Appendix "B"

Final Road Needs Study Report - 2019

Township of Lake of Bays

D.M. Wills Project No. 4697

D.M. Wills Associates Limited
PARTNERS IN ENGINEERING
Peterborough

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Prepared for the
Township of Lake of Bays

Executive Summary

The Township of Lake of Bays (Township) retained the services of D.M. Wills Associates (Wills) to undertake a review of the Township's existing road network, and assess its physical condition as well as confirm various road attributes. Data collected during the field review was used to develop a prioritized listing of the road network needs, the results of which are documented in this report.

The Township's complete road infrastructure system spans a total of 218 km primarily within a rural setting, with small areas of urban and semi-urban development. The road network includes surfaces ranging from gravel to hot mix paved (asphalt). The Township has approximately 122 km of gravel roads, 71 km of surface treated roads (Low class bituminous (LCB)), and 26 km of hot mix asphalt paved roads (high class bituminous (HCB)).

The Township's efforts in maintaining its road network has had an evident effect. Since the 2014 report, **the average surface rating has increased from 6.8 to 8.0 out of 10.** Although Lake of Bays still has some capital needs identified in this report, **the Township should concentrate on not allowing the current overall rating to slip.**

Capital Improvements

Prioritization and recommendations for planned capital improvements have been developed based on the condition rating and traffic demands on each road. Those roads identified as having a "NOW" or 1 – 5 year structural need have been included in the capital improvement plan for rehabilitation.

A total length of approximately 10.3 km of roads were identified as having structural needs in the "NOW" or 1 – 5 year periods. The estimated cost to improve these roads is approximately $ 1.0 M over the next 5 years. An additional length of approximately 54.3 km of road is identified as having inadequate surface widths or surface type. Generally, provided no operational or safety concerns are identified, roads with surface width and/or type deficiencies are typically addressed / considered at the next full reconstruction cycle.

It should be noted that a structural "NOW" need does not explicitly mean that work must be undertaken on the road immediately (although this may be so in some cases). A structural "NOW" need means that the road's surface has reached the end of its useful service life and will require reconstruction or major rehabilitation to fully repair. Logically, a structural "1-5" year need is expected to become a "NOW" need in the next five years, and a "6-10" year need is expected to become a "NOW" need in the next 10 years. Many "6-10" year needs may be corrected by timely resurfacing, extending their service lives.

Resurfacing

In addition to addressing currently deficient roads (i.e. capital reconstruction), a dedicated preservation management approach is required, and perhaps even more important, to "keep the good roads good"; the fundamental principle being that it

costs much less to maintain a good road than it does to let it fail and then reconstruct it, from a life cycle cost perspective. Ultimately the goal of preservation management is to extend the useful life of a road, maximizing the municipality's investment over the road life-cycle.

Road resurfacing is an effective way of extending the overall life of the pavement structure. A road resurfacing program is therefore recommended in addition to capital improvements.

Based on typical degradation rates for gravel roads, surface treatment, and hot mix, a resurfacing program / budget is recommended as follows:

Hot Mix Paved Roads:

- 25.9 km of paved roads (HCB).
- Degradation rate 0.25 / year (surface rating drops from 10 to 5, over a 20-year period).
- Annual resurfacing 1.3 km / year.
- **Annual budget $250,900:** (1.3 km / year x $96,500 / ln **PP1** x 2 lanes).

High Float Surface Treated Roads:

- 70.6 km of surface treated roads (LCB).
- Degradation rate 0.5 / year (surface rating drops from 10 to 5, over a 10-year period).
- Annual resurfacing 7.1 km / year.
- **Annual budget $556,600** (7.1 km / year x $78,400 / km **ST2A**).

Gravel roads require regular maintenance. Maintenance includes regular grading and reapplication of new gravel. Conventional Granular A is typically placed every 3-5 years. Lake of Bays employs a crushed granite product, justifying a 5 – 6 year cycle.

Gravel Roads:

- 121.2 km of earth / gravel roads.
- 75 mm gravel every 5 years.
- Annual gravelling of 24.2 km.
- Granular A ($27,000 / km).
- **Annual budget $653,400** (23.4 km / year x $27,000 **G**) **.

*** Cost based on supply and application of gravel by external forces.*

The total resurfacing program, (hot mix, surface treatment and gravel) is estimated at $1,460,900 per year.

Further, it is recommended that regular maintenance in the form of roadside ditch cleanout and clearing be undertaken in order to extend the useful service life of the existing roads.

Road System Inventory

Township of Lake of Bays		
Road System in Kilometers		
(As of July 2019)		
A.	**Surface Type**	**Totals***
	Earth	0
	Gravel (loose Top Gravel)	121
	Surface Treatment (LCB)	71
	Hot Mix Asphalt (HCB)	26
	Total A	**218 km**
B.	**Roadside Environment**	
(i)	**Rural**	
	Earth	0
	Gravel (loose Top Gravel)	121
	Surface Treatment (LCB)	71
	Hot Mix Asphalt (HCB)	22
	Total Rural	**214 km**
(ii)	**Semi-Urban**	
	Gravel (loose Top Gravel)	0
	Surface Treatment (LCB)	0
	Hot Mix Asphalt (HCB)	4
	Total Semi-Urban	**4 km**
(iii)	**Urban**	
	Gravel (loose Top Gravel)	0
	Surface Treatment (LCB)	0
	Hot Mix Asphalt (HCB)	0
	Total Urban	**0 km**
	Total B	**218 km**
**Estimated to the nearest kilometre.*		

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1.0 Purpose, Background and Study Method

1.1 Purpose

The purpose of the 2019 Road Needs Study Report is to update the current road inventory and road condition assessments within the Township of Lake of Bays (Township). Using this information, a prioritized listing of the road network needs is developed. The information derived from the study and documented in this report will provide assistance to the Township for developing and executing a planned road maintenance and improvement program.

The Township retained the services of D.M. Wills Associates (Wills) to undertake a review of the existing road network, and assess its physical condition as well as confirm various attributes. Data collected as a result of the field review is used to develop a prioritized listing of the road and sidewalk network needs, the results of which are documented in this report.

1.2 Background

The Township of Lake of Bays is located in the District of Muskoka, southeast of Huntsville. The Township is largely rural with some scattered semi-urban developments. The communities of Baysville, Dorset, and Dwight serve as the Township's main population centres.

This Road Needs Study Report was completed to inventory and document the Township's existing road assets. This current study (2019) utilizes and builds from the road asset information documented in the 2014 Road Needs Study, also completed by Wills.

1.3 Study Objectives

Based on the Request for Proposal and discussion with Municipal staff, the following study objectives were identified:

- Inspection of the road network.
- Inspection of all roadside safety devices (traffic barriers & signage).
- Collection of traffic data for selected road sections.
- Asset inventory, valuation, condition assessment and needs identification.
- Provide a prioritized list of capital projects for the Township to invest in.

1.4 Study Methodology

The procedure utilized to complete the study was generally in accordance with the MTO's Inventory Manual for Municipal Roads (February 1991).

During the field study the following road characteristics were reviewed and documented to assess the current adequacy of the road:

- Platform Width (overall width of road).
- Surface Width (width of pavement surface).
- Shoulder Width.
- Surface Type (gravel, low class bituminous, or high class bituminous).
- Drainage Type (open ditches vs. storm sewers etc.).
- Surface Condition (assigned based on Ride Condition Rating for this Study).
- Structural Adequacy.
- Maintenance Demand.
- Roadside Environment.
- Capacity.
- Alignment.

Critical Deficiencies

Critical deficiencies represent road characteristics that result in increased maintenance costs or lead to an inadequate level of service. Road sections may be assessed as critically deficient if any one (1) of the following characteristics fall below the minimum tolerable standards defined in the MTO Inventory Manual:

- Surface type - Insufficient surface type for traffic volumes.
- Surface width - Insufficient width of the road surface excluding the shoulders.
- Capacity - Inability of the road to accommodate traffic volumes at peak periods.
- Structural Adequacy - Inability of the road base to support vehicular traffic.
- Drainage - Increased frequency of flooding or excessive maintenance effort required to prevent flooding.

Surface Type

Wills assessed the adequacy of the road surface type based on the parameters listed in Table 1. Roads with traffic volumes (AADT) in excess of the values recommended below for various surface types were noted as critically deficient triggering a "Now" need.

Table 1 – Surface Type by Annual Average Daily Traffic (AADT)

Surface Type	Standard AADT Level	Tolerable AADT
Earth (E) Gravel (G)	- 0-199	<50 <400
Low Class Bituminous (LCB)	200-399	<800
High Class Bituminous (HCB)	400+	-

Surface Width

Surface widths that fall below minimum tolerable standards, as detailed in the MTO Inventory Manual were noted as critically deficient triggering a "Now" need. Narrow roads within the network have low to very low traffic volumes.

Capacity

An in-depth traffic capacity analysis was not completed as part of the scope of this Road Needs Study. Decisions with respect to expansion of roads should be made within the context of a Transportation Master Plan or Official Plan for the Township.

However, from a general perspective, a two-lane road can typically provide adequate service up to an AADT of approximately 12,000 vehicles. The functionality of a road from a capacity standpoint is of course dependent upon other factors in combination with volume. Adjacent land uses, and number of access points i.e. entrances and side roads etc. also have a significant impact on how the road functions.

A rural road with limited entrances and side roads will have a much greater capacity to flow traffic versus an urban street with many entrances and side road intersections. The AADT of 12,000 can be used as a 'rule of thumb' to trigger further analysis on the road capacity and operation. For the purposes of this study, a detailed capacity analysis was not undertaken as part of the scope of work. All roads were assigned to be adequate from a capacity perspective noting the highest traffic volume amongst all road segments of approximately 405 AADT.

Structural Adequacy

In cases where road base or structure is showing distress over more than 20% of the length of the road section, a "Now" need is assessed.

Drainage

A road section is assessed as a "Now" need for drainage generally when a road becomes impassible due to water one or more times a year. This information is not readily accessible from inspection. Characteristics such as ditching, water ponding on or around the road, and evidence of past washouts were used to assess road drainage. As such, a road was given a "Now" need for drainage if there were evident drainage problems that would likely lead to an impassable road during a heavy rain or a rapid snow melt.

2.0 The Road System

2.1 Inventory and Classification

All roads in the municipal road system were inventoried according to the methods outlined in the MTO Inventory Manual for Municipal Roads.

The inventory procedure requires that each road in the system be studied as a separate unit. Initially, the road system was divided into sections so that each conformed, as close as possible, to the following requirements:

- Uniform traffic volume.
- Uniform terrain.
- Uniform physical conditions.
- Uniform adjacent land.

Depending on location with respect to the built up areas, roads were classified in a manner generally descriptive of the type of construction as follows:

- Urban - Roads with curb and gutter and storm sewer drainage.
- Semi-Urban - Roads in built up areas (development exceeds 50% of the frontage) without curb and gutter or curb and gutter on one (1) side only.
- Rural - Roads with development on less than 50% of the frontage.

Rural roads were further evaluated based on estimated traffic volumes based on a previously conducted counts.

Table 2 summarizes the total road length in kilometres by surface type and road environment as of July 2019.

The existing road system consists of 218 km of roadway, 121 km of gravel roads, 71 km of surface treated roads (LCB) and 26 km of HCB (asphalt paved) roads; with all calculations being approximate and rounded to the nearest kilometre.

Table 2 – Road System Inventory

Township of Lake of Bays		
Road System in Kilometers		
(As of July 2019)		
A.	**Surface Type**	**Totals***
	Earth	0
	Gravel (loose Top Gravel)	121
	Surface Treatment (LCB)	71
	Hot Mix Asphalt (HCB)	26
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B.	**Roadside Environment**	
(i)	**Rural**	
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(iii)	**Urban**	
	Gravel (loose Top Gravel)	0
	Surface Treatment (LCB)	0
	Hot Mix Asphalt (HCB)	0
	Total Urban	**0 km**
	Total B	**218 km**
**Estimated to the nearest kilometre.*		

3.0 Road Needs

The primary purpose of the study is to develop a list of all roads within the Township ranked according to priority with respect to road needs.

The method of evaluating road needs in terms of type, cost and timing of improvements is identified in the Inventory Manual for Municipal Roads.

It is important to note that budgetary restrictions will often influence the level of upgrades to the road system and therefore it is imperative to maximize the improvements based on availability of funds and needs priority.

3.1 Critical Deficiencies

The inventory of the road system revealed that certain road sections are now deficient or will become deficient during the study period.

As noted previously, critical deficiencies include road characteristics which result in increased maintenance costs and which inevitably lead to an inadequate level of service. A road section is critically deficient if any one of the following characteristics fall below the minimum tolerable standards defined in the Inventory Manual.

- Surface type - Incorrect surface type to suit traffic volumes on the roadway.
- Surface width - Insufficient width of the road surface excluding the shoulders.
- Capacity - Inability of the road to accommodate traffic volumes at peak periods.
- Structural Adequacy - Inability of the road base to support vehicular traffic.
- Drainage - Increased frequency of flooding or excessive maintenance effort required to prevent flooding.

Of the 218 km of roads inventoried, a total of 57.1 km had a critical deficiency. Of these 57.1 km of road, all but 20.9 km had an AADT of less than 50. Regardless of condition, roads with AADT of fifty or less are typically assigned as "Adequate" (as per the Inventory Manual) for the purpose of the system adequacy calculation.

The overall system adequacy for the Township's road network, which is based upon the total road kilometres less the identified critically deficient ("NOW" needs) roads, is as follows:

$$\textbf{2019 System Adequacy} = \frac{\textbf{218 - 20.9}}{\textbf{218}} \textbf{ x 100\% = 90\%}$$

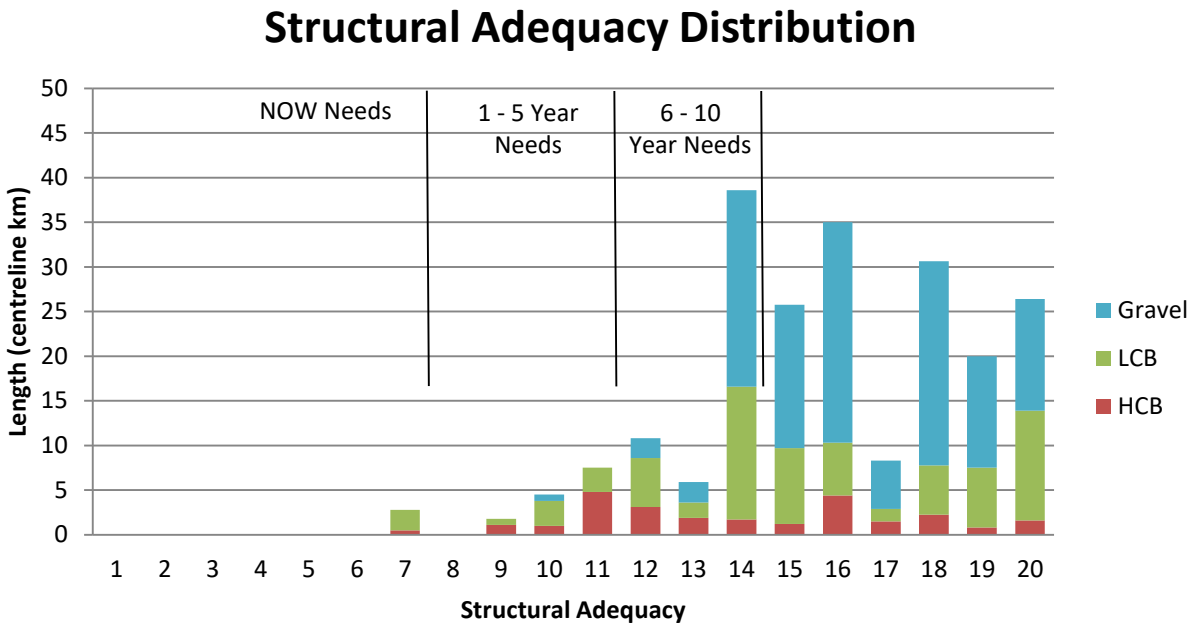
The Township's System Adequacy has reached the point where significant improvements cannot be made without widening efforts. Surface Width needs accounted for 87% of the critical needs on roads with over 50 AADT. As discussed further in Section 6, the Township may not need to (nor even desire to) widen all these roads.

The average surface condition rating of all roads has increased from 6.8 to 8.0 / 10 while the average structural adequacy rating has increased from 15.2 to 16.0 / 20. This reflects the Township's recent efforts to increase regular resurfacing – the surface rating has increased significantly while the structural adequacy has improved modestly.

Looking at the structural adequacy distribution of the Township's roads reinforces this picture. A group of roads, over 65%, are in good condition (structural adequacy of 15 and over), and with regular resurfacing and preservative maintenance, should not require reconstruction in the next ten (10) years. Another 25% are in fair condition (structural adequacy from 12 to 14). The remaining 10% of the road network is well

distributed over the poor to very poor range (structural adequacy from 7 to 11). Most of these roads will require reconstruction over the next five (5) years to fully repair them.

It is therefore recommended that, while the Township endeavors to repair the poor to very poor roads as part of its 10-year capital plan, every reasonable effort is made, through preservation management, to prevent the current cohort of good roads from becoming capital needs themselves.



As per O. Reg. 588/17, the average unpaved road was in **good condition** and the average hard top surface had a **PCI of 76.4.**

3.2 Priority Ratings of Roads

A mathematical empirical formula was used to calculate the priority rating for each road section. The priority rating is a weighted calculation which takes into account the existing traffic volume and overall condition rating of the road, as per the Inventory Manual Methodology. This priority analysis is an impartial procedure to place the deficiencies in order of relative need. **A higher Priority Rating number indicates a relatively greater need for improvement.**

The formula takes into account the current traffic volume (AADT), whether it is from actual road counts or estimated road counts and the Asset Condition Rating (CR) of the road at the time of this Road Needs Study Report. The formula is as follows:

$$\textbf{Priority Rating} = 0.2 \times (100 - CR) \times (AADT + 40)^{0.25}$$

In utilizing the above equation Wills identified a priority listing for review with Township staff. It is important to emphasize that the priority rating calculation considers only CR

and traffic volumes. When developing the recommended capital expenditure plan consideration may be given to the remaining useful service life of a road / roadbed with a view to coordinating major reconstruction efforts at / near the end of the road's life. Furthermore, while a priority rating will give a general idea of which roads should be improved before others, it does not prescribe an exact order for road improvements nor does it determine the timing of preservation and rehabilitation work. For example, it may be wise to defer the full reconstruction of a high priority road ("let the bad roads fail") in favour of resurfacing work on a medium priority road ("keep the good roads good").

3.3 Dominant Distress Types

As detailed in **Figure 1**, distortion and wheel-track alligator cracking had the highest effect on PCI rating on the Township's HCB network. Flushing and rippling and shoving were not observed during this study.

Figure 1 – Surface Treated Distress Type Prevalence

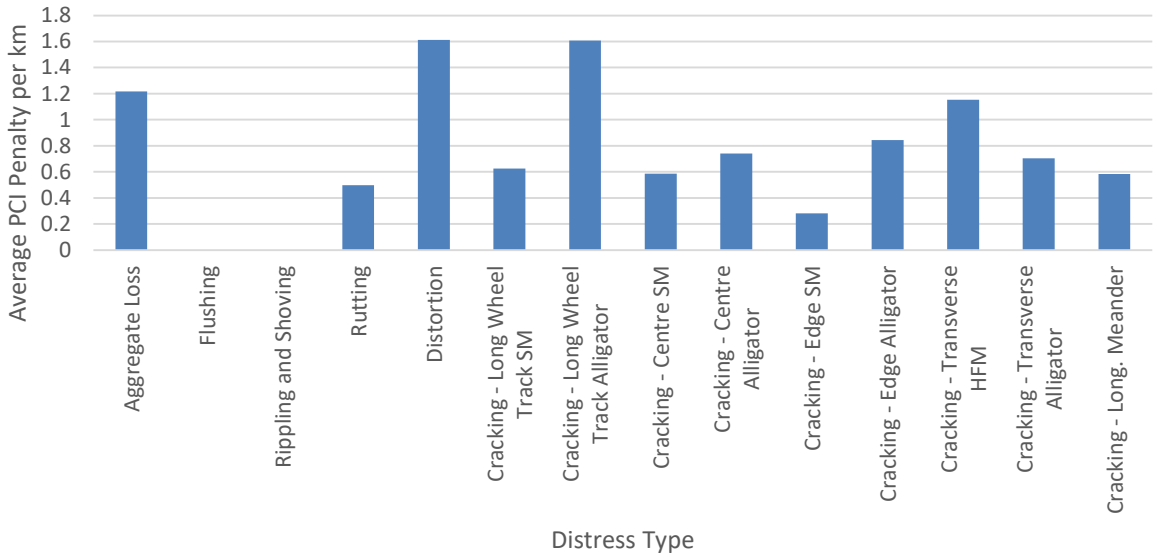
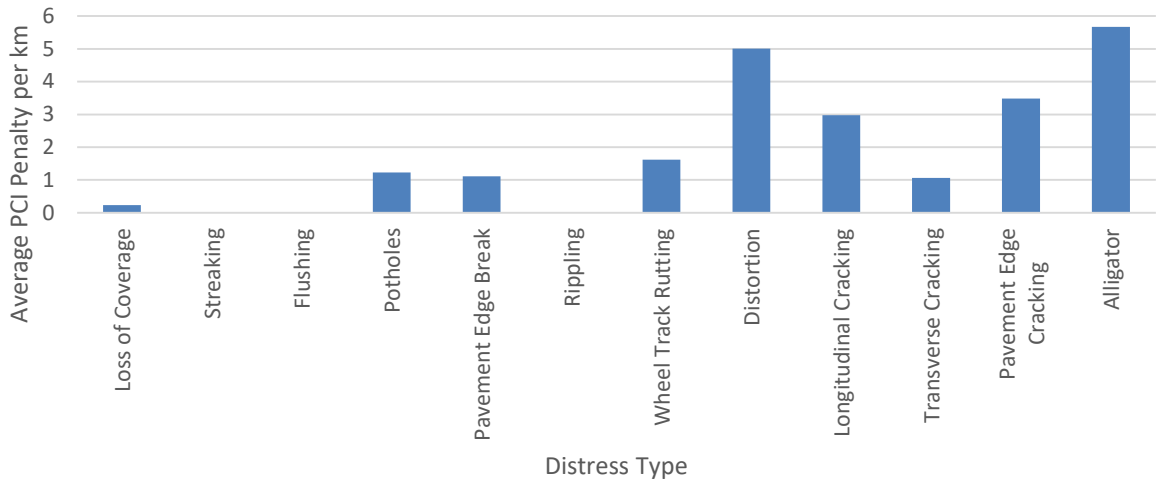


Figure 2 the principal distress types in the Township's LCB roads were also distortion and alligator cracking. Streaking, flushing and rippling were not observed, although winter sanding still present on many of the surfaces may have obscured these surface defects.

Figure 2 – Surface Treated Distress Type Prevalence



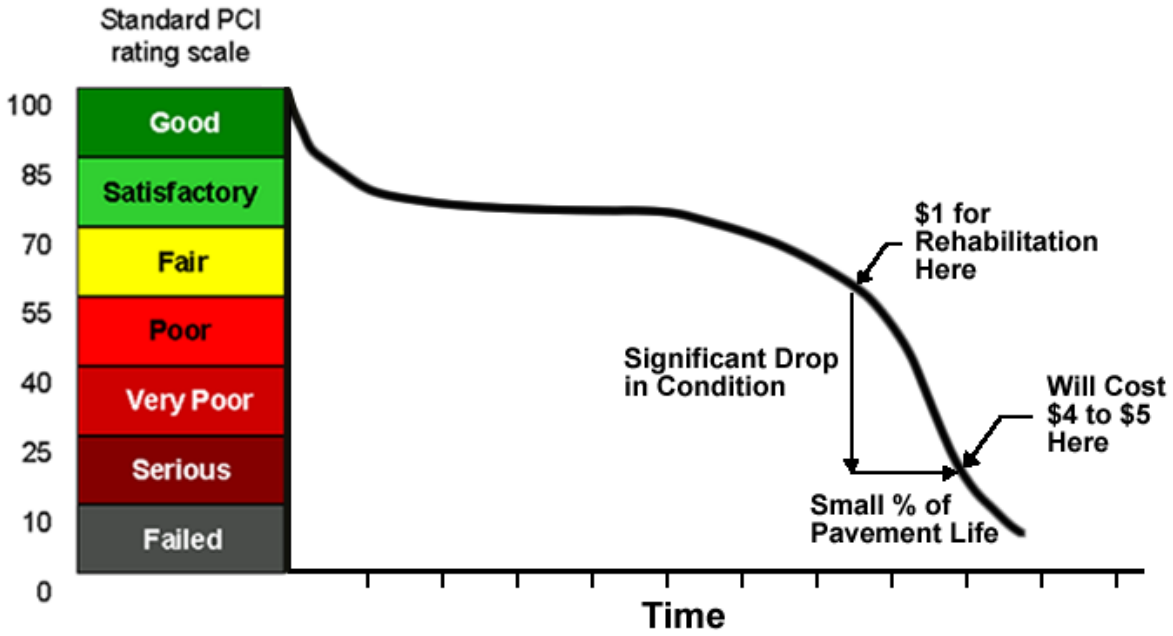
4.0 Roads Best Management Practices

The key to managing a pavement / road network is the timing of maintenance and rehabilitation activities. This idea evolves from the fact that a pavement's structural integrity does not fall constantly with time. A pavement generally provides a constant, acceptable condition for the first part of its service life and then begins to deteriorate very rapidly. In many cases, maintenance and rehabilitation measures are not taken until structural failure or noticeable changes in ride quality become apparent. This is the "fix it once it is already broken" approach.

The unfortunate consequence of this decision is that maintenance and rehabilitation becomes exponentially more expensive over the life of the pavement and is often overlooked until the pavement condition reaches a severe state of distress. There is opportunity for substantial cost savings when intervention is made *before* the pavement becomes severely compromised; i.e. "fix it before it breaks". **Figure 3** illustrates the underlying principle in support of a preservation management approach to pavement infrastructure. The principle also has application to each of the classes of roads maintained by the Township. Significant cost savings will result from proactive intervention rather than simply waiting as long as possible before performing maintenance.

Examples of approach to roads management with their associated cost implications over the lifecycle of a road are set out below in **Figure 3** and are provided as an illustration of the benefit of a "preservation management approach".

Figure 3 – Typical Service Life of an Asphalt Pavement



4.1 Example Life Cycle Cost Analysis

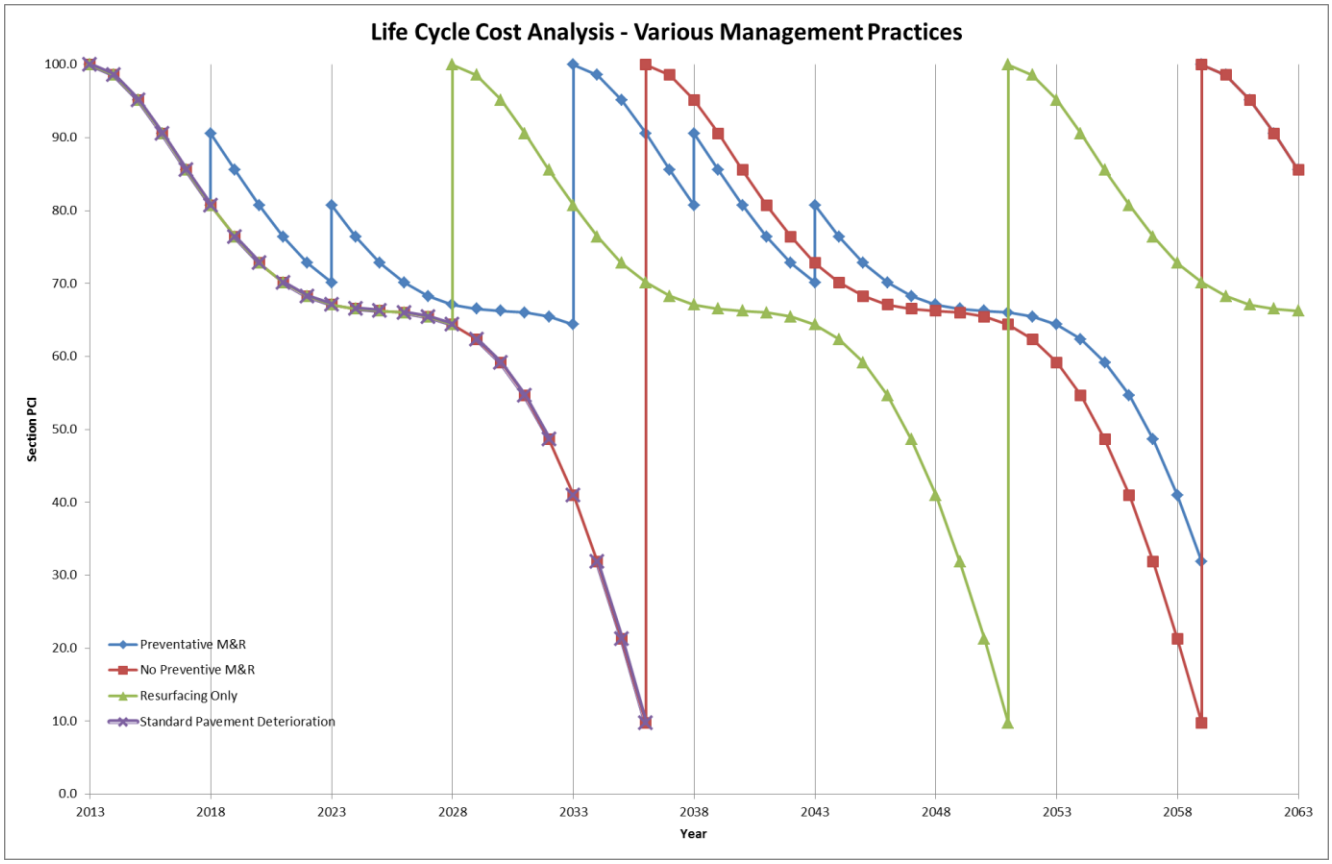
The following life cycle costs analysis compares three (3) different municipalities Township 1, Township 2 and Township 3; each with three (3) distinct approaches to pavement management. For this analysis we will assume each of the three (3) municipalities has 7000 m^2 of pavement, i.e. 1 km of asphalt paved road that is 7 m wide. In each scenario, the road is assumed to have been constructed in 2013 and will operate under normal traffic loading.

The Life Cycle Cost Analysis (LCCA) assumes no user costs. The LCCA uses a discount rate of 2.5% / year.

The LCCA shows the three (3) different municipalities and tracks their pavement management decisions and related condition over the specified time period. Township 1 represents decisions made based on strategic preventive maintenance and rehabilitation (M&R), Township 2 represents decisions based on no preventive M&R and Township 3 represents decisions based on resurfacing only.

Figure 4 below illustrates a time- pavement condition plot for each municipality.

Figure 4 – Time-Condition Plot for 3 Municipalities



The costs associated with the corresponding maintenance and rehabilitation decisions are outlined in the following three (3) charts:

Preventive M&R									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
		-- Annual Ditching/Clearing --							
2018	**5**	**Localized Preventive - Rout and Seal**	81-90	Satisfactory-Good	1000	m	$1.50	$1,500.00	**$1,325.78**
2023	**10**	**Global Preventive - Slurry Seal**	70-81	Satisfactory-Good	7000	m^2	$6.50	$45,500.00	**$35,544.53**
2033	**20**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$124,792.78**
2038	**25**	**Localized Preventive - Rout and Seal**	81-88	Satisfactory-Good	4500	m	$1.50	$6,750.00	**$3,640.89**
2043	**30**	**Global Preventive - Slurry Seal**	68-78	Satisfactory-Good	7000	m^2	$6.50	$45,500.00	**$21,691.79**
2048	**35**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$4,424.40**
2053	**40**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$7,821.04**
2058	**45**	**Full Reconstruction**	32-100	Serious-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$107,290.28**
2063	**5**	**Localized Preventive - Rout and Seal**	81-90	Satisfactory-Good	1000	m	$1.50	$1,500.00	**$436.41**
		Final PCI in 2063:	**90**	**Good**				**Net:**	**$306,967.90**
								Residual Value:	**$85,346.08**
								Total Cost:	**$221,621.82**

The policy of Township 1 is to strategically intervene with preventative maintenance measures over the course of the pavement's service life. Two (2) significant maintenance measures are performed on the pavement at various times and ultimately extend the service life of the pavement, prorating the total cost of the pavement over a longer period of time. Eventually, a full reconstruction is required and this cycle repeats. The total life cycle costs are substantially less when compared to Township 2 and 3, at a total of $221,622 over 50 years.

No Preventive M&R									
Year	Age	Treatment	Δ PCI	PCI_q	Quantity	Unit	Unit Cost	Total Cost	Present Worth
2023	**10**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$8,202.58**
2028	**15**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$14,499.78**
2030	**17**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	20%	m^2	$30.00	$42,000.00	**$27,602.19**
2036	**23**	**Full Reconstruction**	10-100	Poor-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$184,707.88**
2043	**7**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	5%	m^2	$30.00	$10,500.00	**$5,005.80**
2048	**12**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	10%	m^2	$30.00	$21,000.00	**$8,848.79**
2053	**17**	**Safety/Stopgap Maintenance - AC Patching/Leveling**	N/A	N/A	20%	m^2	$30.00	$42,000.00	**$15,642.09**
2059	**23**	**Full Reconstruction**	10-100	Poor-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$104,673.45**
		Final PCI in 2063:	**86**	**Good**				**Net:**	**$369,182.56**
								Residiual Value:	**$81,552.92**
								Total Cost:	**$287,629.64**

The policy of Township 2 is to simply construct the pavement and wait until serious deficiencies begin to appear before acting. This approach unfortunately remains common still today. Over the last period of the pavement's life, maintenance is required to ensure safety and operation until the pavement becomes completely destroyed. Once the pavement has failed, a complete reconstruction is carried out restoring the pavement to new condition. This cycle repeats again until a second reconstruction is required. The total costs are substantial and total $287,630 over 50 years.

Resurfacing Only									
Year	**Age**	**Treatment**	**Δ PCI**	**PCI_q**	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**	**Present Worth**
2028	**15**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$141,191.58**
2051	**23**	**Full Reconstruction**	10-100	Serious-Good					
		Remove Asphalt Full Depth			7000	m^2	$15.00	$105,000.00	
		Add and Compact Corrective Aggregate/Correct Crossfall (25mm avg.)			420	t	$35.00	$14,700.00	
		40mm Base Course			686	t	$125.00	$85,750.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$325,937.50	**$127,534.43**
2067	**15**	**Surface Course**	64-100	Poor-Good					
		Mill and Dispose of Surface Course			7000	m^2	$12.00	$84,000.00	
		50mm Surface Course			892.5	t	$135.00	$120,487.50	
								$204,487.50	**$53,898.67**
		Final PCI in 2063:	**66**	**Good**				**Net:**	**$322,624.67**
								Residiual Value:	**$62,587.12**
								Total Cost:	**$260,037.55**

The policy of Township 3 is periodic resurfacing. The pavement is constructed and time passes until early signs of serious distress are observed. This occurs after the time when preventive maintenance is neither appropriate nor possible, but before the pavement becomes completely destroyed. Resurfacing is performed and restores the pavement to almost new condition. The pavement then deteriorates for the remainder of its life, requiring significant maintenance in the last years before it becomes completely destroyed. A full reconstruction is then carried out and the cycle continues. The total costs are in between that of Township 1 and 2 at $260,038 over 50 years.

It may be easy to see upfront cost savings by understanding that as long as any costs associated with maintaining the pavement are deferred as long as possible, money will be saved. The reality is that extending a pavements service life prorates the total cost of the pavement over a longer period of time and ultimately becomes more economical in the long run. If preventive maintenance measures are strategically planned and carried out then the service life of the pavement can be maximized and substantial reconstruction costs can be deferred for longer periods of time. In a time when economy and efficiency are becoming more and more important, this type of proactive management is essential in the management of infrastructure.

4.2 Preservation Management Approach

4.2.1 Gravel Roads

The proposed preservation management approach for this class of road is outlined in the following **Table 3** and **Table 4.**

Table 3 – Preservation Management Approach- Gravel Surface

Action	Frequency
Regrade surfaces to maintain smooth / safe driving surface and proper crossfall.	As needed, generally 2-3 times per year for higher volume gravel, or more frequently as necessary; 1-2 for lower volume.
Add calcium to tighten surface, retain aggregate and reduce dust.	Each spring on all roads of higher volume and as needed during summer months.
Ditching and brushing of right-of-way to improve roadbed drainage and safety.	Complete road network every 10 years.

Table 4 – Capital Activities – Gravel Roads

Action	Frequency
Add layer (75 mm) of granular material to road surface.	Every 5-6 years for gravel roads.
Base and sub-base improvements.	As needed or as dictated by traffic volumes.
Reconstruct / convert to hard top.	As dictated by traffic volumes.

4.2.2 Surface Treated Roads

Surface treated roads have a hard wearing surface that must be preserved in order to be effective. Unlike gravel roads, a significant investment has been made in the surface and consequently these roads must be managed properly to obtain the longest possible service life from the surface.

Table 5 – Preservation Management Approach – Surface Treated Roads

Activity	Age (Years)	Ride Condition Rating	Estimated Service Life Extension (Years)
Slurry Seal	3	8	4
Slurry Seal	6	7	3
Double Surface Treatment	10	6	5
Pulverize and DST	14	<4	8

In addition to the above noted preservation approach in **Table 5**, the following best management practices may be employed to preserve the surface, extend the service life and reduce life cycle costs of surface treated roads:

1. Surface treatment shall be applied to the entire road platform, from "grass to grass", including any shoulders. This will eliminate grading on surface treated roads, which has a tendency to damage the edge of the surface treatment and cause premature failure of the surface.
2. Suitable new technologies will be utilized where they can be demonstrated to reduce life cycle costs, such as fiber-reinforced surface treatment. This technology can be used to mitigate reflective cracking (if cracks are narrow and inactive) when a single or double surface treatment is applied over an aging surface. It can eliminate the need for pulverizing the underlying surface in certain situations and can reduce overall costs.
3. Assess drainage and culvert needs prior to any significant renewal or rehabilitation strategy and complete any improvements concurrently. This will eliminate the need to cut / excavate a relatively new surface to replace a culvert.
4. Ditching and clearing (brushing) of the right-of-ways (ROW) to improve roadbed drainage and safety.

4.2.3 Asphalt Roads

Asphalt surfaces are the smoothest and most durable hard top surface used by the Township however; they are also the most expensive. Asphalt provides a constant, acceptable condition for the initial portion of its service life but then begins to deteriorate rapidly as it ages. Surface defects such as cracking and raveling are the first signs of the deterioration. If left untreated, the pavement will rapidly deteriorate to the point where reconstruction is the only option. A preservation management strategy can mitigate this by applying renewal treatments earlier in the pavements life before the conditions begin to deteriorate too far. **Table 6** below summarizes preservation management activities to be considered for asphalt roads:

Table 6 – Preservation Management Approach – Rural Asphalt Roads

Activity	Age (Years)	Ride Condition Rating	Estimated Service Life Extension (years)
Crack seal / rout and seal[1]	2-6	9	2
Slurry Seal / Microsurface[1]	4-8	8	4-6
Overlay	12-15	6-7	10
Pulverize and Pave	20-25	< 5	20
Reconstruct	30	< 4	30

Note: Slurry seal can be used on lower volume paved roads (less than 1000 vehicles per day). For roads with volumes in excess of 1000 AADT, microsurfacing should be considered.

[1] Due to the limited number of HCB roads, these techniques are not employed by the Township. They are referenced here for information.

In addition to the above noted preservation approach, the following best management practices may be employed to extend the service life and reduce life cycle costs of asphalt roads:

1. Review the condition of other infrastructure, particularly underground infrastructure prior to implementing any major renewal or rehabilitation of the pavement. Any repairs or capital upgrades to other infrastructure should be coordinated. This should reduce utility cuts in newer asphalt.
2. Repair potholes in the surface in a timely fashion to prevent saturation and weakening of road base.
3. Undertake regular shouldering program of rural paved roads to promote proper drainage. Poorly maintained shoulders allow surface water to pond and saturate the road base, which weakens the base and leads to cracking at the edge of pavements.
4. Undertake a ditching program to ensure there is adequate drainage for road base on rural roads. This will reduce the likelihood of structural distresses caused by softening of the road base due to poor drainage.
5. Specify the appropriate type of performance graded asphalt cement for the location.
6. Undertake a clearing program to reduce shading of the roadbed and remove roots / vegetation from the road base.

4.3 Application of Preservation Management Approach

The preservation management activities detailed in each of the tables above are not necessarily intended or required to be completed on each and every road. Road deterioration rates and the type of deterioration will dictate when action should be taken and what kind of treatment is most appropriate. The intention of the above is to outline the series of techniques to be considered in an effort to realize and extend the useful service life of the road asset for the lowest overall lifecycle cost while maintaining the highest overall condition. As detailed in the life cycle costs analysis presented above, the preservation management approach to roads is proven to yield the lowest overall life-cycle costs.

Each of the preservation management activities for gravel, surface treatment and asphalt roads identified above (including route and seal, slurry seal, resurfacing etc.), shall be considered as part of the regular Road Needs Study Report every five (5) years. Recommendations on the specific treatments required shall be documented and prioritized in this report.

5.0 Road Needs Study Summary Table

5.1 Types of Improvements

All roads were examined to appraise the extent and type of improvement necessary.

"Order of Magnitude" construction costs were developed for each of the below options on a per kilometre basis. An estimated cost for isolated frost heave repairs was also considered.

The below alternative rehabilitation strategies are considered preliminary in nature and are intended to assist in providing an order of magnitude cost estimate to rehabilitate the road. Further field investigations and engineering design is required to confirm and develop the rehabilitation strategies for each road.

5.1.1 Asphalt

High Class Bituminous roads (HCB) or hot mix asphalt roads have rehabilitation alternatives ranging from a simple overlay to complete reconstruction. The following is a listing of standard road rehabilitation techniques that were considered for HCB or hot mix asphalt roads.

RO1 Resurfacing, Single-Lift Overlay.

RO2 Resurfacing, Double-Lift Overlay.

RMP1 Resurfacing, Mill and Pave 1-Lift.

RMP2 Resurfacing, Mill and Pave 2-Lifts.

PP1 Pulverize and Pave 1-Lift.

PP2 Pulverize and Pave 2-Lifts.

Recon 1R Excavate and Reconstruct Road and Pave 1-Lift – Rural.

Recon 1S Excavate and Reconstruct Road and Pave 1-Lift – Semi-Urban.

Recon 2S Excavate and Reconstruct Road and Pave 2-Lifts – Semi-Urban.

Recon 2U Excavate and Reconstruct Urban Road and Pave 2-Lifts – Urban.

Upgrade 2U Excavate and Upgrade to Urban Cross-Section 2 Lifts – Urban.

SS Slurry Seal (Preventative Maintenance).

MS Microsurfacing (Preventative Maintenance).

RS Route and Seal (Preventative Maintenance).

5.1.2 Surface Treatment

Surface treated roads are generally able to be rehabilitated with either a single or double Low Class Bituminous (LCB) overlay treatment. They may also be upgraded to HCB pavement or downgraded to gravel. In some cases, previous resurfacing of LCB roads has occurred or the LCB surface or road structure has deteriorated to a state where a simple overlay surface treatment is not feasible. In these cases consideration can be given to removal or pulverizing of the existing surface treatment and placement of a new application. In some cases, where it is necessary to improve the overall roadbed structure, the addition of Granular A to build up the road and the reapplication of a surface treatment is recommended. The following is a listing of standard road rehabilitation techniques that were considered for LCB (surface treated) roads:

ST1 Single Surface Treatment.

ST2 Double Surface Treatment.

ST2R Double Surface Treatment, with Removal of Existing.

ST2A Double Surface Treatment, over New Granular A.

ST2PA Double Surface Treatment, over Pulverized Existing and New Granular A.

ST2PAW Double Surface Treatment, over Pulverized Existing and New Granular A with 1 m Widening.

SS Slurry Seal (Preventative Maintenance)

5.1.3 Gravel

Gravel roads can likewise be upgraded with the reapplication of Gravel (G) or surface treatments (ST1 or ST2).

5.2 Benchmark Construction Costs

A Unit Price Form, found in **Appendix A,** is based on average prices for the local area. The unit prices were used to prepare an array of benchmark construction costs.

For the Township of Lake of Bays, the following design standards, **Table 7,** were utilized for development of the benchmark cost estimate for reconstruction. It should be noted that these are suggested standards and therefore should not necessarily be used as standards for detail design of roadway improvements.

Table 7 – Design Standards for Construction Cost Estimates

Functional Classification	Surface Width (m)	Shoulder Width (m)	Granular A Depth (mm)	Granular B Depth (mm)	Hot Mix Depth (mm)*
Rural R200 (50 to 199 vpd)	6.0	1.5	150	450	-
Rural R300 (200 to 399 vpd)	6.0	1.5	150	450	16*
Rural R400 (400 to 999 vpd)	6.5	1.5	150	450	50
Semi - Urban Local Residential	6	1.5	150	450	50
Semi - Urban Local Industrial	6.5	1.5	150	450	50
Urban Local Residential	8.5	-	150	450	100
Urban Local Industrial	9.0	-	150	450	100

Note - Prime and Double Surface Treatment is based on 16 mm of Hot Mix.

6.0 Improvement Plan

6.1 Road Needs

The Capital Improvement Plan is included in **Appendix B**, noting recommendations in terms of priorities throughout the Township. AADT is based on counts / estimates completed prior to this study. All costs are based on 2019 dollars and should be adjusted for inflation based on program year, for budgeting purposes. The capital improvements are listed based on Structural "NOW" and 1-5 years needs and in descending priority based on traffic volumes and Condition Rating, as described previously.

6.2 Annual Resurfacing Program

Based on typical degradation rates for gravel roads, surface treatment, and hot mix, a resurfacing program / budget is recommended, in addition to the noted capital construction works, as follows.

As the Township's HCB network is largely rural, and most of the HCB resurfacing in the next 5 years is expected to take place in a rural environment, pulverize and pave with one lift (PP1) was selected as the typical "resurfacing" treatment as opposed to a mill and pave or overlay. Long term resurfacing costs for semi-urban sections are expected to be much more expensive.

Hot Mix Paved Roads:

- 25.9 km of paved roads (HCB).
- Degradation rate 0.25 / year (surface rating drops from 10 to 5, over a 20-year period).
- Annual resurfacing 1.3 km / year.
- **Annual budget $250,900: (1.3 km / year x $96,500 / ln PP1 x 2 lanes**).

The typical resurfacing recommendation for surface-treated roads is to apply a new treatment every 7 years (**ST1**). However, a significant portion of the Township's LCB network lies on inadequate road bases, as per their construction histories and visible surface defects– funding based on typical **ST1** resurfacing would dramatically underestimate the Township's needs.

To compensate for this, a more intensive 'typical' treatment was selected as Lake of Bays' surface treated roads: **ST2A** (Double Surface Treatment with additional Granular 'A'). This strategy allows the Township to renew a surface and gradually improve the road structure by building up.

Using ST2A also justifies a slightly longer resurfacing cycle of 10 years. Over time, the additional structure provided by Granular 'A' may improve the road to the point where typical **ST1** treatment every 7 years will be broadly applicable, **bringing the annual expected resurfacing costs down to $200,000**.

High Float Surface Treated Roads:

- 70.6 km of surface treated roads (LCB).
- Degradation rate 0.5 / year (surface rating drops from 10 to 5, over a 10-year period).
- Annual resurfacing 7.1 km / year.
- **Annual budget $556,600** (7.1 km / year x $78,400 / km **ST2A**).

Gravel roads require regular maintenance. Maintenance includes regular grading and reapplication of new gravel. Conventional Granular A is typically placed every 3-5 years. Lake of Bays employs a crushed granite product, justifying a 5 – 6 year cycle.

Gravel Roads:

- 121.3 km of earth / gravel roads.
- 75 mm gravel every 5 years.
- Annual gravelling of 24.2 km.
- Granular A ($27,000 / km).
- **Annual budget $653,400** (24.2 km / year x $27,000 **G**) **.

*** Cost based on supply and application of gravel by external forces.*

The total resurfacing program, (hot mix, surface treatment and gravel) is estimated at $1,460,900 per year.

Candidates for preservation / resurfacing include all roads with a 6-10 year structural need or are rated as structurally adequate. Although some of these roads will invariably become capital needs, most can have their service lives extended at significantly less cost than reconstruction (i.e. keeping the good roads good). Roads that are candidates for preservation / resurfacing are listed in **Appendix C,** Lake of Bays' Resurfacing List.

6.3 Preservation Management

Preservation techniques seal the surface as to prevent water infiltration into the granular base. Route and Seal is used on HCB pavements to seal individual cracks. Slurry Seal / Microsurfacing is used on LCB and HCB pavements to seal large areas, although wide / active cracks will reflect through the treatment. An annual preservation management budget has been estimated as follows:

Given the Township's short total length of HCB roads, it is not practical to fund an annual Route and Seal program. Alternatively, the Township may wish to program route and seal activities automatically 4 years after any new lift of HCB is paved.

Slurry Seal / Microsurfacing

- 25.9 km of paved roads (HCB).
- 70.9 km of surface treated roads (LCB).
- Assume that slurry seal / microsurfacing will be applied, on average, once per resurfacing cycle.
- 11.4 km of road to preserve per year (1.3 km HCB and 10.1 km of LCB).
- **Annual budget $148,200** (11.4 km x $12,600 / km **Slurry Seal**).

The goal of preservation management programs is to extend the service lives of hard top surfaces lengthening the time between more expensive rehabilitation activities, reducing the long term costs of maintaining a pavement.

6.4 Roadside Maintenance

Preventative roadside maintenance is critical to prolonging the useful service life of a road and maximizing the capital investment. Since the 2014 study, the Township has employed an annual road and roadside maintenance program to reduce the road degradation rates, carrying out ditching and clearing of vegetation from the right-of-way on a regular basis.

The Township's ROW program has produced a noticeable effect on the network. The average drainage rating has improved from to 10.7 to 12.0 / 15. There is still considerable work to be done, as over 100 km of the Township's network has superficial ditching, or no ditching at all.

Ditching and Brushing Recommendations

- Length of Rural Network 214 km
- Mechanical Brushing costs: $3,000 / km (both sides of the road) **
- Ditching costs: $7,000 / km (both sides of the road) ***
- Recommended to brush and ditch entire rural network every ten years, 21.4 km / year
- Mechanical Brushing budget: $ 64,200 / year (21.4 km / year x $3,000 / km **Brushing**)
- Ditching budget: $ 149,800 / year (21.4 km / year x $7,000 / km **Ditching**)
- **Annual budget: $214,000:**

***Estimate based on current costs and production rates for the Township.*

****A number of roads run along natural drainage features (i.e. lakes) and may not benefit from or need ditching on both sides.*

It should be noted that the above program only covers routine mechanical brushing and ditching activities. Other incidental costs such as using arborists for individual tree management, or ditching to support culvert replacements, would be over and above the recommended funding levels.

6.5 Surface Type Conversions

Historically, the Township has surface treated Class 5 roads as per the Minimum Maintenance Standards. Due to changes in MMS classification and more accurate traffic counts, all Township Roads are now Class 6. As such, the Township has asked Wills for guidance on selecting the appropriate surface type for each road.

Although the suitability of any surface type conversion should be informed by geotechnical investigations, from a high level the following considerations should be satisfactory:

1. HCB is more durable than LCB, which is in turn more durable than gravel; however, HCB is much less tolerant of base defects than LCB, which is in turn less tolerant of base defects than gravel.
2. All other things being equal, the higher the AADT, the higher the gravel maintenance requirements. If the AADT is above 200, a hard top surface should be considered. No loose-top roads within the township currently have AADT's above 200.
3. If the existing pavement is performing poorly compared to its age, consider replacing it with a more flexible type or converting to loose-top surface.
4. There is value in maintaining homogeneity along a road. A patchwork of surface types reduces maintenance efficiency. The Township should continue to homogenize surface types where appropriate, as they have done with Old Highway 117 and Port Cunnington Road.

Potential candidates for surface conversion in the next 5 years include:

- Dwight Beach Road from District Road 9 to 0.2 km North of Charlie Thompson Road: the existing LCB is in very poor condition. It is recommended that the Township consider converting this road to gravel.
- McLennan Drive: The middle section of McLennan Drive is already gravel. Due to the low AADT (estimated to be less than 50), the Township should consider converting all of McLennan Drive to gravel as the surface treated end treatments deteriorate.
- Menominee Road from District Road 2 to 0.8 km West: the existing LCB is reaching the end of its useful life and has less than 50 AADT. Due to the low AADT (estimated to be less than 50), the Township should consider converting to gravel.
- Walker Lake Road East from District Road 8 to 1.1 km Northeast: This section appears to be an isolated section of HCB. The Township should consider converting to LCB when it reaches the end of its useful life.

- Walker Lake Road West from Walker Lake Road to 0.7 km West: This section appears to be an isolated section of HCB. The Township should consider converting to LCB when it reaches the end of its useful life.

6.6 Surface Width Needs

The large majority of the Township's "NOW" needs are due to narrow surface widths as per the inventory manual. Roads with inadequate surface widths are listed in **Appendix D,** Lake of Bays's Surface Width Needs. Although the Inventory Manual classifies these roads as inadequate, Wills does not automatically recommend widening them to standard. Many of them are seasonally maintained only and are likely suitable for their use. Some of them, such as Tally-Ho Beach Road may be impractical to widen due to property constraints.

7.0 Replacement Cost

In conjunction with this Road Needs Study Report, a replacement cost for the road asset was calculated based strictly on roadbed materials i.e. sub-base, base and surface. Road design standards noted in Table 7 were used to estimate the existing depth of road bed materials for the purpose of the replacement cost calculation.

The total replacement cost for the Township's road infrastructure is approximately $27.1 M.

Note this cost represents the theoretical road bed materials costs only and does not include items such as removal of the existing road bed, installation of signs, pavement markings, lighting, drainage infrastructure, property etc.

8.0 Summary

D.M. Wills Associates (Wills) undertook a review of the Township of Lake of Bays' (Township) existing road network to assess its physical condition and confirm various road attributes. Data collected as a result of the field review was used to develop a prioritized listing of the road network needs based primarily on condition and traffic volumes.

Wills undertook the field study in July of 2019. A visual assessment of each road within the Township was undertaken to assess surface and structural distress. A Condition Rating (CR) was calculated based on the identified deficiencies.

An overall road system adequacy has been calculated, consistent with the MTO Inventory Manual for Municipal Road (February 1991), based on a number of road characteristics including:

- Capacity.
- Geometrics.
- Surface Condition.
- Shoulder and Road Widths.
- Structural Adequacy.

- Drainage.
- Maintenance Demand.

The average surface condition rating of all roads is 8.0 / 10 while the average structural adequacy rating is 16.0 / 20, an increase of 1.2 and 0.8 respectively. This suggests that the township's regular resurfacing efforts have resulted in significant improvement.

Capital Improvements

Prioritization and recommendations for planned capital improvements have been developed based on the condition rating and traffic demands on each road. Those roads identified as having a "NOW" or 1 – 5 year structural needs have been included in the capital improvement plan for rehabilitation.

A total length of approximately 10.3 km of roads were identified as having structural needs in the "NOW" or 1 – 5 year periods. The estimated cost to improve these roads is approximately $ 1.0 M. An additional length of approximately 54.3 km of road is identified as having inadequate surface widths or surface type. Generally, provided no operational or safety concerns are identified, roads with surface width and/or type deficiencies are typically addressed / considered at the next full reconstruction cycle.

Resurfacing

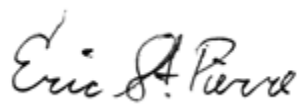
The total resurfacing program, (hot mix, surface treatment and gravel) is estimated at $1,460,900 per year.

Implementation / continuation of a road and roadside preventative maintenance program are strongly recommended. A concerted effort and funding for regular road maintenance can reduce the annual resurfacing / reconstruction requirements by prolonging the useful service life of a road.

The time of inspection plays a significant role in assessing a road's condition. Certain deficiencies, particularly for gravel roads, are only obvious during the "spring break-up" period. By midsummer, any evidence to suggest these deficiencies may have disappeared due to regular grading and grooming activities and general drying of the roadbed. The field work for this study was carried out in July 2019, by which time any deficiencies specifically evident during the "spring break-up" were not visible.

We trust the above and attached information will be of benefit to the Township and appreciate the opportunity to assist the Township in developing its road improvement plan.

Respectfully submitted,



Eric St. Pierre, P. Eng.

Project Engineer

ESP

Statement of Limitations

This report has been prepared by D.M. Wills Associates on behalf of the Township of Lake of Bays. The conclusions and recommendations in this report are based on available background documentation and discussions with applicable Township staff at the time of preparation.

The report is intended to document the 2019 Roads Needs Study Report findings and assist the Township in developing budgetary plans for investment into their road network.

Any use which a third party makes of this report, other than as a Road Needs Study Report is the responsibility of such third parties. D.M. Wills Associates Limited accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or action taken based on using this report for purposes other than as a summary of the 2019 Road Needs Study Report findings.

Appendix A

Unit Price Form

ROAD IMPROVEMENT COSTS
Lake of Bays

Unit Costs	Units	Unit Cost
Granular A (100% crushed)	t	$25.00
Granular B	t	$12.00
Hot Mix	t	$165.00
Earth Excavation	m3	$10.00
Asphalt Removal	m2	$4.00
Asphalt Removal - Partial Depth	m2	$2.00
Removal of Concrete Curb & Gutter	m	$25.00
Concrete Curb & Gutter	m	$120.00
In-Place Full Depth Reclamation	m2	$4.00
Surface Treatment	m2	$3.35
Granular A Conversion	2.4	t/m3
Granular B Conversion	2	t/m3
Hot Mix Conversion	2.45	t/m3

Gravel (75mm)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Granular A	6.0	75	2.4	t		1080	$25.00	$ 27
							G	**$ 27**

Frost Heave Treatment

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/50m Digout (x 1000)*
Earth Excavation	8.0	800		m3		320	$10.00	$ 3
Granular A	7.0	150	2.4	t		126	$25.00	$ 3
Granular B	8.0	650	2	t		520	$12.00	$ 6
							FT	**13**

Surface Treatment - Rural/Semi Urban - Single [ST1]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Surface Treatment - Single (Overlay)	7.0			m2		7000	$3.35	$ 23
							ST1	**23**

Surface Treatment - Rural/Semi Urban - Double [ST2]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Surface Treatment - Double (Overlay)	7.0			m2		7000	$6.70	$ 47
							ST2	**47**

Surface Treatment - Rural/Semi Urban - Double with Removal of Existing [ST2R]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Surface Treatment - Double	7.0			m2		7000	$6.70	$ 47
Removal Asphalt Pavement/ST	7.0	16		m2		7000	$0.60	$ 4
							ST2R	**51.1**

Surface Treatment - Rural/Semi Urban - Double with Granular Base [ST2A]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Surface Treatment - Double High Float	7.0			m2		7000	$6.70	$ 47
Granular A	7.0	75	2.4	t		1260	$25.00	$ 32
							ST2A	**78**

Surface Treatment - Rural/Semi Urban - Double with Pulverization and Granular Base [ST2PA]

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Surface Treatment - Double	7.0			m2		7000	$6.70	$ 47
Granular A	7.0	300	2.4	t		5040	$25.00	$ 126
Pulverizing	7.0			m2		7000.0	$0.60	$ 4
Minor Items @ 25%								$ 1
							ST2PA	**178**

Surface Treatment - Rural/Semi Urban - Widening and Double with Pulverization and Granular Base [ST2PAW]								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Surface Treatment - Double	7.0			m2		7000	$6.70	$ 47
Granular A	7.0	300	2.4	t		5040	$25.00	$ 126
Pulverizing	7.0			m2		7000.0	$0.60	$ 4
Earth Excavation	2	450		m3		900	$10.00	$ 9
Granular B	1	300	2	t		600	$12.00	$ 7
Minor Items @ 25%								$ 5
							ST2PAW	**198**

Resurfacing - Rural/Semi Urban Single Lift Overlay [RO1]								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction ***	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Hot Mix	3	50	2.45	t	74	441	$165.00	$ 73
Granular A	1.5	50	2.4	t		180	$25.00	$ 5
Minor Items @ 15%								$ 12
							RO1	**89** (per Lane Kilometre)

Resurfacing - Rural/Semi Urban - Double Lift Overlay [RO2]								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction ***	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Hot Mix	3	90	2.45	t	66	728	$165.00	$ 120
Granular A	1.5	90	2.4	t		324	$25.00	$ 8
Minor Items @ 15%								$ 19
							RO2	**147** (per Lane Kilometre)

Resurfacing - Urban - Single Lift Mill and Pave [RMP1]								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Hot Mix	4.25	50	2.45	t		521	$165.00	$ 86
Remove Curb and Gutter				m		200	$25.00	$ 5.00
Curb and Gutter - 20%				m		200	$120.00	$ 24.00
Milling	4.25			m2		4250	$2.00	$ 8.50
Minor Items @ 25%								$ 31
							RMP1	**154** (per Lane Kilometre)

Resurfacing - Urban - Double Lift Mill and Pave [RMP2]								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Hot Mix	4.25	90	2.45	t		937	$165.00	$ 155
Remove Curb and Gutter				m		200	$25.00	$ 5.00
Curb and Gutter - 20%				m		200	$120.00	$ 24.00
Milling	4.25			m2		4250	$3.00	$ 12.75
Minor Items @ 25%								$ 49
							RMP2	**245** (per Lane Kilometre)

Pulverize and Pave One Lift [PP1] Rural/Semi-Urban								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Hot Mix	3	50	2.45	t		367.5	$165.00	$ 61
Granular A	1.5	50	2.4	t		180	$25.00	$ 5
Pulverize	3			m2		3000	$4.00	$ 12.00
Minor Items @ 25%								$ 19
							PP1	**96** (per Lane Kilometre)

Pulverize and Pave Two Lifts [PP2] Rural/Semi-Urban								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Hot Mix	3	90	2.45	t		661.5	$165.00	$ 109
Granular A	1.5	90	2.4	t		324	$25.00	$ 8
Pulverize	3			m2		3000	$4.00	$ 12
Minor Items @ 25%								$ 32
							PP2	**162** (per Lane Kilometre)

Semi-Urban: Resurfacing and Widening

Residential (Single Lift Widening)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction* **	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Earth Excavation	2	500		m3		1000	$10.00	$ 10
Granular A	5	150	2.4	t		1800	$25.00	$ 45
Granular B	5	300	2	t		3000	$12.00	$ 36
Hot Mix	8	50	2.45	t	196	1176	$165.00	$ 194
Milling	4			m2		4000	$2.00	$ 8
Minor Items @ 25%								$ 73
							RW1	**366** (per Lane Kilometre)

Commercial and Industrial (Double Lift Widening)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Earth Excavation	2	600		m3		1200	$10.00	$ 12
Granular A	5	150	2.4	t		1800	$25.00	$ 45
Granular B	5	450	2	t		4500	$12.00	$ 54
Hot Mix	8	90	2.45	t	353	2117	$165.00	$ 349
Milling	4			m2		4000	$2.00	$ 8
Minor Items @ 25%								$ 117
							RW2	**585** (per Lane Kilometre)

Gravel Road Widening

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Earth Excavation	2	450		m3		900	$10.00	$ 9
Granular A	1	150	2.4	t		360	$25.00	$ 9
Granular B	1	300	2.45	t		735	$12.00	$ 9
Minor Items @ 25%								$ 7
							GW	**34** (per Lane Kilometre)

Rural: Full Excavation and Reconstruction - Gravel (6 m surface width)

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Earth Excavation	5	450		m3		2250	$10.00	$ 23
Granular A	3	150	2.4	t		1080	$25.00	$ 27
Granular B	5	300	2	t		3000	$12.00	$ 36
Minor Items @ 25%								$ 21
							Recon G	**107** (per Lane Kilometre)

Rural: Full Excavation and Reconstruction - 1 Lift

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Asphalt Removal - Full Depth	3			m2		3000	$4.00	$ 12
Earth Excavation	5	500		m3		2500	$10.00	$ 25
Granular A	4	150	2.4	t		1440	$25.00	$ 36
Granular B	5	300	2	t		3000	$12.00	$ 36
Hot Mix	3	50	2.45	t		368	$165.00	$ 61
Minor Items @ 25%								$ 42
							Recon 1R	**212** (per Lane Kilometre)

Semi-Urban: Full Excavation and Reconstruction - 1 Lift

Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Asphalt Removal - Full Depth	3			m2		3000	$4.00	$ 12
Earth Excavation	5	500		m3		2500	$10.00	$ 25
Granular A	4	150	2.4	t		1440	$25.00	$ 36
Granular B	5	300	2	t		3000	$12.00	$ 36
Hot Mix	3	50	2.45	t		368	$165.00	$ 61
Minor Items @ 25%								$ 42
							Recon 1S	**212** (per Lane Kilometre)

Semi-Urban: Full Excavation and Reconstruction - 2 Lift								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Asphalt Removal - Full Depth	3			m2		3000	$4.00	$ 12
Earth Excavation	5	500		m3		2500	$10.00	$ 25
Granular A	4	150	2.4	t		1440	$25.00	$ 36
Granular B	5	300	2	t		3000	$12.00	$ 36
Hot Mix	3	90	2.45	t		662	$165.00	$ 109
Minor Items @ 25%								$ 55
							Recon 2S	**273**

(per Lane Kilometre)

Urban: Full Excavation and Reconstruction - 2 Lift								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction*	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Asphalt Removal - Full Depth	4.25			m2		4250	$4.00	$ 17
Earth Excavation	5.5	500		m3		2750	$10.00	$ 28
Granular A	4.5	150	2.4	t		1620	$25.00	$ 41
Granular B	5.5	300	2	t		3300	$12.00	$ 40
Hot Mix	4.25	90	2.45	t		937	$165.00	$ 155
Remove Curb and Gutter				m		1000	$25.00	$ 25.00
Curb and Gutter				m		1000	$120.00	$ 120.00
Minor Items @ 25%								$ 70
							Recon 2U	**494**

(per Lane Kilometre)

Rout and Seal								
Item				*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Rout and Seal				m		1000	$4.00	$ 4
							RS	**4**

Slurry Seal								
Item	*Width - m*			*Unit*		*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Rout and Seal	7			m2		7000	$1.80	$ 13
							SS	**13**

Resurfacing - Rural/Semi Urban Single Lift Overlay [RO1]								
Item	*Width - m*	*Depth - mm*	*Conversion Factor*	*Unit*	*Crossfall Correction* **	*Quantity*	*Unit Cost*	*Cost/km (x 1000)*
Hot Mix	6.6	35	2.45	t		566	$165.00	$ 93
Granular A	2	35	2.4	t		168	$25.00	$ 4
Minor Items @ 15%								$ 15
							HM-35	**112**

Appendix B

Capital Improvement Plan

Capital Improvement Plan

Sect. No.	Road Name	From - To	Length (km)	AADT	Preliminary Improvement Type Recommendation	Cost (x1000)	Surface Rating (10)	Structural Adequacy (20)
Structural NOW Needs								
135121	DWIGHT BEACH ROAD	0.2km N. OF DWIGHT BEACH ROAD - DISTRICT ROAD 9	2.3	114	*ST2A - Double Surface Treatment with Granular A*	*$180*	*5*	*7*
Structural 1-5 Year Needs								
202031	WALKER LAKE ROAD WEST	WALKER LAKE ROAD - 0.7km WEST	0.7	331	PP1 - Pulverize and Pave 1 Lift	*$135*	6	10
204031	WALKER LAKE ROAD EAST	DISTRICT ROAD 8 - 1.1km NORTH EAST	1.1	222	PP1 - Pulverize and Pave 1 Lift	*$212*	6	9
438121	MENOMINEE ROAD	0.4km W. OF DISTRICT ROAD 2 - 0.8km WEST	0.4	18	ST2A - Double Surface Treatment with Granular A	*$31*	5	9
202131	WALKER LAKE ROAD WEST	0.7km W. OF WALKER LAKE ROAD EAST - END	2.8	331	ST2A - Double Surface Treatment with Granular A	*$220*	6	10
437051	SOUTH MENOMINEE ROAD	DISTRICT ROAD 2 - 0.3km WEST	0.3	48	PP1 - Pulverize and Pave 1 Lift	*$58*	7	10
227031	GRASSMERE RESORT ROAD	0.3km S. OF GRASSMERE ROAD - 1.0 SOUTH	1.0	199	ST2A - Double Surface Treatment with Granular A	*$78*	6	11
201031	TALLY-HO WINTER PARK ROAD	HIGHWAY 60 - DISTRICT ROAD 8	1.7	160	ST2A - Double Surface Treatment with Granular A	*$133*	6	11

Notes:

1. *Rehabilitation strategy to be confirmed by geotechnical investigations at detail design.*
2. *A structural "NOW" need does not explicitly mean that work must be undertaken on the road immediately. A structural "NOW" need means that the road's surface has reached the end of its useful service life and will require reconstruction or major rehabilitation to fully repair.*
3. *Fairly Falls Road and Ronville Road are programed for 2019 microsurfacing – capital work may be deferred until the microsurfacing fails*

Appendix C

Resurfacing List

Resurfacing List

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
323122	WATSON ROAD	0.9km S/W OF NORTH RIL LAKE ROAD - END	0.5	26	G/S	6	10
311022	NARROWS ROAD	1.3km E. OF HWY 117 - 1.7km E. OF HWY 117	0.4	47	G/S	7	13
401122	GRANDVIEW LAKE ROAD	0.6km W. OF DIST ROAD 117 - 2.3km NORTH	1.7	40	G/S	7	14
401021	GRANDVIEW LAKE ROAD	DIST ROAD 117 - O.6km NORTH	0.6	100	G/S	7	14
309322	BELLWOOD ACRES ROAD	3.1km N/WEST OF HWY 117 - 0.4km SOUTH	0.4	40	G/S	6	17
303121	SHOE LAKE ROAD	0.3km WEST - 1.7km WEST	1.4	56	G/S	8	12
313121	SOUTH LONG LINE LAKE ROAD	LONG LINE LAKE ROAD - END	0.4	40	G/S	8	18
311122	BAYVIEW AVENUE	NARROWS ROAD - END	0.9	23	G/S	7	13
416031	HAMMOND ROAD	DISTRICT ROAD 51 - 0.6km NORTH	0.6	82	LCB	8	15
145021	PORTAGE FLYER LANE	WOLF BAY ROAD - END	0.05	54	G/S	8	15
218122	WEST OXBOW LAKE ROAD	1.9km S. OF DISTRICT ROAD 8 - 2.9km TO END	2.9	60	G/S	8	14
212022	BILLIE BEAR ROAD	OLD SINCLAIR ROAD - DISTRESS DAM ROAD	2.6	21	G/S	8	16
219022	EAST OXBOW LAKE ROAD	DISTRICT ROAD 8 - 1.9km SOUTH	1.9	34	G/S	7	14
411121	DICKIE LAKE ROAD	MANITOU ROAD - DICKIE LAKE ROAD WEST	1	110	G/S	8	18
314122	BIGWIN VIEW LANE	OLD HIGHWAY 117 - OLD HIGHWAY 117	0.8	15	G/S	8	18
144221	MILLAR HILL ROAD	3.9km EAST OF HWY 60 - END	0.3	21	G/S	8	16

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
310021	NARROWS ROAD	HIGHWAY 117 - 1.3km EAST	1.3	63	*G/S*	7	14
305222	RED CHALK ROAD	1.0km S. OF PAINT LAKE ROAD - 1.6km SOUTH	0.6	7	*G/S*	7	16
317052	GLENMOUNT ROAD	1.6km N/W OF OLD HIGHWAY 117 - 0.5km WEST TO END	1.1	40	*HCB*	6	12
323021	WATSON ROAD	NORTH RIL LAKE ROAD - 0.9km SOUTH WEST	0.9	47	*G/S*	7	15
319021	EAST GRANDVIEW ROAD	DIST ROAD 117 - 1.2km NORTH WEST	1.2	63	*G/S*	8	18
205022	HUTCHESON ROAD	HUTCHENSON ROAD SOUTH - 3.1km NORTH EAST	2.9	15	*G/S*	10	19
419022	HENEY LAKE ROAD	2.6km S. OF DIST ROAD 117 - 3.5km SOUTH OF DISTRICT ROAD 117	0.9	10	*G/S*	8	18
129051	DWIGHT BEACH ROAD	HIGHWAY 60 - LAKE OF BAYS LANE	1.3	238	*HCB*	6	12
133222	COOPER LAKE ROAD	0.2km N. OF COOPER LAKE BRIDGE - END	0.6	36	*G/S*	7	15
405021	WINDER'S BAY ROAD	DIST ROAD 117 - 2.7km NORTH EAST	2.7	71	*G/S*	8	16
139021	MARINA ROAD	DISTRICT ROAD 9 - 0.3km SOUTH	0.3	47	*G/S*	9	19
120021	HILLTOP CRESCENT	ELDER DRIVE - 0.7km NORTHERLY	0.7	32	*G/S*	7	15
446151	SPRUCE STREET	0.5km W. OF BAY STREET - END	0.1	132	*G/S*	8	15
143122	WOLF BAY ROAD	0.8km EAST OF DIST. RD. 23 - END	0.2	22	*G/S*	7	10
123021	ARTS ROAD	PORT CUNNINGTON ROAD - 0.1km SOUTH WEST	0.1	15	*G/S*	6	13
213022	DISTRESS DAM ROAD	OLD SINCLAIR ROAD - END	2.7	2	*G/S*	8	18
321021	BROWNS BRAE ROAD	PAINT LAKE ROAD - NORTH RIL LAKE ROAD	2.6	33	*G/S*	6	14
206021	SOUTH LIMBERLOST ROAD	DISTRICT ROAD 8 - 2.4km SOUTH	2.4	179	*G/S*	8	14

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
324321	MacARTHUR POINT ROAD	SOUTH RIL LAKE ROAD - END	1.2	43	*G/S*	7	15
316051	GLENMOUNT ROAD	OLD HIGHWAY 117 - 1.6km NORTH WEST	1	186	*HCB*	7	16
404021	STRATHEID ROAD	DIST ROAD 117 - 0.3km NORTH WEST	0.3	15	*G/S*	8	16
441021	CHANNEL ROAD	PRICE POINT ROAD - 0.3km NORTH	0.3	15	*G/S*	8	15
103131	SEABREEZE ROAD WEST	SEABREEZE ROAD - CHURCH	0.2	26	*LCB*	6	12
302021	GRINDSTONE LAKE ROAD	HWY 35 - END	0.1	40	*G/S*	7	12
207221	CARL FISHER DRIVE	FIELDALE ROAD - 0.8km NORTH	0.8	58	*G/S*	8	15
133121	COOPER LAKE ROAD	COOPER LAKE BRIDGE - 0.2km N. OF COOPER LAKE BRIDGE	0.2	55	*G/S*	7	15
408021	BIRCH GLEN ROAD	DIST ROAD 117 - 0.3km NORTH	0.3	95	*G/S*	7	12
229021	TALLY-HO BEACH ROAD	HIGHWAY60 - GOVERNMENT DOCK	0.2	32	*G/S*	7	13
308021	KENNEY ROAD	PAINT LAKE ROAD - 0.2km NORTH EAST	0.2	32	*G/S*	7	15
437121	SOUTH MENOMINEE ROAD	0.3km WEST - 0.8km WEST	0.5	47	*G/S*	8	15
424022	MOOT LAKE ROAD	DIST ROAD 117 - 3.1km NORTH	3.1	24	*G/S*	8	18
116021	HERMAN'S ROAD	DISTRICT ROAD 22 - 0.2km NORTHERLY	0.2	46	*G/S*	7	15
418051	HENEY LAKE ROAD	DIST ROAD 117 - 0.7km SOUTH	0.7	78	*HCB*	6	12
313021	LONG LINE LAKE ROAD	HIGHWAY 117 - 0.7km EAST	0.7	45	*G/S*	8	18
438221	GRAND BOULEVARD ROAD	MENOMINEE ROAD - 0.3km SOUTH	0.3	53	*G/S*	8	14
210131	BILLIE BEAR ROAD	0.5km N. OF DIST. RD. 8 - BELLA SHORES ROAD	1.8	85	*LCB*	8	15

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
217021	WEST OXBOW LAKE ROAD	DISTRICT ROAD 8 - 1.9km SOUTH WEST	1.9	96	*G/S*	8	15
410051	DICKIE LAKE ROAD	DISTRICT ROAD 51 - DICKIE LAKE ROAD	0.5	308	*HCB*	6	13
130021	LAKE OF BAYS LANE	DWIGHT BEACH ROAD - 0.7km SOUTH	0.7	40	*G/S*	8	18
304121	McLENNAN DRIVE	0.3km S/E OF HIGHWAY 35 - 0.6km SOUTH	0.3	40	*G/S*	8	14
325021	MUSKOKA BOB ROAD	NORTH RIL LAKE ROAD - WESTERLY	0.2	40	*G/S*	7	15
222021	NORTH CAMP LAKE ROAD	NORTH TASSO LAKE ROAD - TASSO LAKE ROAD	0.7	24	*G/S*	8	16
132051	DWIGHT BAY ROAD	DWIGHT BEACH ROAD - HIGHWAY 60	0.2	405	*HCB*	7	16
324021	SOUTH RIL LAKE ROAD	JAMES POINT ROAD - MacAUTHUR POINT ROAD	3	33	*G/S*	7	15
417021	McCABE ROAD	HAMMOND ROAD - 0.3km NORTH WEST	0.3	15	*G/S*	8	18
324421	JAMES POINT ROAD	SOUTH RIL LAKE ROAD - 0.2km WEST	0.2	13	*G/S*	7	15
447051	BAY STREET	BRIDGE STREET - DIST ROAD 117	0.1	380	*HCB*	8	17
432021	AUSTIN LANE	BURLMARIE ROAD - 0.8km NORTH	0.8	32	*G/S*	8	15
433021	SOUTH TOOKE LAKE ROAD	DISTRICT ROAD 2 - 0.4km WEST	0.3	29	*G/S*	8	14
113021	ECHO BAY ROAD	DISTRICT ROAD 21 - 1.3km NORTHERLY	1.3	104	*G/S*	10	20
318021	NORWAY POINT ROAD	GLENMOUNT ROAD - 0.3km EAST	0.3	40	*G/S*	8	15
443051	ELIZABETH STREET	EAST ROAD - END	0.1	132	*HCB*	9	17
402121	NITHGROVE DRIVE	WEST END - EAST END	0.5	46	*G/S*	8	16
216021	BELLA SHORES ROAD	BILLIE BEAR ROAD - 1.5km WEST	1.5	12	*G/S*	8	18

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
427431	BURLMARIE ROAD	BASTEDO ROAD - END	0.1	384	*LCB*	9	18
143021	WOLF BAY ROAD	DISTRICT ROAD 23 - 0.8km EAST	0.8	104	*G/S*	7	14
428021	DORAN ROAD	BURLMARIE ROAD - 0.2km SOUTH	0.2	9	*G/S*	10	19
102021	RABBITS BAY LANDING ROAD	HIGHWAY 35 - 0.1km WESTERLY	0.1	33	*G/S*	7	14
220021	NORTH TASSO LAKE ROAD	DISTRICT ROAD 8 - TASSO LAKE DAM	2.4	91	*G/S*	8	16
114022	ECHO BAY ROAD	1.3km N. OF DISTRICT RD. 21 - 0.5km NORTHERLY	0.4	18	*G/S*	10	20
409021	MALLARD LANE	DICKIE LAKE ROAD - END	0.3	24	*G/S*	7	14
137121	PINE RIDGE ROAD	RAT BAY ROAD - 0.8km SOUTH OF RAT BAY ROAD	0.8	104	*G/S*	10	20
221021	NORTH TASSO LAKE ROAD	TASSO LAKE DAM - 1.1km SOUTH EAST	1.1	11	*G/S*	8	16
134051	CHARLIE THOMPSON ROAD	DWIGHT BEACH ROAD - 1.4km SOUTH EAST	1.4	208	*HCB*	7	13
324151	SOUTH RIL LAKE ROAD	MacAUTHUR POINT ROAD - 0.3km NORTH OF MacAUTHUR POINT ROAD	0.3	33	*HCB*	6	15
447151	BRIDGE STREET	DIST ROAD 117 - BAY STREET	0.4	339	*HCB*	10	17
449121	DICKIE STREET	CAROL STREET - MUSKOKA RIVER	0.1	26	*G/S*	7	16
451051	UNIVERSITY STREET	DIST ROAD 117 - DICKIE STREET	0.4	132	*HCB*	7	16
214022	OLD SINCLAIR ROAD	DISTRESS DAM ROAD - BIG EAST RIVER	0.9	2	*G/S*	8	18
410131	DICKIE LAKE ROAD	DICKIE LAKE ROAD - 1.5km SOUTH WEST	1.5	265	*LCB*	10	20
439021	NORTH MENOMINEE LAKE ROAD	BOUNDARY - LAKE OF BAYS / HUNTSVIL - 0.7km SOUTH WEST	0.7	24	*G/S*	8	15

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
442151	NORTH ROAD	DIST ROAD 117 - EAST ROAD	0.3	203	*HCB*	9	17
406021	KING'S ROAD	DIST ROAD 117 - 0.5km NORTH	0.5	32	*G/S*	8	18
407021	MARY ROBERTS ROAD	DIST ROAD 117 - 0.3km NORTH	0.3	32	*G/S*	8	18
222122	TASSO LAKE ROAD	NORTH CAMP LAKE ROAD - END	0.5	24	*G/S*	8	16
119031	ELDER DRIVE	DISTRICT ROAD 22 - 1.7km EASTERLY	1.7	131	*LCB*	6	14
426121	WALSH ROAD	0.4km N. OF LANDFORD ROAD - 0.6km NORTH	0.6	16	*G/S*	8	18
112021	MELROSE DRIVE	DISTRICT ROAD 21 - 0.3km WESTERLY	0.3	15	*G/S*	8	16
118031	POINT IDEAL ROAD	DISTRICT ROAD 22 - 2.8km WESTERLY	2.8	148	*LCB*	6	12
103031	SEABREEZE ROAD	HIGHWAY 35 - 0.3km SOUTH OF HWY 35	0.3	210	*LCB*	9	18
446051	SPRUCE STREET	BAYSVILLE TER. - 0.5km W. OF BAY STREET	0.15	132	*HCB*	9	18
411021	DICKIE LAKE ROAD	MANITOU ROAD - EAST END	1	43	*G/S*	8	18
101031	CLIFFDENE ROAD	BOUNDRY - LAKE OF BAYS / SHERBORNE - 1.1km WESTERLY	1.1	33	*LCB*	6	12
117021	BOYCES ROAD	DISTRICT ROAD 22 - 1.3km SOUTH EAST	1.3	49	*G/S*	10	20
131051	DWIGHT BEACH ROAD	CHARLIE THOMPSON ROAD - BOYNE RIVER BRIDGE	0.6	150	*HCB*	8	16
450051	CAROL STREET	DICKIE STREET - END	0.4	132	*HCB*	9	18
416121	HAMMOND ROAD	0.6km N. OF DISTRICT ROAD 51 - 0.7km NORTH	0.7	52	*G/S*	8	18
314021	SCOTTS BOATHOUSE ROAD	OLD HIGHWAY 117 - 0.4km NORTH EAST	0.4	15	*G/S*	8	18
135051	DWIGHT BEACH ROAD	CHARLIE THOMPSON ROAD - 0.2km N. OF CHARLIE THOMPSON ROAD	0.2	141	*HCB*	8	15
427151	BURLMARIE ROAD	1.0km E. OF DISTRICT ROAD 2 - 0.3km NORTH	0.3	384	*LCB*	9	18
111021	SOMMERZEIT ROAD	DISTRICT ROAD 21 - DISTRICT ROAD 21	0.2	9	*G/S*	8	16

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
115021	FOX POINT ROAD	DISTRICT ROAD 21 - 2.2km SOUTHERLY	2.2	48	*G/S*	10	20
410221	DICKIE LAKE ROAD	1.5km SW DICKIE LAKE ROAD - END	2.1	95	*G/S*	7	16
427551	RYCKMAN ROAD	BURLMARIE ROAD - 0.2km WEST	0.2	53	*HCB*	7	14
430031	KELLY ROAD	BURLMARIE ROAD - 0.5km WEST	0.5	87	*LCB*	9	18
110051	RONVILLE ROAD	HIGHWAY 35 - 2.7km SOUTH WEST	2.7	199	*HCB*	7	16
442051	EAST ROAD	DIST ROAD 117 - NORTH ROAD	0.3	132	*HCB*	9	17
444051	BAY STREET	DIST ROAD 117 - SPRUCE STREET	0.1	132	*HCB*	8	18
453031	HOWARD STREET	UNIVERSITY STREET - BRIDGE STREET	0.1	132	*HCB*	9	17
209021	BUCK ISLAND ROAD	FIELDALE ROAD - 0.7km NORTH	0.7	15	*G/S*	8	16
228031	HARP LAKE ROAD	HIGHWAY60 - 0.8km NORTH	0.8	232	*LCB*	7	14
128022	OXTONGUE RAPIDS ROAD	0.9km E. OF HIGHWAY 60 - BOUNDRY - LAKE OF BAYS / SHERBORNE	2.3	30	*G/S*	10	20
210321	BILLIE BEAR ROAD	BELLA SHORES ROAD - OLD SINCLAIR ROAD	2.3	77	*G/S*	7	14
207131	FIELDALE ROAD	2.6km N. OF DISTRICT RD 8 - BRIDGE	1.7	119	*LCB*	7	13
431021	BASTEDO ROAD	BURLMARIE ROAD - 0.7km SOUTH WEST	0.7	24	*G/S*	8	15
440021	PRICE POINT ROAD	DISTRICT ROAD 9 - 1.8km SOUTH EAST	1.8	146	*G/S*	8	15
448051	DICKIE STREET	DIST ROAD 117 - UNIVERSITY STREET	0.2	145	*HCB*	10	17
437222	SOUTH MENOMINEE ROAD	0.8km W. OF DISTRICT ROAD 2 - 0.3km WEST	0.3	47	*G/S*	8	15
126051	FRANKLIN LANDFILL SITE ROAD	OXTONGUE RAPIDS ROAD - 0.4km SOUTH	0.4	261	*HCB*	7	15

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
106131	DELBROOKE ROAD	BAYVIEW POINT ROAD - END	1	26	*LCB*	7	14
148022	SHAW'S ROAD	MAPLEHURST DRIVE - 0.3km SOUTH	0.3	26	*G/S*	8	13
427231	BURLMARIE ROAD	1.3km E. OF DIST. RD. 2 - 1.9km EAST OF DIST. ROAD 2	0.6	384	*LCB*	9	18
456051	BAYSVILLE TERRACE	BAY STREET - 0.1km EAST	0.1	33	*HCB*	10	18
104031	SEABREEZE ROAD	TEN MILE CREEK - 4.0km SOUTH OF HWY 35	1.7	123	*LCB*	8	15
458021	SOUTH MOOT LAKE ROAD	MOOT LAKE ROAD - 0.3km EAST	0.3	13	*G/S*	9	18
445051	BAYSVILLE TERRACE	SPRUCE STREET - END	0.1	132	*HCB*	10	20
454051	LENA STREET	BRIDGE STREET - 0.1km NORTH	0.1	132	*HCB*	10	20
208031	FIELDALE ROAD	BRIDGE - 0.8km WEST	0.8	74	*LCB*	8	15
303021	SHOE LAKE ROAD	HIGHWAY 35 - 0.3km WEST	0.3	56	*HCB*	6	15
101131	CLIFFDENE ROAD	1.1km WESTERLY - END	0.2	21	*LCB*	6	12
322121	NORTH RIL LAKE ROAD	1.1km S. OF BROWNS BRAE ROAD - SOUTH RIL LAKE ROAD	2.1	95	*G/S*	8	14
208131	FIELDALE ROAD	0.8km WEST OF BRIDGE - END	0.8	33	*LCB*	6	12
301022	MARGARET LAKE ROAD	HIGHWAY 35 - 2.2km WEST	2.2	2	*G/S*	10	19
429021	BURLMARIE ROAD EAST (Jesin Road ?)	BURLMARIE ROAD - 0.2km EAST	0.2	13	*G/S*	10	19
455051	LENA STREET	BRIDGE STREET - UNIVERSITY STREET	0.1	132	*HCB*	10	20
320021	BROWNS BRAE ROAD	DIST ROAD 117 - PAINT LAKE ROAD	2.5	46	*G/S*	8	16
127051	OXTONGUE RAPIDS ROAD	HIGHWAY 60 - 0.9km EAST	0.9	138	*HCB*	7	14

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
412021	MANITOU ROAD	DISTRICT ROAD 51 - DICKIE LAKE ROAD	0.3	57	*G/S*	8	18
420051	FAIRY FALLS ROAD	DIST ROAD 117 - 2.1km SOUTH	2.1	114	*HCB*	7	16
403021	BAYVIEW ROAD	DIST ROAD 117 - DIST ROAD 117	0.4	15	*G/S*	7	15
435021	NORTH BURNT ISLAND ROAD	DISTRICT ROAD 2 - 2.0km EAST	2	90	*G/S*	8	16
324521	RIL COVE ROAD	SOUTH RIL LAKE ROAD - 0.4km TO END	0.4	13	*G/S*	10	20
305121	RED CHALK ROAD	RED CHALK ROAD - 0.1km EAST TO END	0.1	26	*G/S*	7	16
402031	NITHGROVE ROAD	DIST ROAD 117 - 1.4km NORTH	1.4	131	*LCB*	8	15
434021	NORTH TOOKE LAKE ROAD	DISTRICT ROAD 2 - 0.8km WEST	0.8	40	*G/S*	8	14
324221	SOUTH RIL LAKE ROAD	0.3km NORTH OF MacARTHUR POINT ROAD - BROWNS BRAE ROAD	1.4	149	*G/S*	6	14
306031	PAINT LAKE ROAD	HIGHWAY 117 - 4.1km WEST	4.1	300	*LCB*	7	14
131151	DWIGHT BEACH ROAD	BOYNE RIVER BRIDGE - LAKE OF BAYS LANE	0.6	156	*HCB*	7	14
140121	OSBORNE POINT ROAD	0.7km S.E. OF DISTRICT RD. 9 - 1.5km EAST	1.5	32	*G/S*	8	18
109021	ROBSON LANE	RONVILLE ROAD - 0.3km SOUTH WEST	0.3	24	*G/S*	10	20
146031	MAPLEHURST DRIVE	HIGHWAY 60 - 1.6km SOUTH WEST	1.6	191	*LCB*	8	15
144031	MILLAR HILL ROAD	HIGHWAY 60 - 3.9km EAST	3.9	119	*LCB*	7	14
449051	DICKIE STREET	UNIVERSITY STREET - CAROL STREET	0.2	132	*HCB*	10	18
136021	DWIGHT BEACH ROAD	DISTRICT ROAD 9 - 0.2km NORTH	0.2	7	*G/S*	7	14

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
138021	GRANGER GROVE ROAD	RAT BAY ROAD - 0.7km SOUTH	0.7	42	*G/S*	10	20
121031	PORT CUNNINGTON ROAD	DISTRICT ROAD 22 - 0.2km SOUTHERLY	0.2	119	*LCB*	10	20
104221	SEABREEZE ROAD	4.3km SOUTH OF HWY 35 - END	1	23	*G/S*	8	18
231031	HUTCHESON ROAD SOUTH	DISTRICT ROAD 8 - DISTRICT ROAD 8	0.4	11	*G/S*	8	16
138121	SILVER BIRCH ROAD	GRANGER GROVE ROAD - 0.6km SOUTH EAST	0.6	46	*G/S*	9	17
438031	MENOMINEE ROAD	DISTRICT ROAD 2 - 0.4km WEST	0.4	45	*LCB*	7	12
106031	DELBROOKE ROAD	SEABREEZE ROAD - BAYVIEW POINT ROAD	2.3	127	*LCB*	7	14
421051	SEVENTEEN ACRES	DIST ROAD 117 - 0.3km SOUTH WEST	0.3	15	*LCB*	8	15
226031	GRASSMERE RESORT ROAD	GRASSMERE ROAD - 0.3km SOUTH	0.3	199	*LCB*	7	14
124021	SALE ROAD	HIGHWAY 35 - 0.2km WEST	0.2	15	*G/S*	8	18
423051	TACKABERRY ROAD	DIST ROAD 117 - 0.2km SOUTH WEST	0.2	8	*G/S*	9	19
202421	HEMLOCK DRIVE	WALKER LAKE ROAD WEST - 0.3km EAST	0.3	26	*G/S*	8	16
414021	LAWSON ROAD	DISTRICT ROAD 51 - 1.4km NORTH	1.4	24	*G/S*	10	20
140031	OSBORNE POINT ROAD	DISTRICT ROAD 9 - 0.7km SOUTH EAST	0.7	71	*LCB*	10	20
147131	GOLF COURSE ROAD	1.0km WEST OF HWY 60 - END	1.4	62	*LCB*	7	16
207031	FIELDALE ROAD	DISTRICT ROAD 8 - 2.6km NORTH	2.6	232	*LCB*	10	19
425121	LANGFORD ROAD	1.0km WEST - 1.4km WEST	0.4	74	*G/S*	8	19
427351	BURLMARIE ROAD	1.9km EAST OF DIST. ROAD 2 - BASTEDO ROAD	0.4	384	*LCB*	9	18
420121	FAIRY FALLS ROAD	2.1km S. OF DIST ROAD 117 - 3.2km SOUTH	1.1	26	*G/S*	8	17
108021	BIRKENDALE ROAD	HIGHWAY 35 - ROBSON LANE	0.3	32	*G/S*	10	20

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
309051	BELLWOOD ACRES ROAD	HIGHWAY 117 - 3.1km N/WEST	3.1	216	*LCB*	10	20
201531	HILLSIDE CRESCENT	DISTRICT ROAD 8 - DISTRICT ROAD 8	1.1	99	*LCB*	9	17
137221	PINE RIDGE ROAD	0.8km SOUTH OF RAT BAY ROAD - END	0.8	84	*G/S*	10	20
457021	TRUSCOTT ROAD	LAWSON ROAD - END	0.5	24	*G/S*	10	19
230021	WALKERS GLEN	DISTRICT ROAD 8 - END	1.8	183	*G/S*	8	16
202221	WALKER LANE	WALKER LAKE ROAD WEST - 0.1km EAST	0.1	20	*HCB*	9	18
304041	McLENNAN DRIVE	HIGHWAY 35 - 0.3km S/E OF HIGHWAY 35	0.3	40	*LCB*	7	14
304241	McLENNAN DRIVE	0.6km S/E OF HIGHWAY 35 - HIGHWAY 35	0.2	40	*LCB*	7	14
322031	NORTH RIL LAKE ROAD	BROWNS BRAE ROAD - 1.1km SOUTH	1.1	136	*LCB*	10	20
146131	MAPLEHURST DRIVE	1.6km W. OF HWY 60 - 0.3km WEST	0.3	53	*LCB*	8	15
142021	PUT IN BAY ROAD	BOUNDARY - LAKE OF BAYS / HUNTSV - 2.3km SOUTH EAST	2.3	123	*G/S*	8	17
133031	COOPER LAKE ROAD	HIGHWAY 60 - COOPER LAKE BRIDGE	1	98	*LCB*	10	19
147031	GOLF COURSE ROAD	HIGHWAY 60 - 1.0km WEST	1	115	*LCB*	8	16
106231	BAYVIEW POINT ROAD	DELBROOKE ROAD - 0.3km SOUTHERLY	0.3	45	*LCB*	8	14
103251	SEABREEZE ROAD	0.3km SOUTH OF HWY 35 - TEN MILE CREEK	2.1	210	*HCB*	8	16
422051	EARTH PARK ROAD	DIST ROAD 117 - 0.5km NORTH WEST	0.5	15	*LCB*	9	18
418121	HENEY LAKE ROAD	0.7km S. OF DIST ROAD 117 - 2.6km SOUTH OF DISTRICT ROAD 117	1.9	14	*G/S*	8	18

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
122031	PORT CUNNINGTON ROAD	0.9km S. OF DISTRICT RD. 22 - 1.9km WESTERLY	1.9	110	*LCB*	10	19
307021	PAINT LAKE ROAD	4.1km W. OF HWY 117 - BROWNS BRAE ROAD	4.8	100	*G/S*	9	19
137321	PINE RIDGE ROAD	PINE RIDGE ROAD - 0.3km EAST	0.3	47	*G/S*	10	20
107051	TEN MILE BAY ROAD	HIGHWAY 35 - HIGHWAY 35	1.2	23	*HCB*	8	18
202321	WALKER LAKE CIRCLE	WALKER LAKE ROAD WEST - 0.1km EAST	0.1	26	*HCB*	8	16
305021	RED CHALK ROAD	PAINT LAKE ROAD - 1.0km SOUTH	1	29	*G/S*	8	17
104131	SEABREEZE ROAD	4.0km SOUTH OF HWY 35 - 4.3km SOUTH OF HWY 35	0.3	123	*LCB*	8	17
203021	UPPER WALKER LAKE ROAD	DISTRICT ROAD 8 - WALKER LAKE ROAD EAST	0.4	51	*G/S*	7	12
427031	BURLMARIE ROAD	DISTRICT ROAD 2 - 1.0km EAST	1	384	*LCB*	9	18
225031	GRASSMERE ROAD	HIGHWAY 60 - BOUNDRY - LAKE OF BAYS / HUNTSVILL	0.2	199	*LCB*	9	18
121131	PORT CUNNINGTON ROAD	0.2km SOUTHERLY - 0.9km SOUTHERLY	0.7	132	*LCB*	10	20
426031	WALSH ROAD	LANGFORD ROAD - 0.4km NORTH	0.4	24	*G/S*	9	19
125031	SPRING LAKE ROAD	HIGHWAY 60 - 0.8km NORTH	0.8	66	*LCB*	10	20
440121	VANCLIEAF DRIVE	PRICE POINT ROAD - 0.7km WEST	0.7	33	*G/S*	8	16
210051	BILLIE BEAR ROAD	DISTRICT ROAD 8 - 0.5km NORTH	0.5	119	*HCB*	10	20
106321	BOB SHIRE ROAD	DELBROOKE ROAD - END	1.8	26	*G/S*	8	16
134151	CHARLIE THOMPSON ROAD	1.4km SOUTH EAST - 2.7km SOUTH EAST	1.3	177	*HCB*	10	20
315151	OLD HIGHWAY 117	1.6km EAST - DIST ROAD 117	3.5	212	*LCB*	8	16

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Rating (10)	Structural Adequacy (20)
149021	OLD HIGHWAY	HIGHWAY 60 - 0.4km SOUTH	0.4	17	*G/S*	10	19
134251	CHARLIE THOMPSON ROAD	2.7km SOUTH EAST - END	0.8	155	*HCB*	10	19
137031	RAT BAY ROAD	DISTRICT ROAD 9 - PINE RIDGE ROAD	1.2	152	*LCB*	10	19
312031	LAKE OF BAYS MARINE ROAD	HIGHWAY 117 - HIGHWAY 117	0.5	85	*LCB*	10	20
224032	SOUTH CAMP LAKE ROAD	DISTRICT ROAD 8 - 0.8 EAST	0.8	9	*LCB*	10	20
326031	NORTH RIL LAKE ROAD	BROWNS BRAE ROAD - DISTRICT ROAD 51	1.7	34	*LCB*	10	20
315051	OLD HIGHWAY 117	DIST ROAD 117 - 1.6km EAST	1.6	135	*LCB*	9	18
133331	COOPER LAKE ROAD	0.7km N. OF HWY 60 - 0.2km NORTH	0.2	9	*LCB*	10	20
425031	LANGFORD ROAD	DISTRICT ROAD 2 - 1.0km WEST	1	105	*LCB*	10	20

Appendix D

Surface Width Needs

Township of Lake of Bays Road Width Needs

Notes:

1. *Roads listed from narrow to wide in terms of total platform width (Surface Width + 2 x Shoulder Width)*
2. *Need for widening to be confirmed by Township.*

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Width (m)	Shoulder Width (m)
145021	PORTAGE FLYER LANE	WOLF BAY ROAD - END	0.1	54	G/S	*3.2*	*0*
133222	COOPER LAKE ROAD	0.2km N. OF COOPER LAKE BRIDGE - END	0.6	36	G/S	*3.7*	*0*
114022	ECHO BAY ROAD	1.3km N. OF DISTRICT RD. 21 - 0.5km NORTHERLY	0.4	18	G/S	*4*	*0*
128022	OXTONGUE RAPIDS ROAD	0.9km E. OF HIGHWAY 60 - BOUNDRY - LAKE OF BAYS / SHERBORNE	2.3	30	G/S	*4*	*0*
205022	HUTCHESON ROAD	HUTCHENSON ROAD SOUTH - 3.1km NORTH EAST	2.9	15	G/S	*4*	*0*
213022	DISTRESS DAM ROAD	OLD SINCLAIR ROAD - END	2.7	2	G/S	*4*	*0*
229021	TALLY-HO BEACH ROAD	HIGHWAY60 - GOVERNMENT DOCK	0.2	32	G/S	*4*	*0*
314122	BIGWIN VIEW LANE	OLD HIGHWAY 117 - OLD HIGHWAY 117	0.8	15	G/S	*4*	*0*
116021	HERMAN'S ROAD	DISTRICT ROAD 22 - 0.2km NORTHERLY	0.2	46	G/S	*4*	*0.1*
212022	BILLIE BEAR ROAD	OLD SINCLAIR ROAD - DISTRESS DAM ROAD	2.6	21	G/S	*4*	*0.1*
323122	WATSON ROAD	0.9km S/W OF NORTH RIL LAKE ROAD - END	0.5	26	G/S	*4*	*0.1*
219022	EAST OXBOW LAKE ROAD	DISTRICT ROAD 8 - 1.9km SOUTH	1.9	34	G/S	*4*	*0.2*
401122	GRANDVIEW LAKE ROAD	0.6km W. OF DIST ROAD 117 - 2.3km NORTH	1.7	40	G/S	*4*	*0.2*
311022	NARROWS ROAD	1.3km E. OF HWY 117 - 1.7km E. OF HWY 117	0.4	47	G/S	*4*	*0.3*
311122	BAYVIEW AVENUE	NARROWS ROAD - END	0.9	23	G/S	*4*	*0.3*
424022	MOOT LAKE ROAD	DIST ROAD 117 - 3.1km NORTH	3.1	24	G/S	*4*	*0.3*
130021	LAKE OF BAYS LANE	DWIGHT BEACH ROAD - 0.7km SOUTH	0.7	40	G/S	*4*	*0.4*
133121	COOPER LAKE ROAD	COOPER LAKE BRIDGE - 0.2km N. OF COOPER LAKE BRIDGE	0.2	55	G/S	*4*	*0.4*
222122	TASSO LAKE ROAD	NORTH CAMP LAKE ROAD - END	0.5	24	G/S	*4*	*0.4*

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Width (m)	Shoulder Width (m)
302021	GRINDSTONE LAKE ROAD	HWY 35 - END	0.1	40	G/S	*4*	*0.4*
308021	KENNEY ROAD	PAINT LAKE ROAD - 0.2km NORTH EAST	0.2	32	G/S	*4*	*0.4*
325021	MUSKOKA BOB ROAD	NORTH RIL LAKE ROAD - WESTERLY	0.2	40	G/S	*4*	*0.4*
438221	GRAND BOULEVARD ROAD	MENOMINEE ROAD - 0.3km SOUTH	0.3	53	G/S	*4*	*0.4*
305222	RED CHALK ROAD	1.0km S. OF PAINT LAKE ROAD - 1.6km SOUTH	0.6	7	G/S	*4*	*0.5*
313021	LONG LINE LAKE ROAD	HIGHWAY 117 - 0.7km EAST	0.7	45	G/S	*4*	*0.5*
314021	SCOTTS BOATHOUSE ROAD	OLD HIGHWAY 117 - 0.4km NORTH EAST	0.4	15	G/S	*4*	*0.5*
428021	DORAN ROAD	BURLMARIE ROAD - 0.2km SOUTH	0.2	9	G/S	*4.1*	*0.5*
318021	NORWAY POINT ROAD	GLENMOUNT ROAD - 0.3km EAST	0.3	40	G/S	*4*	*0.6*
139021	MARINA ROAD	DISTRICT ROAD 9 - 0.3km SOUTH	0.3	47	G/S	*4.2*	*0.5*
214022	OLD SINCLAIR ROAD	DISTRESS DAM ROAD - BIG EAST RIVER	0.9	2	G/S	*4.2*	*0.5*
416031	HAMMOND ROAD	DISTRICT ROAD 51 - 0.6km NORTH	0.6	82	LCB	*4.2*	*0.5*
429021	BURLMARIE ROAD EAST (Jesin Road ?)	BURLMARIE ROAD - 0.2km EAST	0.2	13	G/S	*4.3*	*0.5*
438121	MENOMINEE ROAD	0.4km W. OF DISTRICT ROAD 2 - 0.8km WEST	0.4	18	LCB	*4.3*	*0.5*
222021	NORTH CAMP LAKE ROAD	NORTH TASSO LAKE ROAD - TASSO LAKE ROAD	0.7	24	G/S	*4.4*	*0.5*
324321	MacAUTHUR POINT ROAD	SOUTH RIL LAKE ROAD - END	1.2	43	G/S	*4.4*	*0.5*
406021	KING'S ROAD	DIST ROAD 117 - 0.5km NORTH	0.5	32	G/S	*4.4*	*0.5*
109021	ROBSON LANE	RONVILLE ROAD - 0.3km SOUTH WEST	0.3	24	G/S	*4.5*	*0.5*
112021	MELROSE DRIVE	DISTRICT ROAD 21 - 0.3km WESTERLY	0.3	15	G/S	*4.5*	*0.5*
115021	FOX POINT ROAD	DISTRICT ROAD 21 - 2.2km SOUTHERLY	2.2	48	G/S	*4.5*	*0.5*
304121	McLENNAN DRIVE	0.3km S/E OF HIGHWAY 35 - 0.6km SOUTH	0.3	40	LCB	*4.5*	*0.5*
309322	BELLWOOD ACRES ROAD	3.1km N/WEST OF HWY 117 - 0.4km SOUTH	0.4	40	G/S	*4.5*	*0.5*
313121	SOUTH LONG LINE LAKE ROAD	LONG LINE LAKE ROAD - END	0.4	40	G/S	*4.5*	*0.5*

Sect. No.	Road Name	From - To	Length (km)	AADT	Surface Type	Surface Width (m)	Shoulder Width (m)
120021	HILLTOP CRESCENT	ELDER DRIVE - 0.7km NORTHERLY	0.7	32	G/S	*4.7*	*0.5*
221021	NORTH TASSO LAKE ROAD	TASSO LAKE DAM - 1.1km SOUTH EAST	1.1	11	G/S	*4.7*	*0.5*
405021	WINDER'S BAY ROAD	DIST ROAD 117 - 2.7km NORTH EAST	2.7	71	G/S	*4.7*	*0.5*
458021	SOUTH MOOT LAKE ROAD	MOOT LAKE ROAD - 0.3km EAST	0.3	13	G/S	*4.7*	*0.5*
218122	WEST OXBOW LAKE ROAD	1.9km S. OF DISTRICT ROAD 8 - 2.9km TO END	2.9	60	G/S	*4.8*	*0.5*
407021	MARY ROBERTS ROAD	DIST ROAD 117 - 0.3km NORTH	0.3	32	G/S	*4.8*	*0.5*
113021	ECHO BAY ROAD	DISTRICT ROAD 21 - 1.3km NORTHERLY	1.3	104	G/S	*5*	*0.5*
310021	NARROWS ROAD	HIGHWAY 117 - 1.3km EAST	1.3	63	G/S	*5*	*0.5*
319021	EAST GRANDVIEW ROAD	DIST ROAD 117 - 1.2km NORTH WEST	1.2	63	G/S	*5*	*0.5*
401021	GRANDVIEW LAKE ROAD	DIST ROAD 117 - O.6km NORTH	0.6	100	G/S	*5*	*0.5*
411121	DICKIE LAKE ROAD	MANITOU ROAD - DICKIE LAKE ROAD WEST	1.0	110	G/S	*5*	*0.5*
419022	HENEY LAKE ROAD	2.6km S. OF DIST ROAD 117 - 3.5km SOUTH OF DISTRICT ROAD 117	0.9	10	G/S	*4.2*	*0.9*
217021	WEST OXBOW LAKE ROAD	DISTRICT ROAD 8 - 1.9km SOUTH WEST	1.9	96	G/S	*5.2*	*0.5*
430031	KELLY ROAD	BURLMARIE ROAD - 0.5km WEST	0.5	87	LCB	*5.2*	*0.5*
207221	CARL FISHER DRIVE	FIELDALE ROAD - 0.8km NORTH	0.8	58	G/S	*5.3*	*0.5*
408021	BIRCH GLEN ROAD	DIST ROAD 117 - 0.3km NORTH	0.3	95	G/S	*5.4*	*0.5*
303121	SHOE LAKE ROAD	0.3km WEST - 1.7km WEST	1.4	56	G/S	*5.4*	*0.5*
303021	SHOE LAKE ROAD	HIGHWAY 35 - 0.3km WEST	0.3	56	HCB	*5.1*	*1*