

## **Appendix C – Autonomous Vehicles**

Council Motion MN18-1 from the January 29, 2018 City Council meeting stated:

1. The City of Regina monitor the research and trials that are currently underway and will shortly be undertaken with regards to autonomous and connected vehicles.
2. The Administration report back to Regina City Council in the second quarter of 2019 with analysis as to the impacts or potential impacts upon the City of Regina of these type of vehicles and to take into account any impact of a large number of vehicles powered by batteries and the need for charging stations.
3. The Administration consider any advantage the City of Regina may have with being one of the leading-edge communities with regard to testing of autonomous vehicles given our varied climate.

The following information responds to that motion.

### **Research and Trials**

Research suggests autonomous vehicle technology, like other new technologies, will follow a path of development, testing, approval, commercial release, product improvement, market expansion, differentiation, maturation, and eventually saturation and decline. Autonomous vehicles (AV) are currently in development and testing stages. Current in-market vehicles have some limited autonomous technologies such as cruise control, hazard warning and automated parallel parking. Tesla's Autopilot offers automated steering and acceleration in limited conditions, although deployment was delayed after it caused a fatal crash in 2016. Several companies have more advanced pilot projects testing AV in specific conditions, but many technical improvements are needed before vehicles can operate autonomously under all normal conditions. Research suggests that AV development and testing will continue throughout the next decade before entering the marketplace. In the 2030s, AV is predicted to make up 1-2 per cent of the total vehicle fleet and that share is expected to grow to 10-20 per cent in the 2040s and 20-40 per cent in the 2050s.

#### *Autonomous Shuttle Trials*

The City of Beaumont in 2019 was Canada's first city to pilot an autonomous electric shuttle within mixed traffic use (traffic signaling and human interaction) in its community under a six-month pilot project in partnership with Pacific Western Transportation. The pilot vehicles interacted with pedestrians and traffic infrastructure such as lights, intersections, and road signage. The six-month pilot ran May through October 2019 on a one kilometre route travelling north and south on the east lane of 50th Street. Although without significant problems, the City of Beaumont has stated that it is too soon to determine if, when and how electric autonomous transportation can become a permanent option in their community. More broadly, it has not been determined when autonomous transportation will move beyond the testing stage. This pilot project is a calling card showing others across Canada and abroad that Beaumont is open to partnering with innovators in advancing and commercializing new technologies. The City of Edmonton projects that autonomous public transportation could become part of transit infrastructure in the next 10 to 15 years.

### **Autonomous Vehicles (AV) Impacts on Regina and Planning**

A range of immediate policy issues require investigation and resolution by national and provincial government regulatory bodies before AV technology enters the consumer marketplace. Research

indicates that data for other policy issues such as traffic congestion and impacts on travel habits and roadway design will take much longer. Like other emerging policy issues, such as ride sharing or legalization of marijuana, other levels of government need to create legislation and regulation. Currently, Saskatchewan Government Insurance is in the preliminary stages of developing insurance-related policy and Transport Canada, on behalf of the federal government, is in the early stages of developing safety regulations. Although high-level regulations and legislations will come from the federal government, it is likely that provincial jurisdictions will be responsible for imposing specific regulations around different testing, approval and as well as licensing. Using ride sharing and the legalization of marijuana as examples, it is likely that the AV landscape will see varying rates of deployment across Canada.

### *Electric Vehicle (EV) Charging*

As electric vehicles currently make up a small share of total vehicles, the City of Regina does not have a specific policy or mandate to increase the availability of EV charging. The City's near-term and future-term approach to EV will be a part of the Energy & Sustainability Framework. There are businesses in Regina, such as gas stations, that have installed EV charging stations. Developers could also make this part of new build infrastructure; however, the City is not aware of this currently taking place. Of note, there are currently 84 electric vehicles registered in Regina. It is likely that as EV becomes more prevalent, SaskPower and other related provincial government bodies will ensure adequate electricity infrastructure is in place.

### **Connected Vehicles (CV)**

#### *Traffic Signal Preemption*

The City currently uses technology that enables traffic signal preemption for Fire and Protective Services vehicles, helping reduce response time to emergency calls and enhance public safety. The City is planning to adopt newer technology that will enable traffic signal changes based on GPS positioning of approaching vehicles.

Effective traffic signal priority and preemption improves public safety by reducing the chance of vehicle collisions and personal injury in situations where emergency vehicles would be required to cross through an intersection during a red light. This technology can be leveraged by Fire & Protective Services, and potentially Regina Police Service and EMS ambulance services.

There is also the potential to use a new traffic signal priority and preemption technology with fixed route buses to help improve route schedule adherence. The Transit Master Plan will identify under what conditions this technology would be ideally suited (for example, future use of rapid transit). The Transit Master Plan is tentatively planned to start fall 2020 and be completed before 2022.

Snow removal is another service that could benefit from traffic signal priority and preemption. The technology would eliminate the need for graders and plows to stop at red lights in the middle of the night. Preempting the traffic signal lights during a snow event would help ensure Priority 1 street clearing meets the Service Level Agreement (SLA) of 24 hours as well as Priority 2 street clearing to meet the 48 hours SLA. Use of this technology will also reduce fuel costs and greenhouse gas emissions from reduced idle times at red lights.

## Telematics

Telematics is another example of connected vehicle technology that involves acquiring data from vehicles and their systems, in conjunction with the vehicle's position. The use of telematics allows for vehicle route optimization, improved vehicle utilization, and increased customer service all because specific work and information can be traced back to specific vehicles. Telematics has been successfully used by the City of Regina for a decade and is currently implemented in the following ways:

- a. Winter Road Maintenance – Snow Removal and Road Sanding. The City can track activity progress for priority street clearing, confirm service delivery, plowing activities, where sand is spread, and optimize routes.
- b. Summer Road Maintenance – Potholes and Road Sweeping. The City tracks Asphalt patching of pothole locations as well as where asphalt patching has occurred, street and alley sweeping, and route optimization.

A telematics project is currently underway involving the City's solid waste collection vehicles. The project will improve the 25-vehicle fleet and is expected to provide an operational savings of: \$45,000 from reductions in missed collection service requests; \$164,000 from a 30-minute reduction in route completion times; \$80,000 from a reduction in the amount of vehicles required and \$66,000 from a reduction of one less vehicle operator. The project is expected to produce a return on investment within 18 months, realizing a total savings of \$355,000.

The table below provides an overview of how connected vehicle technology is used throughout City services as well as future opportunities the City is currently exploring.

Services currently using telematics		
Service Area	Activity	Opportunities
Winter Road Maintenance	Snow Removal	<ul style="list-style-type: none"> <li>• Track priority street clearing progress to enhance quality of service</li> <li>• Monitor plowing activities such as whether the blade is up or down</li> </ul>
	Sanding	<ul style="list-style-type: none"> <li>• Track where and how much sand is spread</li> <li>• Track vehicle locations for route optimization</li> </ul>
Summer Road Maintenance	Sweeping	<ul style="list-style-type: none"> <li>• Track route completions to ensure areas are not missed</li> <li>• Track vehicle locations for route optimization</li> </ul>
Landfill	Solid Waste Disposal	<ul style="list-style-type: none"> <li>• Optimize placement and compaction of garbage to better utilize landfill space</li> </ul>
Transit	Public Transit	<ul style="list-style-type: none"> <li>• Real-time location of bus operators to ensure personal safety considerations</li> <li>• Publicly viewable real-time location of buses through transit app</li> </ul>
Fleet	Vehicle Information	<ul style="list-style-type: none"> <li>• Track engine hours, engine idling, vehicle diagnostic codes, fuel management and preventative maintenance</li> </ul>

Future telematics opportunities		
Service Area	Activity	Opportunities
Parking	Parking Enforcement	<ul style="list-style-type: none"> <li>• Manage 3rd party contracts for performing parking enforcement</li> </ul>
Parks and Opens Spaces	Pest Control, Pruning, Watering and Mowing	<ul style="list-style-type: none"> <li>• Remote monitoring of pesticide application, pruning, watering and mowing</li> <li>• Track route completions to ensure areas are not missed</li> <li>• Track vehicle locations for route optimization</li> </ul>
Fire & Protective Services	Emergency Response	<ul style="list-style-type: none"> <li>• Validate routing data against actual performance, with interest in ability in real time vehicle location to improve deployment of closest vehicle</li> </ul>

**Regina as a Testing Community**

According to research, the following criteria are all required to become a leading-edge community for new technologies including specifically for testing autonomous vehicle technology:

- Strong partnerships with the private sector
- Strong partnerships and involvement with universities and academia
- Strong research ecosystem
- Federal funding support

Existing realities indicate that Ontario has already established market dominance as the go-to Canadian destination for AV and CV testing, research and development. Not only does Ontario meet the above criteria, it is also the home of Canada’s automotive sector. Since 2017, nearly \$1.5 billion of private sector investment related to the research and development of automated vehicles has been announced for Ontario. Additionally, the Ontario provincial government has committed \$80 million in funding over five years for the Autonomous Vehicle Innovation Network (AVIN), and the federal government has allocated millions for other Ontario initiatives through the Program to Advance Connectivity and Automation in the Transportation System (ACATS). Moreover, Regina’s weather is not unique enough to create the competitive advantage necessary to attract groups away from established hubs such as those throughout Ontario. A unique aspect to the AVIN initiative is the recently launched WinterTech Development Program, which focuses on refining the technology to meet Ontario’s challenging winter climate.

The City of Regina’s current approach has been focused on seeking innovative solutions to existing or near-term service-related issues. Economic Development Regina (EDR) is the City’s development arm. The Administration will continue to work with EDR to attract the economic development opportunities to our community that align with the City’s growth plan.