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EXECUTIVE SUMMARY

Administration conducted a thorough investigation of technologies and related societal trends that are likely to have a significant impact on the future transportation networks and land use patterns in Calgary. The Future of Transportation in Calgary report (Attachment 1) provides a detailed assessment of technologies that are beyond an initial concept stage, and are likely to impact Calgary within the next 25 years. Three themes were identified which largely describe the anticipated technological trends: Autonomy, Electrification, and Connectivity and Shared Mobility. In many cases, these trends will complement each other to enable technologies that will have a significant impact in terms of how Calgary is built and evolves. The highest impact technologies are expected to be fully autonomous vehicles (no driver required), electric vehicles, and the increased use of mobility as an on-demand service (versus ownership of vehicles).

If these technologies are fully realized there are likely to be a mix of impacts both to The City of Calgary and the broader public. The general objectives of the Municipal Development Plan (MDP) and Calgary Transportation Plan (CTP) likely continue to be supported and can be complemented by future technologies, but aspects of the plans will need to be revisited as more is known on the timing and extent of uptake of the technologies. The most significant impacts to The City of Calgary are erosion of several existing funding sources (such as fuel tax due to the projected increase of electric vehicles) and the potential changing role of Calgary Transit. The technologies offer significant societal benefits with respect to health outcomes (due to reduced collisions), environmental outcomes (lower greenhouse gases), fiscal outcomes (lower travel costs) and opportunities to diversify the job market in Calgary. This comes with high risk to employment in several fields, potential for reduced physical activity and potential increases in social isolation.

The report is not an infrastructure plan requiring financial commitment. Rather the intention is to continue fostering discussion and support ongoing planning as the technologies evolve and shape the city. Administration recommends a go-forward strategy that chiefly consists of: ongoing monitoring of technological developments, continued collaboration with government, academia and industry, updating of plans and bylaws on an opportunity basis, and undertaking pilot projects. Recommendation 2 seeks direction for Administration to participate in a pilot of a low-speed autonomous vehicle at the Calgary Zoo LRT station in 2018 (described in Attachment 2).

ADMINISTRATION RECOMMENDATIONS

That the SPC on Transportation and Transit recommend that Council:

1. Receive the report for information;
2. Endorse the City of Calgary's participation in field trials of a low-speed autonomous vehicle pilot project as described in Attachment 2;
3. Direct Administration to explore opportunities for participation in the Government of Canada's Smart Cities Challenge; and
4. Direct Administration to continue work with Calgary Economic Development, the Province of Alberta, the Alberta Centre for Advanced MNT Products (ACAMP), The City of Edmonton and others to promote Alberta and Calgary as an autonomous technology cluster to the Government of Canada.

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RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED 2017 MAY 17:

That the Administration Recommendations contained in Report TT2017-0382 be approved.

Excerpt from the Minutes of the Regular Meeting of the SPC on Transportation and Transit, Dated 2017 May 17:

"And further, that the PowerPoint presentation from Lina Kattan be attached to the report prior to being forwarded to Council."

PREVIOUS COUNCIL DIRECTION / POLICY

At the 2016 April 25, Council approved Notice of Motion NM2016-12 – "The Future of Transportation in Calgary" which contained the following direction:

"NOW THEREFORE BE IT RESOLVED that Council direct Administration to undertake a study on societal trends and advancements in transportation technologies as they relate to Calgary with the potential to significantly transform our transportation network, such as;

- Autonomous vehicles
- Alternate delivery methods (e.g. drones)
- Alternate vehicle fuels and electrical charging systems
- Connected vehicles
- Alternate public transit provisions
- Alternate parking and curbside management strategies
- Open data and development of apps
- Alternate payment mechanisms

And report back to Council through the Transportation and Transit Committee with recommendations, potential pilot opportunities and next steps, no later than Q1 2017."

A request to defer the report by two months was approved in report TT2017-0178 at the 2017 April 10 Combined Meeting of Council.

The notice of motion requested that the report look at alternate payment mechanisms. This was done separately, as part of report TT2017-0184, which looked at advanced payment strategies for transit fare systems, and thus was not focused on as part of this report.

BACKGROUND

There are many technology advancements on the horizon that are highly likely to have significant impacts on the future transportation system and land use pattern in Calgary. The City will have limited control over the use and uptake of these technologies. Thus, The City's objective is to be as proactive as possible to facilitate the transition to and use of these advancements while making best use of limited resources. The main objective is to leverage technological changes to continue to improve the quality of life for citizens.

Other cities, both in Canada and globally, are currently at a similar point with respect to the preparation for these technologies, particularly in regards to autonomous vehicles. Edmonton, Toronto and Vancouver have all taken similar reports to their respective councils within the past several months. The City is working with these and other municipalities to share knowledge, strategies and approaches to improve our preparedness for these changes.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Administration undertook a comprehensive scan of the technologies identified in the notice of motion as well as other potential transformative technologies that were seen to have an impact on the future transportation and land use systems in Calgary. This included meeting with a wide variety of subject-matter experts, conducting extensive research and connecting with fellow municipalities.

The objectives of the Future of Transportation report (Attachment 1) are to:

- Provide an understanding of emerging transportation trends and technologies
- Provide information on what The City is in control of, what tools it has to influence the technology and what the responsibility of other levels of government and industry are
- Provide a scan of what other countries are doing in regards to regulating or promoting the technology
- Provide an analysis of how future technologies could impact the long term vision for Calgary as articulated in the Municipal Development Plan (MDP), Calgary Transportation Plan (CTP) and other City policy documents
- Create an understanding of how future technologies may impact The City's finances and steps that The City can take to be financially resilient
- Detail what the potential impacts are of the various technologies

Three themes were identified that largely describe the anticipated technological trends that will impact Calgary:

Autonomy – For transportation, there will be an increase in the amount of processes that will be automated into the foreseeable future. The major technologies studied for this theme were: Autonomous Vehicle Technology and Aerial Delivery Drones.

Electrification – The convergence of price and battery capacity is allowing manufactures to build practical and cost-effective electric vehicles for the first time. The major technologies studied for this theme were: Electric Vehicles, E-Bikes and Pedelecs.

Connectivity and Shared Mobility – More devices will be connected to the internet, allowing for interaction between devices and a greater amount of information for the user, companies and governments. This will allow for the sharing of transportation resources. The major technologies studied for this theme were: Connected Vehicles, Mobility as a Service (MaaS), Internet of Things (IoT) and Parking Technology.

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Technologies with a lower impact or that are at the conceptual/early prototype stage of technological development were identified, but explored in less detail.

There are many unknowns with respect to the technologies, such as when/if it will be adopted by the general public. With respect to the MDP and CTP, the aspects that require the most short-term consideration are:

- Growth strategies
- Regional strategies
- City-wide mode split goals
- Parking policies
- Infrastructure investment strategies
- Regulatory and user-pay policy framework
- Transit service delivery

Preparing for the future is a delicate balance of being proactive and leveraging opportunities while being careful not to prematurely overreact when technology is not proven. To best prepare for these technologies Administration intends to take the following short-term actions:

- Participate in field trials for a low speed autonomous vehicle pilot project
- Continuing development of an Electric Vehicle Strategy for Calgary
- Create a scenario using the Calgary Regional Transportation Model (RTM) that account for new transportation technologies and trends
- Continue participating in the nationwide municipal working group on autonomous vehicles
- Collaborate with universities, private industry and all levels of government on various initiatives and pilot projects
- Updating the MDP/CTP to reflect new technologies and societal trends
- Updating bylaws as required to reflect technological changes in the near future
- Incorporate an Autonomous Vehicle assessment into business cases for new transportation capital projects
- Make City assets and information available for public use to facilitate technological development
- Build knowledge through staff attendance at key meetings and conferences
- Explore opportunities to participate in the Smart Cities challenge

It is felt that these activities will keep Calgary in a proactive position as many of the technologies continue to evolve.

The short term actions that are part of Administrations recommendation to Council are:

<u>Participation in field trials of a low-speed autonomous vehicle pilot project</u>

The most significant implementation activity at this time is a potential low-speed autonomous vehicle pilot, described in Attachment 2. This project has several benefits that can help both

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The City and Calgarians to learn more about autonomous vehicle technology. The City is working in partnership with the Province of Alberta, University of Alberta, and The City of Edmonton on a plan to bring the vehicles to Alberta, with deployment in Calgary at the Zoo LRT site, most likely in 2018. The pilot will be led by the University of Alberta, and is able to be carried out at minimal cost to The City; no adjustments to budget are necessary.

Explore opportunities for participation in the Government of Canada's Smart Cities Challenge

The Government of Canada announced $300 million fund over the next 11 years to encourage cities to adopt new and innovative approaches to city-building as part of the 2017 budget. There are currently no details on the funding application.

The City of Calgary plans on working with internal and external stakeholders to participate in the Smart Cities Challenge. The challenge should highlight how the technologies identified in the report can be best integrated into the urban realm.

Continue work with Calgary Economic Development, the Province of Alberta, the Alberta Centre for Advanced MNT Products (ACAMP), The City of Edmonton and others to promote Alberta and Calgary as an autonomous technology cluster to the Government of Canada

As part of Canada's Innovation Agenda, The Government of Canada is focusing on identifying and supporting business innovation 'superclusters'. Clusters are areas that share a number of attributes (successful entrepreneurs, excellent universities, a pool of top talent, and access to financing) to create a self-propelling economic area). Clusters need to be focused and purposeful to work well.

The Government of Canada, through Budget 2017, is investing up to $950 million over the next five years to support superclusters. Calgary, and Alberta, have an opportunity to position ourselves as a possible candidate for a transportation technology – autonomous systems cluster. Through the development of this report, The City has connected with many academic and industry groups who see potential for a successful cluster. Recommendation 4 proposes continuing these discussions and work with these partners in support of a potential application towards this initiative.

Stakeholder Engagement, Research and Communication
Administration conducted an extensive review process of the report with both external and internal stakeholder groups. This exercise was largely to validate elements of the report and gather expertise. External contributors are identified in the acknowledgement section of Attachment 1. No public engagement exercises were conducted as part of the report.

Strategic Alignment
The report looks at the eleven sustainability principles that guided the development of the Municipal Development Plan (MDP) and Calgary Transportation Plan (CTP) in Appendix 1 of the report (Attachment 1). The technologies will have a mix of impacts that will both support and detract from the plans objectives. This is largely dependent on the extent and adoption of the technologies.

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Social, Environmental, Economic (External)
Appendix 3 of the report (Attachment 1) provides a detailed analysis of the social, environmental and economic impacts resulting from new technologies.

Financial Capacity
Appendix 2 of the report (Attachment 1) provides a look at opportunities and impacts to The City's fiscal position as a result of the new technologies.

Current and Future Operating Budget:
The most significant potential impacts to the future operating budget would be:

- Reduced dividends from parking assets due to lower parking revenues
- Reduced income from enforcement of traffic and parking violations
- Reduced growth in the property tax base if autonomous vehicles facilitate significant amounts of growth outside of Calgary's borders
- Reduced revenue to Calgary Transit if ridership on profitable routes is taken by alternate travel providers

The above impacts can be offset through opportunities to introduce more direct user payment of the transportation system, reduced operational costs, and potential increased utility dividends.

Participation in the low-speed autonomous vehicle pilot in recommendation 2 would be funded through the Transportation Department's existing budget so no changes to budget are required for this initiative.

Current and Future Capital Budget:
The most significant potential impact to the future capital budget would bet the need for a source of funding for infrastructure to replace the current fuel tax approach (road tolls likely the best alternative). Future costs can potentially be mitigated from capacity increases in the long term (due to full automation of vehicles) that may reduce the need for additional infrastructure.

Risk Assessment
There are no risks associated with this report. The broader risks associated with each technology are discussed as part of Attachment 1.

REASONS FOR RECOMMENDATIONS:
The implementation actions in the report will help best position The City for potential technological advancements with minimal risk. The low-speed autonomous vehicle trial will have several benefits at minimal cost to The City.

Attachments
1. Future of Transportation in Calgary
2. Low-Speed Autonomous Shuttle Project Summary
3. **PowerPoint presentation received at the meeting**