing manual waste collection system and discontinue exploring an automated truck collection system.

IMPLICATIONS

Option 1

The cost for the automated collection system will be an increase of the garbage fee by over 46% or \$58 per year per household for phase 1 and a 65% increase for phase 2 or \$85 per year. Although this cost for automation is considerable, it is an increased level of service with yard waste collection, and the cost is comparable to other Vancouver Island communities. The \$183 cost for automation is equivalent to hauling garbage to Bing's Crook twice a month at \$7 per load x 26 weeks.

There is the potential that the CVRD will not have the capacity to accept commingled organics at the Bings Creek facility in time for the proposed 2025 commencement of service. In this circumstance, North Cowichan would need to postpone or eliminate the yard waste component of the service. Picking up only kitchen waste would result in the underutilization of the 100-litre carts.

For a proposed automated collection system, the increase in the garbage fee would start in 2023 with the ordering of the trucks, but the start of the collection would not be until 2025. There could be some negative feedback from residents regarding paying for the service before the carts are delivered and picked up. Delaying the cost increase in 2023 and 2024 will result in higher fees in subsequent years.

The proposed 100-litre size of the garbage carts is a 30% increase over the existing 77 litres. Although over 40% of residents in the survey requested larger carts, garbage volume per year will increase. Some residents could perceive this as counter to our waste reduction mandate. Staff estimate that overall garbage volume will not increase significantly, but the amount of self haul will be reduced, and volumes from garbage tags will be eliminated.

The additional funding required to cover the electric premium of the proposed electric truck will be allocated from the CAEP Reserve Fund as a \$110,000 loan repaid over four years (\$27,500/yr), starting in 2025 with operational savings. A portion of operational savings will be realized in the first four years of operation (estimated full savings are \$35,000/yr) while the loan is being repaid, and this will be restored in full through the vehicle lifespan of approximately ten years. Staff anticipate that the Reserve Fund will be able to accommodate this loan but may delay other projects not yet presented to Council for approval (e.g. future fleet electrification).

The electric truck comes with a five-year warranty that covers repairs and maintenance to the chassis. If the electric truck is purchased, staff training on electric vehicle maintenance will be conducted before the end of the warranty period.

Option 2

As with option 1, the service cost will increase, residents will be required to pay in advance for the service, and garbage volumes will increase. This option will not allow for any fleet emissions reduction, and emissions will continue to be approximately 120 tonnes per year.

Option 3

Should Council decide to continue with a manual collection of organics and garbage, staff will continue with the replacement of the manual trucks and maintain the current system. If the manual system is maintained, the replacement of trucks is still required over the next couple of years. Also, staff will identify and implement improvements to our existing system to reduce injuries.

An increase to the existing garbage fee of \$4 per household is required in 2023 due to the additional costs associated with the manual trucks and an increase to tipping fees at the CVRD transfer station for organics and garbage disposal.

RECOMMENDATION

THAT Council direct staff to:

- (1) Proceed with the Automated Curbside Collection Implementation Phase 1 Plan in 2025, including the purchase of four fully automated trucks (three diesel and one electric truck), organics including yard waste collection and a utilizing a default cart size of 100 litres;
- (2) Increase the garbage fee in 2023 from \$125 per year to \$183 for phase 1 of the Automated Collection Program;
- (3) Allocate \$110,000 to cover the electric premium for the electric fully automated truck from the Climate Action and Energy Plan Corporate Reserve Fund; and,
- (4) Allocate up to \$250,000 on electrical upgrades and one level three charging station from the Climate Action and Energy Plan Corporate Reserve Fund and Local Government Climate Action Program grant.



Shawn Cator
Director, Operations



George Farkas
General Manager, Planning, Development and
Community Services

Approved to be forwarded to Council:



Ted Swabey
Chief Administrative Officer

Attachment: MH Curbside Automation Implementation Plan

APPENDIX A

Automated Curbside Service Phasing

Phase 1 of the program would include the automated curbside collection of garbage and organics, including yard and kitchen waste only. Recycling will continue to be collected by a contractor until at least 2024. There will be no change to the collection frequency for all three streams. The current collection frequency of weekly organics and bi-weekly garbage and recycling collection (alternating every other week) is considered best practice in BC. During phase 1, the MNC will work with our contractor to reduce contamination levels prior to consideration for automated collection.

Phase 2 is the potential transition to automated collection of recycling material. With this future phase, there is the option to bring recycling in-house or move to automation with a contractor providing the service. Phasing the transition to automation allows the MNC to set aside finances for additional capital outlay involved in the addition of trucks and carts needed for the recycling.

Transition to Commingled Organics (Kitchen and Yard Waste)

Providing curbside collection of food and yard waste (commingled organics) would provide a service with a higher level of convenience for North Cowichan residents. Currently, yard waste must be self-hauled to the CVRD facilities (Bings Creek and Peerless Road facilities). Allowing commingled food and yard waste can also help to reduce the “ick” factor associated with a separate food waste collection (odour, vectors). Staff recommend that the automated system include yard waste collection. This addition to the current kitchen waste collection is in keeping with the 58% of survey respondents in favour of yard waste collection.

All curbside collected organics and garbage are taken by the MNC to the CVRD’s Bings Creek Recycling Centre. This is an important transfer location since it is too far for the curbside trucks to direct-haul to the nearest organics processing facility in Cobble Hill. The CVRD charges tipping fees to cover the transfer and processing costs it pays to the processing facility (Fisher Road Recycling in Cobble Hill). At this time, Bings Creek accepts only kitchen waste material.

The CVRD facility has some capacity to accept and manage more organics; however, there currently is not sufficient capacity to accept commingled food and yard waste from a curbside collection program. However, there could be capacity constraints if other communities (i.e., Duncan and the electoral areas in the region) also initiate commingled organics collections at the same time. The CVRD has identified the need for a long-term increase in organics transfer capacity and has begun to develop plans to increase the transfer capacity at the facility. The CVRD will find out about access to provincial funding for the facility upgrades by mid-2023. Transfer station upgrades are unlikely to begin until 2024/2025 at the earliest.

Should MNC decide to transition to an automated collection system, there is the potential that the Bings Creek facility will not have the capacity for the additional yard waste, which is estimated at 2267 tonnes per year and adds an additional \$306,000 in tipping fees (existing kitchen waste weights are 1500 tonnes per year). This could result in a requirement to postpone the yard waste component until a

future date. The disadvantage of this is that the large organics carts will be underutilized with only kitchen waste.

Fully Automated Trucks

The MNC needs to replace the current aging trucks as soon as possible. The current trucks are becoming increasingly more costly to maintain due to their age. The decision to purchase replacement trucks is urgently required regardless of the decision to proceed with the switch to cart-based automated curbside collection.

An assessment was undertaken to determine the number and capacity of trucks required to transition to automation for garbage and organics. This analysis considers the increased garbage volume based on larger cart sizes and organics based on the addition of yard waste. It is recommended that three automated trucks plus one spare be purchased for service. The four trucks required are equivalent to the existing complement of trucks, but the total capacity of the trucks will increase. As well, the staffing levels for collection staff will remain the same. The general specifications of the trucks are outlined below:

- Automated side load split body on a chassis of the client's preference (such as Mack, Peterbilt, Autocar, Freightliner, etc.)
- 60/40 split body
- Straight frame, Labrie "Automizer" body type
- Equipped with automated lift arm and grabber mechanism
- Tandem axle, 33 cubic yard capacity

The timing of a truck order delivery to a client in BC will depend upon the selected chassis manufacturer. Based on conversations with vehicle manufacturers and other local governments, the current delivery for a truck is between 18 and 24 months.

Dual Purpose Trucks (Manual and Automated Lifting)

There is an option to purchase new trucks capable of servicing either as manual or automated collections. These trucks have a drop frame and stand-up cab that is suitable for both types of collection. The advantage of dual-purpose trucks is that they will allow for the replacement of one or more trucks in 2023 and continue with manual collection until the CVRD is in a position to accept yard waste. There are two other local governments that are currently using dual-purpose trucks for manual and automated collection.

Cart Sizes

For an automated collection system, there is a range of cart sizes from 80 to 360 litres. Currently, the cart size limit for the existing manual system is 77 litres for garbage and 46 litres for kitchen waste organics. The MNC should provide cart upsize options for households with larger families or those currently using the extra bin tag system with the manual collection. Residents choosing a larger cart size from the default would pay a larger user fee. The increased cost for the larger cart sizes is related to the

increased tipping fees for the disposal of the materials. Staff recommend that residents advise the MNC of their size preference prior to the procurement of both the garbage and organics carts. Table 1 outlines automated cart sizes in other communities on Vancouver Island.

Table: Local Governments on Vancouver Island Automated Curbside Service Delivery (2022)

Area	# Serviced hh (approximate)	Service	Default cart sizes
City of Nanaimo	29,000	Garbage Food & Yard Recycling	Garbage: 120 L Organics: 120 L
City of Port Alberni	7,000	Garbage Food & Yard Recycling	Garbage: 80L, 120L, 240L Organics: 120L, 240L
City of Victoria	14,000	Garbage Food waste Recycling (manual by contractor)	Garbage: 120 L Organics: 120 L
District of Saanich	33,100	Garbage Food & Yard Recycling (manual by contractor)	Garbage: 120L, 180L Organics: 80L, 120L, 240L
Regional District of Nanaimo	29,000	Garbage Food waste Recycling	Garbage 100 L Organics 100 L
Town of Lake Cowichan	1,300	Garbage Food waste Recycling (manual by contractor)	Garbage: 80 L Organics: 80 L
Town of View Royal	4,000	Garbage Food waste Recycling	Garbage: 80 L Organics: 80 L

Garbage Carts

Most automated collection systems use cart sizes for garbage of 80, 100 or 120 litres. The survey for the automated system indicated that 44% of participants were in favour of larger cart sizes from the current 77-litre limit. Staff recommend a default cart size of 100 litres, an increase over the current limit of 30%. This larger size has associated increases in cost for the cart purchase and volume of material collected. Staff have estimated that the increased garbage cart size will result in 34 kg of additional material per year for each household or a total increase of 350 tonnes. The additional cost associated with the

increased volumes have been incorporated into the proposed yearly garbage fee. There were concerns brought forward in the survey that increases in cart sizes could decrease the amount of diversion of organics and recycling. The City of Nanaimo recorded a 17% increase in curbside garbage when residents moved from 77-litre manual garbage cans to 120-litre garbage carts. The MNC will likely see an increase in the garbage of approximately 8% when a 100-litre cart size is used.

Staff recommend that an upsize option of 240 litres be available for households with larger families or for those who are currently using the extra bag tag system with the manual collection. An increased user fee will be implemented to reflect the user-pay system, where those who generate more waste pay more to dispose of it. *Examples of fees charged in nearby collection programs include the Regional District of Nanaimo, which charges a \$50 cart exchange fee to upsize from 100-litre garbage carts to 240 litres, and the annual user fee increases by \$80 to reflect the higher volume of waste being disposed of. The City of Nanaimo charges \$60 for cart exchanges and increases the annual user fee by \$100 for upsizing to a 240-litre garbage cart.*

Organics Carts

Staff are recommending a default cart size of 100 litres for organics, including yard waste. The 100-litre organics carts will provide sufficient capacity for food and yard waste for most households, based on continuing with a weekly collection. Residents may have quantities of yard waste that exceed the weekly cart capacity; however, residents can typically store yard waste until the next collection date as this material is not generally unpleasant to accumulate in small amounts and does not attract wildlife. Residents can also self-haul excess materials to a transfer station.

Staff recommend that the upsize option for organics, including yard waste, be 240 litres for larger properties that typically generate more than the default 100 litres per week. As with the larger sizes for garbage carts, there will be an increased yearly fee associated with the 240-litre organics cart as outlined in the garbage cart section.

Staff have estimated that the increased organics cart size to 100 litres will result in 210 kg of additional material per year for each household or a total increase of 2267 tonnes. The additional cost associated with the increased volumes has been incorporated into the proposed yearly garbage fee.

Recycling Carts

Staff recommend that recycling would not transition to an automated collection until phase 2 of the implementation plan. Until then, the MNC can work closely with its current contractor to reduce contamination and review the most suitable collection option and delivery model (e.g., move to an in-house recycling collection).

The MNC can review the options based on operational experience from the automated collection of organics and garbage. Phasing the transition to automation allows the MNC to set aside finances for additional capital outlay involved in additional trucks and carts needed for recycling.

In BC, it is common to collect recycling using 240 litre carts (for an automated collection) on a bi-weekly basis (every other week).

A change of recycling collection method to one using carts will involve an initial capital outlay for cart purchases, and it will result in a lower financial incentive paid by Recycle BC. Data provided by Recycle BC shows that cart-based single-stream recycling collection programs have the highest contamination levels of any collection system. Recycle BC pays a lower incentive for cart-based collection programs to account for the extra effort required in sorting the cart-based recycling before sending the materials to market.

Bear-Resistant Carts

Over the last five years, the number of bear issues related to waste management in the North Cowichan area was negligible. With that said, many BC local governments have provided bear-resistant residential collection containers for garbage and organic waste in some areas where bears are common. Bear-resistant carts can be broadly split into two categories: off-the-shelf bear-resistant cart systems and retrofitted lock systems.

Staff recommend that residents be given the option to purchase carts retrofitted to be bear-resistant. The retrofitted locks help prevent wildlife from opening the lid but do not protect the container itself. The resident would pay for the one-time charge of approximately \$60.

Other Considerations

Several components associated with the transition to an automated service will require further development in 2023/2024. An overview of these items is outlined below.

Bylaw

The existing Waste Collection Bylaw 3466 will need to be updated prior to the commencement of the automated system. Items to be added include cart storage requirements, collection day practices, cart ownership and repair, and curbside cart placement regulation.

Route Balancing

The development of this implementation plan includes an assessment of how many curbside collection trucks the MNC would require when collecting the three waste streams. The exact routing of each collection vehicle needs to be revisited as part of a launch plan prior to the service roll-out. A detailed review would help in forecasting each zone's (collection routes) workload and inform if any changes are needed to balance collection workloads.

Retired Carts

The MNC will need to develop a program for residents to replace their used containers with new carts during their transition to an automated curbside collection program. Options for this program include the following:

- Pick up and drop off of used carts and transportation to a recycling facility in the lower mainland
- Encouragement to repurpose used carts for usages such as storage, rain barrels, and vegetable planters
- Reuse as food waste and garbage containers for schools or other local governments

Walk Up Service

In the MNC curbside collection survey, close to 200 respondents (making up 8% of total surveys) noted concerns about accessibility. These were mainly owners of large properties with a long driveways, making it challenging to bring the collection carts out to the front road for collection day. Some local governments on Vancouver Island offer alternative service options to residents who require additional assistance setting out the curbside carts for collection. For residents over 80 who have no other assistance available and persons living with a disability, drivers will pick up the carts from the property. Typically an application and doctor's note is required. Some local governments provide this service for free, and others charge between \$50 to \$120 per year.

Communications Planning

A detailed communications plan is required to be developed. Funding has been set aside for a consultant to assist staff with a three-stage plan to inform residents during the transition to automation. A pre-launch plan is needed to identify and describe the purpose, target audience, provide key messages, tools, and timing for communications for the successful launch of a collections service. A service launch plan is needed to distribute materials for residents, establish customer point of contact and develop compliance notices. A post-launch plan is needed to identify engagement techniques and tools to use for ongoing communications.

Work Place Injuries

The existing manual collection system has resulted in significant cost to the MNC from injuries to staff. The physical nature of the position requires access and egress into the truck between 600 to 700 times per day. In addition to access and egress, crews lift 1200 to 1500 carts weighing 35 to 50 pounds up four feet into the truck's hopper. Injuries to staff include knee, ankle, back, and shoulder, resulting in time loss.

Since 2018, seven WorkSafeBC claims have resulted in 216 lost days from short-term disability. The cost from claims during this time is over \$50,000. In the past three years, two staff have had to be accommodated into other positions due to injury. Also, in the past three years, there have been over 220 lost days for accommodation into light duties due to injury and six employee first aid reports.

Many local governments and private sector collectors have recently switched to automated cart-based collection. For automated collection, the operator stays in the cab and has no direct contact with the cart or its contents. This switch is often precipitated by a desire to reduce worker injuries. Automation would realize other benefits in addition to reducing injuries, including retaining an aging workforce,

increasing the labour pool size for waste collection staff and creating opportunities to diversify the workforce.

Electric Trucks

There are several municipalities throughout Canada that are making plans to transition to electric curbside collection trucks. These types of trucks typically suit electrification as they often travel at low speeds with frequent stops/starts, which provide opportunities for regenerative braking. Regenerative braking is unique to electric vehicles and enables the vehicle's kinetic energy to be converted back to electrical energy during braking (deceleration or downhill running). Electric curbside trucks bring benefits beyond just emissions reductions that may not be obvious initially. For example, they reduce noise and pollution, limit oil/fuel spills, and provide a better operator experience that may attract more people to the occupation.

Electric curbside collection trucks are still new in North America, and there is little data to show ongoing operational costs and collection truck performance in different climates. The truck manufacturers are starting to provide maintenance packages and extended warranties on the electric battery to reduce unknown operational costs and ensure that electric trucks have the same clearance and durability as conventional diesel trucks.

A manufacturer of electric chassis is being used in BC that would be suitable as a spare truck. These Mack trucks are fully electric and have a range of up to 240km. Labrie manufactures the garbage body. Two electric trucks have been operating since 2022 in the lower mainland. These two trucks are being trialled by the District of Squamish and the University of BC endowment lands to determine if they are suitable for their areas.

Each unit costs \$900,000, but there is currently a federal and provincial rebate program of \$250,000 per truck. The cost for the truck includes an unlimited chassis warranty for five years, excluding tires. Each truck would require a level three charging station with an estimated cost of \$250,000. The charging rate for the truck with the level three unit is three to four hours.

Currently, there is limited data available about how temperature and topography affect battery life. The battery performance is reduced at sub-zero temperatures, and the charging speed becomes slower. At 0°C, the battery performs at 80% capacity, and lower temperatures (-10°C to -20°C) can result in 40-60% battery capacity unless there is a battery/cabin heater. Low temperatures can be acceptable if the collection route is dense with frequent stops/starts. If you factor in the loss of battery life due to extreme cold and gradients such as the Properties area, battery life could be reduced to under 100 km. The maximum range for garbage routes in North Cowichan is about 60km per truck.

Due to the limited information on battery life resulting from cold and extreme topography, maintenance costs, and battery longevity, at this time, staff do not recommend purchasing all electric vehicles for the transition to automated collection. There is a case to be made for a fully electric spare as part of the new fleet. If you factor in the rebates, reduced maintenance and energy costs, and charging station requirements, there is a business case for an electric automated collection truck. The

cost to implement an electric garbage truck as a spare will increase the garbage fee per household per year by approximately \$4.

Potential Funding

There are potential funding options available to reduce the program costs to residents. The MNC should review funding options for program implementation (e.g., purchase of new collection trucks or carts) through organizations, including the Federation of Canadian Municipalities Green Municipal Fund and the Government of Canada's Low Carbon Economy Fund.

Proposed Work Plan

Careful implementation planning is needed to enable the MNC staff to transition to an automated collection system. The below work plan reflects current supply chain constraints (e.g., extended lead times to procure collection trucks), which have been experienced by Western Canada (and the rest of the world) post-COVID. The MNC will need to allow at least a two-year lead time from when the automated trucks are purchased to the service launch. The table below is an overview of the main tasks that are required to be completed before the commencement of phase 1 automated service proposed in 2025.

Task	Start Date
Ordering of 4 automated trucks	Feb-23
Appoint or hire a solid waste coordinator	Jun-23
Bylaw update	Sep-23
Load balancing	Sep-23
Discussion with CVRD on comingled organics site	Nov-23
Prepare a communications plan	Jan-24
Ordering organics and garbage Carts	Apr-24
Pre-launch of communications	Mar-24
Delivery of Carts	Oct-24
Service launch communications	Nov-24
Training of staff	Nov-24
Start of automation project	Jan-25
Post-launch communications	Feb-25
Retired Cart program	Feb-25