City of Peterborough

To:	**Members of the Committee of the Whole**
From:	**W.H. Jackson, Director of Utility Services**
Meeting Date:	**September 6, 2016**
Subject:	**Report USEC16-015** **Rehabilitation of Roads with a Pavement Conditions Index less than 25**

Purpose

A report to present a program to prioritize and fund the rehabilitation of roads that have a Pavement Condition Index less than 25 ("PCI25") as identified through the Road Needs Study.

Recommendations

That Council approve the recommendations outlined in Report USEC16-015 dated September 6, 2016, of the Director of Utility Services, as follows:

a) That the rehabilitation of roads with a Pavement Condition Index less than 25 as identified through the Road Needs Study be prioritized using the criteria outlined in Appendix C of Report USEC16-015 and with the priority list provided in Appendix D of Report USEC16-015;

b) That a 2017 Capital Budget Project in the amount of $650,000 be established, and indexed in future years Capital Budgets, for the rehabilitation of roads with a Pavement Condition Index less than 25; and

c) That funding for the 2017 Capital Budget Project in Recommendation b) come from the existing "Various Road Resurfacing" capital budget and, subject to budget availability, the funding in the "Various Road Resurfacing" be restored by the 2021 Capital Budget.

Budget and Financial Implications

The establishment of a new 2017 Capital Budget of $650,000 for the Rehabilitation of PCI25 Roads will be funded entirely from the existing Capital Budget “Various Roads Resurfacing” project for year one, with future budgets submitted as part of the Draft Capital Budget to be approved in subsequent years.

Background

In 2014 D.M. Wills Associates Limited completed a comprehensive Road Needs Study (see Report USEC14-005 in Appendix A) to evaluate the current pavement condition of the City road network. This task also included work plans to optimize the Various Roads Resurfacing capital budget item. This study produced a pavement condition index (PCI) ranking the condition of each road.

The “Various Roads Resurfacing” program in the capital budget is dedicated to pavement preservation. As outlined in Report USEC14-005, the concept of pavement preservation allocates funding throughout the life of the road to extend the pavement life on a prioritized basis thereby saving money in the long term. The funding under the Various Roads Resurfacing is utilized for roads that are ‘fair’ to ‘good’ condition or those roads with a PCI greater than 55.

City Council at its meeting of May 16, 2016 requested staff:

> “...to report on a program to prioritize and fund the rehabilitation of streets that the Road Needs Study refers to as “serious and/or failed”.

Current State

The importance of a “road network condition” that relates to vehicles, transportation of goods, and active modes of transportation cannot be understated. The information provided through the 2014 Road Needs Study shows the current overall PCI of the City’s roads to be 67 or in the category listed as “Fair”. The standard PCI rating scale is shown in Figure 1.

Figure 1 – Standard PCI Rating Scale and Strategies

Description	PCI	Pavement Management Strategy
Failed	**0-10**	**Full Reconstruction**
Serious	**10-25**	
Very Poor	**25-40**	**Public Work Maintenance**
Poor	**40-55**	
Fair	**55-70**	**Capital Preventive Maintenance**
Satisfactory	**70-85**	
Good	**85-100**	

To move the PCI to above 70 was considered financially prohibitive. On the other hand, the funding levels of 2014 for road resurfacing and rehabilitation resulted in an unacceptable long-term decline of the road network PCI to 30. In light of this, Council decided to dedicate funding to capital preventative maintenance in an attempt to stop the drastic decline in pavement condition. Council endorsed a phased approach to double the available pavement maintenance funding over a three-year period which would still, however, result in a PCI decrease from the current 67 rating to a 48 rating in the year 2033.

Since the increase in funding to the preventative maintenance program in 2014, the City road network has received a noticeable change in volume of preventative maintenance work completed. Examples of this include the initiation of micro surface on Armour Road, Television Road, Sherbrooke Street and most recently Lansdowne Street from The Parkway to Monaghan Road. Other examples include, but are not limited to, Monaghan Road, improvements in Major Bennett Industrial Park, Gutherie Drive, Kawartha Heights Boulevard, Hunter Street, George Street, and Champlain Drive. The City has also crack sealed approximately 21 km of roads citywide following a fifteen-year period without this service. Although the level of funding provided will still see a slow decline in the long-term PCI rating, observations and comments received from the public have been positive.

Discussion

Roads with conditions listed as “poor” or “very poor” are generally maintained through Public Works. Rehabilitation frequently includes pothole repairs, patching, and localized pavement resurfacing. The roads with a PCI25 (”serious” or “failed”) are generally found to be in a state of disrepair and require full reconstruction of the road surface.

Improving only the pavement of these roads is generally not considered the most effective use of funding. It is these roads with a PCI25 that form the subject matter of this report. Appendix B provides a list of PCI25 roads from the most recent 2015 inspection. Thirty-nine km, or 9%, of the total 429 km of roads in the City have a PCI25.

The resolution of Council from May 2016 had two parts. The first was to establish a priority of rehabilitation for the PCI25 roads and the second was to consider how to fund the rehabilitations. The following sections of this report deal with these two matters.

1. Prioritization

Considering the magnitude of work required to address the PCI25 roads, only pavement and minor associated drainage work will be considered in this report. Specifically assets such as streetlights, sidewalk, pipe reconstruction, etc. will not be considered in the analysis.

To simplify the priority process further, roads included in the capital budget will be removed from the analysis to avoid duplication. Through our annual pipe inspections, pipes requiring full reconstruction or dig repairs will by default reconstruct the road surface, therefore removing these road segments from the analysis. Also, any roads that require a full watermain reconstruction will be excluded from this analysis.

Having filtered the roads that will be addressed via other construction projects, a priority criteria is required. Information which is currently available and that can directly be related to the road surface is pavement condition, road class, bus routes, geographic location, and dedicated bike lanes. An importance factor has been assigned to each of the items listed above through a criteria weight. The full Priority Decision Criteria is provided in Appendix C.

Criteria such as road class and PCI are directly related to the asset however the remaining measures have been chosen to reflect the Provincial Policy Statement issued under the Planning Act and Places to Grow Act. Both guiding documents stress the importance of alternate transportation modes and geographic intensification. Appendix D provides the results of the above described decision matrix.

2. Funding

The 2014 Road Needs Study was completed for the purpose of pavement preservation but has also provided valuable insight into the overall condition of the road network. There was sufficient evidence that “worst first” was not the most economical means to preserve the City’s roads if the City wanted to extend the useful life of the overall road system. Subsequent to the Roads Needs Study, Council endorsed pavement preservation and a funding structure that has since been implemented benefitting the preservation of our roads.

With pavement preservation tackling the ‘fair’ to ‘good’ roads and Public Works maintaining the ‘poor’ roads, the question remains; how do we address of the PCI25 road segments? Since the 2014 study, these road projects have been included in draft budget documents however competing budget priorities result in road reconstructions being deferred. Critical road reconstructions resulting from inadequate PCI are funded entirely from the general tax levy and are therefore often difficult to fund.

2.1 Funding Alternatives

Various alternatives are presented below to fund improvements to the critical roads in the City. If any of options 2.1.1 to 2.1.5 are selected, projects will be selected from a pool of priority projects depending on the magnitude of work required for each location versus the available budget. Options 2.1.6 will, however, produce independent projects with required funding based the magnitude of work required.

2.1.1 Create New Capital Budget

Create a PCI25 Project in the capital budget of approximately $650,000 per year and adjusted according to construction cost changes. This project will be funded through the general tax levy. The potential benefit to this approach will be the ability to address multiple roads in one fiscal year if budget permits. The disadvantage will be competing capital funding through the budget process which could remove the entire project(s) from the current capital budget.

2.1.2 Create a PCI25 Roads Reserve

Create a PCI25 Roads Reserve through the operating budget process dedicating funds of approximately $650,000 per year for 2017 and 2018. During this two year period and any future years, place any surplus budget amounts from other roads and related capital projects to this reserve. Only funding that is applicable to this type of road project can be placed in the reserve such as capital levy excluding funding through development charges, dedicated flood reduction or bridge reserves, etc. This process can also begin with current roads projects. The benefit to this approach is potentially being able to address multiple roads in one fiscal year if budget permits. As the reserve builds, the issue of competing funds is no longer an issue. The disadvantage is funding the first two years with an ongoing review of the reserve to ensure that a sustainable program can be administered each year. Another disadvantage is that capital road projects that go over budget will need to look to the Capital Levy Reserve rather than other capital road projects for required additional funding.

2.1.3 Debenture Financing

Create a PCI25 Roads Project in the capital budget funded entirely through debenture financing over and above the current 1% debenture financing policy. With a debenture value of approximately $650,000 per year and adjusted according to construction cost changes, the impact on the City tax levy would be an additional 0.05% per year. The potential benefit to this approach will be the ability to address multiple roads in one fiscal year if budget permits. This process also dedicates this funding to PCI25 roads. The disadvantage is an increase to the current debenture financing policy from 1% annually to 1.05%.

2.1.4 Additional Tax Levy Financing

Create a PCI25 Roads Project in the capital budget entirely funded through dedicated tax levy financing over and above the current taxation. With a funding value of approximately $650,000 per year and adjusted according to construction cost changes. The impact on the City tax levy would be an additional 0.45% per year. The potential benefit to this approach will again be the ability to address multiple roads in one fiscal year if budget permits. This process also dedicates this funding to PCI25 roads. The disadvantage is an increase to the current tax levy by 0.45%.

2.1.5 Divert Pavement Preservation Funding to PCI25 Roads

Create a PCI25 Roads Project in the capital budget with funding of approximately $650,000 per year and adjusted according to construction cost changes by diverting funding from the pavement preservation programme. The benefit is the ability to address multiple roads in one fiscal year if budget permits. The additional benefit is utilizing funding already approved by Council thereby not increasing the overall capital budget.

The drawback to this alternative would see Council back off a previous full commitment to pavement rehabilitation. It is important to note that the current pavement preservation plan is presently underfunded and the condition of City roads is continually declining although at a much slower rate than prior to the onset of the rehabilitation program. To divert dollars from pavement preservation to PCI25 roads will accelerate the decline in the overall road PCI. The proposed $650,000 will impact approximately 400m of PCI25 road construction. This same value in pavement preservation would impact a greater length of roads in the “Fair” to “Good” category.

2.1.6 Individual Budget Projects

Create individual reconstruction projects for the top priority PCI25 roads in the capital budget allowing for flexibility in the budget process. The total funding value would change year to year depending on the magnitude of the road being reconstructed. The projects would be funded from the general tax levy. Years with challenging capital expenditures would see shorter road segments being selected for reconstruction. On the other hand, should there be additional budget available during the budget planning process larger roads can be selected for reconstruction. The benefit to this approach is flexibility in the budget process. The disadvantage will be competing capital funding through the budget process could remove the project from the current capital budget.

2.1.7 Hybrid

This alternative will combine Alternatives 2.1.1 and 2.1.5 by creating a new Capital Budget and utilizing existing pavement preservation funding. For the Hybrid alternative, the existing pavement preservation funding would be returned to its existing level over a five year period.

3. Discussion

A process has been outlined to prioritize road pavements that are in the PCI25 category. This process is transparent and flexible if minor alternations are required in future years. The prioritization incorporates pavement condition, provincial and federal requirements, location considerations as well as road usage.

Various funding alternatives have been presented to implement the rehabilitation of the prioritized PCI25 roads. Ultimately, the best scenario would see new funding applied to this program. However, it is understood that capital funding is extremely constrained and, accordingly, it is proposed, at this time, to go with the hybrid scenario that initially diverts funds from the existing Capital Program "Various Road Resurfacing" (2016 Item 5-3.01). It is proposed to then transition to a full capital levy funding for PCI25 road rehabilitation over a five year period. This will have long term implications to the overall pavement condition index for road pavements in the City but if Council wishes to undertake work on the PCI25 road pavement categories without a major increase to the overall corporate capital budget this is the only alternative available.

A comparative analysis has been completed to gauge the volume of work potential with the proposed budget recommendations for PCI25 road rehabilitation versus the existing road rehabilitation program. With a budget value of $650,000, the City can rehabilitate approximately 400m of PCI25 road dependant on the roadside environment. If challenging conditions exist, this length may be reduced. In comparison, the same budget amount can complete 1500m of a grind and overlay project or 4500m of a micro seal project. Therefore, the transfer of funds away from the existing road resurfacing budget will reduce the impact on pavement preservation by a length of 1500-4500m annually.

4. Further Considerations

Pavement deterioration is not only age based, it is often accelerated when repairs are made to infrastructure beneath the paved surface resulting in excavation of the road. This leaves the road with a scar that over time will degrade that area of the road much quicker.

To avoid this pavement degradation to new roads, or provide the funds to properly rehabilitate the road, numerous Ontario municipalities have created a road cut process that places road cut moratoriums on newly built roads (generally in effect for 7-10 years) and a pavement degradation fee. It is understood that utilities have emergency cuts or repairs that are required during all times of a pavements life but careful planning can help minimize the adverse impact of the City's road network.

Staff will be addressing this issue in the near future and will report further to Council. The funding collected through the degradation fee should be allocated to the repair and rehabilitation of the City road network and this may help to further fund the work proposed in this report.

Summary

The impacts of a road network condition cannot be minimized when considering the general public, transportation of goods, active modes of transportation and provincial and federal policy requirements. The proposed practice described in this report will result in a quicker decline in the overall PCI but it will also result in some of the worst roads in the City being rehabilitated earlier than originally expected.

Equally important, the topic of pavement deterioration for utility cuts has been broached and Council should expect further information on this matter in the near future.

Submitted by,

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Attachments:
Appendix A – Report USEC14-005
Appendix B – List of PC125 Road Segments
Appendix C – Priority Decision Criteria
Appendix D – Decision Matrix Results