RM of Antelope Park #322

Asset Management Plan

- Final

Prepared by:

Pillar Systems Inc
23 Westerra Close
Stony Plain, AB, Canada T7Z 2W1

115-125 Avenue B North
Saskatoon, SK, S7L 1C9

Project Number:

PS21002

Date:

2022-03-02

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by Pillar Systems Inc. (the "Consultant") for the benefit of the RM of Antelope Park (the "Client") in accordance with the agreed correspondence between Consultant and Client, including the scope of work and fees identified therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents the Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to the Consultant which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement;
- Subsurface, environmental or geotechnical conditions may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

The Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. The Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

The Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but the Consultant makes no other representations, or any guarantees or warranties whatsoever, whether expressed or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed in writing by Consultant and Client;
- as required by law;
- for use by governmental reviewing agencies.

The Consultant accepts no responsibility, and denies any liability whatsoever, to parties other than the Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of the Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

The preparation of this project was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

Executive Summary

In compliance with the Canada-Saskatchewan administrative agreement and gas tax fund agreement, the RM of Antelope Park is developing its asset management program that will determine the asset's current level of service, target (desired) level of service, and financial gap needed to attain this level of service. Asset Level of Service (LOS) is illustrated according to the following performance measures:

- Condition State – Very Good, Good, Fair, Poor, Very Poor
- Monetary Performance – Difference between the asset replacement cost (RC) and the write down value (WDV)
- Remaining Service Life (RSL)

Based on a condition assessment of each asset within each asset group, the following table summarizes the current (2021) level of service for each asset group.

Existing (2021) Level of Service

Asset Group	Condition State					Monetary Performance		RSL
	V. Good	Good	Fair	Poor	V. Poor	RC	WDV	
Water Intake	0%	0%	62%	38%	0%	$ 65,000	$ 38,750	40%
Water Treat	0%	0%	0%	0%	100%	$ 50,000	$ 50,000	0%
Water Main	0%	100%	0%	0%	0%	$ 225,357	$ 56,339	75%
Roads-Gravel	20%	39%	21%	17%	2%	$ 64,755,339	$ 21,511,659	67%
Roads-Paved	0%	0%	0%	0%	100%	$ 2,581,826	$ 2,581,826	0%
Buildings	15%	85%	0%	0%	0%	$ 972,000	$ 205,500	79%
Machinery	23%	55%	21%	1%	0%	$ 2,399,520	$ 598,628	75%
Totals						**$ 71,049,042**	**$ 25,042,702**	**65%**

Overall, the current state of the infrastructure is in relatively good condition with an average Remaining Service Life (RSL) of 65 percent.

The urban (i.e. Hoosier and Loverna) asset groups (i.e. water & wastewater) stands out as being the most concerning. These asset groups are a vital component to the community and should be sustained without risk of operation or health consequence to the community. Water Security Agency standards state that "*The objectives of a public water supply system are to provide safe and aesthetically appealing water to the customers without interruption and at a reasonable cost*". Alternatives moving forward may include internal upgrades or a regional water systems approach in union with the RM of Milton and the Village of Marengo.

The "Gravel Roads" asset group is the RM's greatest asset comprising an asset value of $64,755,000 of the total inventory replacement cost of $71,049,000. Unique to this project is the application of Dynamic Cone Penetrometre (DCP) testing of the gravel road strength, which was used to determine the structural classification. While the tests varied from road to road, many roads showed greater strength in the top 200 mm (8 inches), which is largely due to the RM's years of investment in applied gravel and incorporation of the gravel into the road surface. Two elements that impact road stability and surface condition are the amount of heavy haul traffic and the roadway strength. Higher class roadways (i.e. "Grid" Functional Classification), heavy haul traffic routes (i.e. "Heavy Haul" Capacity Classification), and lower strength roadways (i.e. "Poor" Structural Classification) drive the need for continuous renewal in part through conventional clay-capping, gravel application, and related treatments.

One recommended new spending initiative is the application of road (subgrade) stabilization. This is an evolution of traditional clay-capping for gravel roads that enhances the existing roadway surface. There is

a chemical additive incorporated, which binds the gravel aggregate within the clay surface. This results in a higher strength road with reduced maintenance needs, reduced gravel needs, dust free surface, and improved traffic safety. In addition, the surface can still be maintained with conventional equipment (i.e. motor graders and roto-mixers). While there is an initial investment, there are long-term benefits. This treatment was triggered on many of the roads with low road subgrade strength and high heavy haul traffic volume. Application should extent for the full roadway corridor.

The gravel roads network also included a fair amount of partially developed roads. The program strategy included addressing the partially developed ditches. Roads that were fully undeveloped, were left in an undeveloped state in the long-range (20-year) planning horizon. Undeveloped roads were not included in the asset management analysis.

The recommended target level of service (LOS) over the long-range (20-year) horizon, would improve overall asset LOS by 5 percent. This benefit would improve the overall asset valuation, including consequence of risk, by $3,631,000, which addresses a significant component of the infrastructure deficit. To attain this LOS improvement does not appear to require an expenditure increase as the current budget allocations appear adequate. In addition, there are a variety of grant funding programs that may be used in part to fund the identified water systems and roadways capital renewal initiatives. This will further reduce the projected expenditure needs.

The study's condition assessments, level of service analysis, and program strategy are housed in an Asset Management Database. The RM now has the tools and data in place to sustain, manage, and adjust its asset management program. However, sustaining an asset management program will require additional time and resource by the Administrator and associated staff. Moving forward, the following are expected new commitments the RM will need to allocate time and financial resources to:

- Conduct on-going condition assessments and infrastructure lifecycle analysis
- Train and develop staff on condition assessments and computing the current level of service
- Routinely update the asset management database based on reassessed condition assessments, completion of work, and adjusting the works program based on budget levels and level of service targets.
- Periodically outsource the lifecycle analysis to update the recommended maintenance and capital program strategy in line with on-going level of service targets set by the RM.

Table of Contents

1. Introduction

As part of the Canada-Saskatchewan Administrative Agreement and the Municipal Gas Tax Fund Agreement, municipalities are required to:

- Make progress towards developing and/or implementing an asset management plan; and
- Report on progress made.

In accordance with this plan, administered by the Government of Saskatchewan, Gas Tax Program and Financial Management, municipalities are to attain the following asset management targets:

- June 30, 2018 – Completed an asset management policy and strategy
- June 30, 2019 – Determined the current level of service (assets condition) and target level of service moving forward
- June 30, 2020 – Determined the financial gap needed to attain the target level of service
- June 30, 2022 – Report back to the Provincial Government on initiatives to monitor and improve the asset management program moving forward

In March 2021, the Federation of Canadian Municipalities (FCM) approved grant funding for the given study under the Municipal Asset Management Program (MAMP). The study is to be complete by March 2022.

The objectives of the asset management study are as follows:

- Compile an asset listing for the various asset groups
- Complete a condition assessment of the assets and determine the current level of service
- Complete a lifecycle analysis and determine the targeted level of service
- Develop the infrastructure renewal plan/strategy and financial gap needed to attain the target level of service
- Implement an asset management database, housed with the data and results of this analysis, to help the municipality manage its asset management program moving forward.

The most critical asset groups are those related to water systems. While this study did not complete a regulatory review, we reference one document by the Saskatchewan Water Security Agency, "Waterworks Design Standard – EPB 501", November 15, 2012. Section 3.11, "Treatment Objectives", states the following:

> *"The objectives of a public water supply system are to provide safe and aesthetically appealing water to the customers without interruption and at a reasonable cost, an adequate quantity of water at sufficient pressure for fire protection"*

Further to this, Section 5.1 "Distribution – General", states the following:

> "*Whether or not fire protection is provided via the communal drinking-water system is the decision of the municipality/owner of the system and can be subject to a cost/risk-benefit analysis, especially for smaller systems."*

These are key items in setting water system level of service targets to ensure a safe, reliable, and sustainable delivery of water within reasonable budget allocations. External grant funding opportunities may be of assistance in meeting the level of service targets and bridging the funding gap.

2. Policy and Strategy

The RM has an Asset Management Policy and an Asset Management Strategy approved January and May of 2019 respectively, with a review scheduled for January and May of 2020. We conducted a review of both the existing Policy and Strategy documents. Both were well written. The only revision included additions around the Asset Management Database, including monitoring and managing the asset management program moving forward. Both revised policy and strategy documents are contained in Appendix A. The following highlights the additional items to these documents:

Policy:

Objectives:

- Having the systems, processes, and resource allocations in place for continued monitoring and management of an asset management program.

Principles:

a. An asset management database will be deployed and maintained with annual review of condition assessments, level of service assessment, and capital renewal treatment programming in line with delivering level of service targets.

Strategy:

MONITORING AND MANAGING THE ASSET MANAGEMENT PROGRAM

The asset inventory, condition assessment data, level of service results, and resulting 5-year maintenance and capital works program will be loaded into an MS Access Asset Management Database for the RM to continue to manage the asset management program moving forward. Based on the initial asset management assessments and analysis completed in 2021, the following are requirements for the RM Administrator to sustain and manage an asset management program moving forward:

- Continuously update the data within the Asset Management Database.
- Train and engage operations staff to provide condition assessments and updates to the Administrator to update the data and level of service results.
- On a periodic basis, seek the support of professional services to reanalyze the Long-Range Sustainability Plan and determine the corresponding Short-Range Maintenance and Capital Program in line with delivering the long-range level of service targets.

3. Asset Inventory

The asset inventory for the RM includes seven asset groups, including urban asset groups for the Hamlets of Loverna and Hoosier:

Asset Group	Functional Classification	Quantity	Description
Roads-Gravel	Primary Grid	3 km	
	Grid	46 km	
	MFA	15 km	
	Local	102 km	Includes some roads in Loverna and Hoosier
	Undeveloped	125 km	More trail-like in nature. Lacks ditch geometry and in some cases traffic gravel. Not a significant monetary investment structure. Not included in assessment, but in-place in the inventory. When developed later to a "Local" class or higher, these roads can be added to the assessment.
Roads-Paved	Collector (MFA)	4 km	
Water Intake	N/A	3	• 1 water well in Hoosier (1960) – Not potable • 1 community well in Loverna – Not potable • 1 Rural community well/dugout (2001) – Not potable
Water Treatment	N/A	1	• Hoosier (1960), includes reservoir only – Not potable • No water treatment in Loverna
Water Mains	Main	957 m	• Hoosier 50 mm (2") HDPE – No hydrants or valves • No functioning water distribution in Loverna
Buildings	N/A	4 structures	• Office is shared use with RM of Midale and Village of Marengo • 3 public works structures
Machinery	N/A	21 units	

4. Condition Assessment and Lifecycle Analysis Process

4.1 Condition Assessment Criteria

Condition rating criteria was developed for each asset (i.e. infrastructure) group. The condition rating criteria defined for the RM's infrastructure groups is contained in a separate document. As appropriate for the asset group, the assessment of each component is based on one of three fundamental performance measures.

- Physical Condition – The level of deterioration
- Capacity – A measure of the size needed to meet the volume desired
- Functional Adequacy – A measure of the component doing what it should be doing, including design resiliency

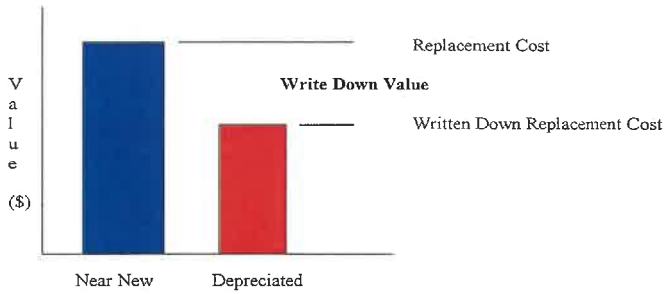
The following table summarizes the condition types assessed for each asset groups.

Asset Group	Condition Type	Comments
Roads-Gravel	Surface Condition	
	Surface Gravel	
	Dust	
	Crown	
	Drainage	
	Width	
	Sight Distance	Sight triangle (horizontal) and stopping sight distance (vertical)
Roads-Paved	Rutting	
	Fatigue Cracking	
	Surface Condition	
	Lineal Cracking	
	Sight Distance	
Water Intake	Building	
	Instrumentation	
	Wet Well	
	Pumping	
	Backup Power	
	Auxiliary Items	
Water Treatment	All Included	Includes building filtration, disinfection, pumping, and storage
Water Main	Pipe	
	Valves	
	Hydrants	
	Service Connections	
	Pipe Capacity	
Buildings	Civil	
	Exterior Building	

	Interior Building	
	Plumbing	
	HVAC	
	Electrical	
Machinery	All Included	

The first level of service measure is condition state. The fundamental elements of deriving this in the condition assessment criteria for each asset group are severity and extent. Severity is a defined measure of the level of deterioration (i.e. minor, moderate, major, and severe). The extent is the proportion of the infrastructure segment within each of the defined severity levels. In relation to defined threshold levels, this determines the condition state, assessing the infrastructure to be very good, good, fair, poor, or very poor. Threshold levels are tolerance levels defined for each severity level; which in part determines how much risk can be endured. As example, the tolerance to minor (i.e. hairline) cracking can be rather high. However, major cracking cannot be tolerated to any significant amount, as it becomes the threshold to failure, expensive repair, disruption, and potential consequence to life and safety in some instances.

A second level of service measure is monetary performance. This is also derived through the condition assessment. It measures the amount of deterioration and depreciation of the infrastructure assets. This is the asset Write-Down-Value (WDV). It is a very effective measure as it provides a dollar to dollar comparison between input expenditures (i.e. maintenance and capital costs) to the output benefit (i.e. asset valuation).



In addition, we use the WDV to measure risk. One major risk is that associated with collision injury or fatality. The combination of the collision severity with the probability of the event is added to the WDV. This triggers proactive infrastructure renewal practices that will address the consequence of risk.

A third measure of level of service is the asset Remaining Service Life (RSL). This can be computed as the ratio between the asset write-down-value and its replacement cost.

Gravel Roads are the largest asset group comprising approximately 91 percent of the overall asset valuation. As such, it is the most impacting to budgets and requires the greatest level of effort in assessment. After the gravel roads condition data is collected, the analysis is in part influenced by various classification factors relating to the conditions and operations.

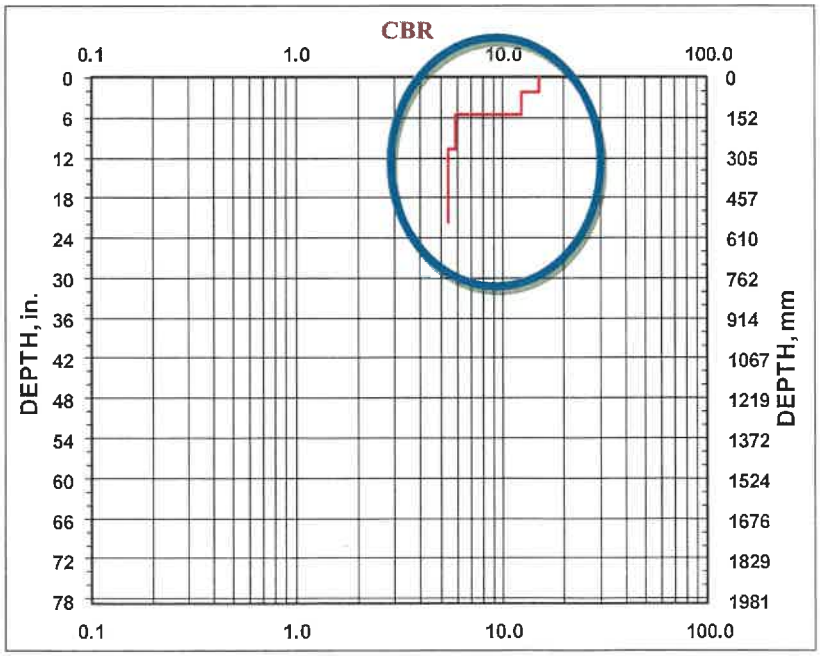
- The Functional classification is based on the hierarchy of roadways for Saskatchewan Rural Municipalities. Typically, the higher the roadway classification, the greater amount of heavy-haul traffic. This affects roadway deterioration rates and resulting maintenance and renewal expenditures.
- The Structural classification is based on field testing of the existing soils strength using a Dynamic Cone Penetrometre (DCP) during the condition assessment. The roadway strength is largely influenced by both the soil types used to construct the roadway as well as the gravel that over time is incorporated into the roadway surface. The standard measurement of roadway strength used by the Saskatchewan Ministry of Highways and Infrastructure (MHI) is the CBR. In this study, we collected the roadway strength data and placed the results into the following structural groupings.

Road Classifications

Class Group	Classification	Description
Functional	Primary Grid	High traffic volume and functional standard
	Grid	Major collector equivalency
	MFA	Main Farm Access – Minor collector equivalency
	LMG	Local Municipal Gravel – Low traffic volume and functional standard; primarily local access
Structural (Subgrade)	Very Good	Ave Depth CBR >20
	Good	Ave Depth CBR 15-20
	Fair	Ave Depth CBR 10-15
	Poor	Ave Depth CBR 5-10
	Very Poor	Ave Depth CBR <5

We computed the CBR based on measurements taken throughout the gravel road network to an approximate depth of 500 mm below the road surface. In the majority of the cases, most of the roadway strength is in the top 200 mm. This is due to the years of repeat traffic gravel applications that have incorporated into the road surface over time forming a structural cap. We computed the average CBR over the depth of testing. The following graph is an example illustrating the top 200 mm surface with a CBR of 12, but the soil below has a CBR of 5. The average CBR is 7, which we consider poor for classification purposes only. In Saskatchewan, this soil's strength example is typical. However, by considering the surface gravel, generated by years of traffic gravel application, this brings forward the ability to deliver the overall strength higher than the native soils can provide. This is the importance of protecting and enhancing the RM's investment in the roadway surface. This can be built into the asset management strategy.

Example - Roadway Strength Measurements



Based on MHI and AASHTO roadway design guidelines, both the roadway "Functional" and "Structural" classifications are calculated to have an impact on the load carrying capacity of the roadway. The following table summarizes the relative impacts, which are considered in the lifecycle analysis for each roadway. As example a structural classification with a "Poor" classification will deteriorate/fail approximately 5 times faster than a road with a "Fair" classification. This affects maintenance and renewal needs and associated costs over the roadway lifecycle.

Road Life Relative Effect on Roadway Classifications

Class Group	Classification	Relative Effect	Comments
Functional	Primary Grid	-2x	Half the road life in comparison to a MFA
	Grid	-1.5x	
	MFA	1x	Base Case
	LMG	5x	
Structural	Very Good	20x	20 times the road life in comparison to "Fair"
	Good	5x	
	Fair	1x	Base Case
	Poor	-5x	Interpolated – Below threshold of calculation
	Very Poor	-50x	Interpolated – Below threshold of calculation

Influencing the roadway service life are the treatments and maintenance operations. Gravel roads are inherently non-structural. They fail routinely due to weather (i.e. rain and snow melt) and heavy haul traffic. However, maintenance operations significantly influence their functionality and level of service. Grader maintenance makes numerous passes per year. Each pass provides a renewal of roadway failures. In addition, maintaining the surface with a relatively steep crown (i.e. cross slope), adequate traffic gravel, and non-impeding drainage will work to sustain roadways to a relatively good Level of Service, even with relatively poor structural subgrade characteristic (i.e. poor and very poor) and relatively high heavy haul traffic volumes (i.e. Grid and Primary Grid). As a result, the Functional and Structural Classifications are factors in the lifecycle analysis that influences the asset management outcome.

4.2 Lifecycle Analysis

Lifecycle analysis uses the collected condition data from each infrastructure asset. The objective of the analysis is as follows:

- Determine a long-range (20-year) infrastructure sustainability plan identifying the targeted (optimal) level of service and funding needs required to get there.
- Determine the detailed maintenance and capital program required to deliver that sustainability plan.

The type of analysis varies between the asset groups. Regardless of the analysis approach between the varying asset groups, the analysis reporting is seamless. This enables the RM to view all asset groups together in a single table and graph, providing effective decision management in the overall asset management program strategy. The analysis results are summarized into two horizons. The first is the short-range (5-year) horizon. This identifies immediate needs to be considered in the maintenance and capital budget programs. The second is the long-range (20-year) horizon. This illustrates the program strategy to deliver the targeted infrastructure sustainability plan.

Throughout the lifecycle analysis, multiple treatment options are tested given the current and forecast condition state. The sequence of treatment options that minimizes annualized costs over the lifecycle are selected. The following summarizes treatment options considered for each asset group.

- Gravel Roads
    - Routine Maintenance
        - Summer grader operations
        - Partial repair of problematic or failed road areas
        - Correction of shallow road crown (i.e. cross slope)
    - Sight Improvements - Sight corrections, including intersection signage, sight triangle clearing, and grading to address intersection/approach stopping sight distance deficiencies.
    - Spot Dust Suppression – Calcium Chloride dust suppression where house or other sensitive location (i.e. church or cemetery) is within close proximity.
    - Surface Gravel Replacement
    - Ditch Improvements
        - Additional minor grader maintenance of ridges at the shoulder.
        - Moderate shoulder pulling of slumping side-slopes.
        - Correcting major drainage deficiencies within the ditch and culverts.
        - Extensive construction to develop a ditch geometry.
    - Shoulder Widening
        - To address the more sever road width deficiencies.
    - Spot Strengthening
        - Excavate problematic areas of weak soil locations, and back fill with pit-run and/or other subgrade strengthening materials.
    - Road (Subgrade) Stabilization
        - A relatively new practice and evolution/hybrid between conventional clay capping and surfacing. The existing surface is chemically stabilized, gravel is incorporated and locked into place, and the resulting surface is dust-free. The roadway surface strength is improved by approximately three times; annual maintenance needs are significantly reduced; gravel replacement needs are significantly reduced; traffic safety is improved; and driver comfort is improved.
    - Road Regrading (i.e. Reconstruction)

        - Full depth roadway reconstruction to address strength deficiencies and geometric deficiencies (i.e. lack of ditch grade)
- Paved Roads
    - Patching
        - Potholes and other major deficiencies impacting traffic safety.
    - Crack Filling
    - Micro Sealing
        - Specialized cost-effective treatment where the deficiency is open surface texture (i.e. raveling).
    - Resurfacing
        - Could involve reconstructing the entire granular substructure if it is unsuitable for the heavy haul traffic using the roadway.
- Water Intake
    - Repair
    - Upgrade
    - Replace
- Water Treatment
    - Repair
    - Upgrade
    - Replacement
- Water Main
    - Pipe Repair
    - Valve Replacement
    - Hydrant Replacement
    - Full Distribution Line Replacement – Pipe, valves, hydrants, and service connections
- Buildings
    - Routine Maintenance
    - Special Identified Maintenance
        - Noted deficiencies
        - Can be above average expenditures requiring budget allocation
    - Replacement
- Machinery
    - Routine Maintenance
    - Special Identified Maintenance
        - Noted deficiencies
        - Can be above average expenditures requiring budget allocation
    - Replacement

The lifecycle analysis results for each infrastructure asset within each asset group are contained in the Asset Management Database for review, reporting, adjustment, and financial/operations management moving forward.

5. Current and Targeted Level of Service

The infrastructure level of service is based on compilation of lifecycle analysis completed for each infrastructure asset. The results are compiled for all the assets within each asset group.

Level of service is presented in the following three measures, which present a unique understanding of the state of the infrastructure. However, each of the three level of service measures were derived from the same base condition data.

- Condition State (Very Good, Good, Fair, Poor, and Very Poor)
- Monetary Performance ($WDV)
- Remaining Service Life (%)

The level of service first illustrates the current state of the infrastructure. Then it is illustrated to show the targeted short-range (5-year) and long-range (20-year) level of service resulting from the recommended (optimal) program strategy expected to minimize costs and maximize infrastructure performance over the asset lifecycle.

5.1 Current Level of Service

The following table and graphs summarize the current state of the infrastructure for all asset groups.

Overall, the current level of service (LOS) is in relatively good condition with an overall Remaining Service Life (RSL) of 65 percent.

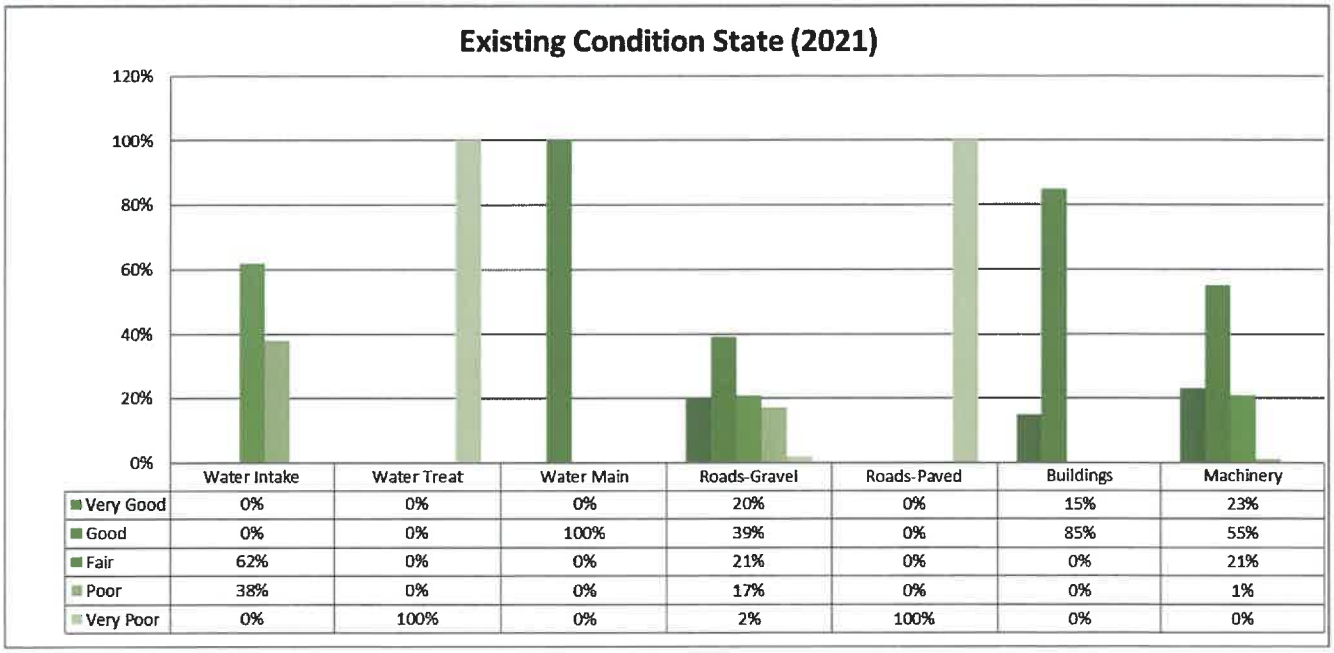
The Replacement Cost (RC) of all asset groups is $71,049,000. The "Gravel Roads" asset group has a RC of $64,755,000, comprising 91 percent of all the assets worth. Gravel roads are the primary asset group. Currently, the gravel roads RSL on average is 67 percent.

The urban (i.e. Hoosier and Loverna) asset groups (i.e. water and wastewater systems) are the most concerning with an RSL ranging between 0 percent and 75 percent. Hoosier has a water supply distributed to households but is not potable. Loverna does not have a functioning water supply and distribution system.

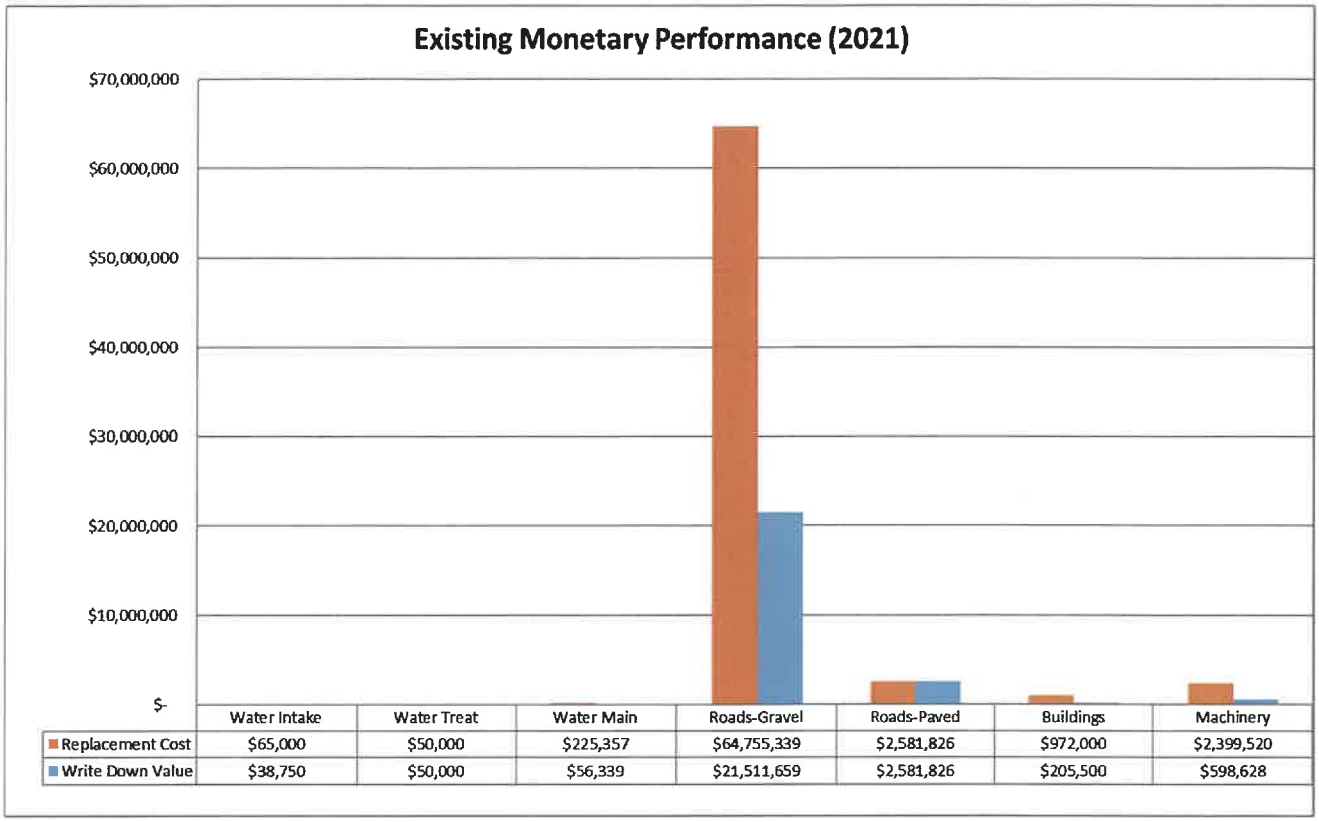
The monetary performance is a key indicator noting the relative importance of each asset group. The "Gravel Roads" asset group by far dominates the relative importance of assets and preservation thereof. However, the overall integration of all seven asset groups is paramount to the functionality of the infrastructure network and the services they provide to the local rate payers.

Existing (2021) Level of Service

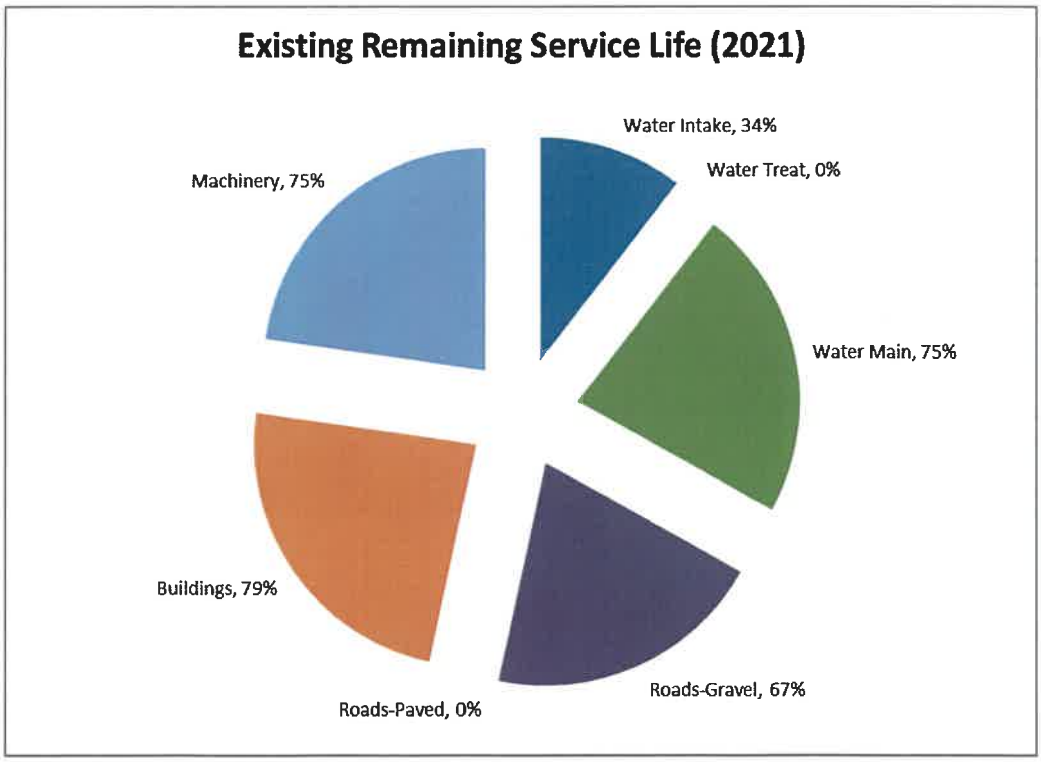
Asset Group	Condition State					Monetary Performance		RSL
	V. Good	Good	Fair	Poor	V. Poor	RC	WDV	
Water Intake	0%	0%	62%	38%	0%	$ 65,000	$ 38,750	40%
Water Treat	0%	0%	0%	0%	100%	$ 50,000	$ 50,000	0%
Water Main	0%	100%	0%	0%	0%	$ 225,357	$ 56,339	75%
Roads-Gravel	20%	39%	21%	17%	2%	$ 64,755,339	$ 21,511,659	67%
Roads-Paved	0%	0%	0%	0%	100%	$ 2,581,826	$ 2,581,826	0%
Buildings	15%	85%	0%	0%	0%	$ 972,000	$ 205,500	79%
Machinery	23%	55%	21%	1%	0%	$ 2,399,520	$ 598,628	75%
Totals						**$ 71,049,042**	**$ 25,042,702**	**65%**



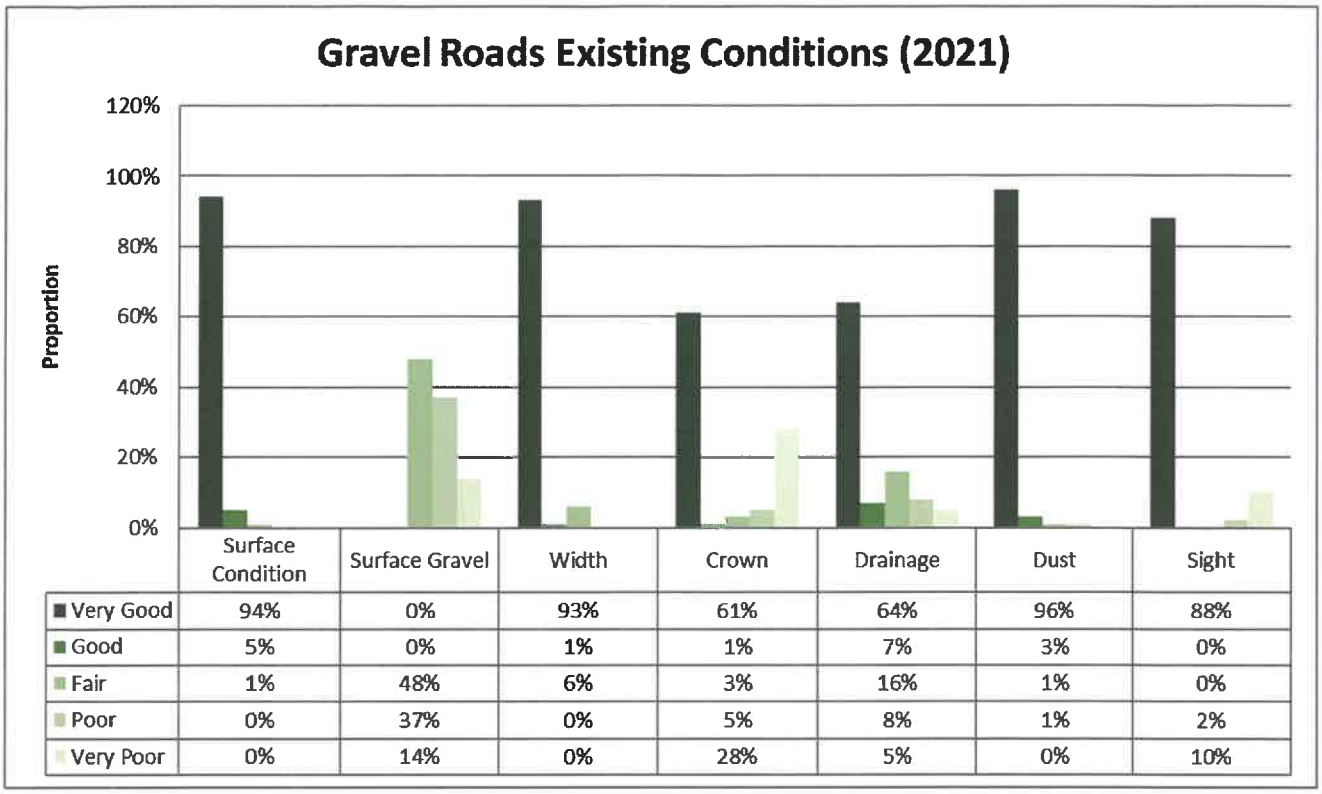
	Water Intake	Water Treat	Water Main	Roads-Gravel	Roads-Paved	Buildings	Machinery
Very Good	0%	0%	0%	20%	0%	15%	23%
Good	0%	0%	100%	39%	0%	85%	55%
Fair	62%	0%	0%	21%	0%	0%	21%
Poor	38%	0%	0%	17%	0%	0%	1%
Very Poor	0%	100%	0%	2%	100%	0%	0%



	Water Intake	Water Treat	Water Main	Roads-Gravel	Roads-Paved	Buildings	Machinery
Replacement Cost	$65,000	$50,000	$225,357	$64,755,339	$2,581,826	$972,000	$2,399,520
Write Down Value	$38,750	$50,000	$56,339	$21,511,659	$2,581,826	$205,500	$598,628



Looking more specifically at the "Gravel Roads" asset group, the following chart illustrates the existing condition state broken down into the seven performance measures.



	Surface Condition	Surface Gravel	Width	Crown	Drainage	Dust	Sight
Very Good	94%	0%	93%	61%	64%	96%	88%
Good	5%	0%	1%	1%	7%	3%	0%
Fair	1%	48%	6%	3%	16%	1%	0%
Poor	0%	37%	0%	5%	8%	1%	2%
Very Poor	0%	14%	0%	28%	5%	0%	10%

Some of the condition elements are related to backlog in deferred maintenance. These are relatively low-cost to address. One of these is "Surface Gravel". It shows 51 percent in the poor to very poor condition states, while zero in the very good to good condition states. The gravel renewal is lagged.

The roadway "Crown" (i.e. cross slope) has 33 percent of the roadways in the poor to very poor condition state. This can be addressed through a conscious effort in grader maintenance.

"Sight" conditions vary in severity (i.e. including cost to remedy) from intersection signing (lease severe and lowest cost), sight triangle clearing, to stopping sight distance (most sever and highest cost). Currently 12 percent of the road network have sight related deficiencies. This would include 3 road segments with a sign related deficiency, 7 road segments with a sight triangle related deficiency, and 3 segments, with a stopping sight related deficiency. The latter would require much higher cost roadway construction to cut the road to address the deficiency.

The "Drainage" is a concern with 13 percent in the "Poor" and "Very Poor" condition state. There are two issues here. One is more maintenance related to the slumping side-slopes, which is commonly addressed through a shoulder pull. This includes 15 road segments. The other is deficient or no ditch drainage involving 7 and 6 road segments respectively. Addressing this involves relatively expensive road construction to develop/build the appropriate ditch grade.

The "Surface Condition" is in a "Very Good" condition state with only 6 percent of the network with any noted issues. This is an indication of sufficient and appropriate maintenance activities currently in place. Impacting the surface condition is the combination of high volumes of heavy haul traffic and relatively

poorer soils conditions. This is conventionally addressed through "Clay Capping" and other related road stabilizing initiatives. The evolution of clay capping is "Road (Subgrade) Stabilization". In addition to addressing the roadway stability issues, it has long-term benefits of reduced maintenance, reduced gravel needs, and improved traffic safety. Road (Subgrade) stabilization will be an alternative considered in the lifecycle analysis.

During the field condition assessment, we tested the road strength using a Dynamic Cone Penetrometre (DCP). This was used to assign a structural classification to each roadway. This has an impact in the lifecycle analysis in determining the extent of capital renewal needs. For example, lower strength roads will deteriorate faster and require more a greater level of maintenance and potentially trigger capital renewal activities earlier.

The following chart summarizes the structural classification results for the RM's gravel road network. This is combined function of the inherent materials used to construct the roadway as well as the investment the RM has made to the road surface over years of gravel incorporated into the subgrade and periodic clay capping.

Gravel Road Structural Class (DCP)

Very Good	7%
Good	19%
Fair	55%
Poor	19%
Very Poor	0%

5.2 Short-Range (5-Year) Level of Service Targets

For the gravel roads asset group, this horizon addresses the relatively lower cost maintenance related issues. This would include accelerated gravelling, addressing the deficient crown locations, addressing the sight deficiencies, and addressing the slumping side-slopes through a shoulder pull type treatment.

This horizon also addresses many of major deficiencies for the gravel roads asset group including ditch grading and/or reconstruction, road cutting to address deficient stopping sight distance, and road (subgrade) stabilization to address the weaker road sections with higher volume traffic, which is the evolution of the conventional clay capping.

For the paved roads asset groups, there are two segments. They are both nearing the end of their service life. These roads could be reverted to gravel with the potential of subgrade stabilization to enhance the road strength and road user benefits.

For the water asset groups, this horizon provides allocation for some maintenance (i.e. Hoosier and Loverna well pump replacement). It also provides the planning horizon for more significant works later in the long-range horizon. While it is anticipated only internal upgrades to the Hoosier pumphouse, consideration may be given towards a regional water system approach to provide potable water to Hoosier. This could potentially come from Marengo, given their water system planning and that of the RM of Milton for Alsask. With these regional water system planning initiatives an extension of this planning could include the potential to provide potable water supply to Loverna.

As a result, while there were significant gains in the gravel roads asset group, the water and wastewater asset groups continued to decline (deteriorate) awaiting needed upgrades. Overall, the Level of Service (LOS) improved from 65 percent to 70 percent. The following table summarizes the short-range (5-year) LOS targets expected.

Five-Year Target (2026) Level of Service

Asset Group	Condition State					Monetary Performance		RSL
	V. Good	Good	Fair	Poor	V. Poor	RC	WDV	
Water Intake	0%	0%	32%	68%	0%	$ 65,000	$ 45,069	31%
Water Treat	0%	0%	0%	100%	0%	$ 50,000	$ 41,250	18%
Water Main	0%	100%	0%	0%	0%	$ 225,357	$ 72,436	68%
Roads-Gravel	16%	51%	24%	8%	0%	$ 67,337,165	$ 19,572,481	71%
Roads-Paved	100%	0%	0%	0%	0%	$ -	$ -	
Buildings	0%	15%	51%	33%	0%	$ 972,000	$ 484,171	50%
Machinery	21%	18%	32%	21%	8%	$ 2,399,520	$ 1,135,754	53%
Totals						**$ 71,049,042**	**$ 21,351,162**	**70%**

To obtain the above LOS targets, the following tables summarizes the projected maintenance and capital expenditure needs. More specific details, costing, and capital renewal strategy maps noting the locations of these works are contained in the Asset Management Database.

Five-Year Projected (2022-2026) Expenditure Levels – Asset Group A

Asset Group	Treatment	Annualized Costs ($/yr)
Water Intake	Maintenace-Specific	$ 2,000
	Upgrade	$ -
	Replace	$ -
		$ 2,000
Water Treat	Maintenace-Specific	$ -
	Upgrade	$ -
	Replace	$ -
		$ -
Water Main	Pipe Repair	$ -
	Valve Replacement	$ -
	Hydrant Replacement	$ -
	Service Connection Replacement	$ -
	Full Replacement	$ -
		$ -

Note that in the lifecycle analysis for linear asset groups (i.e. Pipes and Roads), the unit costs for each treatment option includes the full cost for equipment, labor, materials, and overhead. Included in this are the "Buildings" and "Machinery" costs. As we provide separate costing for the "Buildings" and "Machinery" asset groups, we need to back these costs out of those calculated for the "Gravel Roads" asset group as noted in the table below.

Five-Year Projected (2022-2026) Expenditure Levels – Asset Group B

Asset Group	Treatment	Annualized Costs ($/yr)
Road-Gravel	Maintain	$ 88,267
	Regravel	$ 254,665
	Sight Improvement	$ 17,555
	Dust Control	$ 2,287
	Drainage Improvement	$ 92,965
	Regrade/Reconstruct	$ 5,257
	Subgrade Stabilize	$ 92,050
		$ 553,046
	Machinery & Building Adjustment	$ 200,025
	Net	**$ 353,021**
Road-Paved	Patch	$ -
	Crack Fill	$ -
	Sight Improvement	$ -
	Subgrade Stabilize (Revert to Gravel)	$ 51,636
	Resurface	$ -
		$ 51,636

Five-Year Projected (2022-2026) Expenditure Levels – Asset Group C

Asset Group	Treatment	Annualized Costs ($/yr)
Buildings	Maintenace-Specific	$ 940
	Demolish	$ -
	Upgrade	$ -
	Replace	$ -
		$ 940
Machinery	Maintenace-Specific	$ -
	Lease	$ -
	Upgrade	$ -
	Replace	$ 199,085
		$ 199,085

5.3 Long-Range (20-Year) Level of Service Target

The long-range strategy sustains the improved Level of Service (LOS) on the road network from the previous horizon. The most noted improvement in this horizon would be water system upgrades in Hoosier. While the actual upgrade is yet to be determined, the costing model assumes an internal upgrade to provide potable water. Overall, the expected LOS for all asset groups is expected to hold at 70 percent RSL.

Based on life-cycle analysis, the following table summarizes the projected level of service targets within this long-range (20-year) horizon.

20-Year Target (2041) Level of Service

Asset Group	Condition State					Monetary Performance		RSL
	V. Good	Good	Fair	Poor	V. Poor	RC	WDV	
Water Intake	38%	0%	0%	0%	62%	$ 65,000	$ 38,090	41%
Water Treat	100%	0%	0%	0%	0%	$ 850,000	$ 625	100%
Water Main	0%	0%	100%	0%	0%	$ 225,357	$ 120,727	46%
Roads-Gravel	14%	58%	22%	6%	0%	$ 67,337,165	$ 19,745,818	71%
Roads-Paved	100%	0%	0%	0%	0%	$ -	$ -	
Buildings	4%	0%	67%	0%	29%	$ 972,000	$ 647,714	33%
Machinery	23%	8%	43%	24%	2%	$ 2,399,520	$ 858,315	64%
Totals						**$ 71,849,042**	**$ 21,411,289**	**70%**

To obtain the above LOS targets, the following tables summarizes the projected maintenance and capital expenditure needs. More specific details, costing, and capital renewal strategy maps noting the locations of these works are contained in the Asset Management Database.

20-Year Projected (2027-2041) Expenditure Levels – Asset Group A

Asset Group	Treatment	Annualized Costs ($/yr)
Water Intake	Maintenace-Specific	$ -
	Upgrade	$ -
	Replace	$ 2,199
		$ 2,199
Water Treat	Maintenace-Specific	$ -
	Upgrade	$ -
	Replace (inc. potable water upgrade)	$ 17,732
		$ 17,732
Water Main	Pipe Repair	$ -
	Valve Replacement	$ -
	Hydrant Replacement	$ -
	Service Connection Replacement	$ -
	Full Replacement	$ -
		$ -

Note that in the lifecycle analysis for linear asset groups (i.e. Pipes and Roads), the unit costs for each treatment option includes the full cost for equipment, labor, materials, and overhead. Included in this are

the "Buildings" and "Machinery" costs. As we provide separate costing for the "Buildings" and "Machinery" asset groups, we need to back these costs out of those calculated for the "Gravel Roads" asset group as noted in the table below.

20-Year Projected (2027-2041) Expenditure Levels – Asset Group B

Asset Group	Treatment	Annualized Costs ($/yr)
Road-Gravel	Maintain	$ 103,372
	Regravel	$ 242,851
	Sight Improvement	$ -
	Dust Control	$ 1,179
	Drainage Improvement	$ 26,619
	Regrade/Reconstruct	$ -
	Subgrade Stabilize	$ 28,677
		$ 402,698
	Machinery & Building Adjustment	$ 218,764
	Net	**$ 183,934**
Road-Paved	Patch	$ -
	Crack Fill	$ -
	Sight Improvement	$ -
	Subgrade Stabilize (Revert to Gravel)	$ -
	Resurface	$ -
		$ -

20-Year Projected (2027-2041) Expenditure Levels – Asset Group C

Asset Group	Treatment	Annualized Costs ($/yr)
Buildings	Maintenace-Specific	$ -
	Demolish	$ -
	Upgrade	$ -
	Replace	$ 3,251
		$ -
		$ 3,251
Machinery	Maintenace-Specific	$ -
	Lease	$ -
	Upgrade	$ -
	Replace	$ 215,513
		$ 215,513

5.4 Summary of Long-Range Financial Plan and Asset Performance

Based on the above short-range (5-year) and long-range (20-year) plans, the following table summarizes the financial needs in comparison to existing maintenance and capital renewal budget allocations.

Financial Summary

Asset Group	Annual Budget Allocation ($/yr)	Short-Range (5 Year) Needs ($/yr)	Long-Range (6-20 Year) Needs ($/yr)	Financial Gap Needs to Budget Surplus (+); Deficit (-)	
				Short-Range ($/yr)	Long-Range ($/yr)
Water Intake	$1,500	$ 2,000	$ 2,199	$ (500)	$ (699)
Water Treat	$5,000	$ -	$ 17,732	$ 5,000	$ (12,732)
Water Main	$100	$ -	$ -	$ 100	$ 100
Road-Gravel	$872,926	$ 353,021	$ 183,934	$ 519,905	$ 688,992
Road-Paved	$1,300	$ 51,636	$ -	$ (50,336)	$ 1,300
Buildings	$6,000	$ 940	$ 3,251	$ 5,060	$ 2,749
Machinery	$158,300	$ 199,085	$ 215,513	$ (40,785)	$ (57,213)
Total	**$1,045,126**	**$ 606,682**	**$ 422,629**	**$ 438,444**	**$ 622,497**

The historic budget allocations are estimated based on review of available budget drawing on expenditure allocations towards capital renewal. Currently the RM is budgeting approximately $1,045,000/year for capital renewal, which includes an allocation for amortization/depreciation within each of their asset groups.

The recommended program strategy addresses a backlog of gravel roads renewal in the short-range horizon. Then it addresses the water supply issues in Hoosier in the long-range horizon, including provision for a potable water upgrade. The net financial result includes a surplus of $438,000/year in the short-range (5-year) horizon and a surplus of $622,000/year for the long-range (20-year) horizon. The projected surplus provides contingency for program fluctuations and alterations as deemed appropriate during implementation. Future considerations may include additional road (subgrade) stabilization initiatives and/or potable water supply to Loverna.

The following table summarizes the projected long-range (20-year) asset performance resulting from the recommended asset management strategy.

Asset Performance Summary

20-Year Performance (i.e. Level of Service) Targets					
Asset Group	Budget Allocation ($)	Expenditure Needs ($)	Expenditure Change (%)	WDV Change (Improve +) ($)	RSL Change (Improve +) (%)
Water Intake	$30,000	$ 42,987	43%	$ 660	1%
Water Treat	$100,000	$ 265,974	166%	$ 49,375	100%
Water Main	$2,000	$ -	-100%	$ (64,388)	-29%
Road-Gravel	$17,458,520	$ 4,524,116	-74%	$ 1,765,841	4%
Road-Paved	$26,000	$ 258,182	893%	$ 2,581,826	0%
Buildings	$120,000	$ 53,460	-55%	$ (442,214)	-45%
Machinery	$3,166,000	$ 4,228,124	34%	$ (259,687)	-11%
Total	**$20,902,520**	**$ 9,372,843**	**-55%**	**$ 3,631,413**	**5%**

Over the 20-year period, there is a projected funding surplus. In addition, given the recommended capital renewal strategy, the overall level of service is expected to increase by 5%. This will work towards improving the value of the infrastructure assets and addressing risk with a net benefit of $3,631,000 over the 20-year horizon. This results in value for taxpayers in delivering a sustainable infrastructure plan.

In addition, grant funding programs such as the "Rural Integrated Roads for Growth" (RIRG) program, formerly known as "Municipal Roads for the Economy Program" (MREP), will potentially fund 50 percent of capital costs up to $500,000 per application. There also exist numerous water systems capital renewal grant funding programs. Tapping into such funding programs, for major works such as road (subgrade) stabilization, drainage improvements, and water system upgrades can significantly reduce the internal funding allocation needs.

5.5 Grant Funding Programs

Considering the funding gap, the following lists some relevant grant funding programs for Saskatchewan municipalities. There may be other existing and/or new grant funding programs available as well. It is important for the municipal administrator to be aware of these revenue opportunities as these programs may be able to bridge the funding needs and deliver the capital renewal program to attain infrastructure sustainability.

i. Communities in Transition Funding – This fund provides financial assistance to rural municipalities that assume financial liabilities related to environmental-based physical infrastructure when a village dissolves into a rural municipality (RM). There are two streams on this, Capital and Operating. There is a time-line eligibility on both funding streams. However, this would be applicable to the communities of Loverna and Hoosier and their infrastructure renewal needs that are nearing or at the end of their service life. The following are contacts to pursue further:

   a. https://www.saskatchewan.ca/government/municipal-administration/funding-finances-and-asset-management/funding/funding-for-communities-in-transition

   b. Questions: 306-787-1262 or mifprovgrants@gov.sk.ca

ii. Canada Community Building Fund (CCBF) – This is formerly the federal Gas Tax Fund (GTF). Funding allocation is based on a per capita basis. There is a requirement for municipalities to be making progress in asset management, which by this report, the RM is doing. The following are contacts to pursue further:

   a. https://www.saskatchewan.ca/government/municipal-administration/funding-finances-and-asset-management/funding/canada-community-building-fund

   b. Questions: 306-787-1262 or ccbfprogram@gov.sk.ca

iii. Investing in Canada Infrastructure Program (ICIP) – This program provides eligibility for all types of Saskatchewan infrastructure projects. There are five steams of project funding. One stream is "Green Infrastructure", which supports the needs for safe drinking water. That also has the greatest funding component to that. The following are contacts to pursue this further.

   a. https://www.saskatchewan.ca/government/municipal-administration/funding-finances-and-asset-management/funding/investing-in-canada-infrastructure-program

   b. Questions: 306-787-1262 or infr@gov.sk.ca

iv. Provincial Territorial Infrastructure Component Program (PTIC) – This program is a part of the "New Building Canada Fund (NBCF)". There is a section of this program designed or Small Communities (< 100,000 residents). The program is designed for infrastructure programs resulting in economic growth, cleaner environment, developing sustainable communities, and other. These are relevant to asset management initiatives. The following are contacts to pursue further:

   a. https://www.saskatchewan.ca/government/municipal-administration/funding-finances-and-asset-management/funding/nbcf

b. Questions: 306-787-1262 or infr@gov.sk.ca

v. Clean Water and Wastewater Fund Program (CWWF) – This program is also a part of the "New Building Canada Fund (NBCF)". This program is targeted for projects that can be designed and constructed over a short-term including water and wastewater treatment systems, water distribution, and wastewater collection. The following are contacts to pursue further:

a. https://www.saskatchewan.ca/government/municipal-administration/funding-finances-and-asset-management/funding/nbcf

b. Questions: 306-787-1262 or infr@gov.sk.ca

vi. Rural Integrated Roads for Growth (RIRG) – The purpose of this programs is to provide a sustainable road network on the higher-class roadways. It was originally designed for the "Grid" road classes and higher. Latest amends now included the "Main Farm Access "class. The eligible infrastructure types are "Roads", "Bridges", and "Culverts". For the road construction, eligible projects include earthworks, which would include the ditch grading needs. Eligible projects also include clay capping, which should include subgrade stabilization, which is the evolution of traditional clay capping. The program will fund $500,000 per RM per project. The following are contacts to pursue further:

a. https://sarm.ca/programs/rirg

b. Questions: 306-761-3747 or info@rirg.ca

6. Implementation Plan

Based on the short-range (5-year) program strategy, the following table summarizes a step-by-step implementation plan the RM may use as a guide in delivering their asset management plan moving forward. Specific details of the individual assets and other related reporting is contained in the AM Database.

Action Item	Year	Comments
Asset Management Strategy	2022	Complete
LOS Targets and Corresponding Capital Renewal Strategy	2022	Either adopt the LOS targets and corresponding capital renewal strategy as presented in this report; or use these as a guide to set RM generated LOS targets. The recommended targets include a 5% improvement in LOS over the 20-year horizon. Special LOS commitments may be given towards water systems which are critical asset groups
Initiate usage of the Asset Management Database	2022	Upon installation of the AM Database, which is loaded with LOS data and a recommended capital renewal program strategy, begin using the database to report on the current LOS and develop the detailed maintenance and capital works program for annual budget development.
Develop the Maintenance and Capital Renewal Annual Budget Program	2022-2026	Initiate the program by developing the maintenance and capital renewal budget using the AM Database. Adjust as appropriate to do so. This should be an annual occurrence. Initiate design engineering and tender preparation as appropriate for the more significant and outsourced works Refer to AM Database for program specific details of location, condition state, and preliminary cost estimates.
Hoosier Water Supply and Treatment Preliminary Engineering	2022	Hoosier currently has a non-potable supply of water from an internal community well. The treatment system does not have filtration. This study would consider upgrading the combined raw water supply and treatment to serve the community with potable water. An alternative to consider could be supply from Marengo, pending the potential integrated water system upgrades within the RM of Milton (i.e. Alsask). During this study, consideration may be given to providing a regional potable water supply to Loverna direct from Alsask.
Deployment - Sight Triangle and Stopping Sight Distance Mitigation	2022-2023	This report identified 14 locations of sight distance (safety) deficiencies for a total estimated expenditure of $88,000. 11 of these locations are relatively minor in nature involving either signage (stop or yield) at the minor road and/or clearing of the sight triangle. 3 of these locations are more significant in nature involving

		earthworks and road grade alignment to address stopping sight deficiencies at the intersection/approach.
Deployment – Grader Maintenance and Gravel Enhancement	2022	Initiate grader maintenance on 42 segments of gravel roads addressing surface cross slopes where the crown is less than 3 percent. Initiate the backlog of surface gravel, including 51 road segments of re-gravelling for 2022 for an estimated cost of $471,000.
Apply for External Capital Grant Funding	2022	The Road (Subgrade) Stabilization program could be an eligible candidate for such grant funding. As such, it would be prudent to apply for external grant funding to offset RM's capital expenditures. The application is the evolution of "Clay Capping", which is an eligible expenditure. Completing the partially developed roads, including Regrading (i.e. reconstruction) or major ditch improvements may also be an eligible expenditure. Program grant funding is currently estimated at $500,000 per project application under the Rural Integrated Roads for Growth" (RIRG) program.
Deployment – Road (Subgrade) Stabilization	2023-2026	This report recommends implementation of subgrade stabilization within 3 road segments. These roads would often have high volume heavy haul traffic and poorer road strength. The estimated total cost for the above noted work is $460,250. Given the projected funding surplus, it would be desired to expand these areas to longer continuous applications defining a roadway corridor. Engineering is required to determine both soils material needs and geometric needs. It is necessary to complete appropriate materials/geometric design. It will be required to develop tender packages if deploying through external contract forces. There are various chemical stabilization products on the market with varying levels of performance for the intended application. For this application, the balance between "resulting strength" and "maintenance workability" are key criteria. One product that is having positive reviews by some rural municipalities is "Gravelock". For further information, the RM may contact Flagstaff County and/or Sturgeon County in Alberta.
Deployment – Drainage Improvements	2023-2026	The report recommends drainage improvements among 27 road segments. Half of these would be relatively low cost to pull the slumping side-slopes. The other half is more extensive addressing re-establishing and/or developing the ditch grade. The total estimated cost is $465,000.
Buildings Renewal	2022-2024	One item is expected during this horizon

		• RM Office roof and siding repair - $4700 (RM 322 share)
Equipment and Machinery Replacement	2022-2026	As per expected replacement cycles, 4 units expected for replacement for an estimated replacement cost of $995,424:
Infrastructure Condition Reassessment and Training	2026	Conduct a reassessment of all infrastructure groups involving operations staff that would be trained during the process of conducting future condition assessments The trained staff would enter the collected data into the AM Database and recomputed the updated level of service and assess the changes from the base year 2021. A module exists in the AM Database for conducting field entry. Alternatively, reassessments could be completed by trained summer staff.
Infrastructure Lifecycle Analysis - Update	2026	Consult an asset management specialist to utilize condition assessments by the RM to re-compute the lifecycle optimization maintenance & capital renewal strategy and update these planned works within the AM Database.

7. Conclusions and Recommendations

The following summarizes key conclusions and recommendations for implementation moving forward so the RM may sustain and maintain a viable asset management program as part of its on-going administration and operations.

7.1 Conclusions

- In accordance with the Government of Saskatchewan, Gas Tax Program, this asset management plan attains the following:
  - Completes the Asset Management Policy and Strategy
  - Determines the current level of service (assets condition) and target level of service moving forward
  - Determines the financial gap needed to attain the target level of service
  - Develops an Asset Management Database, loaded with data analysis and results, so the RM can monitor and improve its asset management program moving forward
- The Asset Management Policy and Strategy was amended to include the Asset Management Database as a means for the RM to manage its asset management program moving forward.
- The RM's asset groups include rural and urban assets including, "Roads-Gravel", "Roads-Paved", "Water Intake (raw water supply and rural fill stations)", "Water Treatment", "Water Mains", "Buildings", and "Machinery".
- The current replacement cost (RC) value of all infrastructure assets is estimated at $71,049,000. The "Roads-Gravel" asset group has the greatest value at $64,755,000 and is the most critical in the infrastructure sustainability plan.
- The current LOS, considering all asset groups, is in relatively good shape with an overall RSL of 65 percent.
- The most concerning asset groups are water system assets within the Hamlet of Hoosier, where the RSL ranges between 0 percent and 75 percent. Hoosier does not have a potable water supply. The Hamlet of Loverna has only a non-potable community well and no water distribution system.
- The short-range strategy for Hoosier water systems is for preliminary engineering to determine the appropriate upgrade option. While the study assumes internal water treatment upgrades to supply potable water, consideration should be given towards a regional water system solution pending the water system planning within the Village of Marengo and that of the RM of Milton (i.e. Alsask). This strategy may also expand to include direct potable water supply to Loverna from Alsask. The current long-range strategy includes funding allocation for water treatment upgrades within Hoosier, but no funding allocation to Loverna. This should be reviewed.
- The gravel road network is in relatively good condition state with an RSL of 67 percent. Many of the issues are relatively low-cost maintenance issues include sight deficiencies (intersection signage and sight triangle), roadway crown (cross slope), traffic gravel replacement, and slumping shoulders and side-slopes. The major issues included substandard ditch drainage, a few deficient stopping sight distance to intersections, and some roadway stability locations.
- A unique feature of this study was the use of the DCP testing of the roadway strength to provide a structural classification. The results showed variability between the various gravel roads. However, a common trend among many roads showed higher strength in the top 200 mm (8 inches). This is due to the RM's cumulated activities over time of gravel application, clay capping, and grader

operations incorporating the gravel into the surface. This is an investment the RM should look at preserving and even enhancing in its road strengthening activities moving forward.

- The two elements that impact roadway surface condition and stability are the volume of heavy haul traffic and roadway strength. The DCP testing classified the roadway strength for each roadway segment. The roads with the greatest road (subgrade) stabilization needs to be those roadways with the highest traffic volume (i.e. Grid functional classification) and those with the lowest strength (i.e. poor structural classification). One conventional method of addressing roadway instability is "Clay Capping". An improvement to that is "Road (Subgrade) Strengthening", which has the added value of strengthening the roadway, locking in the surface gravel, and creating a dust-free surface. While traffic gravel replacement is a significant component of the RM's budget, this cost can be significantly reduced over time.

- While both conventional roadway grading (reconstruction) and subgrade stabilization will each in their own way improve the strength of the roadway, it is often more effective to continue to build on the existing roadway surface instead of full grading reconstruction. While there are numerous means to strengthen the surface, subgrade (chemical) stabilization methods can be an effective way to achieve this. A major drawback of grading (reconstruction) is the loss of the RM's surface strengthening activities built up over time. Roadway grading (reconstruction) would only have advantage over stabilization if major geometric improvements were required to maintain traffic safety.

- The short-range strategy for the gravel road network addresses both the low-cost maintenance issues as well as the higher cost capital renewal initiatives including correcting ditch/drainage deficiencies and subgrade stabilization. Having corrected these issues, for the long-range, it is forecast reduced maintenance and capital renewal needs, resulting in an increasing budget surplus.

- There exist two paved road segments nearing the end of their service life. The strategy is to revert these to gravel using subgrade stabilization to increase the strength, reduce annual gravel needs, reduce dust, and provide a higher level of service for a gravel road standard.

- The "Machinery" asset group includes assets of relatively short Theoretical Service Life (TSL). They turn over quickly. Ideally, an average Remaining Service Life (RSL) of 50 percent is adequate for this asset group. The RM is currently running approximately 75 percent, diminishing to 64 percent towards the end of the 20-year horizon. This is an acceptable normal variation for this asset group.

- The LOS target over the long-range (20-year) horizon would improve the assets overall remaining service life (RSL) by 5 percent. This will result in an overall asset valuation (i.e. WDV) improvement by $3,631,000. This is significant and will provide a noticeable LOS improvement.

- To get to the targeted LOS does not appear to require an incremental additional investment as the recommended program is expected to run a budget surplus. It should be recognized that expenditure needs will vary over time. The projected surplus should be used as a contingency to sustain a financial balance and potentially introduce new initiatives. One potential new initiative could be potable water supply to Loverna, which is currently unfunded within the recommendations of this study. Another may be expanded road (subgrade) stabilization to include implementation on corridor basis, instead of the isolated one-mile segments as currently triggered within the asset management analysis.

- The study's condition assessments, level of service analysis, and program strategy are housed in an Asset Management (AM) Database. The RM now has the tools and data in place to sustain and maintain its asset management program. However, sustaining an asset management program

will require additional time and resources by the Administrator and staff. Moving forward, the following are expected new activities the RM will need to allocate time and financial resources to:

- Routinely update the AM Database based on reassessed condition assessments, completion of work, and adjusting the works program based on budget levels and level of service targets.
- Train and develop staff on condition assessments and computing the current level of service
- Potentially outsourcing the lifecycle analysis to update the recommended maintenance and capital program strategy in line with on-going level of service targets set by the RM. This could be done on the same cycle as the field level condition reassessments.

7.2 Recommendations

i. That the RM uses the findings of this report to set its asset level of service (LOS) targets for the short-range and long-range horizons; including consideration for the recommended LOS targets which would improve the overall asset remaining service life (RSL) by 5 percent over the 20-year horizon.

ii. That the RM consider implementing the asset management recommended program that addresses the infrastructure deficit and lends a roadmap to infrastructure sustainability.

iii. That the RM recognize the potential for a funding surplus over the 20-year horizon and monitor it to manage the varying expenditure needs that will occur over time. However, this surplus may provide strategic advantage including the potential to deliver additional enhancements including:

   a. Regional potable water supply to Loverna and Hoosier. These water systems capital upgrade needs are grant funding eligible under numerous programs.

   b. Expanded subgrade stabilization to continuous corridors on the higher-class roadways to define a higher standard, improved strength, improved traffic safety, reduced maintenance, reduced dust, and reduced gravel needs. As the evolution of traditional clay-capping, this treatment has the potential to have costs offset by existing grant funding programs (i.e. Rural Integrated Roads for Growth (RIRG) program).

iv. That the RM reviews the short-range capital renewal works program within this report and the Asset Management Database, conducts a field reality check, and deploys the program subject to changes as appropriate to do so.

v. That the RM allocates the resources and incorporates the on-going activities of asset management within its administration and operations personnel.

vi. That the RM invests as appropriate continued asset management training, including field level condition assessments by its operations staff.

vii. That the RM use the data and analysis results of this study, housed within an Asset Management Database, as the foundation to manage its asset management program moving forward.

Appendix A

Policy and Strategy