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**TOWNSHIP OF DAWN-EUPHEMIA**

**ASSET MANAGEMENT REPORT**

**2016**

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**2016**

October 21, 2016

B. M. ROSS AND ASSOCIATES LIMITED  
Engineers and Planners  
62 North Street  
Goderich, ON N7A 2T4  
Phone: 519-524-2641  
Fax: 519-524-4403  
[www.bmross.net](http://www.bmross.net)

File No. 13216

# **TOWNSHIP OF DAWN-EUPHEMIA ASSET MANAGEMENT PLAN**

## **EXECUTIVE SUMMARY**

This Asset Management Plan provides the Township of Dawn-Euphemia with a tactical plan to manage their infrastructure assets. If the Township's assets are maintained at an acceptable level of service, it will help support the economic development and quality of life for residents in the community. This plan has been prepared as per the requirements in the Province's Building Together Guide for Municipal Asset Management Plans.

The Township of Dawn-Euphemia has 16 bridges, 92 culverts, about 479 km of roads, about 147 km of watermain, 5 facilities with a value over \$150,000 and an 18 vehicle strong fleet. The replacement cost of these assets was estimated at \$197.10 million. With 894 tax paying households in the Township, the replacement cost is about \$220,470 per household.

This Asset Management Plan includes the following:

- Summary of the existing infrastructure
- Process to score the risks, level of service and theoretical priorities
- Outline of target risks and level of service scores
- Strategies that can help to efficiently manage the assets
- Assessment of available finances
- List of financing options

Information from the recently completed road and bridge needs studies were used to complete this plan. It was generally assumed that the Township wants to maintain the current average condition ratings of the road, bridge, watermain, facility and fleet assets so they can maintain the current level of service that is being provided by these assets. Within the road and bridge reports and through discussions with Township staff, an average annual cost to address the capital improvement needs for these two asset categories was calculated at \$1,036,300. This is about \$450,500 more than the anticipated average annual capital budget available for the roads and bridges in the Township.

A detailed outline of the Asset Management Strategy to help efficiently manage each major asset class has been included in the report appendices. These may need to be updated in the future to reflect changes in the Township's circumstances, regulatory changes, advances in technology, and asset condition assessments.

Overall grades that take into account the condition ratings, level of services scores, risk scores and financial sustainability scores for the evaluated asset group were calculated as per the procedure and targets outline in the plan. They are shown in the following table.

Asset Type	Asset Letter Grade
Bridge	B-
Gravel Road	D
Surface Treated Roads	E
Asphalt Roads	D
Watermains	D
Facilities	A+
Fleet	E

The above summary table suggests that the level of service and/or financing being provided for surface treated roads and bridges are less than the Township's target levels. To address the surface treated roads, additional funds should be directed toward this asset type to improve the condition of these roads. With the bridges, the scheduled work in 2016 helped to improve the bridge letter grade. The tables within the report show that all asset types are slightly underfunded, but generally have acceptable scores in the level of service and risk categories.

To address the financial shortfall, we recommend the Township implement the management strategies presented in this report, take advantage of grant programs and, if necessary, increase tax revenues slightly. If the recommended strategies are not adequate, and other savings or grants are not obtained, a tax increase will be necessary. To provide a balanced capital funding program within five years, it is estimated a total tax increase of 17% above inflation or an average annual increase of about 3.5% in each of the next 5 years will be required.

The Township prefers to follow a pay as you go financing strategy and maintain some money in reserves for emergencies. With the changes proposed, this strategy should be able to maintain the Township's assets at a level of service similar to their current state without drastically reducing the amount of money held in reserves. Alternatively, some of the debt financing or project financing options presented in this plan can be implemented, as required, in place of the pay as you go strategy.

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## **TOWNSHIP OF DAWN-EUPHEMIA ASSET MANAGEMENT PLAN**

### **1.0 INTRODUCTION**

The Province of Ontario, Ministry of Infrastructure, want municipalities to prepare an Asset Management plan and in their guide *Building Together-Guide for Municipal Asset Management Plans*, they list the core municipal assets as roads, bridges, water and wastewater systems and social housing. The Township of Dawn-Euphemia is a lower-tier municipality within the region of Lambton County. The focus of the Township economy is agriculture, with 7 Settlement Areas at Florence, Shetland, Oakdale, Edys Mills, Rutherford, Cairo and Bentpath. At this time, a municipal sanitary system does not exist within the Township, and social housing is the responsibility of the County. The Township owns a water distribution system and purchases its water from the neighbouring Township of Enniskillen. Therefore, this plan includes roads, bridges and watermains located on local roads and collectors within the Township, arterial roads being the responsibility of the County. Also included in this plan are Township owned building facilities and Township maintenance fleet vehicles.

The Township of Dawn-Euphemia is primarily agriculturally based with a large natural gas compressor station located in the Township.

The Township of Dawn-Euphemia created a Strategic Plan in 2012. Among other items, the plan establishes that the Township's corporate mission is to "...provide the highest standards of integrity and responsible community leadership through sound financial management, the delivery of the most efficient and effective level of services possible and the promotion of a healthy and sustainable quality of life.<sup>1</sup>" The plan also identifies features of the community that are highly valued and that the Township wishes to maintain. These include<sup>2</sup>:

1. Affordability - including lifestyles, housing and taxes
2. Sense of Community – small town feel
3. Natural Environment – access to natural areas throughout the Township that offer a variety of activities
4. Leadership – moving the community forward
5. Quality of Life – maintaining an enjoyable rural lifestyle welcoming for children

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<sup>1</sup> *Township of Dawn-Euphemia Strategic Plan*, 2012-2014.

<sup>2</sup> Ibid.

6. Quality of Municipal Services – maintaining services offered to the public
7. Rural Based Community –maintain a strong agricultural sector
8. Diversified Assessment Base – integrate a strong industrial assessment into the community

The Strategic Plan also identifies goals for the Township. Two of which will be directly supported by this asset management plan. The first goal is ensuring long term financial sustainability which includes in its strategic actions *creating 5 to 10-year capital budget and developing a capital asset management plan*<sup>3</sup>. The second goal is addressing the Township's municipal infrastructure and facility needs which includes in its strategic actions *completing a comprehensive infrastructure needs study and undertake road, culvert and bridge improvements as required and financially feasible as well as developing a water main replacement program*<sup>4</sup>.

The Asset Management Plan will be referenced during the annual budget process to determine how proposed funding levels will address the recommended asset work. Any identified budget shortfalls will require a decision by the Township as to whether the work can and will be delayed, and whether alternate funding options will need to be pursued. In the long term the Asset Management Plan will be referenced when deciding taxation and user rates.

The purpose of the Asset Management Plan is to preserve the infrastructure, manage risk and provide satisfactory levels of service to the public in the most cost-effective manner over the asset life-cycle for all assets owned by the Township. The plan considers required integration between different asset groups (i.e. roads and bridges) to minimize duplication of cost and effort for a given location. For example, if a road requires re-paving which is expected to last 30 years but a bridge deck is not expected to require work for 2 years the bridge deck repair may be moved up or the road work delayed in order to avoid having to remove new pavement when repairing the bridge deck.

Since the Asset Management Plan includes projected expenses for the 10-year period, it improves the Township's understanding of future budget pressures and assists in predicting future infrastructure funding gaps and provides targets to close the gaps which exist. It also provides the opportunity to achieve cost savings by identifying deterioration early on and taking appropriate action to rehabilitate the asset. This information can then be used by Council when deliberating on budget matters and Township staff when developing capital and maintenance work plans.

The Asset Management Plan contains detailed recommended work lists for the next 10 years. The Township assets included in this plan were last assessed within the years listed in Table 1. The assets and Asset Management Plan will be reviewed and updated about every 5 years at which time the Township will evaluate whether other assets merit inclusion in the plan. Safety reviews of the bridges will occur every 2 years, in accordance with provincial regulations.

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<sup>3</sup> Township of Dawn-Euphemia Strategic Plan, 2012-2014.

<sup>4</sup> Ibid.



**Table 1 – Asset Condition Assessments**

<b>Asset</b>	<b>Last year Assessed</b>
Bridges	2013
Roads	2013
Watermains	2015
Facilities	2015
Fleet	2015

Once per year, the capital and key maintenance work completed by the Township should be recorded in order to maintain the accuracy of the current asset inventory.

This plan provides information on the implementation of Asset Management in the Township of Dawn-Euphemia including an overview of the current state of local infrastructure, explanation of the target levels of service or goals, strategies to help maintain the target level of service and track the performance of this plan, explanation of the Township's Financial strategies and a list of current and future work needs identified. However, while this document and appendices include some detail, references to external documents that contain additional information should be referred to when making decisions about a particular asset.

## **2.0 STATE OF LOCAL INFRASTRUCTURE**

The asset groups included in this plan are the bridges, roads, watermains, facilities and fleet owned and maintained by the Township. A summary of these components and description of the state of the local infrastructure follows.

### **2.1 Bridges**

Table 2 below summarizes the bridge assets as of September of 2016. This information was taken from the Township Bridge Needs Study dated July 2013, with updates for work completed since that time. In 2012, all the structures with spans of 3.0m or more, were reviewed and the observations were documented in general accordance with the *Ontario Structure Inspection Manual* (OSIM). Within Appendix A is a more detailed table listing the relevant support documents, goals and strategies to be used with this asset type.

**Table 2 – State of Local Bridge Infrastructure**

<b>Asset Group</b>	<b>Inventory Summary by Structure Type</b>	<b>Condition Summary Average BCI</b>	<b>Replacement Value of Assets (2016 Dollars)</b>
Bridges	16 Bridges	Bridges – 75.4	Bridges – \$11.16M
	<u>92 Culverts</u>	<u>Culverts – 73.6</u>	<u>Culverts – \$21.72M</u>
	Total Structures - 108	Total Average – 73.8	Total - \$32.87M

To provide a common point of reference for the replacement values provided in Table 2, the total replacement value of the bridge assets is approximately \$18,445 per person based on a Township population of 1,782.

## 2.2 Roads

Table 3 below has been prepared to quantify the centerline kms of road owned and maintained by the Township and indicate the relative condition of these assets. The condition score is out of 10, with 10 being a new road, and 5 being a road ready for reconstruction. The methodology used to evaluate the roads is in general accordance with that outlined in the Ministry of Transportation's Method and Inventory Manual for Small Lower Tier Municipalities. Within Appendix B is a more detailed table listing the relevant support documents, goals and strategies to be used with this asset type.

**Table 3 – State of Local Road Infrastructure**

<b>Asset Group</b>	<b>Inventory Summary by Road Surface Type</b>	<b>Condition Summary Average Condition Rating (Length Weighted)</b>	<b>Replacement Value of Assets (2016 Dollars)</b>
Roads	Gravel – 412.7 km Asphalt – 38.7 km Surface Treated – 25.9 km <u>Earth – 1.5 km</u> Total – 478.8 km	Gravel – 6.8 Surface Treated – 6.6 <u>Asphalt – 7.6</u> Total Average – 6.8	Gravel -\$111.41 Surface Treated -\$13.60 <u>Asphalt -\$13.34M</u> Total -\$138.38M

To provide a common point of reference for the replacement values provided in Table 3, the total replacement value of the road assets is approximately \$77,655 per person based on a Township population of 1,782.

## 2.3 Watermains

Table 4 below has been prepared to summarize the watermains included in this Asset Management Plan. The methodology used to evaluate the watermains is in general accordance with that outlined in the Guide for Municipal Asset Management Plans. An age-based condition score out of 5, with 1 being a new asset, and 5 having exceeded 70% of its life expectancy. A further description of the methodology used and the watermain network is outlined in Appendix C. Within Appendix C is a more detailed table listing the relevant support documents, goals and strategies to be used with this asset type.

**Table 4 – State of Local Watermain Infrastructure**

<b>Asset Group</b>	<b>Inventory Summary by Location</b>	<b>Condition Summary Average Condition Rating (Length Weighted)</b>	<b>Replacement Value of Assets (2016 Dollars)</b>
Drinking Water	Watermains – 147.1 km Master Meters & Pits - 5 Service Meters - 360	Watermains – 1 Master Meters – 2.2 Service Meters - 5	Watermains – \$19.13M Master Meters – \$39,800 <u>Service Meters - \$142,500</u> Total - \$19.31M

To provide a common point of reference for the replacement values provided in Table 4, the total replacement value of the watermain assets is approximately \$10,836 per person based on a Township population of 1,782.

## 2.4 Facilities

Table 5 below has been prepared to summarize the facilities included in this Asset Management Plan. Within this study only sizable buildings or other facilities with an estimated value greater than \$150,000 has been listed as a facility. The other smaller facilities will be maintained under the operating budget, as required. These facilities have been reviewed by Township staff and based on the needs identified and estimated replacement value, a Facility Condition Index score out of 10 was calculated. Within Appendix D is a more detail table listing the relevant support documents, goals and strategies to be used with this asset type.

**Table 5 – State of Local Facility Infrastructure**

<b>Asset Group</b>	<b>Inventory Summary by Location</b>	<b>Condition Summary Average FCI</b>	<b>Replacement Value of Assets (2013 Dollars)</b>
Facilities	Municipal Office	9.5	\$ 322,000
	Dawn Fire Hall	9.3	\$ 242,000
	Rutherford PW Depot	9.2	\$ 210,000
	Cairo PW Depot	9.2	\$ 195,000
	Community Centre	<u>10.0</u>	<u>\$ 1,834,000</u>
		Average FCI – 9.4	Total – \$ 2.803M

To provide a common point of reference for the replacement values provided in Table 5, the total replacement value of the facility assets is approximately \$1,575 per person based on a Township population of 1,782.

## 2.5 Fleet

Table 6 below has been prepared to summarize the facilities included in this Asset Management Plan. This information was taken from the Township's Cash Requirements Budget 2016. Individual vehicles have been assigned an age based condition score out of 10, with 10 being a newer vehicle, and 1 being a vehicle which has exceeded its life expectancy. Within Appendix E is a more detail table listing the relevant support documents, goals and strategies to be used with this asset type.

**Table 6 – State of Local Fleet Infrastructure**

<b>Asset Group</b>	<b>Inventory Summary by Vehicle Type</b>	<b>Avg. Condition Summary (Age Based Score)</b>	<b>Replacement Value of Assets (2016 Dollars)</b>
Fleet	Light Duty – 3	Light Duty – 4	Light Duty - \$0.1M
	Fire – 3	Fire – 5	Fire – \$0.775M
	Heavy Duty – 5	Heavy Duty – 4	Heavy Duty - \$1.14M
	Graders – 4	Graders – 1	Graders – \$1.40M
	Tractors – 2	Tractors – 9	Tractors - \$0.21M
	Backhoe - 1	<u>Backhoe – 8</u>	<u>Backhoe - \$0.1M</u>
		Total Average – 4.3/10	Total – \$3.74M

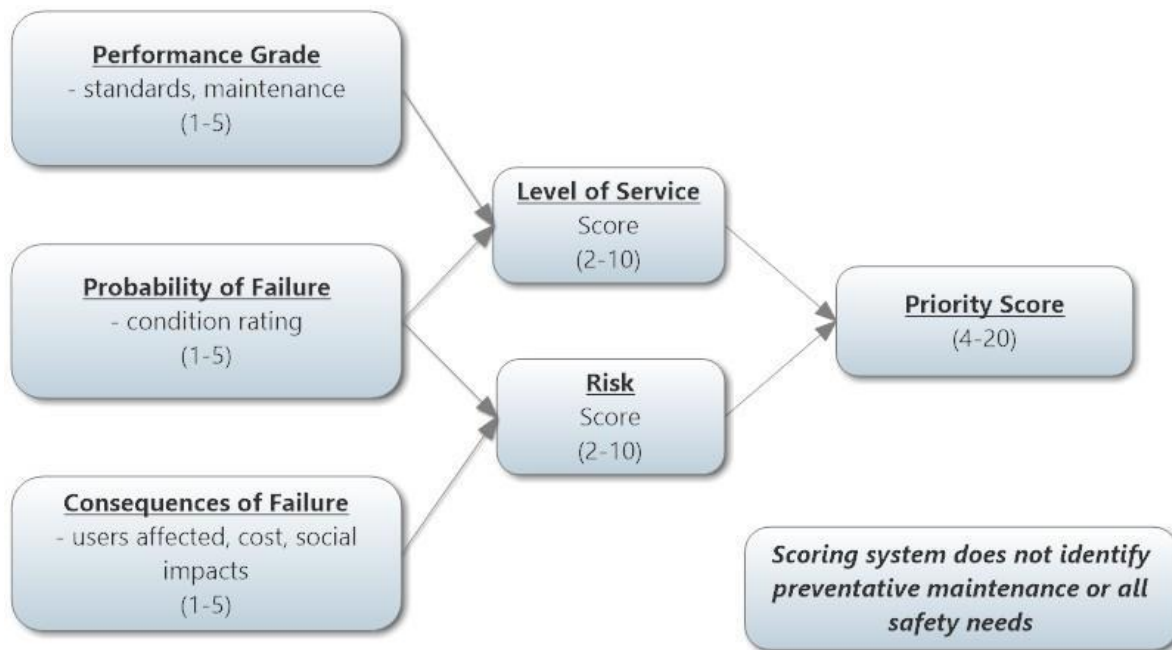
To provide a common point of reference for the replacement values provided in Table 6, the total replacement value of the fleet assets is approximately \$2,100 per person based on a Township population of 1,782.

### 3.0 LEVEL OF SERVICE SCORING METHOD

It is the goal of the Township to ensure their assets provide an acceptable level of service to residents while they are minimizing the risks and costs associated with maintaining that asset. To track the performance of the service being provided by an asset over time, a method to evaluate the level of service being provided and the associated risks is necessary.

When evaluating the performance of individual assets in comparison to the target level of service, we believe there are three key factors that should be taken into consideration; the probability of failure, the consequence of failure and the performance grade. While these factors can include many components, the **probability of failure** factor is generally represented by the condition rating or age of an asset. The **consequence of failure** is a score based on the number of users affected if the asset fails or other social impacts and the cost of the asset. The **performance grade** should incorporate the relative maintenance requirements of the asset and a comparison of how the asset was built versus the appropriate design standard for that particular asset. In a simplified way these components can be used as illustrated in Figure 1 to develop a Level of Service Score, a Risk Score and theoretical Priority Score for the improvements.

**Figure 1**  
**Relationship Between Data Collected and Tracked Parameter Scores**



To explain how the table works, the road assets have been used. When evaluating the roads, the platform width of the road surface and the drainage condition score was used to calculate a performance grade for each road section. A score between 1 and 5 was assigned for each individual road section or asset. If the platform width of a road section is adequate for its application a score of 1 was applied. If the width was somewhat narrow, a score of 3 was applied and if the road was significantly narrower than it should be, a score of 5 was applied. Similarly, the good, fair and poor drainage condition ratings were assigned a score of 1, 3 and 5. The average of the platform width score and drainage score were used as the performance grade in the evaluation.

The condition rating was used to assign the probability of failure factor for each asset. When combining the condition rating with the other components as per Figure 1 prioritize the work, the condition ratings are changed to a score from 1 to 5 where a road section with a condition rating of 1 is in good condition and 5 is ready for reconstruction.

The consequence of failure value has been calculated based on the assumed or supplied traffic volumes on each road section. A score of 1 means it has an average annual daily traffic value of less than 50 and a road with greater than a 1000 vehicles per day would have a score of 5.

Figure 1 suggests that combining the probability of failure rating with the performance standard gives a level of service score and combining the probability of failure and consequence of failure value yields the risk score for each asset. These scores are established by simply adding the two scores together. Although these are just relative numbers, they may be used to define a level of

service score or risk score for each road section. The individual scores or the average scores can be monitored and tracked over time for future comparison purposes. With this Asset Management Plan, some suggested target values for different types of roads and other asset types have been provided.

According to the figure, the priority score for each asset is the combined level of service score and the risk score. The theoretical priority score should only be used as a guide to help prioritize improvement work to the assets. As explained in the road and bridge needs studies, there are other factors that should be taken in account when prioritizing asset improvements. Factors including preventative maintenance activities, scheduling tasks to coincide with integrated assets within the same area, financial and timing restraints and other activities taking place within the locale must be considered by staff. It is impossible to take into account all these other factors in a simplified scoring system. For this reason, the calculated theoretical priority score for the individual assets should only be used as a guide and the best sequence for improvements should be established by the Township staff responsible for those asset types. This priority score is not discussed further in this report as prioritizing the individual asset needs is beyond the score of this plan.

Note, it is important to realize that according to this scoring system, it is desirable to minimize the risk score and minimize the level of service score. In other words, an asset with a low level of service score is in good condition and is able to perform as desired.

Also, while this process could also be used for the Facilities and the Fleet, it was felt that it would make the evaluation of these assets unnecessarily complicated. For these two assets, only a condition rating was used to assess the status of these assets. The condition rating for the fleet is based on age and the condition rating for the facilities is based on the needs to rehabilitate the facility relative to its replacement cost.

#### **4.0 TARGET LEVELS OF SERVICE**

The target levels of service outlined below for the various asset groups are statements of what the Township intends to provide to users of the Township's assets in order to support the Township's goals in a cost efficient manner. These targets are not intended to be binding or unalterable as it is understood that the target levels of service may need to be adjusted as circumstances change in order to deliver a more reasonable and efficient asset system.

In order to measure the applicable condition rating, levels of service and risk scores, each asset group has defined performance indicators which, going forward, will be used to monitor an asset group's performance over a set period of time. The Preventative Maintenance targets will be evaluated as a judgment call by Township staff. It is anticipated that every 5 years the condition ratings and other scores will be updated. These performance indicators are meant to be a simple measurable guide of whether Township asset decisions are having the desired effect on the overall asset inventory. Trends indicating that the performance is not matching the targets can then be examined in more detail to assess possible causes for the deviation.

Where applicable, the target levels of service will include meeting all regulatory requirements for safety, inspection schedules and maintenance. Where assets do not currently meet requirements due to original design; appropriate signage, or possibly appropriate barricades, should be placed until replacement occurs.

The data collected with the bridge and road study and information gathered pertaining to watermain, and the facility and fleet review by Township staff were assembled and reviewed to develop targets and evaluate how the assets within the Township compare with the proposed Target Levels shown in Table 7. The targets are presented here and the current performance level scores and letter grade for all assets are as shown in Section 7.

**Table 7 – Target Asset Performance Levels**

<b>Asset Type</b>	<b>Condition Rating</b>	<b>Level of Service Score</b>	<b>Risk Score</b>	<b>Financial Sustainability Score</b>
Bridge	Average BCI > 60 & Less than 15% with BCI below 40	Average LOS < 5 & Less than 15% above 6	Average Risk < 5 & Less than 15% above 6	Anticipated Costs = or < Available Budget
Roads Gravel	Average CR > 6 & Less than 25% below 5	Average LOS < 5 & Less than 15% above 6	Average Risk < 5 & Less than 15% above 6	Anticipated Costs = or < Available Budget
Roads Surface Treatment	Average CR > 6 & Less than 25% below 6	Average LOS < 5 & Less than 15% above 6	Average Risk < 5 & Less than 15% above 6	Anticipated Costs = or < Available Budget
Roads Asphalt	Average CR > 8 & Less than 25% below 8	Average LOS < 5 & Less than 15% above 6	Average Risk < 5 & Less than 15% above 6	Anticipated Costs = or < Available Budget
Watermain	Average CR <= 3 & Less than 25% above 4	Average LOS < 5 & Less than 15% above 6	Average Risk < 5 & Less than 15% above 6	Anticipated Costs = or < Available Budget
Facilities	Average FCI > 9 & 0% with FCI under 7	N/A	N/A	Anticipated Costs = or < Available Budget
Fleet	Average CR > 5 & 10% of Vehicle with CR <= 0	N/A	N/A	Anticipated Costs = or < Available Budget

**Definitions:**

- BCI, Bridge Condition Index as defined by the Ontario Structural Inspection Manual. Score ranges from 0 to 100, a higher score implies a better condition.
- Road Condition Score as defined in the Ministry of Transportation's Method and Inventory Manual for Small Lower Tier Municipalities. Score ranges from 0 to 10, a higher score implies a better condition.
- Road scores are all weighted based on the length of the road section when calculating averages.
- Watermain Condition Score is based on the number of recorded breaks per pipe length and the age of the pipe.
- Watermain scores are all weighted based on the length of the watermain section when calculating averages.

- FCI is the Facility Condition Index. Score ranges from 0 to 10 and is based on the relation between the anticipated 5-year rehabilitation needs and the replacement cost of the building. A score of 10 implies the facility is in good condition and there are no needs while a score of 7 implies that the rehabilitation costs are equal to thirty percent of the replacement costs.
- LOS is Level of Service score as defined and described in Section 2 of this report, a lower score implies a higher level of service, Score ranges from 2 to 10.
- Risk Score as defined and described in Section 2 of this report, a higher score implies a higher risk. Score ranges from 2 to 10.
- The evaluation of the financial sustainability is a score out of 10 as outline in Appendix F where 10 implies good financial sustainability.
- Fleet condition rating ranges from 0 to 10. A score of 10 implies the vehicle is new and has its entire useful life remaining. A score of 5 implies the vehicle has used up half of its expected useful life.

External factors such as changes to existing and new legislation requirements, and environmental changes may also have an impact on performance level targets. Adjustments should be made to the performance level targets, as required, in future revisions of the plan if external factors dictate or there is a desire to improve or an acceptance a decrease to one or more target levels.

## **5.0 ASSET MANAGEMENT STRATEGY**

The asset management strategy for each asset group is outlined in Appendices A, B, C, D and E. The Township strategy for all asset groups includes a preventative maintenance program that enables planned reaction to minor repairs rather than a delayed reaction resulting in a more significant repair and a higher cost. Integration of asset repairs over the various assets is also included in the strategies for the different asset groups, this will reduce duplication of effort at the same geographic location for the different groups. Complete elimination or duplication may not be possible in all cases, such as in the case of emergency repairs.

Disposal of assets will generally take place as part of a rehabilitation or replacement project. Costs for this aspect of the project will be included in cost projections for the work. Where disposal of the asset involves the sale of the asset to a third party or the exchange of assets with an upper tier of government, the asset will be removed from the Township inventory. The change will be noted wherever the removal of the asset may cause confusion in the asset management report (ie in comparison tables or graphs which may be affected by the assets removal).

Asset repair or rehabilitation projects will be fulfilled in accordance with the Township procurement policy as outlined in Bylaw 2016-29. Completion of a repair or rehabilitation of an asset with a high priority score will generally have the desired effect of decreasing the level of service score and reducing the risk score; however, sometimes there are other factors that should be used to help prioritize the asset improvement schedule within the Township. When there are recommendations within the asset inventory studies, the Township staff will review those recommendations, other needs of the Township and budget restraints, to establish the priorities of the Township. Should the performance of one asset type appear to be falling further behind the



targeted level of service, Township staff will consider applying more funds towards addressing the needs of that asset type. This will be discussed further in section 7.

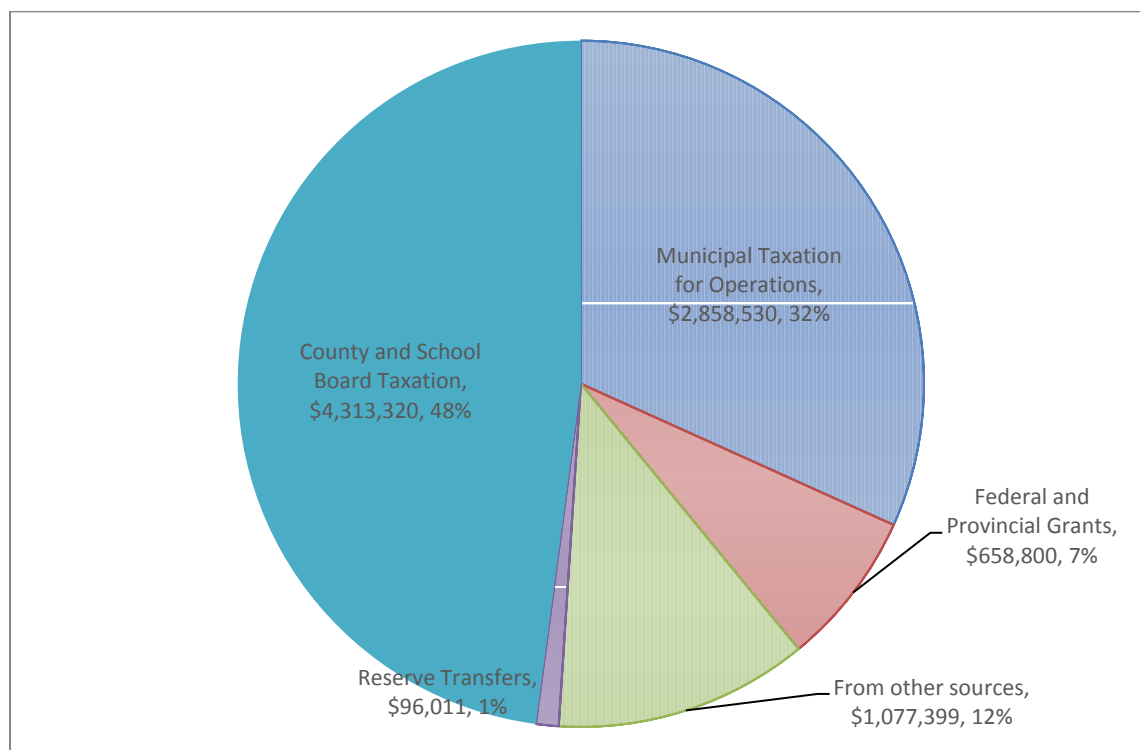
The asset group strategies will be re-evaluated on the same 5-year cycle as the Asset Management Plan or sooner if one asset strategy is found to require significant adjustment. Efficacy of the strategy will be measured by the comparison of future performance target scores to the scores calculated for past versions of the report.

## 6.0 FINANCING STRATEGY

Financial information, used in this section, was extracted from the Township's 2016 budget and the 2015 year-end financial report. Given there remains to be numerous unknown factors, the financial projections are considered to be only rough estimates of the available funds to address the capital needs. Through discussion with Township staff, it is their opinion the numbers presented are typical and suitable for use in this plan.

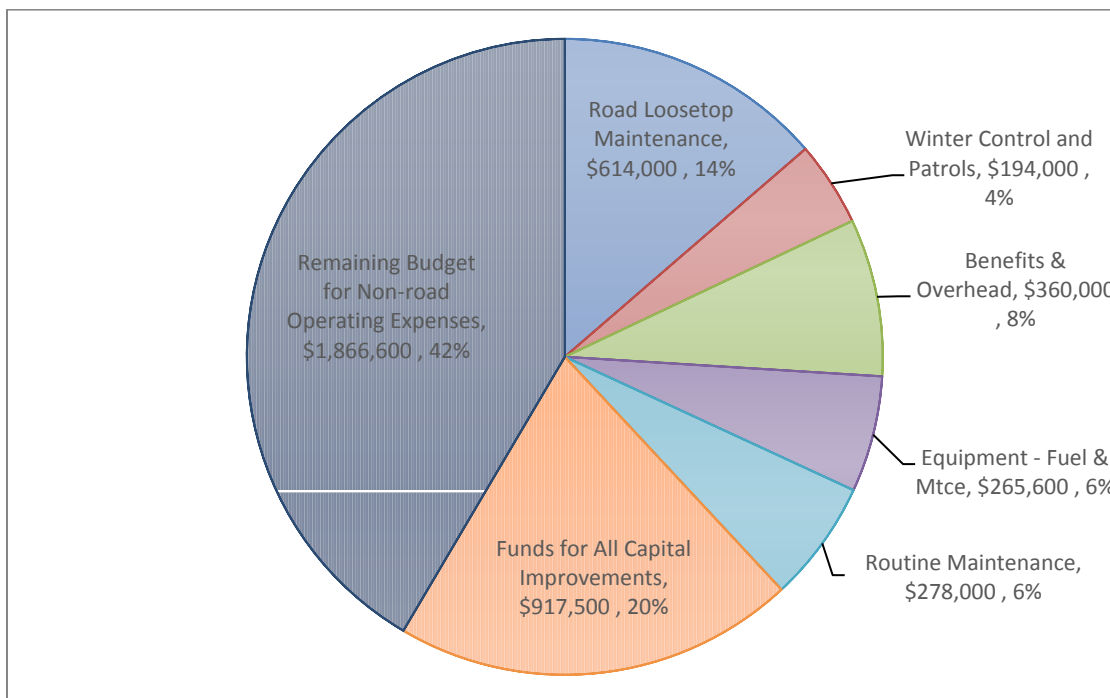
Figure 2 shows the Township's sources of revenue in 2016. The funds included in the miscellaneous revenue includes such things as the user fees, licenses, permits, and other all other revenues. The Federal and Provincial Grant amounts listed in this figure includes asset specific grants such as the Gas Tax Rebate. In 2016 the Township collected about \$7,171,850 in property taxes which includes the amount used for operations and the amount transferred directly to the County and School Boards.

**Figure 2 – 2016 Distribution of Revenue Sources**



An illustration of how the Township expenses were distributed in 2016 is shown in Figure 3. Note, the values presented in Figure 3 only include the operational revenue.

**Figure 3 – 2016 Distribution of Operating Expenses**



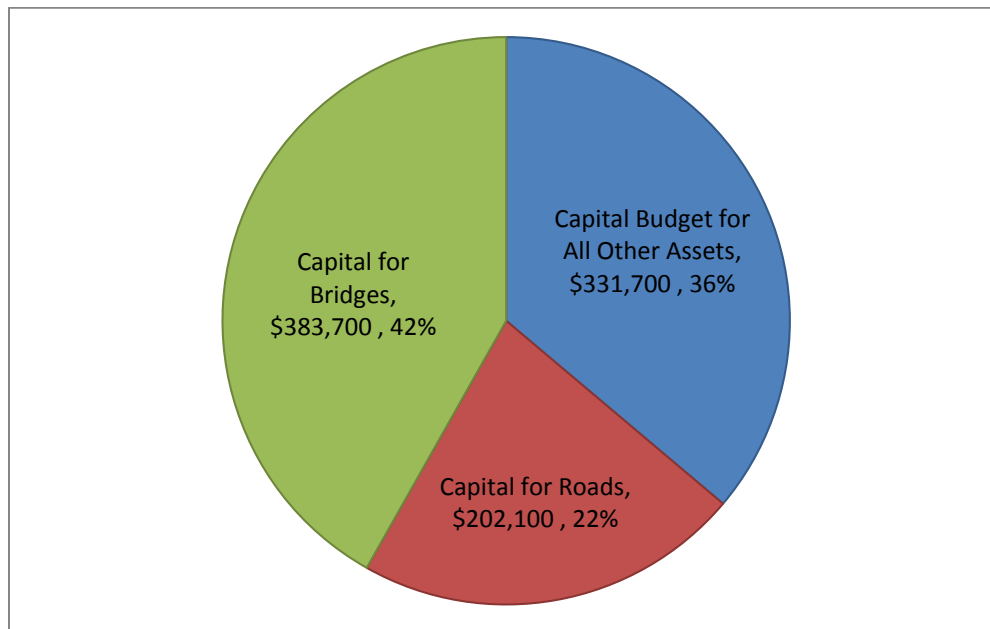
The financial records from the Township were also reviewed to determine how much money is available for capital improvements and the total number of assets owned by the Township. In 2016 there was \$917,500 available for capital improvements, including any dedicated grants.

The book value of the Roads and Bridges equaled 22% and 42% respectively of the assets owned by the Township that are maintained (funded) with property tax revenues. To determine the funds available for capital improvements of the roads and bridges, it was assumed that these same percentages (22% and 42%) of the money available for capital improvements would be used for the roads and bridges, respectively. Based on these assumptions, the amount of money from tax revenues available for capital improvements is presented in Figure 4.

The Township has several reserves for the renewal of Roads, Bridges and Fleet. The projected 2016 balances for Fleet and Equipment are: Roads - \$737,300, Fire - \$177,700; for Roads Capital - \$80,000; and for Water System renewals - \$639,800.

The 2016 Budget included funding from taxation to the Roads Fleet Reserve of \$130,000 and \$80,000 to the Roads Capital Reserve. These funding levels are projected to continue throughout the forecast period.

**Figure 4 – 2016 Assumed Distribution of Capital Budget**



A summary of the typical annual maintenance and capital budget for the roads and bridges is presented in Table 8. The table also shows that the anticipated Gas Tax Rebate, which must be spent on capital improvements of the roads and bridges, is \$59,330. To calculate the total amount of capital funds available, it was split up proportionally to the book value of each asset type and added to the taxation revenue available for capital improvements.

**Table 8 – Typical Annual Operating and Available Capital Budget for the Roads and Bridges**

Asset Group	Annual Operating Budget	Annual Taxation Revenue for Capital	Annual Gas Tax Rebate	Annual Capital Funds Available
Bridges	\$65,000	\$383,700		\$383,700
Roads	\$1,446,000	\$142,770	\$59,330	\$202,100
Fleet	\$280,000	\$135,700		\$135,700
Facilities	\$62,000	\$137,600		\$137,600
All Others		\$58,400		\$58,400
Water System	\$290,000			
Total	\$2,143,000	\$858,170	\$59,330	\$917,500

\* The typical annual operating and capital budget values were calculated using the assumptions presented earlier. All the benefits and overhead costs were assigned to the roads operating budget.

Table 9, summarizes the replacement costs and the anticipated annual capital improvement costs for the asset groups listed. The replacement costs calculated were based on 2016 dollars and include probable design and construction costs. Typically, the costs are based on the existing bridge size and assume it is constructed to current standards. With the road replacement costs, it has been assumed the road would be reconstructed to the current municipal road section for that class of road.

**Table 9 – Annual Capital Replacement Cost and Budget Summary**

<b>Asset Group</b>	<b>Replacement Cost <sup>1</sup></b>	<b>2016 TCA Amortization <sup>2</sup></b>	<b>Anticipated Average Annual Expenditure <sup>3</sup></b>	<b>Anticipated Average Annual Available Capital Budget <sup>4</sup></b>	<b>Annual Surplus (Shortfall)</b>
Bridges	\$32.87M	\$116,360	\$461,800	\$383,700	(\$78,100)
Roads	\$138.38M	\$26,580	\$574,500	\$202,100	(\$372,400)
Facilities	\$2.80M	\$62,900	\$15,000	\$137,600	\$122,600
Fleet	\$3.74M	\$96,810	\$263,000	\$135,700	(\$127,300)
All Other		\$49,580		\$58,400	\$58,400
Watermains	\$19.31M	\$115,450	\$101,915		(\$101,915)
<b>Total</b>	<b>\$197.10M</b>	<b>\$467,680</b>	<b>\$1,416,215</b>	<b>\$917,500</b>	<b>(\$498,715)</b>

<sup>1</sup> The replacement cost estimate assumes components are generally reconstructed as per municipal standard road sections and current bridge code standards.

<sup>2</sup> The amortization charges of the Tangible Capital Asset book values were taken from the 2016 municipal budget.

<sup>3</sup> The anticipated average annual expenditure for bridges is based on the projected required work for the next 40 years. For the roads, it was based on the average projected needs over the next 10 years. For watermain, it was based on setting aside money each year to fund 75% of the future watermain replacement cost.

<sup>4</sup> The anticipated annual average capital budget available was calculated using the 2016 budget figures and the assumptions presented earlier.

The Anticipated Average Annual Expenditure listed in Table 8 comes from the road and bridge studies and from discussions with Township staff for the other assets. The anticipated cost for the roads was generated using condition ratings, anticipated deterioration rates and probable cost estimates for the assumed type of improvement work required. The cost provided for the bridges take into consideration costs further into the future and were generated using the assumed service life for the asset indicated in Appendix A and B. Maintenance work on the assets is required to ensure the asset is able to achieve its anticipated life expectancy. Should the capital budget for 2016 be different than the recommended average annual expenditure, it may be necessary to adjust the budget in future years, use money from reserves or rely on using grant money to address the needs and maintain the assets at the Target Levels.

Table 9 shows that there is currently a calculated funding **deficit of \$498,715** per year over the next ten years. As the total tax revenue is approximately \$2,858,530 a tax increase of approximately 17% above inflation would be needed to avoid the deficit if no other strategies are employed. It is recommended this increase be phased in over 5 years to minimize the impact on the tax base.

**Figure 5 – Anticipated Revenue and Capital Expenditure Forecasts**

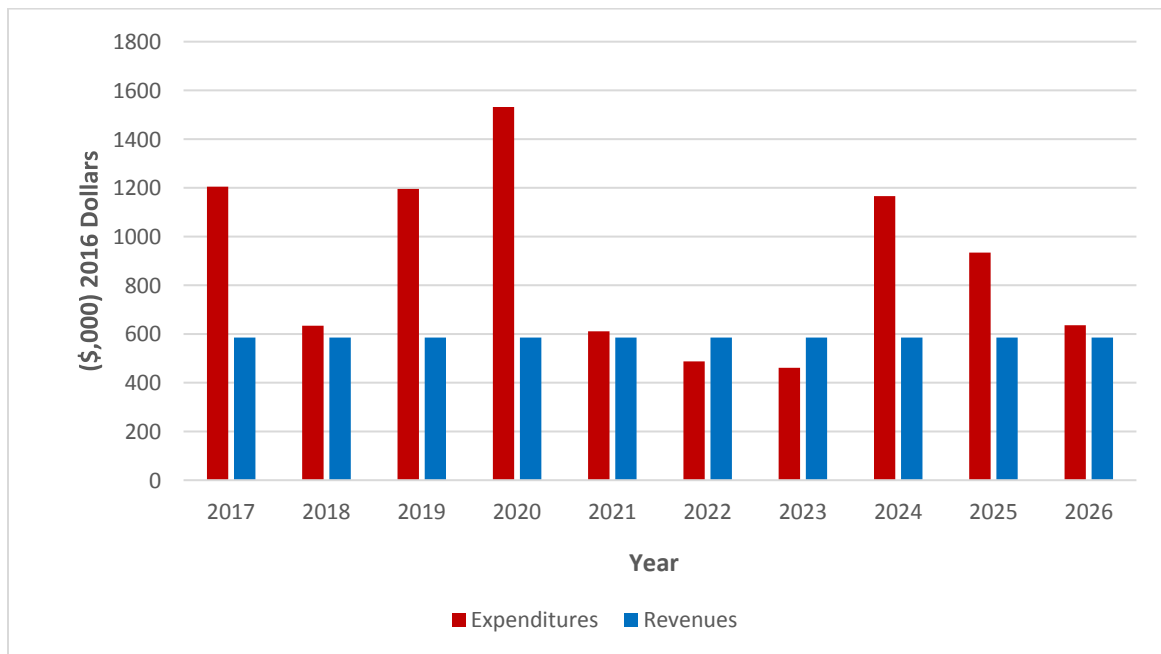


Figure 5 shows the anticipated revenue and capital expenditure forecasts in non-inflated 2016 dollars. To help simplify how the two are compared, it has been assumed that the inflation rate applied to the capital improvements, will be same as the inflation rate that affects the tax revenues. With this assumption applied, all comparisons are made in 2016 dollars and it is assumed that the increases applied to each will cancel each other out.

In September 2012, the Federation of Canadian Municipalities released the first *Canadian Infrastructure Report Card*. The *Canadian Infrastructure Report Card* does not distinguish between roads and bridges, and does not include utilities. It identified that the cost to replace all road sections in Canada that are in fair to very poor condition is \$7,325 per household in Canada. In comparison, the Township of Dawn-Euphemia road and bridge infrastructure costs to complete the anticipated work for the next 10 years is \$9,913 per tax paying household based on 894 tax paying households in the Township.

The construction of the vast majority of the Township's hardtop roads, watermains, bridges, graders, and facilities was funded by significant contributions from the historical grant programs of the Provincial and Federal governments. Those grant programs provided in general 75% to 90% funding of the total costs. It would be fair to say that these assets would not have been acquired without those historical funding levels. The Township's experience is similar to most of the small rural municipalities in Ontario.

The Township principally uses a pay-as-you go system to finance capital and maintenance expenditures. They have also taken advantage of grants to help complete larger capital improvement projects. This has historically allowed the Township to complete asset replacements and improvements when necessary; however, as the number of grants appears to be decreasing, while the service level expectations are increasing and assets age this may become more challenging. The Township plans to continue this strategy into the future for standard capital and maintenance work.

Occasionally the cost for large projects may exceed the capacity of the pay-as-you go strategy. The following strategies are occasionally used by municipalities when they require additional funding:

- applying for grants
- obtaining a loan
- issuing long term bonds
- setting up a public private partnership
- implement a user pay system to help fund the project

It is difficult for the Township of Dawn-Euphemia to implement some of these options given its size and the type of capital improvements typically required. The Township will continue applying for grants when they become available and, if necessary, use money from reserves or debt financing to address emergencies. If the opportunity presents itself and it is in the Township's best interest, the Township would consider a public private partnership or implement a user pay system. It is not expected to be cost effective for the Township to issue bonds.

For emergency repairs, it was explained that the Township will use reserves or debt financing to complete the repairs, where warranted, and adjust their following capital budgets as required to cover this repair. The Township has set a new debt financing target of a maximum of **5 %** of capital budgets in any 5-year period. This amount will be checked on a yearly basis to ensure that the Township continues to comply with the debt and financial obligation limit of a municipality outlined in the *Municipal Act, Ontario Reg. 799/94 as amended by O. Reg. 403/02 – Debt and Financial Obligation Limits*. If this target would cause the Township to exceed the amount allowed by the regulation it shall be adjusted downward.

For special projects, which lend themselves to public-private partnerships, the Township will entertain prospective partners to complete the work. However, this option is not expected to be practical for most infrastructure assets currently owned or expected to be owned by the Township in the near future.

## 7.0 SUMMARY

The Tables in this section summarize the current state of the infrastructure and financial budgets of the Township in comparison to the Targets presented in Section 4.0. The table has been colour coded to illustrate how well the asset groups are meeting their performance targets. Green implies the asset is meeting or exceeding that target, yellow implies it is close to meeting that target and red implies it is not achieving that target.

**Table 10 – 2016 Infrastructure Report Card**

Asset Type	Condition Rating	Level of Service Score	Risk Score	Financial Sustainability Score	Asset Letter Grade
Bridge	Average BCI = 73.8	Average LOS = 3.9	Average Risk = 4.5	83%	B-
	5.6% with BCI below 40	2.8% above 6	13.9% above 6		
Roads Gravel	Average CR = 6.8	Average LOS = 3.8	Average Risk = 4.0	35%	D
	6.0% with CR below 5	5.1% above 6	0.3% above 6		
Roads Surface Treatment	Average CR = 6.6	Average LOS = 3.9	Average Risk = 5.8		E
	23.8% with CR below 6	0% above 6	47.5% above 6		
Roads Asphalt	Average CR = 7.6	Average LOS = 3.1	Average Risk = 5.1		D
	47.0% with CR below 8	0% above 6	25.7% above 6		
Watermains	Average CR = 1.0	Average LOS = 2.0	Average Risk = 3.1	0%	D
	0% with CR below 4	0% above 6	0% above 6		
Facilities	Average FCI = 9.4	N/A	N/A	100%	A+
	0% with FCI under 7				
Fleet	Average CR = 4.3	N/A	N/A	52%	E
	44.4% with CR below 1				

Note:

1. Refer to Table 6 for definitions of targets and scoring system.
2. When reviewing the Level of Service, and the Risk Score, a value out of 10 is applied with a lower score implying the average score for that asset is in relatively good condition and a high score implying it is in poor condition or it represents a higher risk.
3. The Asset Letter Grade is a number out of 100 calculated and converted to a letter grade as outlined in Appendix F.



## **8.0 CONCLUSION**

The Asset Management Plan, as presented in this report, outlines the strategies that will be employed to meet the target levels of service for the different asset groups in a cost-effective manner. The target levels of service were set to meet the principal Township goal of maintaining the targets as defined in the plan. These include factors such as level of service provided, level of risk, condition and financial target.

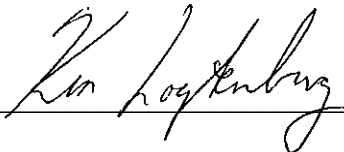
The asset groups included in this report are roads, bridges, watermains, facilities and fleet. The asset inventories for the five groups were completed in 2013 and 2015. Bridges are scheduled to be reviewed every 2 years as per the provincial regulations, all other asset groups will be formally reviewed on a 5-year cycle, and informally reviewed during regular maintenance activities. The Asset Management Plan will be updated about every 5 years and will include a review of the target levels of service and whether they are still supporting the goals of the Township or whether they require adjustment.

Each asset group in the Township has been assigned an overall letter grade, going forward this grade will be referenced in future reports. This comparison will help to determine whether the strategies are having a positive effect on the Township's assets or if more resources need to be allocated to a particular asset type.

Strategies are outlined for the rehabilitation and repair for each asset group along with the expected cost per year for the next 10 years. Based on the costs presented in the 2016 budget and the anticipated grant funds, it is estimated the Township can apply \$917,500 towards capital renewals and capital maintenance. This represents about 20% of their operating budget. It is estimated that the Township will encounter an annual financial shortfall of \$498,715 to address the projected capital improvement needs of the assets analyzed in this plan. To address this shortfall, the Township will either have to find cost savings, obtain grant funding or implement a tax increase. If no savings or additional grants are found, it is calculated that the Township would have to increase the taxation revenues by about 17% above inflation over the next five years to match the anticipated annual capital improvement needs and avoid deviating from the target service levels.

All of which is respectfully submitted for your approval.

B. M. ROSS AND ASSOCIATES LIMITED

Per   
Ken D. Logtenberg, P. Eng

Per   
Rick Steele, GISP

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## APPENDIX A

### BRIDGES

Asset:	Bridges
Asset Goal:	Maintain bridges in accordance with the rehabilitation and replacement criteria and the target level of service in a cost effective manner while satisfying legislative requirements.
Inventory:	108 Structures: 16 Bridges, 92 Culverts (over 3.0m in span)
Anticipated Asset Life Cycle:	<p>Bridges are composed of three broad element categories:  Sub-Structure: consists of footings, wingwalls and abutments  Super-Structure: consists of the deck and its main structural elements, as well as barrier walls  Wearing Surface: consists of asphalt and waterproofing, gravel or exposed concrete</p> <p>Broadly a bridge or concrete culvert in the Township of Howick may be assumed to have a service life of 80 years, prior to requiring replacement. A substantial rehabilitation would be expected to occur approximately every 30 years. An asphalt wearing surface consisting of two lifts of asphalt would be expected to have a life expectancy of 20 years. A corrugated steel pipe culvert may be assumed to have a service life of 50 years.</p> <p>Actual life of a bridge asset will depend on the severity of the environment in which it operates, level of use, and maintenance and rehabilitation activities performed throughout its life cycle.</p>
Integration:	May be integrated with work on the adjacent road sections, not typically integrated with other infrastructure in the Township.
Rehabilitation and Replacement Criteria:	<p>Criteria for prioritizing include safety, level of service, probability of failure and consequence of failure.</p> <p>Biennial visual inspections of the bridges are completed which include recommendations on work required to maintain, rehabilitate or repair the asset from the review Engineer. An overall Bridge Condition Index (BCI), a bridge condition rating between 0 and 100, is provided for each bridge. The BCI is a summary of the condition ratings given to all elements of the bridge. A BCI equal to 0 requires immediate removal from service and equal to 100 is a new structure with no observed defects. In practice no structure should reach a BCI of 0 as rehabilitation work or bridge replacement should be performed prior to all structural elements being rated as poor.</p> <p>Generally structures with an inadequate level of service will not have major rehabilitation work performed with a view to replacement at the end of its service life. Regular maintenance activities for these structures will be performed instead and may be more involved than regular maintenance activities performed for other structures. Where the level of service is substantially lower than required, an individual structure will be assessed in more detail and the Township may decide to schedule replacement earlier than merited by the priority score.</p>
Rehabilitation and Replacement Strategy:	<p>Work needs identified during the biennial bridge inspections will be assigned a priority score based on the level of service, probability of failure and consequence of failure associated with each structure. Work identified will be scheduled and adjusted, as required, to fit within the Township's annual budget and meet the Township's goals.</p> <p>Safety concerns identified during the bi-annual bridge inspections by the Engineer, irrespective of the priority score, will be addressed in a timely manner, proportional to the associated risk.</p> <p>Cost effective preventative maintenance strategies will be implemented where practical. With bridges this may include waterproofing and paving exposed bridge decks on paved roads, placing rip rap where undesirable erosion is taking place, or providing protective coatings on corrosion sensitive components.</p> <p>For long-term planning the Township has assumed that bridges and concrete culverts will require a major rehabilitation at approximately 40 years of age, and replacement at 80 years of age. Corrugated Steel Pipe (CSP) culverts the Township will assume that replacement will be require in 50 years with ongoing, periodic maintenance.</p>

Risks Associated with not Implementing Strategy:	<p>Bridges may not be able to accommodate standard traffic loads and load limits may need to be imposed.</p> <p>Asset users may have to follow an alternative route to avoid bridges with load limits or those not providing acceptable levels of service.</p> <p>Costs to maintain the bridges may increase if the work is not completed in a timely manner.</p>
Integrated Asset Priorities:	Integrated with adjacent road work when applicable.
Related Reports on Asset Type:	Bridge Inspection Report - dated July 8, 2013 completed by B.M. Ross and Associates Ltd.
Estimated Cost per year for Strategy Described:	<p>\$311,800/year for capital costs for the next 10 years (for boundary bridges, this estimate has already been reduced by 50%)</p> <p>\$7,600/year for the next 10 years for maintenance costs</p> <p>Costs are to be adjusted, as required in future reports</p>
Review Schedule and Procedure:	<p>Bridge assets are to be reviewed on a biennial bases under the supervision of a Professional Engineer, in accordance with mandated Provincial requirements to the standards of the Ontario Structural Inspection Manual. Bridges were last reviewed in 2012, therefore future reviews should take place in even-numbered years.</p> <p>A Bridge Condition Index (BCI) score will be calculated for each structure every five years when an updated bridge needs study and asset management plan is completed.</p>
Other Information or reference materials:	

**Proposed 10 Year Bridge Needs**

Site Number	RoadName	Structure Type	BCI	Priority	Type of Work	Proposed Year	Cost Estimate (000's)	Year Built	Last Rehab Date
64	Lambton Line	Rigid Frame, Vertical Legs	66	11	Rehab	2017	220	1930	
12	Pantry School Road	Rectangular Culvert	44	12	Replace	2017	63.1	1930	
90	Aughrim Line	I-beam or Girders	87	5	Rehab	2017	11	1972	2005
80	Smith Falls Road	Rigid Frame, Vertical Legs	70	6	Rehab	2018	65	1930	
39	Lambton Line	Rectangular Culvert	32	15	Rehab	2018	140	1950	
19	Dawn Valley Road / Langbank Line	I-beam or Girders	69	9	Replace	2018	38	1960	
30	Lambton Line	Rectangular Culvert	32	15	Replace	2019	217	1950	
99	Johnston Road	Round Culvert	61	8	Replace	2019	89.6	1960	
8	Tramway Road	Rectangular Culvert	68	10	Replace	2020	96	1940	
52	Oakdale Rd	Rigid Frame, Vertical Legs	73	7	Rehab	2020	231.24	1981	
69	Fansher Road	Ellipse Culvert	43	10	Replace	2021	451.2	1965	
14	Tramway Road	Rectangular Culvert	32	15	Replace	2022	92.8	1930	
13	Tramway Road	Rectangular Culvert	66	10	Replace	2022	108.8	1945	
35	Cuthbert Road	Rigid Frame, Vertical Legs	91	4	Rehab	2023	109.88	1985	
109	Florence Road	Round Culvert	40	11	Replace	2023	35.2	1965	
1	Dawn Valley Road	Rectangular Culvert	74	7	Replace	2023	150.4	1945	
106	Cameron Road	Ellipse Culvert	64	9	Replace	2024	467.2	1965	
3	Cuthbert Road	Rectangular Culvert	43	11	Replace	2025	99.2	1920	
9	Tramway Road	Rectangular Culvert	68	10	Replace	2025	185.6	1945	
71	Annett Road	Ellipse Culvert	50	10	Replace	2026	246.4	1965	

**Projected Cost of Work in (,000) over 40 Years.**

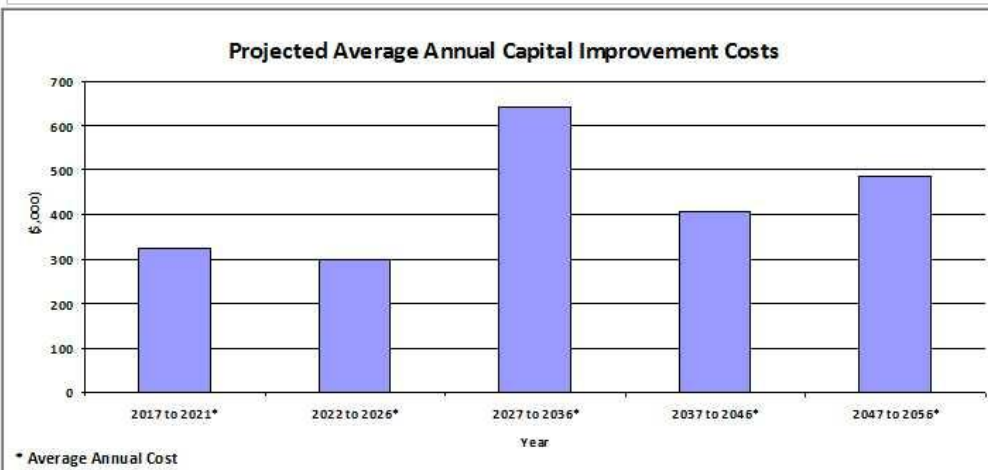
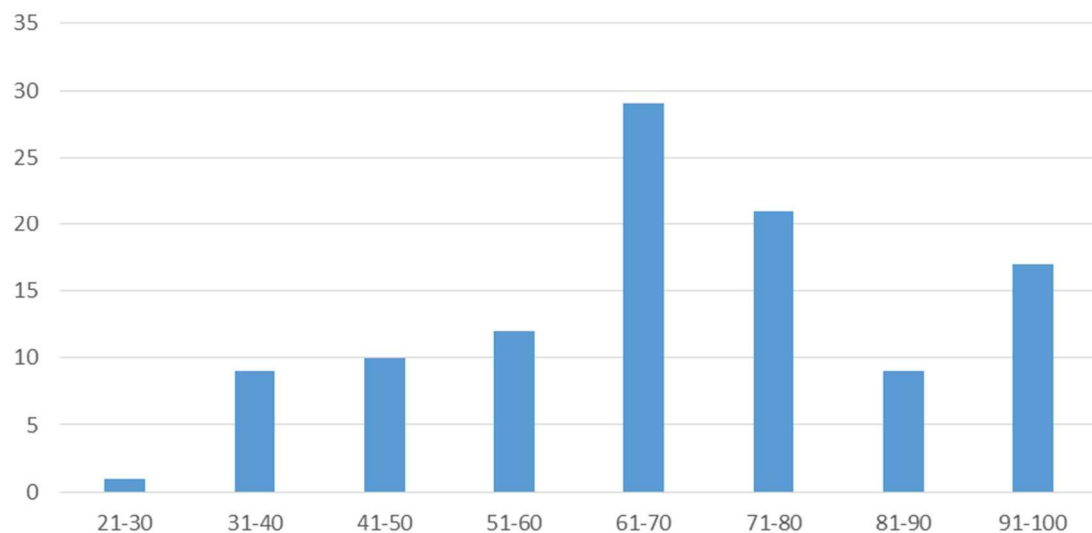
Proposed Timeframe	Bridge	Culvert	Totals	Average Annual
2017 to 2021*	\$565.2	\$1,056.9	\$1,622.1	\$324.4
2022 to 2026*	\$109.9	\$1,385.6	\$1,495.5	\$299.1
2027 to 2036*	\$671.2	\$5,740.8	\$6,412.0	\$641.2
2037 to 2046*	\$0.0	\$4,083.2	\$4,083.2	\$408.3
2047 to 2056*	\$2,238.6	\$2,620.8	\$4,859.4	\$485.9

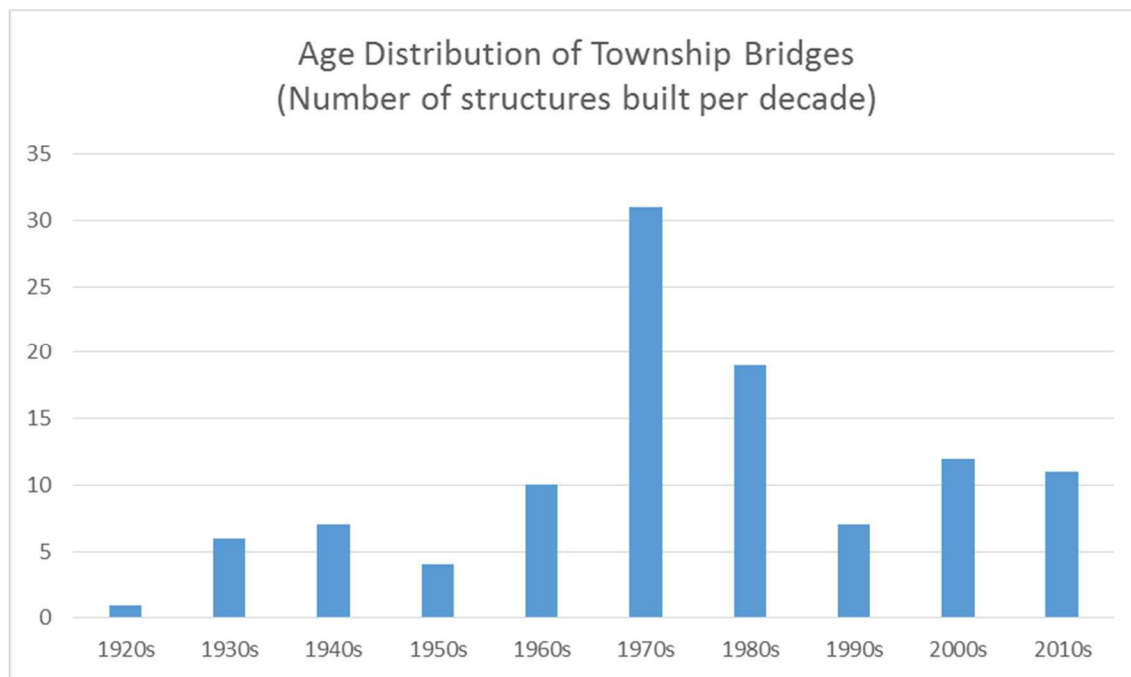
**Bridge Needs Errors**

SiteNum	Proposed Year
90	2017
64	2017
12	2017

Projected Average Annual Cost Over 40 Years (\$,000): Total of all Recommended Maintenance (\$,000):  Annually (Assuming 5 Year Period) in (\$,000): **Average Score Summary:**

Average BCI	Average Risk	Average Level of Service	Average Priority
73.8	4.5	3.9	8.3

**Bridge Condition Index Ratings of Township Bridges**





Site Number	Road Name	Structure Type	Span (m)	BCI	Year Built	Last Rehab Date	Risk Rating	Level of Service Rating	Priority Score
1	Dawn Valley Road	Rectangular Culvert	4.25	74	1945		3	4	7
2	Cuthbert Road	Rectangular Culvert	7.5	75	1975		3	3	6
3	Cuthbert Road	Rectangular Culvert	3.8	43	1920		5	6	11
4	Robinson Road	Rectangular Culvert	3	98	1997		2	2	4
5	Robinson Road	Rectangular Culvert	6.1	86	2003		2	3	5
6	Marthaville Road	Rectangular Culvert	4.9	75	E-1990 W-1960		5	3	8
7	Marthaville Road	Rectangular Culvert	6	89	1975		4	2	6
8	Tramway Road	Rectangular Culvert	3.1	68	1940		5	5	10
9	Tramway Road	Rectangular Culvert	5.5	68	1945		5	5	10
10	Esterville Road	Rectangular Culvert	3.5	58	1940		4	5	9
11	Esterville Road	Rectangular Culvert	3	96	2003		2	3	5
12	Pantry School Road	Rectangular Culvert	2.4	44	1930		6	6	12
13	Tramway Road	Rectangular Culvert	3.6	66	1945		5	5	10
14	Tramway Road	Rectangular Culvert	3.2	32	1930		7	8	15
15	Marthaville Road	Ellipse Culvert	2.6	46	2012		7	5	12
16	Robinson Road	Rectangular Culvert	5.8	91	1990		2	3	5
17	Cuthbert Road	Rectangular Culvert	6.1	97	2006		3	3	6
18	Dawn Valley Road	Rectangular Voided Slab	7.85	93	1975		2	2	4
19	Dawn Valley Road / Langbank Line	I-beam or Girders	6.9	69	1960		5	4	9
20	Cuthbert Road	I-beam or Girders	5.3	39	1940	2012	7	8	15
21	Robinson Road	Rectangular Culvert	5.5	75	1975		4	3	7
22	Marthaville Road	Rectangular Culvert	5.2	90	2005		5	3	8
23	Tramway Road	Rectangular Culvert	3.8	36	1930		6	7	13
24	Edys Mill Line	Rectangular Culvert	3.05	72	1984		3	4	7
25	Tramway Road	Ellipse Culvert	2.6	64	1975		4	5	9
26	Tramway Road	Ellipse Culvert	3.1	64	1970		5	4	9
27	Lambton Line	Rectangular Culvert	2.4	28	2014		9	6	15
28	Lambton Line	Rectangular Culvert	2.5	32	1950	2016	9	6	15
29	Robinson Road	Ellipse Culvert	2.6	61	1977		5	4	9
30	Lambton Line	Rectangular Culvert	2.5	32	1950		9	6	15
31	Dawn Valley Road	Rectangular Culvert	3.1	66	1970		5	5	10
32	Lambton Line	Rectangular Culvert	3.1	98	1995		5	2	7
33	Kent Line	Rectangular Culvert	6.1	84	1975		4	3	7
34	Dawn Valley Road	Rigid Frame, Vertical Legs	6.1	91	1995		3	2	5
35	Cuthbert Road	Rigid Frame, Vertical Legs	6.3	91	1985		2	2	4
36	Kent Line	Ellipse Culvert	3.8	36	1970		7	6	13
37	Kent Line	Rectangular culvert	3.1	97	2000		3	2	5
38	Esterville	Rectangular Culvert	3	97	1980		3	2	5
39	Lambton Line	Rectangular Culvert	6.1	32	1950		9	6	15
40	Pantry School Road	Solid Slab	6.5	64	1990		5	5	10
41	Pantry School Road	Rectangular Voided Slab	16.9	68	1979	2016	5	5	10
42	Gould Road	Rectangular Culvert	3	86	1998		2	2	4
43	Gould Road	Arch Culvert	11	91	2002		2	3	5
44	Huffs Corners Road	Arch Culvert	10.9	93	2001		2	3	5
45	Huffs Corners Road	Ellipse Culvert	2.1	66	2006		4	4	8
46	Lambton Line	Round Culvert	2.2	42	2013		8	5	13
47	Lambton Line	Round Culvert	2	42	2014		8	5	13
48	Lambton Line	Round Culvert	1.8	100	2012		5	2	7
49	Lambton Line	Round Culvert	2	54	2014		8	5	13
50	Lambton Line	I-beam or Girders	15.4	88	1960	2012	5	2	7
51	Lambton Line	Round Culvert	1.8	57	1975		7	4	11
52	Oakdale Rd	Rigid Frame, Vertical Legs	13.5	73	1981		4	3	7
53	Langbank Line	Rigid Frame, Vertical Legs	11	79	1989		4	3	7
54	Oakdale Road	T-Beam	10.9	66	1980	2013	5	4	9
55	Hale School Road	Arch Culvert	2.23	54	2015		6	5	11
56	Hale School Road	Rectangular Culvert	6.3	84	1990		4	4	8
57	Aberfeldy Line	Rectangular Culvert	3	100	2005		3	2	5
58	Oakdale Road	Ellipse Culvert	2.4	47	2014		5	5	10
59	Naylor Road	Ellipse Culvert	2.9	54	1970		5	5	10
60	Naylor Road	Round Culvert	1.8	96	2009		3	2	5
61	McAsulan Road	Rectangular Culvert	3	78	1970		3	3	6
62	Florence Road	Ellipse Culvert	3.7	66	1975		5	4	9
63	McCutcheon Road	Round Culvert	1.78	58	1975		4	4	8
64	Lambton Line	Rigid Frame, Vertical Legs	16.8-18.3	66	1930		7	4	11
65	Florence Road	Rigid Frame, Vertical Legs	9.1	52	1940	2016	8	5	13

Site Number	Road Name	Structure Type	Span (m)	BCI	Year Built	Last Rehab Date	Risk Rating	Level of Service Rating	Priority Score
66	Fansher Road	Round Culvert	1.8	72	1980		3	3	6
67	Davis Road	Round Culvert	4.8-4.8	75	1975		3	3	6
68	Davis Road	Ellipse Culvert	5.4-5.4	57	1970		4	4	8
69	Fansher Road	Ellipse Culvert	5.2	43	1965		5	5	10
70	Annett Road	Ellipse Culvert	5.1	75	1975		3	3	6
71	Annett Road	Ellipse Culvert	4.4	50	1965		5	5	10
72	Downie Road	Ellipse Culvert	4.7	61	1970		4	4	8
73	Downie Road	Round Culvert	1.6	36	2015		6	6	12
74	Fansher Road	Ellipse Culvert	5.5	61	1970		4	4	8
76	Downie Road	Round Culvert	3-3	79	1980		3	3	6
77	Bilton Line	Ellipse Culvert	3.9	61	1975		5	4	9
78	Kerry Road	Round Culvert	1.8	95	2005		2	2	4
79	Bilton Line	Ellipse Culvert	3.8	68	1975		4	4	8
80	Smith Falls Road	Rigid Frame, Vertical Legs	9.7	70	1930		3	3	6
81	Annett Road	Round Culvert	1.4	57	1975		4	4	8
82	Downie Road	Rectangular Culvert	6.4	85	1970		3	2	5
83	Annett Road	Ellipse Culvert	8.7	75	1980		3	3	6
84	Dobbyn Road	Round Culvert	1.5	100	2007		2	2	4
85	Dobbyn Road	Ellipse Culvert	4.8	72	1980		3	3	6
86	Dobbyn Road	Ellipse Culvert	4.4	68	1980		4	4	8
87	Burr Road	Ellipse Culvert	4.4	68	1980		4	4	8
88	Mossie Line	Ellipse Culvert	4.2	58	1970		5	4	9
89	Burr Road	Round Culvert	1.6	57	1980		4	4	8
90	Aughrim Line	I-beam or Girders	21-23-21	87	1972	2005	3	2	5
91	Mossie Line	Round Culvert	1.7	61	1975		5	4	9
92	Johnston Road	Ellipse Culvert	3.65	42	2015		5	5	10
93	Bentpath Line	Rectangular Culvert	5.5	57	1955		7	4	11
94	McCready Road	Rectangular Culvert	5	71	1935		3	4	7
95	Cameron Road	Ellipse Culvert	4.6	68	1975		5	4	9
96	Cameron Road	Ellipse Culvert	4.7	75	1985		4	3	7
97	McCready Road	Ellipse Culvert	5.6	75	1980		3	3	6
98	Johnston Road	Ellipse Culvert	5.3	72	1980		3	3	6
99	Johnston Road	Round Culvert	1.7	61	1960		4	4	8
100	Cameron Road	Ellipse Culvert	3.9	76	1985		3	3	6
101	McCready Road	Ellipse Culvert	3.8	61	1970		5	4	9
102	Euphemia Line	Rectangular Culvert	3.1	68	1960		5	4	9
103	Johnston Road	Ellipse Culvert	4.9	72	1985		3	3	6
104	Burr Road	Round Culvert	2.7-2.7	72	1975		3	3	6
105	Hale School Road	Rectangular Voided Slab	12.9	69	1967	2016	5	4	9
106	Cameron Road	Ellipse Culvert	6.4	64	1965		5	4	9
107	Waterworth Road	Rectangular Culvert	4.5	43	2015		5	5	10
108	Florence Road	Rectangular Culvert	3.6	75	1980		4	3	7
109	Florence Road	Round Culvert	0.75	40	1965		6	5	11

## APPENDIX B

### ROADS

Asset:	Roads
Inventory:	<p>1.5 km of earth roads  412.7 km of gravel roads  25.9 km of surface treated roads  4.8 km of 1-lift paved roads  <u>33.9 km of 2-lifts paved roads</u>  478.8 km total road system</p>
Anticipated Asset Life Cycle:	<p>The probable life expectancies of a road section is affected by design, drainage, traffic volumes and loads, construction quality and climate. It is anticipated that there may be localized repairs and maintenance work such as crack sealing necessary to achieve the probable life expectancy. Generally the expected useful life for roads is: 30 years for a 2-lifts paved road, 15 years for a 1-lift paved road, 6 years for a surface treated road, and 100 years for a gravel road. Expected service life decreases as traffic volume per day increases.</p>
Integration:	<p>At this time, the Township of Dawn-Euphemia only has buried water assets, and no storm or waste water assets. Watermain replacement needs should be considered, however the earliest estimated watermain renewal is 2086. Other assets which may need to be considered during work on a road section include hydro, telephone, natural gas, cable, street lights, and sidewalks.</p> <p>If a road section includes a bridge, that structure should be reviewed to determine if any work needs to be performed prior to paving.</p>
Rehabilitation and Replacement Criteria:	<p>A Condition Rating (CR) is an assessment between one and ten with lower numbers describing roads with the most structural distress. The higher the rating number, the better the condition of the road. The CR takes into consideration the surface condition and structural adequacy of the road section based on the visual inspection. The CR does not consider the road width, vertical and horizontal alignment or an assessment of the road to determine whether it is constructed in accordance with suitable standards.</p> <p>CR point of rehabilitation for paved and surface treated roads is a CR of between 6 and 8, below 6 roads will require reconstruction. For gravel roads the point of rehabilitation is a CR of 5 and above, reconstruction below 5. Road sections with poor drainage identified will either be reviewed on an individual basis to determine whether drainage issues can be addressed by rehabilitation or whether reconstruction will be required.</p> <p>Earth roads will be reconstructed as gravel roads as warranted by changes in usage.</p> <p>As of the 2013 roads report the length weighted average CR for paved roads was 7.6, 6.6 for surface treated roads and 6.8 for gravel roads.</p>

Rehabilitation and Replacement Strategy:	<p>For gravel roads regular grading and biennial application of 50 mm to 75 mm of granular 'A' will be used on all roads above a CR of 5. Where required, spot maintenance at isolated locations will be performed prior to the application of gravel. It is expected that this will maintain most gravel road sections at a CR of 5 or higher. When the CR of a gravel road falls below 5 and usage warrants reconstruction, the road section will be reconstructed with 450mm of granular B and 150 mm of granular A. Any organic materials present in the sub-base will be removed prior to reconstruction and drainage issues will be addressed. For gravel roads with less than 50 AADT (average annual daily traffic) the CR may be allowed to deteriorate beyond 5 in favour of performing capital works on other, higher traffic, road sections. These lower traffic gravel road sections would have capital improvements performed as the budget permits.</p> <p>For paved roads crack sealing will be performed as a maintenance activity where the deterioration level is not too severe, typically a CR above 8. Depending on road section location, urban, semi-urban, rural and condition of the road section one of the following strategies will be selected: Total reconstruction with 350mm granular B, 150 mm granular A and 40mm to 80mm of hot mix asphalt. Mill and resurface pavement with 32mm to 40mm of hot mix asphalt. Mill and resurface patches of pavement with 50mm of hot mix asphalt.</p> <p>For surface treated roads crack sealing will be performed as a maintenance activity where the CR is above 8. Depending on road section location, and condition of the road section one of the following will be selected: Mill and resurface road or road sections with one to two lift surface treatment. Total reconstruction with 350mm granular B, 150 mm granular A and one to two lifts of surface treatment.</p>
Risks Associated with not Implementing Strategy:	<p>If rehabilitation does not occur at the recommended CR level, road sections will deteriorate further until reconstruction is the only option to restore the level of service, this will result in higher construction costs. If road sections are allowed to deteriorate beyond the threshold for reconstruction, the Township's risk and liability for those road sections will increase.</p>
Integrated Asset Priorities:	Road section rehabilitation and reconstruction forecasts are to be compared to forecasts for bridge and underground utility rehabilitation and reconstruction. The co-ordination of projects will occur internally between Township departments.
Related Reports on Asset Type:	
Estimated Cost per year for Strategy Described:	<p>\$574,500/year for the next 10 years for rehabilitation and construction (for boundary roads, this estimate has already been reduced by 50%)</p> <p>\$82,700/year for the next 5 years for maintenance</p> <p>Costs are to be adjusted as required in future reports</p>
Review Schedule and Procedure:	Road sections shall be reviewed regularly by the Township road crew as part of their routine maintenance activities. Every 5 years a more thorough inventory review will be performed by Township staff or outside consultants in order to assign condition ratings, compare them to the level of service targets, and prepare a more detailed 5 year work plan.
Other Information or reference materials:	

**Road Construction Needs**  
**Sorted by Proposed Year of Need and Priority Score**

**Appendix B.1-3**

**Township of Dawn Euphemia**  
**Road Management Study**

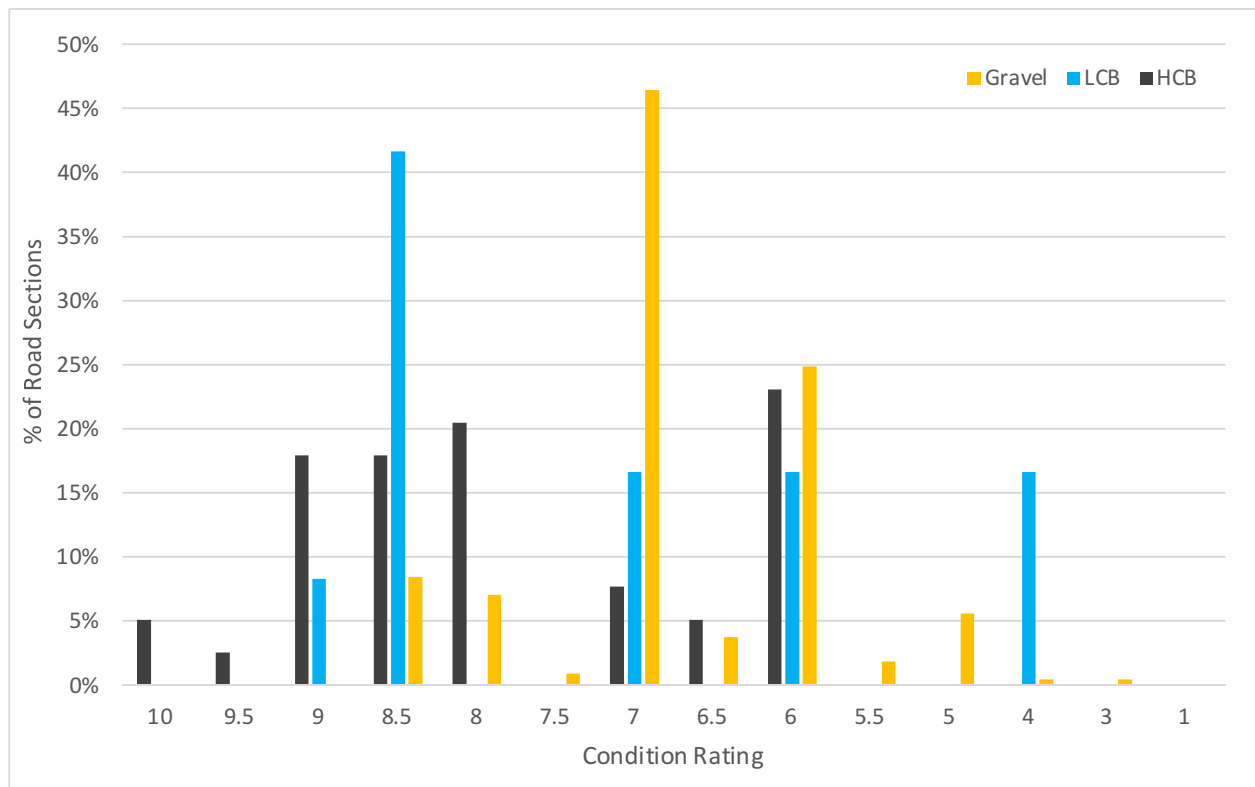
Section ID	Road Name	From	To	Section Length (m)	Surface Type	Traffic Range (vpd)	Road Construction Needs	Theo. Year of Need	Proposed Year of Work	Priority	Probable Costs (\$,000)
10103	Dawn Valley Road	Langbank Line	Bentpath Line	3074	LCB - 2 lifts	50-199	Rural Full depth pulverize and pave	2017	2017	13	455.0
10102	Dawn Valley Road	Lambton Line	Langbank Line	3077	LCB - 2 lifts	50-199	Rural Full depth pulverize and pave	2017	2017	13	455.4
10402	Marthaville Road	Lambton Line	Langbank Line	3071	LCB - 2 lifts	500-999	Surface Treatment - Single surface	2018	2018	13	104.4
10404	Marthaville Road	Bentpath Line	Edys Mills Line	3075	LCB - 2 lifts	200-499	Surface Treatment - Single surface	2018	2018	12	104.5
10403	Marthaville Road	Langbank Line	Bentpath Line	3078	LCB - 2 lifts	500-999	Surface Treatment - Single surface	2019	2018	9	104.7
10405	Marthaville Road	Edys Mills Line	Aberfeldy Line	2280	LCB - 2 lifts	200-499	Surface Treatment - Single surface	2019	2018	8	77.5
31512	Lambton Line	Hale School Road	Oakdale Road	1405	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	2021	2019	13	295.1
31513	Lambton Line	Oakdale Road	Naylor Road	1394	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	2021	2019	13	292.8
31514	Lambton Line	Naylor Road	Florence Road	1435	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	2021	2019	13	301.3
31511	Lambton Line	Huffs Corners Road	Hale School Road	1373	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	2021	2020	13	288.4
31510	Lambton Line	Gould Road	Huffs Corners Road	1380	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	2021	2020	13	289.8
31509	Lambton Line	Pantry School Road	Gould Road	1380	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	2021	2020	13	289.7
31508	Lambton Line	Dawn Mills Road	Pantry School Road	1603	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	2021	2020	13	336.7
33407	Aberfeldy Line	Esterville Road	Oil Heritage Road	1171	HCB - 1 lift	50-199	Surface Treatment - Single surface	2023	2021	7	39.8
33405	Aberfeldy Line	Marthaville Road	Tramway Road	1337	LCB - 2 lifts	200-499	Surface Treatment - Single surface	2021	2021	6	45.4
33403	Aberfeldy Line	Cuthbert Road	Robinson Road	1356	LCB - 2 lifts	200-499	Surface Treatment - Single surface	2021	2021	6	46.1
33406	Aberfeldy Line	Tramway Road	Esterville Road	1393	LCB - 2 lifts	200-499	Surface Treatment - Single surface	2021	2021	6	47.4
33404	Aberfeldy Line	Robinson Road	Marthaville Road	1413	LCB - 2 lifts	200-499	Surface Treatment - Single surface	2021	2021	6	48.1
33401	Aberfeldy Line	Mandaumin Road	Dawn Valley Road	1318	LCB - 2 lifts	200-499	Surface Treatment - Single surface	2022	2021	6	44.8
33402	Aberfeldy Line	Dawn Valley Road	Cuthbert Road	1424	LCB - 2 lifts	50-199	Surface Treatment - Single surface	2021	2021	5	48.4
41506	Lambton Line	Annett Road	Downie Road	1374	HCB - 2 lifts	0-49	Rural partial depth cold in place and pave (50mm HL-4)	2023	2022	10	288.5
41505	Lambton Line	Kerry Road	Annett Road	1353	HCB - 2 lifts	0-49	Rural partial depth cold in place and pave (50mm HL-4)	2023	2022	10	284.0
16	Mary Street	Fansher St	Gunne St	70	HCB - 1 lift	0-49	Semi-Urban Full depth pulverize and pave	2022	2023	8	10.2
15	Gunne Street	Florence Road	Mary St	205	HCB - 1 lift	0-49	Semi-Urban Full depth pulverize and pave	2022	2023	8	29.7
6	Union Street	Florence Road	Joseph St	183	HCB - 1 lift	0-49	Semi-Urban Full depth pulverize and pave	2026	2023	4	26.5
3	George Street	Florence Road	Mill St	382	HCB - 1 lift	0-49	Semi-Urban Full depth pulverize and pave	2026	2023	4	55.4
10	Arthur Street	Florence Road	Lenover St	133	HCB - 1 lift	0-49	Semi-Urban Full depth pulverize and pave	2026	2023	4	19.3
2	Water Street	Florence Road	westerly	43	Gravel	0-49	Rural Full Reconstruction - Gravel Surface	> 2026	2023	4	24.6
31501	Lambton Line	Mandaumin Road	Dawn Valley Road	1935	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	> 2026	2024	7	406.3
31502	Lambton Line	Dawn Valley Road	Cuthbert Road	1393	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	> 2026	2024	7	292.5

**Road Construction Needs**  
**Sorted by Proposed Year of Need and Priority Score**

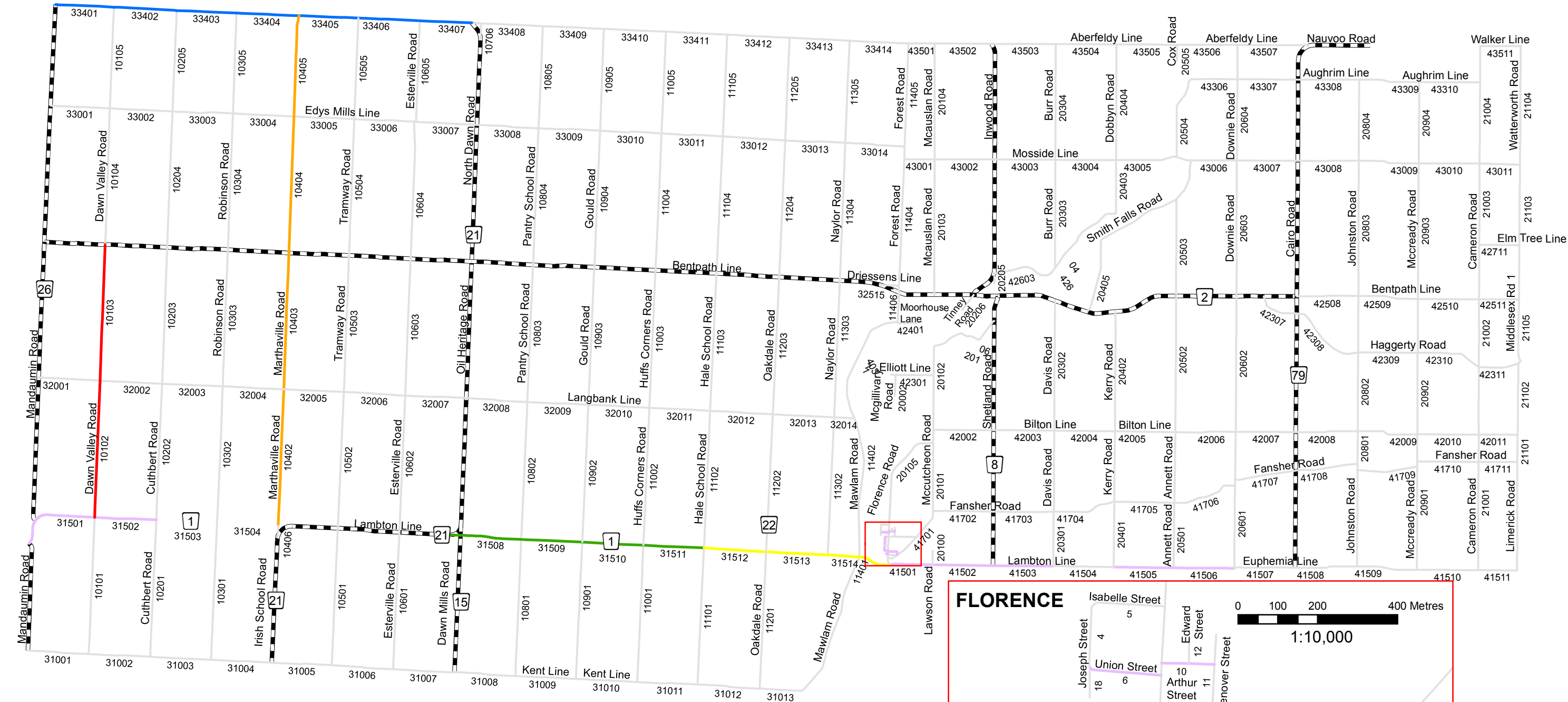
**Appendix B.1-3**

**Township of Dawn Euphemia**  
**Road Management Study**

<b>Section ID</b>	<b>Road Name</b>	<b>From</b>	<b>To</b>	<b>Section Length (m)</b>	<b>Surface Type</b>	<b>Traffic Range (vpd)</b>	<b>Road Construction Needs</b>	<b>Theo. Year of Need</b>	<b>Proposed Year of Work</b>	<b>Priority</b>	<b>Probable Costs (\$,000)</b>
31503	Lambton Line	Cuthbert Road	Robinson Road	1374	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	> 2026	2025	7	288.5
31504	Lambton Line	Robinson Road	Marthaville Road	1719	HCB - 2 lifts	500-999	Rural partial depth cold in place and pave (50mm HL-4)	> 2026	2025	7	360.9
41501	Lambton Line	Florence Road	Lawson Road	977	HCB - 2 lifts	0-49	Rural partial depth cold in place and pave (50mm HL-4)	> 2026	2026	6	205.2
41503	Lambton Line	Shetland Road	Davis Road	1369	HCB - 2 lifts	0-49	Rural partial depth cold in place and pave (50mm HL-4)	> 2026	2026	4	287.4
41502	Lambton Line	Lawson Road	Shetland Road	1363	HCB - 2 lifts	0-49	Rural partial depth cold in place and pave (50mm HL-4)	> 2026	2026	4	286.3







**Legend**

**Proposed Year of Need**

2017

2018

2019

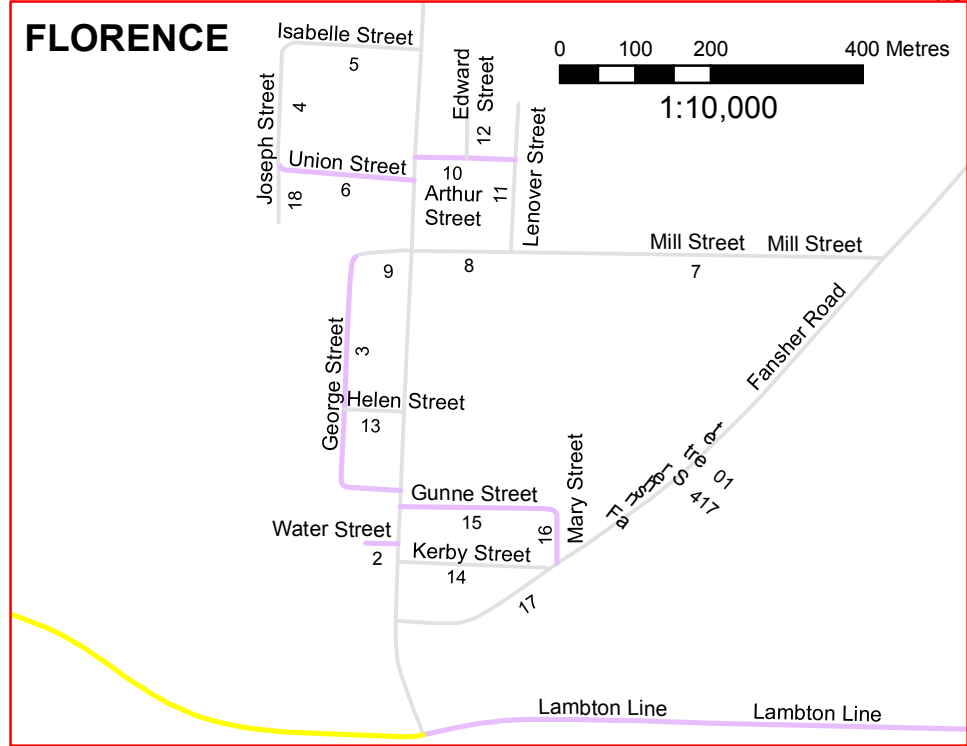
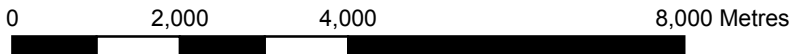
2020

2021

2022-2026

> 2026

County Road



Township of Dawn Euphemia Road Needs Study Dawn Euphemia and Florence Proposed Year of Need	DATE OCT. 15, 2016	PROJECT No. 13216
	SCALE 1:90 000	FIGURE No. B-1

**Inventory Summary Sheet  
Sorted by Road Section Number**

Appendix B.2 - 1

**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
1	Florence Road	Lambton Line	Hamlet hard-top	1338	Semi-Urban	HCB - 1 lift	9.0	7.0	500-999	Local	9.0
2	Water Street	Florence Road	westerly	43	Rural	Gravel	7.0	7.5	0-49	Local	8.0
3	George Street	Florence Road	Mill St	382	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.0
4	Joseph Street	Union St	Isabelle St	159	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.5
5	Isabelle Street	Florence Road	Joseph St	179	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	9.0
6	Union Street	Florence Road	Joseph St	183	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.0
7	Mill Street	Hamlet boundary	Fansher Road	433	Rural	Gravel	8.0	6.5	0-49	Local	8.0
8	Mill Street	Florence Road	Hamlet boundary	192	Semi-Urban	HCB - 1 lift	8.0	6.3	50-199	Local	9.0
9	Mill Street	Florence Road	George St	74	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.5
10	Arthur Street	Florence Road	Lenover St	133	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.0
11	Lenover Street	Mill St	Arthur	197	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.5
12	Edward Street	Arthur St	northerly	62	Rural	Gravel	7.0	5.5	0-49	Local	6.5
13	Helen Street	Florence Road	George St	79	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	9.0
14	Kerby Street	Florence Road	Fansher St	201	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.5
15	Gunne Street	Florence Road	Mary St	205	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	6.5
16	Mary Street	Fansher St	Gunne St	70	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	6.5
17	Fansher Street	Florence Road	Fansher Road	269	Semi-Urban	HCB - 1 lift	7.0	6.3	0-49	Local	8.5
18	Joseph Street	Union St	end	77	Rural	Gravel	7.0	4.5	0-49	Local	7.0
10101	Dawn Valley Road	Kent Line	Lambton Line	3087	Rural	Gravel	11.0	7.0	50-199	Local	7.0
10102	Dawn Valley Road	Lambton Line	Langbank Line	3077	Rural	LCB - 2 lifts	11.0	7.0	50-199	Local	4.0
10103	Dawn Valley Road	Langbank Line	Bentpath Line	3074	Rural	LCB - 2 lifts	9.0	7.0	50-199	Local	4.0
10104	Dawn Valley Road	Bentpath Line	Edys Mills Line	3070	Rural	Gravel	9.0	6.8	0-49	Local	7.0
10105	Dawn Valley Road	Edys Mills Line	Aberfeldy Line	2285	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10201	Cuthbert Road	Kent Line	Lambton Line	3089	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10202	Cuthbert Road	Lambton Line	Langbank Line	3071	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10203	Cuthbert Road	Langbank Line	Bentpath Line	3078	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10204	Cuthbert Road	Bentpath Line	Edys Mills Line	3067	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10205	Cuthbert Road	Edys Mills Line	Aberfeldy Line	2276	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10301	Robinson Road	Kent Line	Lambton Line	3096	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10302	Robinson Road	Lambton Line	Langbank Line	3074	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10303	Robinson Road	Langbank Line	Bentpath Line	3081	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10304	Robinson Road	Bentpath Line	Edys Mills Line	3074	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10305	Robinson Road	Edys Mills Line	Aberfeldy Line	2265	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10402	Marthaville Road	Lambton Line	Langbank Line	3071	Rural	LCB - 2 lifts	11.0	7.0	500-999	Local	6.0

**Inventory Summary Sheet  
Sorted by Road Section Number**

Appendix B.2 - 2

**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
10403	Marthaville Road	Langbank Line	Bentpath Line	3078	Rural	LCB - 2 lifts	11.0	6.8	500-999	Local	7.0
10404	Marthaville Road	Bentpath Line	Edys Mills Line	3075	Rural	LCB - 2 lifts	11.0	6.8	200-499	Local	6.0
10405	Marthaville Road	Edys Mills Line	Aberfeldy Line	2280	Rural	LCB - 2 lifts	11.0	6.8	200-499	Local	7.0
10406	Irish School Road	Irish School Road	Lambton Line	267	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	8.0
10501	Tramway Road	Kent Line	Lambton Line	3090	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10502	Tramway Road	Lambton Line	Langbank Line	3075	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10503	Tramway Road	Langbank Line	Bentpath Line	3078	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10504	Tramway Road	Bentpath Line	Edys Mills Line	3077	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10505	Tramway Road	Edys Mills Line	Aberfeldy Line	2276	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10601	Esterville Road	Kent Line	Lambton Line	3090	Rural	Gravel	9.0	6.3	50-199	Local	7.0
10602	Esterville Road	Lambton Line	Langbank Line	3084	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10603	Esterville Road	Langbank Line	Bentpath Line	3084	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10604	Esterville Road	Bentpath Line	Edys Mills Line	3096	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10605	Esterville Road	Edys Mills Line	Aberfeldy Line	2280	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10706	North Dawn Road	Oil Heritage Road	Aberfeldy Line	343	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10801	Pantry School Road	Kent Line	Lambton Line	3081	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10802	Pantry School Road	Lambton Line	Langbank Line	3098	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10803	Pantry School Road	Langbank Line	Bentpath Line	3095	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10804	Pantry School Road	Bentpath Line	Edys Mills Line	3085	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10805	Pantry School Road	Edys Mills Line	Aberfeldy Line	2309	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10901	Gould Road	Kent Line	Lambton Line	3086	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10902	Gould Road	Lambton Line	Langbank Line	3100	Rural	Gravel	9.0	7.0	0-49	Local	7.0
10903	Gould Road	Langbank Line	Bentpath Line	3101	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10904	Gould Road	Bentpath Line	Edys Mills Line	3083	Rural	Gravel	9.0	7.0	50-199	Local	7.0
10905	Gould Road	Edys Mills Line	Aberfeldy Line	2296	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11001	Huffs Corners Road	Kent Line	Lambton Line	3089	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11002	Huffs Corners Road	Lambton Line	Langbank Line	3097	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11003	Huffs Corners Road	Langbank Line	Bentpath Line	3101	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11004	Huffs Corners Road	Bentpath Line	Edys Mills Line	3089	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11005	Huffs Corners Road	Edys Mills Line	Aberfeldy Line	2296	Rural	Gravel	8.0	7.0	0-49	Local	7.0
11101	Hale School Road	Kent Line	Lambton Line	3082	Rural	Gravel	9.0	7.0	50-199	Local	7.0
11102	Hale School Road	Lambton Line	Langbank Line	3095	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11103	Hale School Road	Langbank Line	Bentpath Line	3099	Rural	Gravel	9.0	7.0	50-199	Local	7.0
11104	Hale School Road	Bentpath Line	Edys Mills Line	3089	Rural	Gravel	9.0	7.0	0-49	Local	7.0

**Inventory Summary Sheet  
Sorted by Road Section Number**

Appendix B.2 - 3

**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
11105	Hale School Road	Edys Mills Line	Aberfeldy Line	2299	Rural	Gravel	11.0	7.0	0-49	Local	7.0
11201	Oakdale Road	Kent Line	Lambton Line	3084	Rural	HCB - 2 lifts	11.0	6.8	200-499	Local	7.0
11202	Oakdale Road	Lambton Line	Langbank Line	3104	Rural	Gravel	9.0	8.0	50-199	Local	7.0
11203	Oakdale Road	Langbank Line	Bentpath Line	3098	Rural	Gravel	9.0	8.0	50-199	Local	7.0
11204	Oakdale Road	Bentpath Line	Edys Mills Line	3087	Rural	Gravel	9.0	7.5	0-49	Local	7.0
11205	Oakdale Road	Edys Mills Line	Aberfeldy Line	2312	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11302	Naylor Road	Lambton Line	Langbank Line	3105	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11303	Naylor Road	Langbank Line	Bentpath Line	3089	Rural	Gravel	9.0	7.0	50-199	Local	7.0
11304	Naylor Road	Bentpath Line	Edys Mills Line	3108	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11305	Naylor Road	Edys Mills Line	Aberfeldy Line	2298	Rural	Gravel	9.0	7.0	0-49	Local	7.0
11401	Mawlam Road	Kent Line	Lambton Line	3340	Rural	Gravel	7.5	5.5	0-49	Local	7.0
11402	Mawlam Road	Lambton Line	Langbank Line	3159	Rural	Gravel	7.5	5.5	0-49	Local	7.0
11403	Mawlam Road	Langbank Line	Forest Rd	2761	Rural	Gravel	8.0	6.0	0-49	Local	7.0
11404	Forest Road	Bentpath Line	Edys Mills Line	3283	Rural	Gravel	8.0	5.8	0-49	Local	7.0
11405	Forest Road	Edys Mills Line	Aberfeldy Line	2330	Rural	Gravel	8.0	5.6	0-49	Local	7.0
11406	Forest Road	Mawlam Rd	Bentpath Line	663	Rural	Gravel	9.0	7.0	0-49	Local	7.0
20002	Mcgillivray Road	Elliott Line	S to Lot 21	469	Rural	Gravel	7.0	7.0	0-49	Local	3.0
20100	Lawson Road	Lambton Line	N to Fansher Creek	317	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20101	Mccutcheon Road	Fansher Road	Florence Road	1560	Rural	Gravel	9.0	7.0	0-49	Local	5.0
20102	Florence Road	McCutcheon Rd	the River	2165	Rural	Gravel	9.0	7.0	50-199	Local	6.0
20103	Mcauslan Road	Bentpath Line	Mossie Line	3054	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20104	Mcauslan Road	Mossie Line	Aberfeldy Line	2609	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20105	Florence Road	Hamlet hard-top	McCutcheon Rd	1968	Rural	Gravel	9.0	7.0	50-199	Local	6.0
20106	Florence Road	the River	Shetland Rd	1672	Rural	Gravel	9.0	7.0	50-199	Local	6.0
20205	Prangley Road	Inwood Road	southerly in Con 2	223	Rural	Gravel	7.0	7.0	0-49	Local	5.0
20206	Tinney Road	Bentpath Line	southerly in Con 2	424	Rural	Gravel	7.0	7.0	0-49	Local	4.0
20301	Davis Road	Lambton Line	Bilton Line	3052	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20302	Davis Road	Bilton Line	Bentpath Line	2929	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20303	Burr Road	Dobbyn Rd	Mossie Line	2437	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20304	Burr Road	Mossie Line	Aberfeldy Line	2609	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20401	Kerry Road	Lambton Line	Bilton Line	3060	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20402	Kerry Road	Bilton Line	Bentpath Line	2700	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20403	Dobbyn Road	River	Mossie Line	1169	Rural	Gravel	7.0	7.0	0-49	Local	6.0
20404	Dobbyn Road	Mossie Line	Aberfeldy Line	2603	Rural	Gravel	9.0	7.0	0-49	Local	6.0

**Inventory Summary Sheet  
Sorted by Road Section Number**

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**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
20405	Smith Falls Road	Bentpath Line	Mosside Line	4586	Rural	Gravel	7.0	7.0	0-49	Local	5.0
20501	Annett Road	Lambton Line	Bilton Line	3061	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20502	Annett Road	Bilton Line	Bentpath Line	3070	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20503	Annett Road	Bentpath Line	Smith Falls Rd	2185	Rural	Gravel	8.0	7.0	0-49	Local	5.0
20504	Aughrim Line	Mosside Line	Aughrim Line	1861	Rural	Gravel	7.0	7.0	0-49	Local	5.0
20505	Cox Road	Lot 33/34 line	Aberfeldy Line	367	Rural	Gravel	5.0	7.0	0-49	Local	5.0
20601	Downie Road	Lambton Line	Bilton Line	3078	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20602	Downie Road	Bilton Line	Bentpath Line	3058	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20603	Downie Road	Bentpath Line	Mosside Line	3060	Rural	Gravel	9.0	7.0	50-199	Local	6.0
20604	Downie Road	Mosside Line	Aberfeldy Line	2603	Rural	Gravel	9.0	7.0	0-49	Local	6.0
20801	Johnston Road	Euphemia Line	Bilton Line	3048	Rural	Gravel	9.0	7.0	50-199	Local	7.0
20802	Johnston Road	Bilton Line	Bentpath Line	3052	Rural	Gravel	9.0	7.0	0-49	Local	7.0
20803	Johnston Road	Bentpath Line	Mosside Line	3045	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20804	Johnston Road	Mosside Line	Aughrim Line	1832	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20901	Mccready Road	Euphemia Line	Bilton Line	3054	Rural	Gravel	9.0	7.0	50-199	Local	7.0
20902	Mccready Road	Bilton Line	Bentpath Line	3052	Rural	Gravel	8.0	7.0	0-49	Local	7.0
20903	Mccready Road	Bentpath Line	Mosside Line	3055	Rural	Gravel	8.0	7.0	0-49	Local	6.0
20904	Mccready Road	Mosside Line	Aughrim Line	1833	Rural	Gravel	8.0	7.0	0-49	Local	6.0
21001	Cameron Road	Euphemia Line	Bilton Line	3056	Rural	Gravel	9.0	7.0	0-49	Local	6.0
21002	Cameron Road	Bilton Line	Bentpath Line	3054	Rural	Gravel	9.0	5.8	50-199	Local	8.0
21003	Cameron Road	Bentpath Line	Mosside Line	3057	Rural	Gravel	8.0	6.5	50-199	Local	8.5
21004	Cameron Road	Mosside Line	Walker Line	2648	Rural	Gravel	8.0	7.0	50-199	Local	7.0
21101	Limerick Road	Euphemia Line	Bilton Line	3055	Rural	Gravel	9.0	7.0	50-199	Local	6.0
21102	Limerick Road	Bilton Line	Haggerty Road	1621	Rural	Gravel	9.0	7.0	50-199	Local	6.0
21103	Watterworth Road	Bentpath Line	Mosside Line	3088	Rural	Gravel	9.0	6.2	0-49	Local	8.0
21104	Watterworth Road	Mosside Line	Walker Line	2672	Rural	Gravel	9.0	6.5	0-49	Local	8.0
21105	Middlesex Rd 1	Haggerty Road	Bentpath Line	1344	Rural	HCB - 2 lifts	12.0	7.0	0-49	Local	8.0
31001	Kent Line	Mandaumin Road	Dawn Valley Road	1378	Rural	Gravel	9.0	7.0	50-199	Local	7.0
31002	Kent Line	Dawn Valley Road	Cuthbert Road	1391	Rural	Gravel	9.0	6.9	50-199	Local	6.5
31003	Kent Line	Cuthbert Road	Robinson Road	1374	Rural	Gravel	9.0	7.3	50-199	Local	7.0
31004	Kent Line	Robinson Road	Irish School Road	1380	Rural	Gravel	9.0	7.2	50-199	Local	7.0
31005	Kent Line	Irish School Road	Tramway Road	1356	Rural	Gravel	9.0	7.0	50-199	Local	7.0
31006	Kent Line	Tramway Road	Esterville Road	1391	Rural	Gravel	9.0	7.1	50-199	Local	7.0
31007	Kent Line	Esterville Road	Dawn Mills Road	1391	Rural	Gravel	9.0	7.0	50-199	Local	7.0

**Inventory Summary Sheet  
Sorted by Road Section Number**

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**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
31008	Kent Line	Dawn Mills Road	Pantry School Road	1373	Rural	Gravel	9.0	7.0	50-199	Local	7.0
31009	Kent Line	Pantry School Road	Gould Road	1373	Rural	Gravel	9.0	7.0	50-199	Local	7.0
31010	Kent Line	Gould Road	Huffs Corners Road	1385	Rural	Gravel	9.0	7.0	0-49	Local	7.0
31011	Kent Line	Huffs Corners Road	Hale School Road	1366	Rural	Gravel	9.0	7.0	50-199	Local	7.0
31012	Kent Line	Hale School Road	Oakdale Road	1411	Rural	Gravel	9.0	7.0	0-49	Local	7.0
31013	Kent Line	Oakdale Road	Mawlam Road	957	Rural	Gravel	9.0	6.8	0-49	Local	7.0
31501	Lambton Line	Mandaumin Road	Dawn Valley Road	1935	Rural	HCB - 2 lifts	12.0	6.9	500-999	Local	10.0
31502	Lambton Line	Dawn Valley Road	Cuthbert Road	1393	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	9.0
31503	Lambton Line	Cuthbert Road	Robinson Road	1374	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	8.0
31504	Lambton Line	Robinson Road	Marthaville Road	1719	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	8.5
31508	Lambton Line	Dawn Mills Road	Pantry School Road	1603	Rural	HCB - 2 lifts	12.0	7.0	500-999	Local	6.0
31509	Lambton Line	Pantry School Road	Gould Road	1380	Rural	HCB - 2 lifts	12.0	7.0	500-999	Local	6.0
31510	Lambton Line	Gould Road	Huffs Corners Road	1380	Rural	HCB - 2 lifts	12.0	7.0	500-999	Local	6.0
31511	Lambton Line	Huffs Corners Road	Hale School Road	1373	Rural	HCB - 2 lifts	12.0	7.0	500-999	Local	6.0
31512	Lambton Line	Hale School Road	Oakdale Road	1405	Rural	HCB - 2 lifts	12.0	7.0	500-999	Local	6.0
31513	Lambton Line	Oakdale Road	Naylor Road	1394	Rural	HCB - 2 lifts	12.0	7.0	500-999	Local	6.0
31514	Lambton Line	Naylor Road	Florence Road	1435	Rural	HCB - 2 lifts	12.0	7.0	500-999	Local	6.0
32001	Langbank Line	Mandaumin Road	Dawn Valley Road	1388	Rural	Gravel	9.0	7.0	50-199	Local	8.5
32002	Langbank Line	Dawn Valley Road	Cuthbert Road	1410	Rural	Gravel	9.0	7.0	0-49	Local	8.5
32003	Langbank Line	Cuthbert Road	Robinson Road	1367	Rural	Gravel	9.0	7.0	0-49	Local	8.5
32004	Langbank Line	Robinson Road	Marthaville Road	1383	Rural	Gravel	9.0	7.0	50-199	Local	8.5
32005	Langbank Line	Marthaville Road	Tramway Road	1357	Rural	Gravel	10.0	8.1	50-199	Local	8.0
32006	Langbank Line	Tramway Road	Esterville Road	1394	Rural	Gravel	10.0	8.0	50-199	Local	8.5
32007	Langbank Line	Esterville Road	Oil Heritage Road	1379	Rural	Gravel	10.0	8.0	50-199	Local	8.0
32008	Langbank Line	Oil Heritage Road	Pantry School Road	1381	Rural	Gravel	9.0	7.0	50-199	Local	8.0
32009	Langbank Line	Pantry School Road	Gould Road	1384	Rural	Gravel	9.0	7.0	50-199	Local	8.0
32010	Langbank Line	Gould Road	Huffs Corners Road	1382	Rural	Gravel	9.0	6.8	0-49	Local	8.0
32011	Langbank Line	Huffs Corners Road	Hale School Road	1375	Rural	Gravel	9.0	6.8	0-49	Local	8.0
32012	Langbank Line	Hale School Road	Oakdale Road	1418	Rural	Gravel	9.0	6.8	0-49	Local	8.0
32013	Langbank Line	Oakdale Road	Naylor Road	1391	Rural	Gravel	9.0	6.5	50-199	Local	7.5
32014	Langbank Line	Naylor Road	Mawlam Road	453	Rural	Gravel	9.0	6.5	0-49	Local	7.5
32515	Driessens Line	Bentpath Line	Forest Road	435	Rural	Gravel	7.0	7.0	0-49	Local	6.0
33001	Edys Mills Line	Mandaumin Road	Dawn Valley Road	1346	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33002	Edys Mills Line	Dawn Valley Road	Cuthbert Road	1414	Rural	Gravel	9.0	7.0	0-49	Local	7.0

**Inventory Summary Sheet  
Sorted by Road Section Number**

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**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
33003	Edys Mills Line	Cuthbert Road	Robinson Road	1370	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33004	Edys Mills Line	Robinson Road	Marthaville Road	1380	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33005	Edys Mills Line	Marthaville Road	Tramway Road	1369	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33006	Edys Mills Line	Tramway Road	Esterville Road	1349	Rural	Gravel	9.0	7.0	50-199	Local	7.0
33007	Edys Mills Line	Esterville Road	Oil Heritage Road	1424	Rural	Gravel	9.0	7.0	50-199	Local	7.0
33008	Edys Mills Line	Oil Heritage Road	Pantry School Road	1395	Rural	Gravel	11.0	7.0	50-199	Local	7.0
33009	Edys Mills Line	Pantry School Road	Gould Road	1392	Rural	Gravel	9.0	7.0	50-199	Local	7.0
33010	Edys Mills Line	Gould Road	Huffs Corners Road	1393	Rural	Gravel	9.0	7.0	50-199	Local	7.0
33011	Edys Mills Line	Huffs Corners Road	Hale School Road	1389	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33012	Edys Mills Line	Hale School Road	Oakdale Road	1412	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33013	Edys Mills Line	Oakdale Road	Naylor Road	1359	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33014	Edys Mills Line	Naylor Road	Forest Road	1346	Rural	Gravel	9.0	7.0	0-49	Local	7.0
33401	Aberfeldy Line	Mandaumin Road	Dawn Valley Road	1318	Rural	LCB - 2 lifts	9.0	6.3	200-499	Local	9.0
33402	Aberfeldy Line	Dawn Valley Road	Cuthbert Road	1424	Rural	LCB - 2 lifts	9.0	6.3	50-199	Local	8.5
33403	Aberfeldy Line	Cuthbert Road	Robinson Road	1356	Rural	LCB - 2 lifts	9.0	6.3	200-499	Local	8.5
33404	Aberfeldy Line	Robinson Road	Marthaville Road	1413	Rural	LCB - 2 lifts	9.0	6.3	200-499	Local	8.5
33405	Aberfeldy Line	Marthaville Road	Tramway Road	1337	Rural	LCB - 2 lifts	9.0	6.3	200-499	Local	8.5
33406	Aberfeldy Line	Tramway Road	Esterville Road	1393	Rural	LCB - 2 lifts	9.0	6.3	200-499	Local	8.5
33407	Aberfeldy Line	Esterville Road	Oil Heritage Road	1171	Rural	HCB - 1 lift	9.0	7.0	50-199	Local	7.0
33408	Aberfeldy Line	Oil Heritage Road	Pantry School Road	1618	Rural	Gravel	9.0	9.5	50-199	Local	8.5
33409	Aberfeldy Line	Pantry School Road	Gould Road	1377	Rural	Gravel	9.0	9.5	50-199	Local	8.5
33410	Aberfeldy Line	Gould Road	Huffs Corners Road	1403	Rural	Gravel	9.0	9.4	50-199	Local	8.5
33411	Aberfeldy Line	Huffs Corners Road	Hale School Road	1385	Rural	Gravel	9.0	9.6	50-199	Local	8.5
33412	Aberfeldy Line	Hale School Road	Oakdale Road	1408	Rural	Gravel	9.0	9.6	50-199	Local	8.0
33413	Aberfeldy Line	Oakdale Road	Naylor Road	1359	Rural	Gravel	9.0	9.3	50-199	Local	8.5
33414	Aberfeldy Line	Naylor Road	Forest Road	1331	Rural	Gravel	9.0	8.0	50-199	Local	8.5
41501	Lambton Line	Florence Road	Lawson Road	977	Rural	HCB - 2 lifts	12.0	7.0	0-49	Local	7.0
41502	Lambton Line	Lawson Road	Shetland Road	1363	Rural	HCB - 2 lifts	12.0	7.0	0-49	Local	8.0
41503	Lambton Line	Shetland Road	Davis Road	1369	Rural	HCB - 2 lifts	12.0	7.0	0-49	Local	8.0
41504	Lambton Line	Davis Road	Kerry Road	1364	Rural	HCB - 2 lifts	12.0	7.0	0-49	Local	10.0
41505	Lambton Line	Kerry Road	Annett Road	1353	Rural	HCB - 2 lifts	12.0	7.0	0-49	Local	6.0
41506	Lambton Line	Annett Road	Downie Road	1374	Rural	HCB - 2 lifts	12.0	7.0	0-49	Local	6.0
41507	Euphemia Line	Downie Road	Cairo Road	1370	Rural	Gravel	9.0	7.0	50-199	Local	6.0
41508	Euphemia Line	Cairo Road	Johnston Road	1413	Rural	Gravel	9.0	7.0	50-199	Local	6.0

**Inventory Summary Sheet  
Sorted by Road Section Number**

Appendix B.2 - 7

**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
41509	Euphemia Line	Johnston Road	McCready Road	1356	Rural	Gravel	9.0	7.0	50-199	Local	6.0
41510	Euphemia Line	McCready Road	Cameron Road	1383	Rural	Gravel	9.0	7.0	50-199	Local	6.0
41511	Euphemia Line	Cameron Road	Limerick Road	875	Rural	Gravel	9.0	7.0	0-49	Local	8.5
41701	Fansher Road	Fansher St	McCutcheon Road	1288	Rural	Gravel	8.0	5.8	50-199	Local	8.0
41702	Fansher Road	McCutcheon Road	Shetland Road	1363	Rural	Gravel	8.0	6.0	0-49	Local	8.5
41703	Fansher Road	Shetland Road	Davis Road	1368	Rural	Gravel	7.0	4.5	50-199	Local	6.5
41704	Fansher Road	Davis Road	Kerry Road	1422	Rural	Gravel	7.0	4.7	0-49	Local	6.5
41705	Fansher Road	Kerry Road	Annett Road	1360	Rural	Gravel	7.0	4.5	0-49	Local	6.5
41706	Fansher Road	Annett Road	Downie Road	1478	Rural	Gravel	7.0	4.5	0-49	Local	5.5
41707	Fansher Road	Downie Road	Cairo Road	1384	Rural	Gravel	7.0	4.5	0-49	Local	6.0
41708	Fansher Road	Cairo Road	Johnston Road	1413	Rural	Gravel	7.0	4.5	0-49	Local	5.5
41709	Fansher Road	Johnston Road	McCready Road	1357	Rural	Gravel	7.0	5.3	50-199	Local	6.5
41710	Fansher Road	McCready Road	Cameron Road	1381	Rural	Gravel	7.0	5.0	0-49	Local	6.0
41711	Fansher Road	Cameron Road	Limerick Road	882	Rural	Gravel	7.0	4.5	0-49	Local	6.0
42002	Bilton Line	Florence Road	Shetland Road	1360	Rural	Gravel	9.0	7.0	50-199	Local	6.0
42003	Bilton Line	Shetland Road	Davis Road	1371	Rural	Gravel	8.0	7.0	50-199	Local	6.0
42004	Bilton Line	Davis Road	Kerry Road	1370	Rural	Gravel	8.0	7.0	50-199	Local	6.0
42005	Bilton Line	Kerry Road	Annett Road	1365	Rural	Gravel	8.0	7.0	50-199	Local	6.0
42006	Bilton Line	Annett Road	Downie Road	1366	Rural	Gravel	8.0	7.0	0-49	Local	6.0
42007	Bilton Line	Downie Road	Cairo Road	1359	Rural	Gravel	8.0	7.0	0-49	Local	6.0
42008	Bilton Line	Cairo Road	Johnston Road	1400	Rural	Gravel	8.0	7.0	50-199	Local	6.0
42009	Bilton Line	Johnston Road	McCready Road	1369	Rural	Gravel	8.0	7.0	50-199	Local	6.0
42010	Bilton Line	McCready Road	Cameron Road	1386	Rural	Gravel	8.0	7.0	50-199	Local	6.0
42011	Bilton Line	Cameron Road	Limerick Road	880	Rural	Gravel	7.0	7.0	0-49	Local	6.0
42301	Elliott Line	Florence Road	W to Dawn Twln	974	Rural	Gravel	5.0	7.0	0-49	Local	6.0
42307	Haggerty Road	Bentpath Line	Cairo Road	945	Rural	Gravel	7.0	3.8	0-49	Local	5.5
42308	Haggerty Road	Cairo Road	Johnston Road	1776	Rural	Gravel	7.0	5.1	0-49	Local	6.0
42309	Haggerty Road	Johnston Road	McCready Road	1348	Rural	Gravel	7.0	5.1	50-199	Local	6.0
42310	Haggerty Road	McCready Road	Cameron Road	1483	Rural	Gravel	7.0	5.1	50-199	Local	6.0
42311	Haggerty Road	Cameron Road	Limerick Road	982	Rural	Gravel	7.0	5.5	0-49	Local	6.0
42401	Moorhouse Lane	Forest Road	E betwn lot 24/25	577	Rural	Earth	6.0	3.5	0-49	Local	3.0
42508	Bentpath Line	Cairo Road	Johnston Road	1391	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	9.5
42509	Bentpath Line	Johnston Road	McCready Road	1353	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	9.0
42510	Bentpath Line	McCready Road	Cameron Road	1380	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	8.5



**Inventory Summary Sheet  
Sorted by Road Section Number**

Appendix B.2 - 8

**Township of Dawn Euphemia  
Road Management Study**

Section Number	Road Name	From	To	Section Length (m)	Roadside Environment	Surface Type	Platform Width (m)	Surface Width (m)	Traffic Range (vpd)	Commercial Traffic	Street Condition Rating
42511	Bentpath Line	Cameron Road	Watterworth Road	930	Rural	HCB - 2 lifts	12.0	6.8	500-999	Local	9.0
42603	Dobbyn Road	Inwood Road	Burr Road	1519	Rural	Gravel	9.0	7.0	0-49	Local	6.0
42604	Dobbyn Road	Burr Road	Con 4 E line	1954	Rural	Gravel	9.0	7.0	0-49	Local	6.0
42711	Elm Tree Line	Cameron Road	Watterworth Road	904	Rural	Earth	6.0	4.0	0-49	Local	1.0
43001	Mossidge Line	Forest Road	McAuslan Road	687	Rural	Gravel	9.0	7.0	0-49	Local	7.0
43002	Mossidge Line	McAuslan Road	Inwood Road	1357	Rural	Gravel	9.0	7.0	0-49	Local	7.0
43003	Mossidge Line	Inwood Road	Burr Road	1374	Rural	Gravel	9.0	7.0	50-199	Local	7.0
43004	Mossidge Line	Burr Road	Dobbyn Road	1371	Rural	Gravel	9.0	7.0	0-49	Local	7.0
43005	Mossidge Line	Dobbyn Road	Aughrim Road	1376	Rural	Gravel	9.0	7.0	50-199	Local	7.0
43006	Mossidge Line	Aughrim Road	Downie Road	1374	Rural	Gravel	9.0	7.0	50-199	Local	7.0
43007	Mossidge Line	Downie Road	Cairo Road	1378	Rural	Gravel	9.0	7.0	50-199	Local	7.0
43008	Mossidge Line	Cairo Road	Johnston Road	1376	Rural	Gravel	7.0	5.0	0-49	Local	6.5
43009	Mossidge Line	Johnston Road	McCready Road	1364	Rural	Gravel	7.0	5.0	0-49	Local	5.5
43010	Mossidge Line	McCready Road	Cameron Road	1376	Rural	Gravel	7.0	5.0	0-49	Local	6.5
43011	Mossidge Line	Cameron Road	Watterworth Road	911	Rural	Gravel	8.0	6.0	0-49	Local	7.0
43306	Aughrim Line	Aughrim Line	Downie Road	1032	Rural	Gravel	7.0	7.0	0-49	Local	5.0
43307	Aughrim Line	Downie Road	Cairo Road	1376	Rural	Gravel	7.0	7.0	0-49	Local	5.0
43308	Aughrim Line	Cairo Road	Johnston Road	1377	Rural	Gravel	7.0	7.0	0-49	Local	5.0
43309	Aughrim Line	Johnston Road	McCready Road	1359	Rural	Gravel	7.0	7.0	0-49	Local	5.0
43310	Aughrim Line	McCready Road	Cameron Road	1381	Rural	Gravel	7.0	7.0	0-49	Local	5.0
43501	Aberfeldy Line	Forest Road	McAuslan Road	595	Rural	Gravel	9.0	7.3	50-199	Local	8.5
43502	Aberfeldy Line	McAuslan Road	Inwood Road	1288	Rural	Gravel	9.0	7.3	50-199	Local	8.5
43503	Aberfeldy Line	Inwood Road	Burr Road	1445	Rural	Gravel	9.0	7.3	50-199	Local	8.5
43504	Aberfeldy Line	Burr Road	Dobbyn Road	1376	Rural	Gravel	9.0	7.3	50-199	Local	8.5
43505	Aberfeldy Line	Dobbyn Road	Cox Road	1366	Rural	Gravel	9.0	7.0	50-199	Local	5.0
43506	Aberfeldy Line	Cox Road	Downie Road	1367	Rural	Gravel	8.0	5.8	50-199	Local	7.0
43507	Aberfeldy Line	Downie Road	Nauvoo Road	1613	Rural	Gravel	8.0	5.8	50-199	Local	8.0
43511	Walker Line	Cameron Road	Watterworth Road	913	Rural	Gravel	7.0	7.0	0-49	Local	6.0



DATE OCT. 15, 2016	PROJECT No. 13216
SCALE 1:90 000	FIGURE No. B-2

APPENDIX C  
WATERMAINS

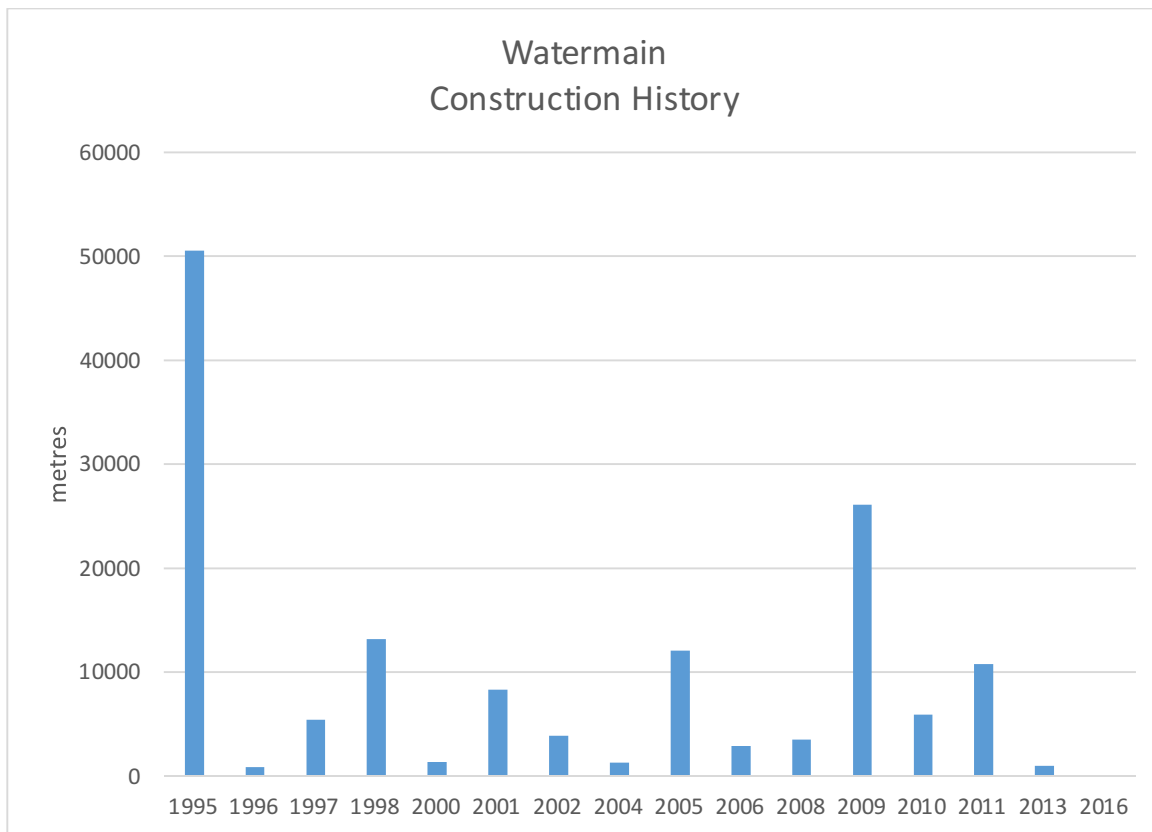
Asset:	Watermains
Inventory:	147 km of watermain 13 hydrants 45 valves 360 system meters 5 master meter pits 360 water services
Anticipated Asset Life Cycle:	The probable life expectancies of watermain sections and peripherals are affected by material and bedding, pipe location, usage, maintenance and construction quality. As this data is tracked over time by the Township, they may find that these assumed expectancies require adjustment. It is anticipated that there may be localized repairs and maintenance work required in order to achieve the probable life expectancy for a given asset. Generally the expected useful life for the components is: 50 to 100 years for watermain (average age of 75 years), about 40 years for hydrants and valves, about 75 years for chambers, about 40 to 100 years for water services (average age of 60 years), about 40 years for water plants and pumping stations, and about 75 years for water storage.
Integration:	The repair and replacement schedules are to be integrated with road work in the same location and other utilities such as hydro, natural gas or cable whenever possible. Where no road work is planned for an area, but watermain work is required, a trench should be cut and the watermain repaired or replaced.
Rehabilitation and Replacement Criteria:	<p>A condition rating between 1 and 5 (5 being in poor condition, 1 being in good condition) will be assigned to each pipe based on the break history, age, size, material and hydraulic requirements of the pipe section. All of the watermain is PVC, and a 90 year expected useful life was used. This rating, along with the expected useful life will be used as a general guide for the expected replacement schedule for a pipe section. Generally a rating of 2 or 3 will indicate that the pipe is about half-way through its expected life or some minor problems have been identified. A rating of 4 or 5 will indicate that the pipe has surpassed its expected life, or more frequent and serious problems are occurring and that replacement is required in the near future. The remaining useful life of the pipe should be used for long term planning and not for prioritizing replacement. The priority for which sections should be replaced first will be as outlined in Section 3.0 of the asset management report.</p> <p>Rehabilitation work will be scheduled once a leak is detected in order to repair the leak. At the time of the leak repair, the exposed pipe section may be visually reviewed to determine whether it is deteriorating faster than projected.</p> <p>The road rehabilitation schedule may accelerate the schedule for replacing a pipe section, if replacement is scheduled in the near future. Or alternatively the pipe replacement schedule may accelerate or delay the road rehabilitation schedule where feasible.</p>
Rehabilitation and Replacement Strategy:	The watermain rehabilitation recommended work will be based on the current condition of the pipe, once it has been exposed by the entity performing the repair. The Township will explore implementing new technology, such as leak detection equipment to aid in the scheduling of rehabilitation activities. As the condition of buried pipes cannot be easily inspected, the Township may use a high pressure cleaning and videotape inspection to determine condition prior to scheduling a replacement. Where the expense of this inspection outweighs the value it would bring to the design of the repair, the Township strategy will instead rely on the break history, age, size and material of the pipe and hydraulic requirements. It is generally expected that full pipe replacement will be used in the case where replacement is warranted. The length of pipe to be replaced may vary depending on roadwork scheduled in the area, and whether the breaks are isolated or not. The Township has completed corrosion protection work for all system valves over the last number of years.
Risks Associated with not Implementing Strategy:	If replacement does not occur in a timely manner, once it is determined to be warranted, the result will be catastrophic failures at unpredictable times. The costs to correct this type of emergency repair or replacement will be higher than a scheduled replacement.
Integrated Asset Priorities:	Road section rehabilitation and reconstruction forecasts are to be compared to forecasts for bridge and underground utility rehabilitation and reconstruction. The co-ordination of projects will occur internally between Township departments. This is not an immediate need, since the first projected watermain replacement is 2086.
Related Reports on Asset Type:	Township of Dawn-Euphemia Drinking Water System Financial Plan, March 2016

Estimated Cost per year for Strategy Described:	<p>The water system is relatively new and is even-aged. Therefore, there are no watermain replacements required in the next 10 year period. The greatest advantage for the Township is that there is a long time period (70 years) to save for the future watermain replacement. An annual allowance was calculated that if placed in reserve, and earning interest (5%), would provide for 75% of the future replacement costs. Two values were calculated, one if money was set aside for the entire life of the pipe, and a second starting in 2017, recognizing that only the remaining useful life is left.</p> <p>Annual allowance (useful life) = \$41,291 (\$117 / service)  Annual allowance (remaining useful life) = \$85,995 (\$246/service)</p> <p>In the next 10 year period, replacement of system meters is necessary since they are at end-of-life. Accurate metering is important since it is the basis of water user charges, and meters under read as they get older. Replace 360 meters = \$142,500 Replace 2 system meters = \$16,700</p>
Review Schedule and Procedure:	<p>The Township will keep a list of all breaks, including the location and suspected cause. This list will be reviewed on an annual basis with the list from past years to determine whether a trend or pattern is developing with watermain sections.</p>
Other Information or reference materials:	<p>Water Main Break Rates in the USA and Canada: A Comprehensive Study, Steven Folkman, Ph. D.</p>

**Proposed 10 Year Water System Needs**

Description	Year Installed	Quantity	Estimated Useful Life	Remaining Useful Life	Age Based Condition	Proposed Year	Current Replacement Cost
150mmsystemmeter	1995	1	15	0	5	2017	\$ 6,700
100-150mmwatermeters	1995	10	15	0	5	2017	\$ 20,000
75mmwatermeters	1995	350	15	0	5	2017	\$ 122,500
200mmsystemmeter	2010	1	15	9	3	2026	\$ 10,000

Length (km)	Current Replacement Cost (2016)	Netbook (2016)	Annual Depreciation	Annual Flow	Annual Full Flow
147	\$19,130,990	\$12,748,735	\$168,772	\$41,291	\$85,995



Diameter (mm)	Length (km)
50	11.7
100	54.2
150	65.6
200	15.7
<b>Total</b>	<b>147.1</b>

Type	Watermain ID	Road Section Number	Diameter (mm)	Material	Year Installed	Length (km) or Quantity	Estimated Life	Remaining Useful Life	Proposed Replacement Year	Age Based Condition	Level of Service	Risk	Priority
Watermain	WAT 1	10004	100	PVC	1998	3682.75	90	72	2089	1	2	4	6
Watermain	WAT 10	10505	200	PVC	1995	402.5561	90	69	2086	1	2	3	5
Watermain	WAT 100	42504	100	PVC	1995	1405.082	90	69	2086	1	2	2	4
Watermain	WAT 101	42505	100	PVC	1995	1080.44	90	69	2086	1	2	3	5
Watermain	WAT 105	20105	50	PVC	1995	732.188	90	69	2086	1	2	3	5
Watermain	WAT 11	10605	200	PVC	1995	733.0624	90	69	2086	1	2	3	5
Watermain	WAT 113	20302	100	PVC	1996	901.3301	90	70	2087	1	2	3	5
Watermain	WAT 114	10706	150	PVC	1995	313.7203	90	69	2086	1	2	3	5
Watermain	WAT 115	20202	150	PVC	1997	561.9295	90	71	2088	1	2	3	5
Watermain	WAT 116	31514	150	PVC	2005	720.3265	90	79	2096	1	2	3	5
Watermain	WAT 12	10504	100	PVC	2011	3108.221	90	85	2102	1	2	3	5
Watermain	WAT 13	10503	100	PVC	2011	1048.201	90	85	2102	1	2	4	6
Watermain	WAT 14	33007	50	PVC	1995	655.3356	90	69	2086	1	2	4	6
Watermain	WAT 15	33008	50	PVC	1995	633.1685	90	69	2086	1	2	3	5
Watermain	WAT 16	10705	150	PVC	1995	1978.723	90	69	2086	1	2	3	5
Watermain	WAT 17	10704	150	PVC	1995	3066.793	90	69	2086	1	2	3	5
Watermain	WAT 18	10804	50	PVC	2001	886.9813	90	75	2092	1	2	3	5
Watermain	WAT 19	33009	50	PVC	1995	419.6346	90	69	2086	1	2	3	5
Watermain	WAT 2	10005	100	PVC	1998	2271.882	90	72	2089	1	2	4	6
Watermain	WAT 20	10905	200	PVC	1995	2292.578	90	69	2086	1	2	2	4
Watermain	WAT 21	10904	200	PVC	1995	3072.744	90	69	2086	1	2	3	5
Watermain	WAT 22	32509	150	PVC	2009	1390.821	90	83	2100	1	2	3	5
Watermain	WAT 23	32508	150	PVC	2009	1384.759	90	83	2100	1	2	3	5
Watermain	WAT 24	32507	150	PVC	2009	1391.768	90	83	2100	1	2	3	5
Watermain	WAT 25	32506	150	PVC	2009	1384.154	90	83	2100	1	2	3	5
Watermain	WAT 26	32505	150	PVC	2009	1349.552	90	83	2100	1	2	3	5
Watermain	WAT 27	32504	150	PVC	2009	1374.571	90	83	2100	1	2	3	5
Watermain	WAT 28	32503	150	PVC	2009	1374.316	90	83	2100	1	2	3	5
Watermain	WAT 29	32502	150	PVC	2009	1398.7	90	83	2100	1	2	3	5
Watermain	WAT 3	10105	50	PVC	2005	2294.924	90	79	2096	1	2	4	6
Watermain	WAT 30	32501	150	PVC	2009	1309.638	90	83	2100	1	2	3	5
Watermain	WAT 31		50	PVC	2004	1301.392	90	78	2095	1	2	4	6
Watermain	WAT 32	10802	100	PVC	2001	1184.927	90	75	2092	1	2	3	5
Watermain	WAT 33	10803	100	PVC	2001	3084.969	90	75	2092	1	2	3	5
Watermain	WAT 34	32008	50	PVC	2001	453.1471	90	75	2092	1	2	3	5
Watermain	WAT 35	10702	150	PVC	1995	3092.126	90	69	2086	1	2	3	5
Watermain	WAT 36	10703	150	PVC	1995	3103.737	90	69	2086	1	2	3	5
Watermain	WAT 37	10303	100	PVC	2013	470	90	87	2104	1	2	3	5
Watermain	WAT 38	10302	100	PVC	2010	798.5264	90	84	2101	1	2	3	5
Watermain	WAT 39	32003	50	PVC	2010	377.4935	90	84	2101	1	2	3	5

Type	Watermain ID	Road Section Number	Diameter (mm)	Material	Year Installed	Length (km) or Quantity	Estimated Life	Remaining Useful Life	Proposed Replacement Year	Age Based Condition	Level of Service	Risk	Priority
Watermain	WAT 4	10205	100	PVC	1998	2293.296	90	72	2089	1	2	4	6
Watermain	WAT 40	10201	100	PVC	2010	702.8264	90	84	2101	1	2	3	5
Watermain	WAT 41	10202	100	PVC	2010	3064.825	90	84	2101	1	2	4	6
Watermain	WAT 42	10203	100	PVC	2010	456.6517	90	84	2101	1	2	3	5
Watermain	WAT 43	10101	100	PVC	2010	541.7574	90	84	2101	1	2	2	4
Watermain	WAT 44	10102	150	PVC	2009	3084.46	90	83	2100	1	2	3	5
Watermain	WAT 45	10103	150	PVC	2009	3073.938	90	83	2100	1	2	4	6
Watermain	WAT 5	10204	100	PVC	1998	1782.129	90	72	2089	1	2	4	6
Watermain	WAT 50	10401	100	PVC	2011	3103.861	90	85	2102	1	2	4	6
Watermain	WAT 51	31004	50	PVC	2011	928.0633	90	85	2102	1	2	3	5
Watermain	WAT 52	10801	100	PVC	2000	1357.596	90	74	2091	1	2	4	6
Watermain	WAT 53	31502	150	PVC	2009	1408.952	90	83	2100	1	2	3	5
Watermain	WAT 54	31503	150	PVC	2009	1364.808	90	83	2100	1	2	3	5
Watermain	WAT 55	31504	150	PVC	2009	1390.332	90	83	2100	1	2	4	6
Watermain	WAT 56	31505	150	PVC	2009	1344.141	90	83	2100	1	2	3	5
Watermain	WAT 57	31506	150	PVC	2009	1393.633	90	83	2100	1	2	3	5
Watermain	WAT 58	31507	150	PVC	2001	1390.273	90	75	2092	1	2	3	5
Watermain	WAT 59	31508	150	PVC	2001	1360.516	90	75	2092	1	2	3	5
Watermain	WAT 6	33003	50	PVC	1998	557.2526	90	72	2089	1	2	4	6
Watermain	WAT 60	31007	50	PVC	2009	747.292	90	83	2100	1	2	3	5
Watermain	WAT 61	10701	150	PVC	1997	3074.377	90	71	2088	1	2	3	5
Watermain	WAT 62	11001	100	PVC	2006	1012.663	90	80	2097	1	2	3	5
Watermain	WAT 63	11201	100	PVC	2006	1017.482	90	80	2097	1	2	3	5
Watermain	WAT 64	31514	150	PVC	2005	728.1189	90	79	2096	1	2	2	4
Watermain	WAT 65	31509	150	PVC	2005	1381.433	90	79	2096	1	2	3	5
Watermain	WAT 66	31510	150	PVC	2005	1379.426	90	79	2096	1	2	3	5
Watermain	WAT 67	31511	150	PVC	2005	1364.37	90	79	2096	1	2	2	4
Watermain	WAT 68	31512	150	PVC	2005	1395.323	90	79	2096	1	2	2	4
Watermain	WAT 69	31513	150	PVC	2005	1410.496	90	79	2096	1	2	3	5
Watermain	WAT 7	33004	100	PVC	1998	512.8845	90	72	2089	1	2	3	5
Watermain	WAT 70	11402	100	PVC	2006	877.1443	90	80	2097	1	2	3	5
Watermain	WAT 71	20100	100	PVC	2011	327.1746	90	85	2102	1	2	3	5
Watermain	WAT 72		100	PVC	2011	1430	90	85	2102	1	2	3	5
Watermain	WAT 73		50	PVC	2011	869	90	85	2102	1	2	3	5
Watermain	WAT 74	41501	100	PVC	2008	976.0039	90	82	2099	1	2	3	5
Watermain	WAT 75	41502	100	PVC	2008	1354.902	90	82	2099	1	2	3	5
Watermain	WAT 76	41503	100	PVC	2013	570	90	87	2104	1	2	2	4
Watermain	WAT 77	20201	100	PVC	2008	1236.412	90	82	2099	1	2	2	4
Watermain	WAT 78	20202	100	PVC	1997	1801.55	90	71	2088	1	2	3	5
Watermain	WAT 79	20202	100	PVC	1995	2467.064	90	69	2086	1	2	2	4



Type	Watermain ID	Road Section Number	Diameter (mm)	Material	Year Installed	Length (km) or Quantity	Estimated Life	Remaining Useful Life	Proposed Replacement Year	Age Based Condition	Level of Service	Risk	Priority
Watermain	WAT 8	10405	150	PVC	1995	2277.164	90	69	2086	1	2	3	5
Watermain	WAT 80	41702	100	PVC	1995	923.6195	90	69	2086	1	2	3	5
Watermain	WAT 81	20102	150	PVC	1995	3294.955	90	69	2086	1	2	3	5
Watermain	WAT 82	20101	150	PVC	1995	275.8313	90	69	2086	1	2	3	5
Watermain	WAT 83	20103	150	PVC	1995	3028.138	90	69	2086	1	2	3	5
Watermain	WAT 84	20104	150	PVC	1995	492.3052	90	69	2086	1	2	3	5
Watermain	WAT 85	42301	50	PVC	1995	845.4319	90	69	2086	1	2	3	5
Watermain	WAT 86	32012	100	PVC	2005	1421.69	90	79	2096	1	2	4	6
Watermain	WAT 87	32013	100	PVC	2002	793.3986	90	76	2093	1	2	3	5
Watermain	WAT 88	11101	100	PVC	1998	946.5948	90	72	2089	1	2	4	6
Watermain	WAT 89	11101	100	PVC	1998	1128.693	90	72	2089	1	2	3	5
Watermain	WAT 9	10404	150	PVC	1995	3113.485	90	69	2086	1	2	4	6
Watermain	WAT 90	11203	100	PVC	2002	3091.789	90	76	2093	1	2	3	5
Watermain	WAT 91	32510	200	PVC	1995	1364.664	90	69	2086	1	2	3	5
Watermain	WAT 92	32511	200	PVC	1995	1378.549	90	69	2086	1	2	3	5
Watermain	WAT 93	32512	200	PVC	1995	1448.716	90	69	2086	1	2	3	5
Watermain	WAT 94	32513	200	PVC	1995	1357.889	90	69	2086	1	2	3	5
Watermain	WAT 95	32514	200	PVC	1995	901.4286	90	69	2086	1	2	3	5
Watermain	WAT 96	32515	200	PVC	1995	474.9405	90	69	2086	1	2	3	5
Watermain	WAT 97	42501	200	PVC	1995	804.9535	90	69	2086	1	2	3	5
Watermain	WAT 98	42502	200	PVC	1995	1425.738	90	69	2086	1	2	3	5
Watermain	WAT 99	42503	150	PVC	1995	1330.282	90	69	2086	1	2	3	5
200mm system meter					2010	1	15	9	2026	3			
150mm system meter					2011	1	15	10	2027	1			
150mm system meter					1995	1	15	0	2011	5			
100mm system meter					2011	1	15	10	2027	1			
100mm system meter					2016	1	15	15	2032	1			
Meter pit					1995	5	75	54	2071	1			
100-150mm water meters					1995	10	15	0	2011	5			
75mm water meters					1995	350	15	0	2011	5			

# APPENDIX D

## FACILITIES

Asset:	Township Owned Facilities
Inventory:	
Anticipated Asset Life Cycle:	Life cycles can vary from 10 to 60 years. A mechanical replacement may be in the 10 to 30 year range, a roof membrane in the 20 year range, and the building superstructure in the 60 year range. These life cycles assume adequate maintenance is provided throughout the life of the various components. Differences in operation conditions or usage load will cause variations in the actual life of individual components
Integration:	Individual building components will need to be reviewed to different criteria. Depending on the work required contracts will be per individual building, or per individual component at multiple buildings to take advantage of any economies of scale. Consideration is to be given to minimize the disruption of the use of a building asset over time.
Rehabilitation and Replacement Criteria:	<p>A Facility Condition Index (FCI) will be calculated to each facility. The FCI is the ratio of total (current replacement value - deferred maintenance costs) : current replacement value of the facility asset. The Township will use an aggregate of all deferred maintenance costs for a given point in time for a facility to calculate the FCI. This is as opposed to calculating an FCI for each individual facility component.</p> <p>An FCI less than 7 will be considered in poor condition, and an FCI greater than 9.5 will be considered in good condition. Fair condition would be an FCI of 9 to 9.4. Once an FCI decreases below 9.5 rehabilitation work will be scheduled. If a facility has an FCI less than 9 the Township will review the maintenance needs and determine whether rehabilitation is still a viable option, or whether replacement is required. A facility with an FCI less than 3 is expected to require replacement.</p>
Rehabilitation and Replacement Strategy:	<p>The Township will assess its facilities and determine a priority list for recommended work. This may not include all recommended work at a single facility, but a grouping of similar work at multiple facilities. For example if it is determined that the furnace and the roof require work at one facility and the furnace and the windows require work at another, but the furnace work at both is more critical. The furnace work may be given a higher priority than the other work at either facility and, as the work is similar, may be grouped into one contract.</p> <p>Other external factors which may impact priority or even the recommended work are changes to energy costs, new technology and changes to safety standards. In addition for facilities, changes or new regulations, such as the Accessibility for Ontarians with Disabilities Act (AODA) which has set minimum accessibility standards, may require alterations to some facilities and outdoor public areas.</p>
Risks Associated with not Implementing Strategy:	Increased deterioration of buildings, health and safety impacts to staff and the public, decreases in operational efficiency, increased operating costs, accelerated depreciation of building assets.
Integrated Asset Priorities:	Replacement and rehabilitation of the asset or asset component shall be based on their actual condition. Where the work is not an emergency repair, it will be scheduled to provided minimal disruption to the users of the facility. Where multiple facility assets require similar rehabilitation work, the Township may decide to combine multiple sites into one contract to take advantage of any economies of scale.
Related Reports on Asset Type:	
Estimated Cost per year for Strategy Described:	There are no projected capital needs in the 10 year period. An annual value of \$15,000 will be budgeted for heating & cooling and retrofitting of light fixtures.
Review Schedule:	Facilities with Township staff onsite will be reviewed as part of regular maintenance activities, facilities without Township staff will rely on the regular user groups to notify the Township of any observed defects. A more formal review of all Township facilities will be completed by Township staff every 5 years for inclusion in the Asset Management Plan.
Other Information or reference materials:	<p>Accessibility for Ontarians with Disabilities Act - Government of Ontario</p> <p>***.mcss.gov.on.ca/en/mcss/programs/accessibility/index.aspx</p>

Township of Dawn - Euphemia									
Asset Register for Township Buildings									
Building ID	Building	Value	Year Built	Remaining Life	Expected Useful Life	Location	Description	Replacement Estimate (cost or '08 MPAC)	Age Based Condition
B1	Dawn Fire Hall	\$146,300.00	1990	24	50	4596 Lambton Line	Agri-Urban Buildings Inc. Construction	\$242,059.00	3
B1a	Dawn Fire Hall	\$53,350.00	2013	47	50	4596 Lambton Line	Storage Addition		1
B2	Rutherford Municipal Office	197,150.00	1980	14	50	4591 Lambton Line	JS Highgate Construction	\$322,330.00	5
B2a	Office Roof	16,400.00	2009	18	25		MBP Steel Roof - Deline Constr		1
B2b	Emergency Generator	17,000.00	1999	-7	10		Sommers Motor Gen - 3ph diesel		5
B3	Shetland Library	12,300.00	1949	-17	50	1279 Shetland Road	Shetland Library	\$114,354.00	5
B3a	Roof Replacement	4,575.00	2010	19	25		Steel Roof - J D Renovations		1
B5	Rutherford Park, Picnic Shelter	1,150.00	1991	0	25	Township Park, Rutherford	Volunteer Labour, material cost only		5
B23	FFG Picnic Shelter	13,400.00	2002	11	25		Florence Fairgrounds Picnic Shelter	\$16,906.00	3
B21	FFG Outdoor Ice Rink	10,900.00	2004	38	50		Florence Fairgrounds Ice Rink	\$11,874.00	1
B20	FFG Storage Shed	29,700.00	1985	19	50		Florence Fairgrounds Storage Shed	\$53,580.00	3
B20a	Storage Shed Floor	8,200.00	2010	19	25		Concrete Floor & Electrical		1
B22	FFG Optimist Ball Booth	14,300.00	1983	17	50		Florence Fairgrounds Ball Booth	\$27,865.00	3
B24	FFG Ball Diamond Dugouts	2,600.00	1981	-10	25		Florence Fairgrounds Ball Dugouts	\$5,907.00	5
B7	D-E Community Centre	1,573,550.00	2010	44	50	6213 Mill Street, Florence	Dawn-Euphemia Community Centre	\$1,834,150.00	1
B8	Mechanical / HVAC Systems	71,700.00	2010	14	20		Mechanical / HVAC Systems		1
B8a	Land Improvments	140,900.00	2010	14	20		Land Improvments		1
B9	Hardwood Flooring	48,000.00	2010	14	20		Hardwood Flooring		1
B13	Storage Garage	5,400.00	1940	-26	50	4590 Lambton Line	Clay Block c/w pitched roof	\$76,610.00	5
B13a	OH Door	3,375.00	2005	4	15		Door & installing new sectional O.H. Door		5
B14	Rutherford Equipment Depot	24,000.00	1970	4	50	4590 Lambton Line	Original Block Building - flat roof	\$210,055.00	5
B14a	Garage Addition	54,750.00	1986	20	50		Added 2 bays & pitched roof		3
B14b	Radiant Heaters	3,210.00	2005	4	15		added radiant heaters to original bays		5
B15	Salt Shed - Rutherford	8,600.00	1995	29	50	4584 Lambton Line	Rutherford Salt and Sand Shed	\$11,208.00	3

Building ID	Building	Value	Year Built	Remaining Life	Expected Useful Life	Location	Description	Replacement Estimate (cost or '08 MPAC)	Age Based Condition
B15a	Salt Shed Renovations	10,710.00	2005	4	15		Salt Shed Renovations		5
B16	Cairo Equipment Depot	34,900.00	1970	4	50	1345 Cairo Road	Cairo Equipment Depot	\$194,695.00	5
B16a	Garage Addition	48,600.00	1981	15	50		Improvements		3
B16b	Cairo Garage Roof	7,995.00	2001	0	15		Cairo Garage Roof		5
B16c	Radiant Shop Heaters	7,215.00	2003	2	15		New Furnace		5
B17	Salt Shed - Cairo	44,950.00	1993	27	50	1345 Cairo Road	Cairo Salt and Sand Shed - Public Works	\$61,850.00	3
B17a	Lean-to addition	16,900.00	2005	39	50		Cairo Salt Shed - Lean-To		1

## APPENDIX E

### FLEET

Asset:	Township owned Vehicles
Inventory:	3 light duty vehicles, 3 fire vehicles, 5 heavy duty vehicles, 4 graders, 2 tractors, 1 backhoe
Anticipated Asset Life Cycle:	Varies depending on principal use area and vehicle type. Pickups and cars - about 7 years, heavy duty vehicles - about 15 years, fire vehicles - about 20 years, graders - about 20 years, backhoes - about 10 years, tractors - about 15 years
Integration:	Will need to conform with changes to environmental and provincial regulations as well as any operational changes.
Rehabilitation and Replacement Criteria:	<p>Non-emergency repairs or replacements will be scheduled based on use, depreciation, fuel use and costs, increasing repair costs, insurance costs, etc. Vehicles will undergo routine maintenance, at minimum on an annual basis.</p> <p>Emergency repairs will be scheduled on an as needed bases.</p>
Rehabilitation and Replacement Strategy:	<p>Repair costs will be compared to replacement cost, generally a vehicle will be scheduled for replacement once repair costs exceed 30% of their replacement cost. Actual usage will be reviewed prior to scheduling replacement to determine whether replacement is warranted.</p> <p>Graders are having major overhauls instead of replacing them at the end of the estimated life. This will occur until parts become available or the superstructure has failed. This explains why in the inventory they have exceeded the useful life. All four graders are even aged, and there is merit to replacing one in order to avoid large capital costs if they all fail around the same time.</p> <p>Leasing, seasonal rental, purchase of refurbished units, or refurbishing owned units and the advantages and disadvantages of contracting services performed by a fleet vehicle to a third party, will be examined prior to performing a replacement.</p>
Risks Associated with not Implementing Strategy:	Costs to operate the vehicle are expected to increase overtime, with increasing maintenance time being required resulting in delays to work requiring those vehicles, resulting in increased hourly wage costs and reduced productivity.
Integrated Asset Priorities:	Integration with other asset groups, involves ensuring the fleet size and condition is adequate to maintain the other assets.
Related Reports on Asset Type:	
Estimated Cost per year for Strategy Described:	The 10 year annual average replacement costs = \$235,000
Review Schedule:	Vehicle maintenance logs should be reviewed once per year to determine whether the vehicle needs any major repair work, or requires replacement in the next capital budget. The Township plans to create a replacement schedule which will be revised every 5 years, as part of the asset management report.
Other Information or reference materials:	

**TOWNSHIP OF DAWN EUPHEMIA**  
**CAPITAL FLEET REPLACEMENT SCHEDULE AND COST PROJECTION**

Ref.	Next replacement	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
No.	year										
W10	2019			32							
W30	2023							32			
W3	2022						275				
W27	2029										
W11	2027										
W14	2015	275									
W14A	2017	0									
W6	2003	350									
W7	2005	350									
W8	2006	350									
W9	2008	350									
W28	2030										
W29	2030										
W16	2025									105	
W22	2011	40									
W23	2010	40									
W24	2021					5					
W21	2011	150									
W21A	2011	0									
W25	2033										
W20	2028										

	Years	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
	<b>Annual Expenditure</b>	\$1,905	\$0	\$32	\$0	\$5	\$275	\$32	\$0	\$105	\$0
	<b>10 year Average</b>	<b>\$235</b>									
	<b>Reserves with \$</b>										

**Notes:** Replacement costs are in 2016 dollars based on the information supplied by the Township.



**TOWNSHIP OF DAWN EUPHEMIA**  
**CAPITAL FLEET REPLACEMENT SCHEDULE AND COST PROJECTION**

Ref. No.	Equipment	Year	Make	Life Cycle (yr)	Remaining Life Expectancy	Replacement Cost (\$1000)	Annual Capital Cost (\$1000)	Age Based Condition
W10	Pick-up	2011	GMC	7	2	32	4.57	2.9
W30	Pick-up	2015	Ford	7	6	32	4.57	8.6
W3	Dump Truck	2006	Volvo	15	5	275	18.33	3.3
W27	Dump Truck	2013	Int.	15	12	275	18.33	8.0
W11	Dump Truck	2011	Volvo	15	10	275	18.33	6.7
W14	Dump Truck	1999	Sterling	15	-2	275	18.33	1.0
W14A	New Spreader System	2006		10	0	0	0.00	0.0
W6	Grader	1987	J.D.	20	-9	350	17.50	1.0
W7	Grader	1989	Champion	20	-7	350	17.50	1.0
W8	Grader	1990	J.D.	20	-6	350	17.50	1.0
W9	Grader	1992	Champion	20	-4	350	17.50	1.0
W28	Tractor	2014	J.D. 6115M	15	13	105	7.00	8.7
W29	Tractor	2014	J.D. 6115M	15	13	105	7.00	8.7
W16	Backhoe	2014	Case	10	8	105	10.50	8.0
W22	Fire Pumper	1990	Int.	20	-6	40	2.00	1.0
W23	Step Van	1994	GMC	15	-7	40	2.67	1.0
W24	7000gvw Trailer	2005	R. Varsava	15	4	5	0.33	2.7
W21	Fire Tanker	1990	Int.	20	-6	150	7.50	1.0
W21A	Rear Pump	1990		20	-6	0	0.00	1.0
W25	Fire Pumper	2012	Fort Garry - Int'l chassis	20	16	325	16.25	8.0
W20	Rescue Van	2007	Fort Garry - Int'l Chassis	20	11	300	15.00	5.5

Capital cost (\$,000)

\$3,739

\$221

## APPENDIX F

### ASSET GROUP FINANCIAL AND LETTER GRADE SCORING METHODS

## Appendix F - Asset Type Score Calculation

### Bridges

$$\text{Asset Type Score} = \text{BCI}/100 * 20 + (1 - \text{LOS}/10) * 20 + (1 - \text{Risk}/10) * 20 + \text{Financial}/10 * 40$$

### Roads

$$\text{Asset Type Score} = \text{CR}/10 * 20 + (1 - \text{LOS}/10) * 20 + (1 - \text{Risk}/10) * 20 + \text{Financial}/10 * 40$$

### Watermains

$$\text{Asset Type Score} = (1 - \text{CR}/6) * 20 + (1 - \text{LOS}/10) * 20 + (1 - \text{Risk}/10) * 20 + \text{Financial}/10 * 40$$

### Facilities

$$\text{Asset Type Score} = (1 - \text{FCI}) * 20 + (1 - \text{LOS}/10) * 20 + (1 - \text{Risk}/10) * 20 + \text{Financial}/10 * 40$$

### Fleet

$$\text{Asset Type Score} = ((\text{CR}/10 * 20 + \text{Financial}/10 * 40) / 60) * 100$$

### Financial Score

% Financed = 100 x (Yearly Funding Available)/(Yearly Amount Required to Address Needs)	Financial Score
95-100	10
85-94	9
80-84	8
75-79	7
70-74	6
60-69	5
50-59	4
40-49	3
30-39	2
<30	1

### Letter Grades

Asset Type Numerical Score	Asset Type Letter Grade
90-100	A+
85-89	A
80-84	A-
75-79	B+
70-74	B
68-70	B-
64-67	C+
60-63	C
55-59	C-
50-54	D
0-49	E