

The Corporation of the City of Kawartha Lakes
Council Report

Report Number EA2018-014

Date: June 19th, 2018
Time: 2:00 p.m.
Place: Council Chambers

Ward Community Identifier: All Wards

Title: Implications of Lowering the Traffic Volume Threshold for the Paving of Gravel Roads

Description: This report reviews the estimated servicing and financial implications of lowering the traffic volume threshold for the paving of gravel roads.

Author and Title: Adam Found, Manager of Corporate Assets

Recommendation(s):

That Report EA2018-014, Implications of Lowering the Traffic Volume Threshold for the Paving of Gravel Roads, be received.

Department Head: _____

Financial/Legal/HR/Other: _____

Chief Administrative Officer: _____

Background:

At the Council Meeting of October 24th, 2017, Council adopted the following resolution:

CR2017-933

Moved By Councillor Strangway

Seconded By Councillor Elmslie

RESOLVED THAT staff be directed to investigate costing and service implications of revising the traffic volume threshold to warrant hard-topping of gravel roads from an annual average daily traffic (AADT) level of 400 to an AADT of both 200 or 300 with a report back to Council by end of Q2 2018.

CARRIED

This report addresses that direction.

The implications of lowering the gravel-to-hardtop threshold of 400 AADT (measured in vehicles per day) was previously examined by staff in 2013 through Council report PW2013-015, attached hereto as Appendix A. Based on that examination and budgetary constraints, the report did not recommend lowering the threshold. Through CR2017-933, Council has directed staff to revisit this matter and bring forward the present report to Council.

Rationale:

According to the 2016 Roads Needs Study, the City has an inventory of approximately 895Km of assumed gravel road, of which an estimated 52Km have AADT of 200 or larger. The inventory of gravel roads making up this latter figure is summarized in Appendix B attached hereto. In terms of the service level categories underlying the 10-Year Gravel Resurfacing Plan, this inventory is distributed as follows:

1. 200 ≤ AADT < 300: 40.85Km
2. 300 ≤ AADT < 400: 9.20Km
3. 400 ≤ AADT: 1.76Km

Hereinafter, this inventory is referred to as “high-volume gravel roads”. Due to general growth in traffic volume, the quantity of high-volume gravel roads has increased by about 4.0Km between 2011 and 2016. Also owing to such growth, about 1.76Km of gravel road now surpasses the 400 AADT warrant threshold for paving. Still, high-volume gravel roads represent less than 6% of the total of 895Km of gravel road assumed by the City.

For the purpose of this report, the term “paving” refers to the upgrading a gravel road to a hardtop surface through the application of surface treatment (aka tar and chip). As discussed at length in Report PW2013-015, a natural tradeoff exists respecting the paving of a gravel road. On the one hand paving provides for an enhanced service level and decreased operating costs, while on the other it entails increased lifecycle (capital + operating) costs primarily due to the relatively large upfront capital investment required.

While operational efficiencies arise from the paving of a gravel road, this benefit, at current lifecycle cost trends and service levels, is more than offset by the increased capital costs associated with surface treatment. This holds even in the case of high-volume gravel roads, which are on an enhanced gravel resurfacing cycle (5-8 years instead of the standard 10 years).

Hence, the increased service level conferred by paving a gravel road must be weighed against the associated increased lifecycle cost. At the centre of this report is the 400 AADT mark the City has fixed for the purpose of this weighing of benefits and costs. That is, a gravel road is considered a candidate for paving once its traffic volume reaches at least 400 AADT.

Table 1: Projected Lifecycle Costs for High-Volume Gravel Roads Over 15 Years if Left Unpaved (2019\$)

Traffic Volume Range	Length (Km)	Capital	Operating				Total
		Gravel Resurfacing	Calcium Chloride	Grading	Winter Control	Other Maintenance	
200 ≤ AADT < 300	40.850	1,413,640	964,994	793,557	2,360,921	2,368,389	7,901,501
300 ≤ AADT < 400	9.201	447,135	217,356	178,742	531,777	533,459	1,908,469
400 ≤ AADT	1.758	90,675	41,529	34,152	101,605	101,926	369,886
Total	51.809	1,951,450	1,223,879	1,006,451	2,994,302	3,003,774	10,179,856

Table 2: Projected Lifecycle Costs for High-Volume Gravel Roads Over 15 Years if Paved in 2019 (2019\$)

Traffic Volume Range	Length (Km)	Capital			Operating		Total
		Double Surface Treatment	Single Surface Treatment	Pulverization	Winter Control	Other Maintenance	
200 ≤ AADT < 300	40.850	3,952,374	902,454	306,494	2,360,921	2,157,764	9,680,008
300 ≤ AADT < 400	9.201	890,238	203,270	69,035	531,777	486,018	2,180,337
400 ≤ AADT	1.758	170,094	38,838	13,190	101,605	92,862	416,589
Total	51.809	5,012,706	1,144,562	388,719	2,994,302	2,736,643	12,276,933

Table 3: Projected Incremental Lifecycle Costs Over 15 Years if High-Volume Gravel Roads are Paved in 2019 (2019\$)

Traffic Volume Range	Length (Km)	Capital	Operating	Total
200 ≤ AADT < 300	40.850	3,747,682	-1,969,175	1,778,507
300 ≤ AADT < 400	9.201	715,408	-443,540	271,868
400 ≤ AADT	1.758	131,448	-84,745	46,702
Total	51.809	4,594,538	-2,497,460	2,097,077

Based on current service levels, maintenance practices and various recent data (e.g. tender prices, Financial Information Return reports etc.), Tables 1-3 summarize lifecycle cost projections for high-volume gravel roads depending on whether they remain with a gravel surface or are paved. To provide for comparability between gravel and hardtop road surfaces, the tables align with the 15-year lifecycle expected of a hardtop road surface whereby paving is set to occur in 2019. For simplicity, cost figures in the tables are normalized to 2019 dollars, based on an assumed inflation rate of 2%/year, and have not been discounted to present value.

Double surface treatment of high-volume gravel roads is estimated to cost about \$5.0M if done in 2019. This does not include future capital costs associated with single surface treatment (a capital intervention typically in year 8 to maintain the 15-year lifecycle) and eventual pulverization of the hardtop road surface at the end of its lifecycle. Table 3 projects incremental lifecycle costs by cost type, indicating renewal and operation of high-volume gravel roads, if paved, would cost an estimated \$2.1M more over the 15-year horizon.

Other Alternatives Considered:

As staff is not recommending a change to the 400 AADT threshold, no alternatives to Council's receiving this report are being considered or proposed by staff at this time. Should Council nonetheless resolve to lower this threshold, staff suggests direction of the following form, where "X" stands for the new desired threshold, be added to the resolution of the present report:

That proposed capital budgets identify for upgrade to a hardtop surface only those gravel roads for which the annual average daily traffic (AADT) is at least "X" vehicles per day; and

That updates to the 5-Year Roads Capital Plan, 10-Year Gravel Resurfacing Plan, Asset Management Plan and Long-Term Financial Plan reflect this enhanced level of service."

Financial/Operation Impacts:

Council's receiving this report has no financial impact. However, should Council elect to lower the 400 AADT threshold, the expected resulting financial impacts are those indicated by Tables 1-3 herein.

Relationship of Recommendation(s) To The 2016-2019 Strategic Plan:

N/A

Consultations:

Supervisor of Technical Services

Attachments:

Appendix A: Report PW2013-015



Report
PW2013-015.pdf

Appendix B: Inventory of High-Volume Gravel Roads



Inventory of
High-Volume Gravel R

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**Department Head: Juan Rojas, Director of Engineering and Corporate
Assets**