Table 11: Large Culvert Inventory

Culvert Location	Length	Diameter	Condition (Good /Fair/Poor)	Estimated Install Year	Replacement Need (Immediate, 0-5 years, 5-10 years, 10+ years)
Brunton Side Road	13 m	1800 mm	Fair	Unknown	5 - 10 years
Brunton Side Road	13 m	1500 mm	Fair	Unknown	5 - 10 years
Brunton Side Road	13 m	1500 mm	Fair	Unknown	5 - 10 years
Brunton Side Road	13 m	1500 mm	Fair	Unknown	5 - 10 years
Kings Creek Road	13 m	1500 mm	Fair	Unknown	10 – 15 years
Kings Creek Road	13 m	1500 mm	Fair	Unknown	10 – 15 years
Kings Creek Road	13 m	1500 mm	Fair	Unknown	10 – 15 years
Kings Creek Road	13 m	1500 mm	Fair	Unknown	10 – 15 years
Days Road	13 m	1800 mm	Fair	Unknown	0 – 5 years (DNE / Beckwith)
Cuckoo's Nest Road	13 m	900 mm	Good	2017	50 years
Scotch Corners Road	19 m	2900 mm	New (Good)	2016	50 years
Gillies Corners Side Road	15 m	2000 mm	New (Good)	2015	50 years
Malcolm's Way	15 m	2000 mm	New (Good)	2015	50 years

3.2.2 Financial Accounting and Replacement Cost Valuation

The replacement value of the bridges has been determined in consultation with a qualified bridge engineer and is estimated at up to $3 million in 2019 dollars. A breakdown of the individual asset replacement value is presented in Table 12. Similarly, an estimated replacement cost for the Township's larger culverts has been provided in Table 13. Again, costs for the culvert replacement are estimated in 2019 dollars.

Table 12:Asset Replacement Cost - Bridges

No.	Description	Est. Replacement Cost
15-082	Jock River Bridge	$1.5 Million
15-133	McGibbon Creek Bridge	$1.5 Million

Table 13:Asset Replacement Cost – Large Culverts

Culvert Location	Length	Anticipated Replacement Length	Diameter	Cost Per Meter	Total Replacement Cost
Brunton Side Road	13 m	15 m	1800 mm	$1,100	$16,500
Brunton Side Road	13 m	15 m	1500 mm	$1,000	$15,000
Brunton Side Road	13 m	15 m	1500 mm	$1,000	$15,000
Brunton Side Road	13 m	15 m	1500 mm	$1,000	$15,000
Kings Creek Road	13 m	15 m	1500 mm	$1,000	$15,000
Kings Creek Road	13 m	15 m	1500 mm	$1,000	$15,000
Kings Creek Road	13 m	15 m	1500 mm	$1,000	$15,000
Kings Creek Road	13 m	15 m	1500 mm	$1,000	$15,000
Days Road	13 m	15 m	1800 mm	$1,100	$16,500
Cuckoo's Nest Road	13 m	15 m	900 mm	$750	$11,250
Scotch Corners Road	19 m	21 m	2900 mm	$1,800	$37,800
Gillies Corners Side Road	15 m	15 m	2000 mm	$1,200	$18,000
Malcolm's Way	15 m	15 m	2000 mm	$1,200	$18,000

3.3 VEHICLES AND EQUIPMENT

3.3.1 Asset Types

The Township has eleven assets classified as vehicles and equipment, the inventory of which has been summarized in Table 14 below.

Table 14:Vehicles and Equipment Inventory

VEHICLES AND EQUIPMENT
2012 Chevrolet 1/2 Ton
2009 INTL Plow
1991 Ford Farm Tractor / Mower
2009 INTL PLow
2000 Champion Grader
2008 Chevrolet 1/2 Ton
2005 INTL Tandem Plow
2006 Chevrolet 1 Ton
2014 Terex Backhoe
2015 INTL Terrastar 3 Ton
2016 CAT Backhoe

3.3.2 Asset Condition

The condition of each vehicle or equipment asset has been categorized as "Very Poor", "Poor", "Fair", "Good" and "Excellent" based on the percent of useful life remaining. See Table 15 for the rating system used to assess the condition.

Table 15: Condition Rating

VERY POOR	POOR	FAIR	GOOD	EXCELLENT
0-20%	21-40%	41-60%	61-80%	81-100%

Replacement of vehicles and equipment should be based on maintenance costs and the number of hours used (or in the case of trucks, the mileage). Generally speaking, municipal equipment can be replaced based on the following schedule:

Table 16:Vehicles and Equipment Life Cycle

ASSET DESCRIPTION	LIFE CYCLE (YEARS)
Graders	15
Single Axle and Tandem Trucks	10
Loader/Backhoe	10
Half-Ton Trucks	7

Based on Table 16, the life cycle and the associated anticipated replacement year of the various vehicles, equipment and machinery is estimated as follows (percent useful life remaining as of 2019):

Table 17:Vehicles and Equipment Useful Life Remaining

ASSET DESCRIPTION	LIFE CYCLE (YEARS)	ESTIMATED REPLACEMENT YEAR	PERCENT OF USEFUL LIFE REMAINING
2012 Chevrolet 1/2 Ton	7	2019	0%
2009 INTL Plow	20	2029	50%
1991 Ford Farm Tractor / Mower	20	2011	0%
2009 INTL PLow	20	2029	50%
2000 Champion Grader	20	2020	5%
2008 Chevrolet 1/2 Ton	10	2018	0%
2005 INTL Tandem Plow	20	2025	30%
2006 Chevrolet 1 Ton	10	2016	0%
2014 Terex Backhoe	10	2024	50%
2015 INTL Terrastar 3 Ton	10	2025	60%
2016 CAT Backhoe	10	2026	70%

Based on the estimated condition by useful life remaining (Table 17), five of the Township's vehicles and equipment are considered "Very Poor", one is considered "Poor", four are considered "Fair" and one is considered "Good". However, this is based solely on the anticipated life cycle. The actual condition (useful life

remaining) may vary from those described above and should ultimately be assessed based on the amount of use the equipment sees and the associated maintenance costs.

3.3.3 Financial Accounting and Replacement Cost Valuation

The replacement value of the vehicles, equipment and machinery has been taken from the Road Needs Study (September 2019) prepared by McIntosh Perry under separate cover. The estimated replacement value of the Public Works department assets is approximately $1.46 million in 2019 dollars. Appropriate construction inflation should be added each year when budgeting. A breakdown of the individual replacement values has been provided in Table 18.

Table 18: Asset Replacement Cost (1,000s)

ASSET DESCRIPTION	REPLACEMENT COST
2012 Chevrolet 1/2 Ton	$ 36
2009 INTL Plow	$ 230
1991 Ford Farm Tractor / Mower	$ 40
2009 INTL PLow	$ 230
2000 Champion Grader	$ 250
2008 Chevrolet 1/2 Ton	$ 36
2005 INTL Tandem Plow	$ 230
2006 Chevrolet 1 Ton	$ 75
2014 Terex Backhoe	$ 110
2015 INTL Terrastar 3 Ton	$ 95
2016 CAT Backhoe	$ 125
Sub-Total	**$ 1,457**

3.4 BUILDINGS AND FACILITIES

3.4.1 Asset Types

Table 19: Buildings and Facilities Asset Inventory

Asset Name	Date of Construction
Fire Hall	1975
Prospect Church	1874
Prospect Church Shed	1874
Salt Shed 02	1995
Road Allowance - Smith Agreement (waterfront dwelling)	1986
Municipal Office / Community Hall	1975
Beckwith Recreation Complex	2006
Park Storage - Large	1995
Multi-purpose Building Coverall	2000
Park Storage - Small	1999
Office / Equipment Depot	1976
Storage	1975
Sand and Salt Storage	1975
Log Barn - Historical Display/Storage	2005
Log Barn	2015
One Room School House	2017

For the purposes of this report, incorporation of the buildings and facilities is limited to an inventory of the Township's assets. It is recommended that as part of future updates to this report, the Township undertakes Building Condition Assessments of the buildings and facilities to better determine their current condition and assess any needs for financial contributions, including required reserve contributions, the likes of which can be incorporated into the Township's Financial Plan.

4.0 ASSET MANAGEMENT STRATEGY

This section identifies the asset management strategies planned to sustain the assets at the desired level of service, including:

1. Non-infrastructure solutions;
2. Maintenance activities;
3. Renewal and reconstruction activities;
4. Disposal activities;
5. Expansion activities;
6. Procurement methods; and
7. Risks.

4.1 NON-INFRASTRUCTURE SOLUTIONS

The Lanark County Sustainable Communities Official Plan ("Official Plan") (adopted June 27, 2012) guides public administrators and private interests towards the most desirable form of development under the anticipated conditions. It is the intent of the Official Plan to provide the County and Local Municipalities with the mechanisms to plan for the cost-effective and efficient delivery of public services and infrastructure, to control the location and phasing of development based on the availability and capacity of services and to minimize or avoid land use conflicts arising from decisions on the location of facilities and infrastructure. The intent of the Official Plan is to also provide for the planned investment in services as a measure to stimulate economic development and to provide for the long-term prosperity of the County and its communities.

Lanark County's Official Plan defines their vision for the future of the region as follows:

> *"Lanark County is proud of its heritage and cherishes its small-town character, rural way of life, sense of community and distinctive natural features. We want to strengthen and diversify the economy effectively manage growth, protect the environment, preserve our heritage and maintain our unique character for future generations."*

Key objectives of the Official Plan are:

1. We will strengthen our communities by providing for efficient land use and opportunities for mixed use development on appropriate infrastructures which recognizes the diversity of Lanark County's settlement areas.
2. Local municipalities will, in a fiscally and environmentally responsible manner, maintain a three year supply of serviced land at all times as part of the ten year supply of land designated for residential development. This objective does not apply where local municipalities do not provide public piped services or where such services are constrained by environmental or financial conditions.
3. A broad range of housing types will be permitted in local municipal planning documents in order to meet the requirements of a growing population.

4. Local Official Plans will designate a sufficient supply of land for uses which facilitate employment growth.
5. Economic development will focus on increasing total employment within the County as a whole taking into consideration the availability of county and local infrastructure.
6. The distinct character and heritage of our towns, villages, hamlets and rural and waterfront areas will be maintained.
7. Significant natural heritage sites and areas will be protected from incompatible land uses.
8. Development shall be directed away from areas of natural or man-made hazards where there is an unacceptable risk to public health or safety or of property damage.

In conclusion, Lanark County's Official Plan will serve as a guide to control development in a cost-effective manner, while promoting development in areas where there is available capacity (i.e. maximizing the use of the current infrastructure in order to reduce costs in the long term).

4.2 MAINTENANCE ACTIVITIES

The operational budgets include maintenance tasks to optimize the life cycle of the infrastructure. For the road network asset, two maintenance strategies: (1) Rout and Seal and (2) Rejuvenating Oil, are proposed. The increased maintenance level will maintain the road condition at higher service levels and also reduce the long-term costs to sustain the infrastructure. These strategies have been included in the capital budget and are further described below.

4.2.1 Rout and Seal

Description:

Rout and seal involves routing of cracks to a standardized size, cleaning and heating of routed cracks with a lance, followed by hot poured rubberized asphalt including squeegee. By keeping the water out, it prohibits freeze/thaw reactions in winter, and guards against reduced strength due to water infiltration at other times, thus retarding the development of "alligator cracking".

Life Extension: 3+ years

When to use:

Routing and sealing is typically used in earlier portions of a pavement's life cycle, with cracks less than 12mm in width and with less than 1,500 linear metres of cracks per kilometre of pavement. It is not normally used in single lift pavements over granular as it can promote full depth cracking where routed.

Cost: $1.50 – $2.50 per lineal metre.

4.2.2 Rejuvenating Oil

Description:
Rejuvenating oil penetrates an asphalt surface and restores the maltene to asphalt ratio. Following application and prior to traffic, a layer of manufactured sand is applied to provide temporary friction. This is subsequently swept up and reused.

Life Extension: 3+ years

When to use:
Typically around the seven to 10-year mark of a pavement's life cycle.

Cost: Approximately $1.50 per square metre.

4.3 RENEWAL AND RECONSTRUCTION ACTIVITIES

4.3.1 Road Network

4.3.1.1 Renewal and Reconstruction Strategy

The renewal and reconstruction strategy for preserving the road structure is presented in Table 20.

Table 20: Renewal and Reconstruction Strategy

SURFACE TYPE	ENVIRONMENT	LIFE-CYCLE YEAR	STRATEGY	AVERAGE CONDITION RATING
GRAVEL	RURAL	N/A	Maintain through regular gravel resurfacing	6.00
LCB (SURFACE TREATMENT)	RURAL	0	Asset Construction	6.45
		8	Single Surface Treatment Overlay	
		19	Partial Depth Reconstruction	
		25	Single Surface Treatment Overlay	
		36	Partial Depth Reconstruction	
		42	Single Surface Treatment Overlay	
		55	Full Depth Reconstruction	
HCB (ASPHALT)	RURAL	0	Asset Construction	7.07
		8	Rejuvenating Oil	
		20	Asphalt Overlay	
		24	Rout and Seal Cracks	
		28	Rejuvenating Oil	
		52	Partial Depth Reconstruction	
		60	Rejuvenating Oil	
		68	Asphalt Overlay	
		72	Rout and Seal Cracks	
		76	Rejuvenating Oil	
		100	Full Depth Reconstruction	

Table 21 summarizes the average condition rating over the life of the asset and the yearly life-cycle cost for each road type. A more detailed breakdown by year has been provided in Appendix C.

Table 21: Life Cycle Condition Rating and Cost

TYPE	ENVIRONMENT	AVERAGE CONDITION RATING OVER ASSET LIFE	LIFE CYCLE COST PER YEAR
SURFACE TREATMENT (LCB)	RURAL	6.45	$15,345
ASPHALT (HCB)	RURAL	7.07	$8,700

In developing the priority of road improvements, the first consideration for the available funds is for preserving the road system. Improvements to preserve the surface will be timed in order to provide the best value for maintaining the asset. Where the road has deteriorated to the point that only major and costly improvements will restore the structural strength of the road, improvements will be timed in order to take full advantage of the remaining life of the infrastructure, but not to the extent were the road falls below Minimum Maintenance Standards.

The second major component in the decision matrix is the Average Annual Daily Traffic (AADT) which provides an indication on the number of users of the road network. Priority is given to roads with higher AADT. As an example, if one street is a dead end and one street is a minor collector, and both cost the same per kilometre to reconstruct, the minor collector would be selected over the dead end since it serves more commuters.

Other factors that may have to be considered are safety, truck traffic, development, economic, social, and timely scheduling of construction to coincide with other infrastructure works.

Section 4.3.1.2 summarizes the findings of the Road Needs Study (September 2019) and presents the Ten Year Capital Plan established based on the current spending levels and analyzes the adequacy of the current spending levels.

4.3.1.2 Ten Year Plan Based on Current Spending Levels

As detailed in the Road Needs Study (September 2019), the average capital budget over the previous years had been approximately $355,000/year. This dollar figure was used as a benchmark in capital spending when preparing the ten year plan. On average, an additional $1.2 million per year for roads would be required in order to improve the current level of services to the desired condition ratings, which is in excess of the Township's previous spending limits. On average, there is a shortfall of approximately $845,000 per year.

The Ten Year Capital Plan for road reconstruction is provided on the following two pages.

Table 22: Summary of Ten Year Roads Program

2019		
Section Number	Road Name	Capital Scope
070	6th Line Road	Single Surface Treatment
071	6th Line Road, West	Single Surface Treatment
103	Cuckoo's Nest Road	Partial Reconstruction, Double Surface Treatment
104	Bourne Road	Partial Reconstruction, Double Surface Treatment
132	Mockingbird Lane	Partial Reconstruction, Asphalt
133	Hummingbird Lane	Partial Reconstruction, Asphalt
136	Cedar Crest Drive	Asphalt Overlay

2020		
Section Number	Road Name	Capital Scope
112A	Ashton Station Road	Partial Reconstruction, Double Surface Treatment
125	Amberwood Road	Partial Reconstruction, Double Surface Treatment
126	Dewar Side Road	Single Surface Treatment

2021		
Section Number	Road Name	Capital Scope
106	Bourne Road	Partial Reconstruction, Double Surface Treatment
116	Crooked Side Road	Partial Reconstruction, Double Surface Treatment

2022		
Section Number	Road Name	Capital Scope
002	Scotch Corners Road	Single Surface Treatment
040, 042	Beckwith 10th Line	Partial Reconstruction, Asphalt

2023		
Section Number	Road Name	Capital Scope
065	7th Line Road	Partial Reconstruction, Asphalt

2024		
Section Number	Road Name	Capital Scope
058, 059	9th Line Road	Asphalt Overlay

2025		
Section Number	Road Name	Capital Scope
019	Lake Part Road West	Single Surface Treatment
057	9th Line Road	Asphalt Overlay
063	Tennyson Road	Partial Reconstruction, Asphalt
080	Ford Road	Asphalt Overlay

2026		
Section Number	Road Name	Capital Scope
041	Beckwith 10th Line	Asphalt Overlay
054, 056	9th Line Road	Asphalt Overlay

2027		
Section Number	Road Name	Capital Scope
085	McLachlin Road	Partial Reconstruction, Double Surface Treatment

2028		
Section Number	Road Name	Capital Scope
144, 148A	Ashton Station Road	Partial Reconstruction, Asphalt

4.3.2 *Bridges and Large Culverts*

4.3.2.1 *Renewal and Reconstruction Strategy*

The goals of the detailed visual inspection are to ensure that (1) the municipal structures remain at an acceptable level of safety, (2) the useful life of the structures are prolonged, (3) maintenance and rehabilitation needs are identified, and (4) the Township has adequate information to economically plan for studies, repairs and/or replacement of their infrastructure.

4.3.2.2 *Ten Year Plan*

The recommended Ten Year Capital Plan is presented in Table 23 below. The table presents recommended reserve contributions and are in 2018 dollars. Appropriate construction inflation should be added each year when budgeting.

Table 23: Summary of Ten Year Bridges Program (1,000s)

No.	Description	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
15-082	Jock River Bridge*										
15-133	McGibbon Creek Bridge							$17.5			
	OSIM Inspections	$2.7	-	$2.7	-	$2.7	-	$2.7	-	$2.7	-
	TOTAL	**$2.7**	**-**	**$2.7**	**-**	**$2.7**	**-**	**$20.2**	**-**	**$2.7**	**-**

*Jock River Bridge recommended for work in 2029 - $17,500.

The Ontario Structure Manual and Canadian Highway Bridge Design Code, CAN/CSA-S6-06 set out the requirements for a barrier across a structure. Rehabilitation of the structure typically triggers the requirement to upgrade the barrier across the structure to current design standards. The Ontario Geometric Design Guide sets out the requirements for the installation of steel beam guide rail for approaches. This report identifies structures that may not meet the current design standards. Upgrading roadside safety is fully justified when vehicular volumes are high. However, when traffic volumes are low and there is no existing accident experience at the site, this justification may be questioned.

As most municipalities have limited financial resources, under these circumstances a risk analysis should be undertaken. This analysis is required because the funds spent on a safety issue, such as installing guide rail on a bridge approach, may mean that adequate resources are then not available to be spent on another safety need elsewhere in the Township. Under the requirements for a thorough bridge inspection, the need for guide rail or the need to upgrade existing guide rail must be identified. However, as only the Township can decide on the risk management assessment, the decision to actually install or upgrade the guide rail must remain with the Township.

4.4 DISPOSAL ACTIVITIES

No disposal activities are planned over the next ten years.

4.5 EXPANSION ACTIVITIES

The Lanark County Official Plan sets the policy for planned expansion activities. For further details please refer to Section 4.1 of this Study and the Lanark County Official Plan.

4.6 PROCUREMENT METHODS

It is important to consider a variety of procurement methods to ensure the most cost-effective allocation of the Township's resources. Some examples include working with other municipalities to combine resources for cost savings on:

- Culverts;
- Asphalt;
- Signs and sign posts;
- Line Painting;
- Miscellaneous Asphalt Painting;
- Dust Suppressant;
- Crack Sealing;
- Road Salt;
- Winter plow parts; and
- Grader Blades.

4.7 RISKS

The biggest risk to the Township is inadequate spending towards maintenance and rehabilitation of its assets. The consequences of underfunding include the steady degradation of assets resulting in a reduction of associated service levels. The consequences also include escalating repair and maintenance costs, as replacing any asset in a state of failure is much more costly than rehabilitation of minor deficiencies. In addition to potential increases in maintenance costs over their lifecycle, failure to implement the necessary risk mitigation strategies may pose a risk to public safety.

It is recommended that the following actions be taken to help reduce these risks:

1. Continue to adopt the ten year capital plans for road reconstruction and bridges.
2. Continue to contribute to the reserves to ensure funding is available for future vehicle and equipment replacement costs.
3. Complete additional work listed as more funds become available.
4. Continue regular monitoring and valuation of assets and their condition.

Implementing the recommended risk mitigation strategies helps to ensure reconstruction and maintenance activities are focused on areas in greatest need of repair. These strategies also ensure opportunities to promote increased levels of service with reduced capital cost are not missed. Additionally, identifying and addressing deficiencies in a timely manner reduces the likelihood of asset conditions deteriorating to a point where

emergency repairs may be necessary. Furthermore, timely rehabilitation of assets not only reduces risks to public safety associated with their failure but also improves service levels while reducing long term costs.

5.0 FINANCIAL STRATEGY

The financial strategy has been prepared by others under separate cover.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information presented in this report, we recommend that the Township focus on rehabilitation and ongoing maintenance efforts, rather than replacement and reconstruction projects. Maintaining a policy for reviewing and maintaining assets on a scheduled basis will enable the Township to plan ahead for long term expenses.

It is imperative that the Township be ready to move forward with specific detailed project requirements in order to satisfy the terms and conditions of possible funding opportunities.

The primary approach used in assessing the condition of many of the Township's assets was based on the age of the asset and the estimated useful life remaining. This approach can produce condition results that differ from the actual condition due to the theoretical assumption based solely on a useful life cycle. For example, a fleet vehicle that has an estimated useful life of 10-20 years may continue to provide a reasonable level of service for 25 years or more. The reverse may also be true, and as such, it is recommended that more in-depth evaluation methods be used to assess the true condition of the Township's various assets such as building condition assessments, regular assessments of road conditions, etc.

This asset management plan is a foundation block for the implementation of an ongoing strategy to address emerging municipal infrastructure needs. Productive discussion regarding permanent funding solutions will be enhanced by the continued review and updating of the current model.