



City of
Peterborough

To: Members of the General Committee

From: Cynthia Fletcher
Commissioner of Infrastructure and Planning Services

Meeting Date: July 20, 2020

Subject: Report IPSENG20-029
Options to Accelerate Road Resurfacing of City streets in Most
Need of Repair

Purpose

A report to address the options for accelerating road resurfacing of City streets most in need of repair.

Recommendation

That Council approves the recommendation outlined in Report IPSENG20-029, dated July 20, 2020, of the Commissioner of Infrastructure and Planning Services, as follows:

That the report be received for information.

Budget and Financial Implications

There are no budget implications in Council receiving this report.

In 2020, the Pilot Roads Program was funded through the allocation of a portion of one-time Federal Gas Tax Funding for 2020.

Background

At the Finance Committee meeting of January 15, 2020 and confirmed at the January 27, 2020 Council meeting, Council passed the following motion:

“That staff report to Council by June of 2020 on options to accelerate the resurfacing of the city streets in most need of repair”.

This report is intended to respond to that request.

Ontario Regulation 239/02 of the **Municipal Act** sets out maintenance standards for Municipal highways and roads. The regulation outlines classification categories for roads, requirements and frequency of inspection, rehabilitation methods and seasonal maintenance standards. While there is some flexibility within the road rehabilitation programs, regulatory requirements must be met.

Industry standard for developing a Road Asset Management program involves a thorough assessment of the condition of the road network. The condition assessment involves a complex matrix of criteria, such as; classification, regulatory requirements, bus routes, traffic loads, urbanized/non-urbanized, sub-surface infrastructure, surface material, surface infrastructure etc.

A standard Road Asset Management program uses the assessment criteria to develop a Pavement Condition Index (PCI):

- Roads with PCI under 25 are intended to be re-constructed
- Roads with PCI under 40 are intended for re-design and then re-construction
- Roads with PCI above 40 are intended to be captured in a regular maintenance program.

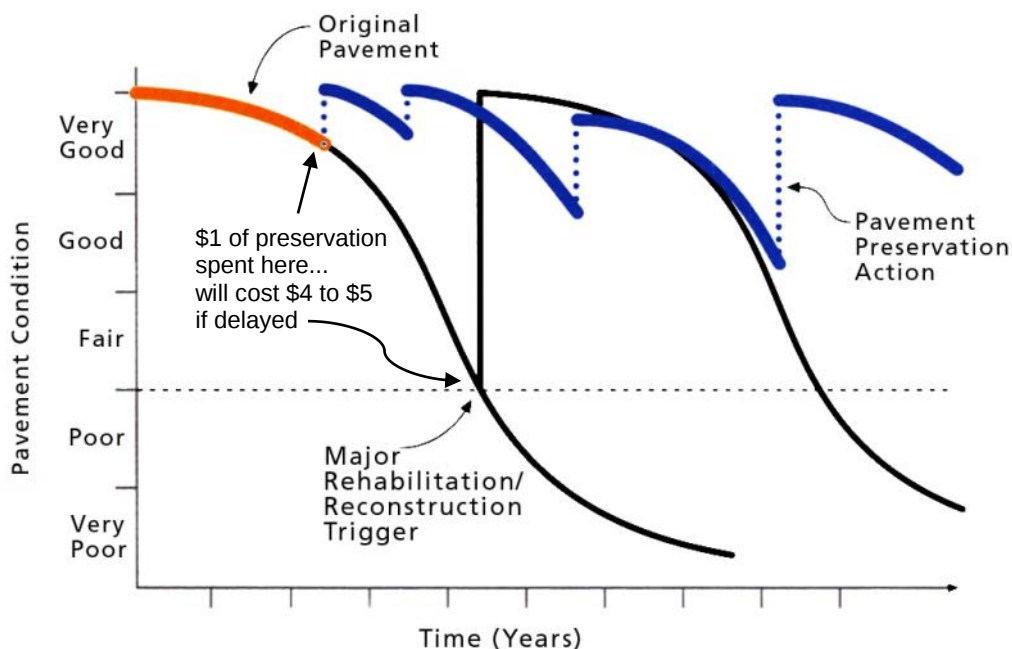
In 2014, the City completed a comprehensive Road Needs Study (Report USEC14-005) to evaluate the condition of the municipal road network. This task also included work plans to optimize the Roads Program capital budgets. This study produced a pavement condition index (PCI) ranking for each road or segment of road. This industry standard method helped the City establish a consistent framework for prioritizing roads and described the concept of pavement preservation. The intention, if funding matches level of expected service, is pavement preservation allocates funding throughout the life of the road to extend the pavement lifespan on a prioritized basis, thereby saving money in the long term. Subsequent to the Roads Needs Study, Council endorsed pavement

preservation and a funding structure that has since been implemented for the preservation of City roads.

In 2019, the City established PCI rankings based on field data collected through high-definition visual imaging. This process leverages technology for a more efficient, objective and repeatable methodology compared with previous data collection performed by visual inspection. This was the first year the new methodology was used and resulted in some changes to previous rankings.

The following figure 1 illustrates the ideal Road Asset Management program scenario. Throughout the lifecycle of a newly constructed or re-constructed road, investment is made within a reasonable timeframe to maintain the road assembly and ensure maximum life can be attained, thereby maximizing investment.

Figure 1



Past Considerations and Funding Challenges

The City's Road Asset Management Program is an ongoing body of work that needs consistent resources in order to meet legislated requirements and expected levels of service. Without ongoing, consistent resources (funding and staff), the backlog of needs and costs to address continue to increase.

Since 2014, roads requiring reconstruction have been included in draft budget review documents, however competing budget priorities result in many road reconstructions being deferred. The ongoing deferral of these projects creates a backlog throughout the entire road asset management program.

In 2016, staff presented Report USEC16-015 which focused on the rehabilitation of roads with PCI under 25, which should be re-constructed. Council requested that staff develop

a program to further prioritize the roads in most need and to recommend funding level and sources of funding.

In 2017, a new Capital Budget of \$650,000 was established through the budget process, for the rehabilitation of roads with PCI under 25. The intention was for funding to be approved as part of the budget review process for subsequent years.

Competing budget priorities has resulted in this funding being reduced in subsequent years and the remaining funding has been focused on arterial and collector roads, because of their regulatory classification. The backlog of local roads, arterial and collectors far exceeds the current funding available. The gap between the required/expected service level and funding level grows each year, as costs increase at ~ 3-5% per year.

In December of 2019 staff presented Report IPSENG19-042 – Pilot Roads Program for 2020, which outlined the potential for a pilot program to address one “road in most need” in each of the City’s wards. Council endorsed the pilot program through the 2020 Budget review and the program was funded through the allocation of a portion of one-time Federal Gas Tax Funding for 2020.

Discussion

The industry standard Roads Preservation Program recommends establishing construction and rehabilitation programs, defining expected service levels/regulatory requirements and allocating funding to meet those service level/requirements. For all Road Asset Management programs, the annual base funding has not been consistent and annual allocations do not cover cost increases. Consequently, the roads programs do not deliver the expected level of service or even the same results as the previous year. In the past five years, on average the municipality completes ~13 lane-kms of road work through several programs as described below (one kilometer of a two-lane road would be two lane-kms, whereas one kilometer of a four lane road would be four lane-kms). The City has an inventory of ~900 lane-kms of roads requiring some level of maintenance or re-construction.

The City has a backlog of needs in all established roads programs

Road Construction

This program is focused on growth related new road construction or expansion of existing roadway to increase capacity. In addition to Development Charges, the City is expected to contribute a portion of funding to construct or upgrade roads to support Growth and Development. If the City is not able to ensure funding is available in a timely manner, development timelines can be impacted.

Road Re-Construction:

This program is focused on roads with a PCI of below 25. The road surface and critical infrastructure (storm, sanitary, water components, configurations etc.) needs to be replaced and/or road is to be urbanized (the new installation of critical infrastructure).

Ideally, planning/design work commences when the road PCI is between 26-40. The re-construction work occurs when the PCI is below 25. This planning cycle allows for full benefit of investment throughout the life of the road assembly. The surface pavement replacement is coordinated with the sub surface work. These roads are reflected as individual projects in the Capital Budget.

Note: For every roadway reconstructed, the pavement preservation budget should be increased exponentially from year to year in order to perform the pro-active preventative maintenance measures. Lack of funding of the pavement preservation program will create a shortfall in this approach and result in significant increased costs for reconstruction in the future, in addition to more rapid deterioration of the road network.

Inventory: ~100 lane-kms of roads with PCI under 25

Pavement Preservation (5.10.02 in the Capital Budget):

The ongoing program is focused on roads with a PCI above 40 and where the sub surface components are in good condition. The maintenance program is intended to maximize the lifespan of new/re-constructed roads

Newly reconstructed roads are to be captured in the pavement preservation program starting 5-10 years following the upgrades and conducted on a prescribed cycle throughout the road's lifespan. The preservation program could result in a 50-60+ life expectancy rather than the original 25 to 30 year reconstruction lifecycle.

Inventory: ~696 lane-kms of roads with PCI over 40

Road Surface Repairs:

This program focuses on roads with a PCI of under 40, but above 25. Theoretically, roads with PCI under 25 should be re-constructed. Following Industry standard, planning/design work would be underway for road re-construction when the road PCI is between 25-40.

Inventory: ~102 lane-kms of roads with PCI between 25-40

Pilot program for 2020:

The reality is the City does not have sufficient funding to rebuild roads with PCI under 25 on a timely schedule. These roads continue to degrade, and the City must manage through temporary solutions.

For 2020, the City received a one-time increase in Federal Gas Tax funding of which \$1,000,000 was allocated as additional Road Surface Repairs funding to address one “road in most need” for each ward. The program was proposed to provide some short-medium term relief for the City’s “roads in most need”. The focus of this program was roads with PCI under 5. The pilot will cease, if additional funding is not available.

Material/Techniques

Asphalt Recycling:

The City employs a number of asphalt recycling methods within its reconstruction and pavement preservation programs.

- a) The main asphalt recycling method that the City currently uses is cold milling (grinding) and reclamation of the asphalt pavement material to be reused in asphalt mixes. Currently the City utilizes the Ontario Provisional Standard Specifications for asphalt mixes that permits certain percentages of reclaimed asphalt pavement (RAP) into the mixes.
- b) Another recycling method that the City has utilized is full-depth reclamation (or pulverizing). This method pulverizes the existing asphalt into the road granular and mixes it to increase the depth of granular road base. Typically, a new asphalt surface is placed on top. This method is mainly utilized in rural cross section (shoulders and ditches) locations where an increase of the road elevation can be accommodated. This method is not normally recommended for urban cross sections (curbs and gutters and underground utilities) because the increase in road elevation reduces the storm water carrying capacity of the curbs and gutters.
- c) Another industry method of asphalt recycling is Cold in Place recycling. This method grinds up the existing asphalt surface and a portion of the base asphalt, mixes it with new materials, and replaces it as a new base asphalt for the road. Normally a new asphalt surface is placed on top. This method also has limitations in an urban environment due to the length of the processing train, utility structure obstacles and the ultimate raising of the road elevation. This method is best suited for longer, straighter stretches of rural paved roads with a significant existing thickness of asphalt. For this reason, the City does not utilize this method of recycling asphalt.

Pavement Preservation and Surface Treatment Methods:

Grind and Overlay: This method involves the cold milling (grinding) of the existing asphalt surface layer (approximately 50mm (2 inches)) and replacing with a new asphalt surface. This is done to restore pavement smoothness, traction and replace a new sealed surface over the road base to help prevent the infiltration of damaging water.

Micro Surfacing: This method places a thin layer (approximately 6mm – 12mm (1/4” – 1/2”) thick) over the existing surface layer of asphalt. This thin layer helps smooth minor

imperfections, improve traction and helps seal the surface from infiltrating water. This method is a lower cost option intended to extend the life of the existing surface asphalt layer before a grind and overlay treatment.

Crack Sealing: This method places rubberized asphalt filler in cracks that have developed in the existing surface asphalt layer. It helps seal the surface from damaging infiltrating water.

Asphalt Overlay: This method places a thin surface asphalt layer (approximately 30mm – 50mm (1" – 2") thick) over the existing surface layer of asphalt. This is not a normally recommended pavement preservation method due to cracks spreading through the surface and a reduced life expectancy. This method can help improve pavement smoothness over a shorter term.

Graded Seal: This method places asphalt emulsions and cover aggregates (tar and chip) over granular base roads to reduce dust emissions and provide a durable driving surface. This method typically comes at a lower cost but with a reduced life cycle as compared to a hot mix asphalt surface.

Implementation of the Roads Programs

Internal vs Contracted Services

City staff regularly reviews services to determine whether cost and service efficiencies are best achieved through internal or contracted services. For many of the Road Construction and Maintenance programs, the costs and risks are prohibitive to internal service provision:

- **Equipment:** initial costs, storage, ongoing maintenance, insurance, replacement, Commercial Vehicle Operators Registration (CVOR) rating. The type of equipment utilized in this area are expensive to acquire and maintain, require special registration, large storage and repair space and costly to acquire insurance
- **Staff and contractual constraints:** Hours of work are specified and negotiated via collective agreements, attracting the number of staff required for seasonal work proves challenging, turnover in temporary and seasonal pools is high, training for the equipment required for roads programs is specialized and costly
- **Access Asphalt Plant:** The City would still need to contract the services and materials from a licenced asphalt supplier/plant, which is a large portion of the cost of the Roads Programs.

Municipalities of similar size to Peterborough contract out roads programs, except for pothole repairs, which is what we do in this City. Staff is not proposing to address the major roads programs with internal resources.

Potential Extension of the 2020 Pilot Program for 2021

In 2020, staff is “piloting” a few different methods for temporarily repairing/resurfacing the four roads. The roads for the 2020 Pilot Road Surface Repairs Program were selected based on several criteria: PCI is less than 5, applicability for one of the test applications, usage: traffic volumes, bus route, etc.

While this one-time influx of funding is providing short term improvements, the work will not address the long-term needs of these roads in need of re-construction. Past practice has demonstrated these approaches will buy some time, but these roads will require further attention within a ten-year period. Without additional funding in 2021, the Pilot program to address the Roads in Most Needs of Repair will cease.

Should Council wish to continue with the program to address the “roads in most need” in this manner, staff would propose Council consider allocating an additional \$1,000,000 for 2021, as part of the annual budget review.

As part of the budget review, staff could provide an accompanying report to recommend the specific roads to be re-surfaced. Roads would be reviewed and proposed based on the following criteria: PCI less than 15, applicability for one of the pilot resurfacing methods, ability to “fit” within the available funding, consultation with Council members.

Appended to this report, staff has provided a list of the Roads with PCI under 15 in alphabetical order.

However, if the \$1,000,000 is a re-allocation from the existing roads program, it jeopardizes the City's Road Asset Management program, ability to support growth and development and to meet legislated requirements. If the \$1,000,000 is an additional allocation to the roads program, it means \$1,000,000 less from other capital requests - very likely other critical infrastructure projects- that, annually, already cannot meet demands. Alternatively, the City can also consider this program a top priority if the appropriate additional stimulus funding becomes available similar to the one-time Federal Gas Tax monies in 2020.

Summary

The City of Peterborough uses an industry standard method to create a pavement condition index and prioritize roads for construction (new), re-construction, pavement preservation or re-surfacing and repairs. Current and historical funding levels do not support the movement of “roads in most need” through the re-construction program in a timely manner. Consequently, Council and staff heard the community's frustration with the state of the road infrastructure through the 2020 and 2021 budget engagement sessions.

For 2020, the City received a one-time increase in Federal Gas Tax allocation. As part of the 2020 budget deliberations, Council approved allocation of \$1,000,000 of the one-time

Federal Gas Tax increase to pilot short term repairs for some “roads in most need”. If additional and ongoing funding is not secured, the program to address “roads in most need” will cease. As part of the budget review, Council could consider allocating an additional \$1,000,000 to continue the program to address the “roads in most need” for 2021. Staff could provide Council a report with proposed “roads in most need” for a 2021 program, as part of the budget review.

Submitted by,

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Attachments

Appendix A - Road with PCI less than 15