2025

Asset Management Plan



RED LAKE
Opportunity...it's our Nature

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Executive Summary

This asset management plan is intended to be a snapshot in time and is based on information currently available to the Municipality. As the Municipality continues to improve and integrate its data collection, additional information will be available to allow for better analysis and long-term planning in future iterations. The plan has been prepared in accordance with Ontario Regulation 588/17 and provides information on the inventory, condition, levels of service, lifecycle activities, risk and 10-year costs for the Municipality's assets, along with a financial strategy. The assets include:

- Water and wastewater assets and buildings
- Stormwater management assets
- Bridges and structural culverts
- Paved and gravel roads
- Sidewalks
- Fleet assets
- Facilities and land improvements

The total length or count and average condition for all assets is provided below.

Asset Category	Length / Count	Average Condition
Water	51.65 KM	Fair
Wastewater	45.97 KM	Fair
Stormwater	6.08 KM	Poor
Bridges	2	Fair
Roads	68.07	Fair
Sidewalks	13.99	Very Good
Fleet	76	Very Poor
Facilities and Land Improvements	47	Poor

The condition information points to significant renewal pressures. Approximately 24.86% of paved road lane-kilometres are rated very poor and 0.90% are rated failed. Approximately 56.63% of the fleet and 40.43% of facility and land-improvement assets are at or beyond their expected useful life. Stormwater culverts and portions of the underground stormwater network also have a high concentration of assets rated very poor.

Service levels are defined under four key pillars:

- **Regulatory Compliance** – meeting applicable legislation and standards
- **Responsive Service** – addressing resident concerns and disruptions promptly
- **Reliable Service** – ensuring continuity and quality of service
- **Affordable Service** – delivering services cost-effectively

The proposed levels of service are the performance targets for each asset category. The Municipality will work toward these targets over the planning period, subject to risk, affordability, available funding and annual Council-approved budgets.

To support these service levels, the Municipality has developed a risk-based lifecycle strategy that prioritizes regulatory compliance, health and safety, environmental protection and service criticality

through proactive maintenance, coordinated capital work and optimized rehabilitation. Highlights include:

- Integrating underground utility replacement with road resurfacing projects
- Applying preventative road maintenance (e.g., crack sealing) to extend surface life
- Using pipelining and insulation to avoid costly excavation in rocky terrain
- Prioritizing replacement of assets with high failure risk and service impact
- Actively managing fleet and facility assets nearing or past their expected life

The overall replacement cost of all core assets in this Plan totals approximately $301.5 million (in 2024 dollars). To achieve or maintain expected service levels over the next ten years, the updated lifecycle analysis identifies approximately $138.97 million in capital requirements, including more than $81 million associated with the existing first-year backlog. Average annual operating lifecycle requirements are approximately $1.18 million. Identified annual funding, grants and capital reserves provide approximately $16.5 million over the ten-year period, resulting in an estimated ten-year lifecycle funding deficit of approximately $122.45 million.

The financial strategy uses a separate annual reinvestment methodology based on updated 2026 replacement values and recurring funding. It identifies a 2026 annual funding target of approximately $5.41 million for tax-supported infrastructure and $7.12 million for water and wastewater infrastructure, for a combined target of approximately $12.53 million. Recurring capital-related funding is estimated at approximately $3.29 million, resulting in a combined annual reinvestment funding gap of approximately $9.24 million.

The ten-year lifecycle deficit and the annual reinvestment gap serve different purposes and should not be directly compared. The lifecycle forecast reflects the timing and cost of identified activities, including the existing backlog, while the annual reinvestment target represents the recurring investment required to support long-term renewal.

Eliminating the funding gap immediately would create significant affordability impacts. The Municipality will therefore use a phased strategy that progressively increases sustainable funding through taxation, water and wastewater rates, reserves, available external funding and selective use of debt. The model demonstrates a path toward fully funding the calculated annual reinvestment targets by 2036; however, actual tax, rate, reserve and debt decisions remain subject to annual Council approval.

Where full funding is not available, lifecycle activities will be prioritized through the Municipality's risk framework, and deferred work, associated risks and interim mitigation measures will be monitored and reported annually.

The Plan will be reviewed annually by Council and comprehensively updated at least every five years, or earlier where material changes warrant.

Introduction

Overview

Well-managed public infrastructure that is safe and reliable is vital to the prosperity and quality of life of communities as it helps maintain property viability across all sectors and industries and facilitates growth within the community. Given the range and scope of services provided, Ontario municipalities have a special responsibility in ensuring that infrastructure is planned, built, and maintained in a sustainable way. A detailed asset management plan is essential to meet this responsibility as it provides a framework for current year and long-term capital planning and operational decisions.

The Municipality of Red Lake 2024 Asset Management Plan provides the Municipality with a framework for capital and operational decision making for assets. The assets include:

- Water and wastewater linear assets and buildings
- Stormwater management assets
- Bridges and structural culverts
- Paved and gravel roads
- Sidewalks
- Fleet assets
- Facilities and Land Improvements

This plan builds on the 2022 Asset Management Plan and follows the format set out by the Ministry of Infrastructure in *Building Together: Guide for Municipal Asset Management Plans.* All dollar figures reported in this 2024 Plan are in constant 2024 dollars and should be adjusted annually to account for the effects of inflation.

The purpose of the Municipality's 2024 Asset Management Plan is to outline the most cost-effective mix of lifecycle activities for infrastructure to minimize risk to the Municipality and users of the infrastructure. The plan will help direct municipal resources to assets in a strategic manner to ensure that assets with the most need are prioritized for funding.

This plan summarizes the current state of the municipal infrastructure, the levels of service of each group of assets, the lifecycle activities associated with each group of assets, the lifecycle plan for each of the assets and the lifecycle costs broken down by operating, capital and development for the next 10 years. It was developed in partnership by the CAO, Director of Operations, Information Technology Manager and Treasurer using the current TCA schedule, GIS information, and engineering studies.

This Asset Management Plan has been prepared in accordance with Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure. It documents the state of the Municipality's infrastructure, current and proposed levels of service, lifecycle management strategies, infrastructure risks, growth considerations, forecast lifecycle requirements and the financial strategy intended to support sustainable service delivery.

All dollar amounts in the original infrastructure and lifecycle analysis are expressed in constant 2024 dollars unless otherwise noted. The financial strategy uses updated 2026-dollar values and forecasts funding and expenditures through 2036.

Monitoring and Updating

At least annually, Council will review progress in implementing the Plan, factors affecting implementation and the Municipality's strategy for addressing those factors. The review will consider levels of service, projects completed or deferred, lifecycle activities not undertaken, changes in condition and risk, reserve and debt activity, funding gaps, external funding, construction inflation, growth and other material assumptions.

Asset management is an ongoing process. The Municipality will monitor implementation through its annual operating and capital budget processes and will update asset information as improved data becomes available.

Asset Management Activity	Review Frequency
Capital Budget	Annually
Tangible Capital Asset Schedule	Annually
GIS Asset Information	Ongoing
Risk Assessment	Annually
Levels of Service Performance	Annually
Financial strategy assumptions	Annually
Asset Management Plan Update	5 Years

State of the Local Infrastructure

This section provides a summary of the Municipality's assets with reference to asset quantity and quality. The condition of the assets is mostly determined by staff or professional inspection and input, and interruptions/decreasing service levels. When a measurement of service levels or inspections were not available, condition assessments were based on the useful life of the asset relative to its age. There were also instances where the remaining useful life of an asset was used in conjunction with service level assessments and inspections. Useful life assumptions for the assets were derived from the Municipality's Tangible Capital Asset (TCA) schedule and are summarized in in the table below.

Asset Class	Useful Life
Bridges and Culverts	20 Years
Buildings	30 - 50 Years
Land Improvements	20 Years
Hydrants	50 Years
Roads	10 - 20 Years
Sidewalks	30 Years
Underground Infrastructure	30 - 50 Years
Vehicles and Equipment	7 – 20 Years

Condition Assessments and Updates Overview

The Municipality's asset registry is documented in a tangible capital asset schedule that contains detailed information about the year the asset was acquired, historical cost of the asset, useful life of the asset and asset descriptions.

The Municipality used a five-point rating scale, consistent with the Canadian National Infrastructure Report Card, to assign a condition to all assets. In instances where staff or professional inspection and service level assessments were not available, the percentage of remaining useful life was used. The table below summarizes the rating scale.

Condition Assessment	Rating Index	Definition
Very Good	80.01% - 100.00%	Well maintained, good condition, new or recently rehabilitated asset.
Good	60.01% - 80.00%	Good condition, few elements exhibit minor deficiencies
Fair	40.01% - 60.00%	Some elements exhibit significant deficiencies. Asset requires attention.
Poor	20.01% - 40.00%	A large portion of the system exhibits significant deficiencies. Asset mostly below standard and approaching end of service life.
Very Poor	<0.00% - 20.00%	Widespread signs of deterioration, service is affected.

Asset condition ratings based on staff or professional inspection and input as well as service interruptions or decreasing service levels took priority over the accounting based useful life. The inspection-based condition assessments were consolidated into the 5-tier condition system as shown above. In cases where it was not possible to visibly inspect the asset (for example water and wastewater pipes), service interruptions and accounting useful life were weighted to create an overall condition assessment.

For all assets (excluding bridges), updates to asset conditions are made throughout the year based on visual inspections or service interruptions. The Municipality currently reviews asset replacement costs on an annual basis as part of its budgeting process. This includes obtaining quotes and engaging engineers to provide cost estimates for asset replacement. Bridges are inspected every two years as required by provincial legislation, and updates to conditions and replacement costs are based on bridge inspection reports.

Water and Wastewater Assets

The Municipality's water and wastewater assets include the water distribution network, fire hydrants, wastewater collection system, lagoon and drying beds, and water and wastewater buildings.

Water Distribution Network

The Municipality's water distribution network is made up of 51.65 km of mains and 1,515 of service connections with an average age of 35.90 years (as of December 31, 2024) throughout the communities of Red Lake, Balmertown, Cochenour, McKenzie Island and Madsen as outlined in Appendix A. The net book value at December 31, 2024 of the water distribution network as indicated by the Municipality's TCA schedule is $4,049,786 while the total replacement cost of the entire network is $131,939,327 (in 2024 construction dollars), excluding any surface works. The Municipality's water distribution network is made from six different types of material consisting of:

Type	Useful Life	Length (km)
Asbestos-Cement	30 Years	1.21
Cast Iron	50 Years	13.72
Ductile Iron	50 Years	5.56
Hi-Dens Poly Ethel	50 Years	22.57
Poly Vinyl Chloride	50 Years	7.25
Steel	50 Years	1.34

Water distribution network asset condition is assigned using a weighted index of number of main breaks (as a measure of service interruptions) and asset age in comparison to useful life. A summary of the water distribution condition assessment is below:

Condition Assessment	Percentage	Length (km)
Very Good	8.47	4.38
Good	23.65	12.21
Fair	51.72	26.71
Poor	13.82	7.14
Very Poor	2.35	1.21

Hydrants

The Municipality currently has 224 fire hydrants with an average age of 37.17 years (as of December 31, 2024) throughout the communities of Red Lake, Balmertown, Cochenour, McKenzie Island and Madsen as outlined in Appendix A. The net book value at December 31, 2024 of the hydrants as indicated by the Municipality's TCA schedule is $18,186 while the total replacement cost is $2,147,288 (in 2024 construction dollars).

The hydrant asset condition is assigned based on asset age in comparison to useful life. A summary of the hydrants condition assessment is below:

Condition Assessment	Percentage	Count
Very Good	-	-
Good	-	-
Fair	54.91	123.00
Poor	28.57	64.00
Very Poor	16.52	37.00

Wastewater Collection System

The Municipality's wastewater collection system is made up of 45.97 km of mains with an average age of 37.87 years (as of December 31, 2024) and 1,502 service connections throughout the communities of Red Lake, Balmertown, Cochenour, McKenzie Island and Madsen as outlined in Appendix B. The net book value at December 31, 2024, of the wastewater collection system as indicated by the Municipality's TCA schedule is $3,845,011 while the total replacement cost of the entire network is $49,597,833 (in 2024 construction dollars), excluding any surface works. The Municipality's wastewater collection system is made from six different types of material consisting of:

Type	Useful Life	Length (km)
Asbestos-Cement	30 Years	9.23
Concrete	50 Years	4.51
Ductile Iron	50 Years	0.72
Hi-Dens Poly Ethel	50 Years	15.84
Poly Vinyl Chloride	50 Years	14.28
Steel	50 Years	0.33
Vitrified Clay	30 Years	1.07

Wastewater collection system asset condition is assigned using a weighted index of number of main breaks (as a measure of service interruptions) and asset age in comparison to useful life. A summary of the wastewater collection system condition assessment is below:

Condition Assessment	Percentage	Length (km)
Very Good	8.43%	3.88
Good	13.70%	6.30
Fair	55.48%	25.50
Poor	0.10%	0.04
Very Poor	22.30%	10.25

Water and Wastewater Buildings

The Municipality has water and wastewater buildings throughout the communities of Red Lake, Balmertown, Cochenour, McKenzie Island and Madsen. The table below outlines the type, location, average age, net book value, replacement cost (in 2024 construction dollars) and average condition assessment of each building.

Name	Location	Useful Life	Weighted Average Age	NBV	Replacement Cost	Average Condition Score
Water Buildings and Structures						
Red Lake WTP	Red Lake	50	63	315,455	25,105,785	1.44
Water Tower	Red Lake	50	33	392,487	3,665,840	2.25
Balmertown RPS	Balmertown	50	53	2,824,226	13,649,600	1.11
Cochenour WTP	Cochenour	50	19	6,661,259	26,334,893	1.22
Madsen WTP	Madsen	50	36	427,051	19,212,848	1.56
Wastewater Buildings and Structures						
Red Lake WPCP	Red Lake	50	32	793,367	14,362,242	2.33
Lift Station #1	Red Lake	50	29	120,718	2,940,115	2.44
Lift Station #2	Red Lake	50	27	131,713	1,637,532	1.89
Lift Station #3	Red Lake	50	20	74,721	1,387,166	1.89
Lift Station #4	Red Lake	50	43	33,672	1,285,666	1.89
Lift Station #5	Red Lake	50	43	30,455	1,263,110	1.89
Lift Station #6	Red Lake	50	33	59,738	1,637,532	1.89
Lift Station #7	Red Lake	50	33	62,953	1,285,666	1.89
Balmertown WPCP	Balmertown	50	46	91,706	11,531,521	2.44
Balmertown WPCP Lift Station	Balmertown	50	53	52,874	1,234,916	2.44
Balmertown Lift Station #2	Balmertown	50	53	2,840	1,637,532	2.00
Cochenour Lagoon	Cochenour	20	9	5,686	3,044,998	2.00
Cochenour Lift Station	Cochenour	50	32	220,089	2,283,749	2.22
Madsen Septic	Madsen	50	35	-	169,167	2.43
Balmertown Drying Beds	Balmertown				422,916	2.00
Sully Lake Drying Bed	Red Lake	20	13	45,048	806,361	2.17
				12,346,056	**134,899,156**	

The condition assessment of water and wastewater buildings is based on an average assessment of the various components within the building to provide an overall condition rating. The criteria applied and the individual rating for each component of the building is included in Appendix C. The overall condition is assigned based on:

Condition Assessment	Rating Index
Very Good	1.00 - 1.50
Good	1.51 - 2.50
Fair	2.51 - 3.50
Poor	3.51 - 4.50
Critical	4.50 +

On January 1, 2015, the Federal Wastewater Systems Effluent Regulation (WSER) came into effect and requires that wastewater treatment plants that have a capacity of less than 5,000 m^3/day are required to meet the new effluent standards by January 1, 2021. Based on the current design of the Red Lake WPCP, the Municipality currently does not meet the WSER standards so that while the Red Lake WPCP has an overall condition assessment of 2.40 (which is considered "good"), there are issues that need to be addressed. The Municipality has completed a Feasibility Study and a Preliminary Design Report to upgrade the Red Lake WPCP which can be found on the Municipal website.

Stormwater Management Assets

The Municipality's stormwater system is made up of retention ponds, pipes, culverts, ditches, manholes and storage chambers as outlined in Appendix D. The net book value at December 31, 2024, of the stormwater management assets as indicated by the Municipality's TCA schedule is $748,276 while the total replacement cost of the assets is $3,789,724 (in 2024 construction dollars), excluding any surface works.

Underground Pipes

There are 4.89 km of underground pipes with an average age of 21.23 years (as of December 31, 2024) within the stormwater management asset network made of six different materials consisting of the following:

Type	Useful Life	Length (km)
Asbestos-Cement	30 Years	0.10
Corrugated Steel	30 Years	1.43
Concrete	50 Years	0.20
Hi-Dens Poly Ethel	50 Years	2.45
Poly Vinyl Chloride	50 Years	0.25
SDR	50 Years	0.46

Stormwater management underground pipe condition is assigned based on age in comparison to useful life and a summary of the condition assessment is below:

Condition Assessment	Percentage	Length (km)
Very Good	32.10	1.57
Good	14.30	0.70
Fair	6.75	0.33
Poor	17.42	0.85
Very Poor	29.44	1.44

Culverts

The culverts within the stormwater management asset network have an average age of 27.97 years (as of December 31, 2024) and consist of the following:

Size	Count	Length (km)
150 mm	1	0.04
300 mm	7	0.11
375 mm	64	0.89
400 mm	9	0.10
450 mm	13	0.17
475 mm	3	0.03
500 mm	3	0.02
525 mm	2	0.10
600 mm	9	0.17
700 mm	1	0.02
750 mm	7	0.10
1050 mm	1	0.08
1500 mm	`4	0.07

Of the above, 16 (12.90%) are made from corrugated metal pipe with a 30-year useful life, 102 (82.26%) are made from corrugated steel pipe with a 30-year useful life and 6 (4.84%) are made from HDPE with a 50-year useful life.

The culvert condition assessment is based on remaining useful life, summary of which is provided below:

Condition Assessment	Percentage	Count
Very Good	3.23	4
Good	11.29	14
Fair	17.74	22
Poor	0.00	0
Very Poor	67.74	84

Other Stormwater Management Assets

The stormwater management asset network also includes the following and have an average age of 18.68 years (as of December 31, 2024):

Feature	Useful Life	Count
Manhole	50 Years	67
Catch Basin	50 Years	120
Catch Basin with Manhole	50 Years	26
Catch Basin in Ditch	50 Years	3
Gate Valve	15 Years	19
Grated Ditch Inlet	50 Years	5

Also included in other stormwater management assets are 109.39 km of ditches.

Other stormwater management asset conditions are assigned based on age in comparison to useful life and a summary of the condition assessment is below:

Condition Assessment	Percentage	Count
Very Good	38.75	93
Good	21.67	52
Fair	-	-
Poor	25.00	60
Very Poor	14.58	35

Note that drainage ditches are not included in the above condition assessment as the useful life of ditches is the equivalent to land, which is to say, is indeterminate.

Bridges and Structural Culverts

The Municipality is responsible for one bridge, “Howey Bay Bridge” and one box culvert, “Forestry Road Culvert” and both are inspected every two years by a registered structural engineer as required by legislation. The last inspection was completed on November 22 and 23, 2023. The next scheduled inspection is September 2025.

In accordance with the Ontario Ministry of Transportation Engineering Standards Branch, the Bridge Condition Index (BCI) was calculated for each structure. The range description for the BCI values is as follows:

Condition Assessment	BCI Rating
Excellent	100
Good	≥70 - 100
Fair	≥60 - <70
Poor	<60

The 2023 inspection of the Howey Bay Bridge indicates a condition rating of 64.04 or in the mid-range of the 'fair' rating. The report recommends a number of interim remediation actions and indicates that the bridge will likely need replacement in the next one to two years. The structure is made of a steel girder with a total deck length of 6.4 meters and an overall width of 8.5 meters. The net book value of the Howey Bay Bridge at December 31, 2024, as indicated by the Municipality's TCA schedule, is $13,941 with a replacement cost of $1,215,380 (in 2024 construction dollars). The age of the bridge is unknown.

The 2023 inspection of the Forestry Road Culvert indicates a condition rating of 70.55 or on the lower end of the 'good' rating. The report recommends a number of interim remediation actions. The structure is a concrete box culvert with a total deck length of 20.1 meters and an overall width of 5.6 meters. The net book value of the Forestry Road Culvert at December 31, 2024, as indicated by the Municipality's TCA schedule is $29,566 with a replacement cost of $2,484,719 (in 2022 construction dollars). The age of the culvert is unknown however municipal records indicate improvements were made to the culvert in 2016.

Roads

The Municipality's road assets include paved roads and gravel roads.

Paved Roads

The Municipality's paved road network is made up of 24.25 lane km (11.87 linear km) of 37.5mm asphalt (overlay) roadways, 46.97 lane km (22.12 linear km) of 50mm asphalt and 35.93 lane km (17.61 linear km) of low compression base roadways (surface treatment) with an average age of 17.08 years (as of December 31, 2024) throughout the communities of Red Lake, Balmertown, Cochenour and Madsen as outlined in Appendix E. The paved road network consists of the following:

Type	Lane km	% of Land Area
Arterial	25.65	15.40
Local	57.48	34.51
Minor Collector	23.61	14.17
Parking Lot	0.41	0.25

The net book value at December 31, 2024, of the paved road network as indicated by the Municipality's TCA schedule is $7,395,581 while the total replacement cost of the entire network is $41,278,064 (in 2024 construction dollars). Note that road base costs are only allocated to roads without underground infrastructure underneath them.

In 2023, the Municipality hired a third party to develop a road condition inventory based on the Pavement Condition Index (PCI) for all the paved roads in the municipality. These ratings have been updated by municipal staff for work completed between 2023 - 2024 and include the following classes:

Condition Assessment	PCI Rating
Excellent	86 - 100
Good	71 - 85
Fair	56 - 70
Poor	41 - 55
Very Poor	26 - 40
Failed	0 - 25

A summary of the Municipality's paved road condition assessment is below:

Condition Assessment	Percentage	Lane km
Excellent	12.86	13.78
Good	29.11	31.19
Fair	25.08	26.88
Poor	7.18	7.70
Very Poor	24.86	26.63
Failed	0.90	0.97

Gravel Roads

The Municipality's gravel road network consists of 24.69 lane km (16.45 linear km) of gravel roads with an average age of 37.77 years (as of December 31, 2024) throughout the communities of Red Lake, Balmertown, Cochenour and Madsen as outlined in Appendix E. All roads in the gravel road network are local and account for 14.82% of the land area of the municipality.

The net book value at December 31, 2024, of the gravel road network as indicated by the Municipality's TCA schedule is $139,664 while the total replacement cost of the entire network is $14,159,859 (in 2024 construction dollars).

The Municipality has rated the gravel roads based on visual inspection with the results below:

Condition Assessment	Percentage	Lane km
Very Good	21.67	5.35
Good	63.88	15.77
Fair	14.34	3.54
Poor	0.11	0.03
Very Poor	-	-

Sidewalks

The Municipality's sidewalk network consists of 1.19 km of asphalt sidewalks, 1.91 km of brick sidewalk and 10.89 km of concrete sidewalk with an average age of 6.30 years (as of December 31, 2024).

The net book value, at December 31, 2024, of the sidewalk network as indicated by the Municipality's TCA schedule is $2,706.412 while the total replacement cost of the entire network is $6,364,281 (in 2024 construction dollars).

In 2023, the Municipality hired a third party to develop a sidewalk condition inventory based on the Sidewalk Condition Index (SCI) for all the paved roads in the municipality. These ratings have been updated by municipal staff for work completed between 2023 - 2024 and include the following classes:

Condition Assessment	SCI Rating
Excellent	86 - 100
Good	71 - 85
Fair	56 - 70
Poor	41 - 55
Very Poor	26 - 40
Failed	0 - 25

A summary of the Municipality's sidewalk condition assessment is below:

Condition Assessment	Percentage	Length (km)
Excellent	65.10	9.11
Good	16.93	2.37
Fair	10.38	1.45
Poor	1.16	0.16
Very Poor	5.03	0.70
Failed	1.41	0.20

Fleet

The Municipality's fleet assets include vehicles, and machinery required to provide all municipal services and are broken down as follows:

- Airport equipment includes assets used in airport operations including runway maintenance and and snow/ice clearing machinery.
- Ferry equipment includes assets used in the provision of ferry services.
- Fire equipment includes assets used in the provision of fire services including pumper trucks, tankers and rescue units.
- Light machinery/mowers include small, versatile machinery used for landscaping and maintenance tasks such as riding mowers, generator sets, and small utility vehicles.
- Light vehicles/autos are used primarily for transportation suitable for administrative and operational tasks such as cars, SUV's and light-duty trucks.

- Medium machinery includes equipment that is larger than light machinery but smaller than heavy machinery, including sweepers, sidewalk tractors and skid steers.
- Medium vehicles include vehicles with a capacity between light and heavy vehicles such as medium duty trucks used for various logistical and operational functions.
- Heavy machinery includes large, robust equipment designed for heavy-duty tasks such as graders, loaders, bulldozers, backhoes and large excavators.

Type	Number of Units	Useful Life	Average Age (years)
Airport Equipment	9	20 Years	11.00
Ferry Equipment	1	20 Years	18.00
Fire Equipment	8	20 Years	16.38
Light Machinery/Mowers	14	8 - 10 Years	10.00
Light Vehicles/Autos	15	7 Years	8.00
Medium Machinery	6	15 Years	25.67
Medium Vehicles	5	10 Years	6.60
Heavy Machinery	10	20 Years	13.50
Heavy Vehicles	4	15 Years	7.50

The net book value, at December 31, 2024, of the fleet assets as indicated by the Municipality's TCA schedule is $5,336,988 while the total replacement cost of the entire network is $17,517,404 (in 2024 dollars).

Fleet asset conditions are based on the remaining useful life of the asset. A summary of which is provided below:

Condition Assessment	Percentage	Count
Very Good	15.28	11
Good	8.33	6
Fair	12.50	9
Poor	11.11	8
Very Poor	52.78	38

Facilities and Land Improvements

The Municipality's facilities and land improvement assets encompass a wide range of buildings, structures, and site enhancements that support the operations and service delivery of all departments, including recreation, public works, protection services, and administration.

Facilities and Land Improvements are broken down into five categories based on their function:

- Administration – Municipal Office, Pharmacy, and Medical Clinic
- Protective Services – Fire Halls, and Dog Pound
- Operations – Public Works Facilities Airport Facilities, Transfer Station and Landfill Site
- Parks – Play Parks, Sports Fields, Beaches, and related structures
- Recreation – Community Centre, Heritage Centre, Libraries, Arena and Pavillion

Category	Replacement Cost	Count	Average Age	Useful Life
Administration	10,045,087	3	22.33	40 Years
Protective	4,001,190	5	35.00	40 - 50 Years
Operations	42,132,986	14	19.50	15 - 40 Years
Parks	4,153,871	17	16.35	15 - 50 Years
Recreation	29,994,766	8	32.88	40 - 50 Years

The net book value, at December 31, 2024, of the facilities and land improvement assets as indicated by the Municipality's TCA schedule is $16,969,724 while the total replacement cost of the entire network is $90,327,900 (in 2024 dollars).

Facility and land improvement asset conditions are based on the remaining useful life of the asset. A summary of which is provided below:

Condition Assessment	Percentage	Count
Very Good	14.89	7
Good	14.89	7
Fair	17.02	8
Poor	12.77	6
Very Poor	40.43	19

Current and Proposed Levels of Service

This section describes current performance, proposed levels of service and the external factors that may affect the Municipality's ability to maintain or improve service.

This section describes the Municipality's current performance and the proposed levels of service it intends to maintain or work toward over the ten-year planning period. Proposed levels of service have been established with consideration for current performance, regulatory requirements, asset condition, infrastructure risk, lifecycle practices, community expectations and financial capacity.

Overview and Measures

The Municipality's current service levels support the intended purpose of the asset and its anticipated impact on the community and the municipality. They have been developed based on a combination of internal asset management practices, community expectations, statutory requirements and industry operating and safety standards and are guided by the following principles:

- Reliable – Services are predictable and continuous; services of sufficient capacity are convenient and accessible
- Cost Effective – Services are provided at the lowest possible cost for both current and future rate payers
- Responsive – Opportunities for community involvement in decision making are provided; and rate payers are treated fairly and consistently, within acceptable timeframes, demonstrating respect, empathy, and integrity

- Safe – Services are delivered so that they minimize health, safety, and security risks
- Suitable – Services are suitable for the intended function
- Sustainable – Services preserve and protect the natural and heritage environment

The level of service measures are described using two perspectives:

- Community perspective – includes the rate payer's expectation of the service provided by the asset
- Technical perspective – includes the Municipality's performance measurement of the service provided by the asset. Included in the technical perspective is the performance target.

Proposed Levels of Service

For the purposes of this Plan, the performance targets identified for each asset category constitute the Municipality's proposed levels of service. Where current performance meets or exceeds a target, the objective is to maintain that level. Where current performance does not meet the target, the Municipality will work toward the proposed level over the planning period.

The proposed levels of service do not represent a commitment to complete every identified lifecycle activity in a particular year. The pace of implementation will depend on annual Council-approved budgets, available funding, asset condition, regulatory requirements and changes in infrastructure risk.

Asset Category	Proposed Level of Service	Current Direction
Water	Meet regulatory requirements; minimize boil water advisories; no more than one break per 5 km of watermain annually	Maintain and improve
Wastewater	Meet regulatory requirements and avoid sewer backups	Maintain and improve
Stormwater	Remove blockages within four hours 95% of the time and avoid flooding caused by blockages	Maintain
Bridges and structural culverts	Meet inspection and maintenance requirements and provide appropriate load capacity	Improve
Roads	No failed PCI and less than 10% of roads rated very poor	Improve
Sidewalks	No failed SCI and less than 10% rated very poor	Improve
Fleet	Maintain safe, reliable and available equipment; renew based on condition, utilization, repair cost and service criticality	Improve
Facilities and land improvements	Maintain safe, accessible and functional assets; renew before condition materially affects service	Improve

Achieving the Proposed Levels of Service

Achieving the proposed levels of service requires operating, maintenance, rehabilitation, renewal and replacement activities. The lifecycle strategies in this Plan identify cost-effective approaches to maintaining infrastructure while managing the probability and consequence of failure.

The Municipality recognizes that the activities required to immediately achieve all proposed levels of service exceed its current financial capacity. Available funding will therefore be prioritized based on

regulatory obligations, health and safety, environmental consequences, service criticality, asset condition, opportunities for coordinated work and the potential for deferral to increase future costs.

Water and Wastewater Assets

Water and wastewater services should provide a potable water supply, and collection, treatment, and disposal of sewage wastewater in a way that protects the natural environment and public health.

Water and wastewater services are available in the communities of Balmertown, Cochenour, Red Lake, McKenzie Island and Madsen but there are areas of the Municipality where water and wastewater services from the Municipality are not available due to the prohibitive cost. Currently 52.49% of properties in the Municipality are connected to the municipal water system and 51.32% of properties are connected to the municipal wastewater system. Further, fire flow is available to 94.03% of properties within the Municipality. Maps indicating the location of the water distribution system, wastewater collection system and the fire flow areas are included in Appendices A, B, and G respectfully.

For those connected to the water and wastewater system, the expectation is that they have clean water when they need it, that tastes good, with adequate pressure, at a reasonable cost and that the wastewater system takes away their waste and treats it with no harm to the environment. From the community perspective, this means a quality, efficient water supply with adequate capacity and a quality wastewater collection with adequate capacity and no environmental impacts. The table below illustrates the technical perspective, performance target and current performance by target.

WATER SERVICES		
Technical Perspective	**Performance Target**	**Current Performance**
Meet all regulatory requirements	No incidents of non-compliance	2023 - 4 incidents 2024 - 4 incidents
	No boil water advisories, other than due to water breaks	All BWA average connection days – 0.77 days (2023); 8.05 days (2024) BWA due to water breaks average connection days – 0.00 days (2023); 0.00 days (2024)
Provide reliable service	One water break per 5 km of water mains per year	.39 water breaks per 5 km of mains (2023) .10 water breaks per 5 km of mains (2024)

Boil water advisories in 2023 consisted of:

- Cochenour and McKenzie Island – 232 properties affected for 5 connection days due to an automated equipment failure on May 16, 2023

Boil water advisories in 2024 consisted of:

- Balmertown, Cochenour, and McKenzie Island – 703 properties affected for 14 connection days due to infrastructure failure on June 22, 2024

• Balmertown – 471 properties affected for 5 connection days due to an automated equipment failure on September 8, 2024

WASTEWATER SERVICES		
Technical Perspective	**Performance Target**	**Current Performance**
Meet all regulatory requirements	No incidents of non-compliance	2023 - 3 incidents 2024 - 2 incidents
Provide reliable service	No sewer backups	0 average connections days due to sewer backups

When looking at improving/maintaining the level of service for water and sewer infrastructure, cost is a significant obstacle. In recent years there have been technological advances that have made underground water and sewer renewals more cost effective however, they are not ideal for the Municipality. Specifically, as the Municipality is situated predominately on bedrock, direction drilling becomes more costly and/or not feasible, negating any savings from not using the traditional cut and cover method. In addition, when some water and sewer lines were originally installed in the mid-1900s, they were placed on waste rock from the nearby mines which is very sharp and jagged. Pushing new pipes through the exiting waste rock could cause the pipes to shred and create additional issues.

Another alternative method is lining existing pipes with structural liners. The use of waste rock as fill for some of the trenches has caused some pipes to become punctured and not structurally able to hold the liner. In these instances, the lining would only be a temporary solution that would like be destroyed by the waste rock as well. In addition, there are some water mains that need an increased diameter. In these cases, the traditional cut and cover method is preferred.

An area of concern for the wastewater system is stormwater entering sanitary sewers causing sewage to overflow into streets or backup into homes. As the Municipality does not have combined sewers in the wastewater system, this happens by infiltration of the sanitary sewer's components. This would include low lying access lids where stormwater collects, failed parging and/or majestic seals of concrete structures as well as failed pipe joints. In the past, weeping tile and eavestroughs have been tied into the sanitary sewer. As these ties in are discovered, they are eliminated. To avoid overflows or backups of the sanitary sewer should stormwater infiltrate the sanitary sewer, lift stations are designed to overflow if they do not have the capacity to deal with a high flow event.

Effluent discharged from the sewage treatment plants is outlined in Appendix H. In 2023, there was one effluent violation at the Red Lake Water Pollution Control Plant where the effluent parameter E. coli exceeded the compliance limit of 200 MPN/100mL in January (781 MPN/100mL).

In 2024, there was one effluent violation at the Cochenour Lagoon where the total suspended solids limit (25.0 mg/L) was exceeded during the Spring 2024 discharge (46.11 mg/L). In 2024, there was one effluent violation at the Red Lake Water Pollution Control Plant where the effluent parameter E. coli exceeded the compliance limit of 200 MPN/100mL in December (434 MPN/100mL).

Stormwater Management Assets

A stormwater management system protects our environment and reduces flooding to protect people and property.

For residents, the expectation is that there is no flooding on their streets or properties. From a community perspective, this means a stormwater system with adequate capacity. The table below illustrates the technical perspective, performance target and current performance by target.

STORMWATER MANAGEMENT		
Technical Perspective	**Performance Target**	**Current Performance**
Provide responsive service	Remove blockage within four hours of initiation, 95% of the time	All blockages removed within four hours of initiation in the last 2 years
Provide reliable service	No flooding incidents due to blockages	No flooding incidents due to blockages in the last 2 years

Appendix D provides a map of areas protected by stormwater management assets. As of February 28, 2022, 100% of the stormwater management system is resilient to a 5-year storm. As of February 28, 2022, 2,466 out of 2,866 properties or 86.04% of properties within the Municipality are resilient to a 100-year storm. A map outlining properties not resilient to a 100-year storm is included in Appendix F.

Bridges and Structural Culverts

Bridges and structural culverts should allow people or cargo easy passage over an obstacle by providing a route that would otherwise be uneven or impossible.

For users of the infrastructure, the expectation is that there are sturdy bridges that take them where they want to go without too much congestion. From a community perspective, this means safe reliable bridges and structural culverts with adequate capacity. The table below illustrates the technical perspective, performance target and current performance by target.

BRIDGES AND STRUCTURAL CULVERTS		
Technical Perspective	**Performance Target**	**Current Performance**
Meet all regulatory requirements	No incidents of non-compliance with minimum maintenance standards	0 incidents of non-compliance with minimum maintenance standards
	Inspection every two years	Last completed November 2023
Provide reliable service	All bridges have adequate load limits	Load limit on Howey Bay Road bridge is not adequate. To be reviewed once the bridge is replaced.

The Howey Bay Road bridge currently has a 5-tonne load limit and supports all vehicles up to 5 tonnes, pedestrians, and cyclists. The Municipality should look at replacing the bridge in the next one to two years as indicated in the 2023 inspection report which can be found on the Municipal website.

In the next one to five years, the Forestry Road culvert will require work to rehabilitate the concrete footing as it has extensive erosion and exposed rebar under the waterline as indicated in the 2023 inspection report which can be found on the Municipal website.

Roads

Roads should exist for two key purposes: to provide access to and from origins and destinations and facilitate movement. For residents, the expectation is that there are smooth roads that take them where they need to go safely and without too much congestion. From a community perspective, this means safe, reliable roads with adequate capacity. The table below illustrates the technical perspective, performance target and current performance by target.

ROADS		
Technical Perspective	**Performance Target**	**Current Performance**
Meet all regulatory requirements	No incidents of non-compliance with minimum maintenance standards	0 incidents of non-compliance with minimum maintenance standards
Provide reliable service	No roads with "failed" PCI rating	0.90% or .97 lane km of road with failed rating
	Less than 10% of roads with PCI rating of very poor	24.86% or 26.64 lane km of road with very poor rating

Integration of road repair/renewal/replacement with the underground infrastructure repair/renewal/replacement is a challenge. Roads requiring work to maintain the level of service may not be addressed right away as there may be roads with underground infrastructure that have a higher priority to be replaced even though the road itself is in better condition. There may be instances of roads in poor condition where the underground infrastructure is also in poor condition resulting in the road not being repaired until the underground infrastructure is also repaired. The .97 lane km of road with a failed rating indicated above falls into this scenario. There are plans to address the underground infrastructure and the failed road in 2025/2026.

Sidewalks

Sidewalks serve two key purposes: to provide safe pedestrian access to and from origins and destinations, and to support the movement of people within the community. For residents, the expectation is that sidewalks are continuous, well-maintained, and safe for all users, including children, seniors, and people with mobility challenges. From a community perspective, this means accessible, reliable pedestrian infrastructure that supports walkability and active transportation. The table below illustrates the technical perspective, performance targets, and current performance against those targets.

SIDEWALKS		
Technical Perspective	**Performance Target**	**Current Performance**
Meet all regulatory requirements	No incidents of non-compliance with minimum maintenance standards	0 incidents of non-compliance with minimum maintenance standards
Provide reliable service	No sidewalks with "failed" SCI rating	1.41% or .20 km of sidewalks with failed rating
	Less than 10% of sidewalks with SCI rating of very poor	5.03% or .70 km of sidewalks with very poor rating

Integration of sidewalk repair, renewal, or replacement with adjacent infrastructure upgrades presents similar challenges to those faced with road assets. Sidewalk segments in need of rehabilitation to maintain the desired level of service may be deferred if they are located in areas where other infrastructure, such as water, sewer, or roads, requires replacement and is prioritized first. In some cases, sidewalks in poor condition may not be repaired until the surrounding or underlying infrastructure is also addressed. The .20 km of sidewalk with a failed rating falls into this scenario.

Fleet

The Municipality's fleet supports the delivery of essential services across departments, including public works, fire protection, parks and recreation, and by-law enforcement. Maintaining appropriate levels of service for fleet assets ensures that vehicles and equipment are safe, reliable, and available when needed to meet operational demands. From a community perspective, this means that the necessary vehicles and equipment are available to deliver service when the service is needed. The table below illustrates the technical perspective, performance targets, and current performance against those targets.

FLEET		
Technical Perspective	**Performance Target**	**Current Performance**
Provide reliable service	Fleet assets are replaced prior to the end of useful life	56.63% of the fleet or 47 units currently exceed their useful life

Coordinating fleet renewal with overall capital planning requires careful prioritization to balance service needs across departments. While some vehicles and equipment are currently operating beyond their useful life, the Municipality is actively managing these assets through targeted maintenance and strategic planning. With 56.63% of the fleet past their expected service life, renewal planning is underway to ensure continued reliability, optimize lifecycle costs, and align replacements with operational priorities and available funding.

Facilities and Land Improvements

Municipal facilities and land improvements provide the physical spaces and supporting infrastructure necessary to deliver a wide range of community services, including administration, recreation, emergency response, and public works. Maintaining appropriate levels of service ensures these assets are safe, accessible, and functional for both staff and the public. From a community perspective this means that municipal facilities and outdoor spaces are available, useable, clean, and in good repair.

SIDEWALKS		
Technical Perspective	**Performance Target**	**Current Performance**
Provide reliable service	Assets are replaced or renewed prior to the end of useful life	40.43% or 19 assets at currently at or exceeding their useful life
	Facilities do not close unexpectedly or experience unscheduled downtime greater than 4 hours	1 facility experienced unscheduled downtime greater than 4 hours

Coordinating facility renewal with overall capital planning requires thoughtful prioritization to ensure service continuity across all departments. While some buildings and site improvements are operating beyond their expected useful life, the Municipality is proactively managing these assets through regular maintenance, risk monitoring, and strategic reinvestment planning. By identifying renewal needs and aligning them with available funding and service delivery priorities, the Municipality is working to ensure its facilities remain safe, functional, and capable of supporting current and future community needs.

Lifecycle Management Strategy

This section outlines the Municipality of Red Lake's approach to lifecycle management for assets, aligning policies and practices with desired levels of service. A well-planned, responsive asset management strategy ensures infrastructure remains safe, functional, and cost-effective throughout its useful life. The strategy also sets out a proactive action plan to support long-term sustainability while adapting to external factors.

External Influences on Lifecycle Activities

The Municipality of Red Lake continues to be shaped by the mining sector, which remains the region's primary economic driver. While mining can introduce fluctuations in property assessments, and, by extension, taxation revenues, Red Lake has demonstrated resilience by adapting its financial and asset planning to respond to both periods of economic expansion and contraction. A flexible, risk-aware approach to lifecycle management helps ensure essential infrastructure remains in good condition, regardless of market variability.

Labour market competition remains a challenge across northern Ontario, particularly in public works and other technical fields. However, Red Lake is taking active steps to attract and retain employees through enhanced training programs, succession planning, and workplace development initiatives. These efforts are closing skill gaps and increasing internal capacity to deliver lifecycle activities more effectively.

Recent trends in the gold market have fostered renewed investment and growth opportunities. A new gold mine located approximately 25 km south of Red Lake is advancing through the development phase, with the potential to bring up to 1,500 new jobs to the region. This anticipated growth positions Red Lake as a regional hub for labour, housing, and services. Additionally, the planned construction of an all-season road to the north is expected to improve access for remote Indigenous communities, strengthening Red Lake's role as a service and supply center.

While global supply chain disruptions and rising material costs, particularly in fuel, steel, and construction materials, have increased pressure on capital budgets, the Municipality has adapted through phased project planning and leveraging competitive procurement practices. Although borrowing costs have recently increased, disciplined capital planning and careful reserve management continue to support the delivery of key infrastructure projects without significant impacts on tax rates.

By integrating flexible, forward-looking strategies with strong financial oversight, the Municipality of Red Lake is well-positioned to maintain service levels, respond to economic change, and deliver infrastructure investments that support long-term community resilience.

Procurement Policy

The Procurement of Goods, Services or Construction & Disposal of Assets By-Law No. 29-2025 sets out the policies and procedures for procurement at the Municipality of Red Lake and can be found on the Municipal website. The objective of the by-law is to obtain the best value when purchasing goods, construction, and services for the Municipality while treating all suppliers equitably and to also ensure that the competitive process is open, transparent, and fair to all suppliers.

The by-law outlines procurement requirements based on purchase value (excluding HST):

- $0 – $1,000: Direct purchase permitted; Department Head approval required
- $1,001 – $5,000: Minimum of 2 written quotations; approval by Treasurer
- $5,001 – $30,000: Minimum of 3 written quotations; approval by Treasurer; contract signing by CAO and Clerk
- $30,001 – $50,000: Invitational competitive process; approval by Treasurer; contract signing by CAO and Clerk
- $50,001 – $100,000: Invitational competitive process; Council approval by resolution; contract passed by by-law
- $100,001 and above: Public competitive process required; Council approval by resolution; contract passed by by-law

Additional provisions:

- Overbudget purchases: Must be approved by the Treasurer, regardless of dollar value
- Sole and Single Source: Permitted when justified in accordance with the by-law; approval thresholds still apply
- Emergency procurements: Defined within the by-law; must be approved by the CAO and Treasurer (if available); a follow-up staff report is required; not to be used to circumvent planning
- Purchase Orders: Required for all purchases unless explicitly excluded in the Exclusions Schedule

Disposal of municipal assets is divided based on value and must follow the surplus declaration process:

- All items: Must first be declared surplus by Council
- Items ≤ $999: May be offered to employees within the originating department for departmental use, then made available to other departments before external disposal
- Items ≥ $1,000: Must be disposed of through sealed public tender following public advertising

Assets cannot be declared surplus if they can be used by another department, board, or commission of the Municipality.

While the Municipality's procurement policy is designed to promote fairness and transparency, challenges remain in balancing cost and value. There may be pressure to select the lowest upfront bid, which can lead to higher long-term operating costs or underperforming goods and services. To mitigate this, the Municipality includes the clause "the lowest or any bid not necessarily accepted" in competitive procurement documents, allowing staff to evaluate best overall value, including lifecycle cost, quality, and service alignment.

Ongoing global economic pressures, such as supply chain disruptions, labour shortages, and volatile commodity prices continue to affect procurement planning. Delays in material availability and rising costs have required the Municipality to prioritize critical maintenance over asset replacement or renewal in some cases, which may increase long-term lifecycle costs. Procurement planning now places greater emphasis on value-driven decisions, scheduling flexibility, and supplier reliability.

While rising interest rates may help curb inflation, they also increase borrowing costs. As a result, the Municipality remains focused on cost-effective lifecycle management strategies that reduce reliance on

debt and support long-term service delivery. This includes exploring early procurement, strategic partnerships, and supply agreements to reduce risk and ensure value.

Alternative Solutions

The Municipality regularly reviews alternative service delivery options on both a formal and informal basis including shared service arrangements, outsourcing, arm's length or Municipal corporations, and volunteer/community-led models.

Shared services have the potential to allow the Municipality to share costs associated with acquiring and maintaining assets through joint agreements with either neighbouring municipalities or private/other public sector organizations in an effort to share risks and minimize costs.

The Municipality currently outsources elements of municipal services:

- Northern Waterworks Inc. as the operating authority for municipal water and wastewater facilities
- Chukuni Sanitation for the provision of curbside collection of waste and industrial, commercial and institutional recycling
- The Township of Ear Falls for waste disposal services
- Thunder Bay Airport Services for management of the Red Lake Municipal Airport

This approach allows the Municipality to leverage external expertise, infrastructure, and economies of scale to deliver services more efficiently and cost-effectively, supporting:

- Regulatory compliance and monitoring
- Specialized operational expertise
- Training and capacity building
- Process optimization and best practices
- Bulk procurement and supply chain efficiency

The Kenora District Services Board (KDSB) is responsible for the provision of social housing and childcare services. The Municipality supports KDSB's asset costs through an annual levy contribution.

These arrangements support the Municipality's ability to maintain service levels, manage costs, and focus internal resources on core areas while ensuring compliance and responsiveness across a range of essential services.

In addition, the Municipality is exploring the feasibility of shared services with neighbouring First Nations to construct a new landfill site.

Lifecycle Activities

The lifecycle activities of the Municipality's assets fall into five categories:

- Non-infrastructure solutions
- Maintenance activities
- Replacement/renewal/rehabilitation activities
- Expansion activities
- Disposal activities

All of these activities were assessed when looking at the long-term plan for municipal assets. A discussion on each activity and how they impacted the plan is outlined below.

Non-Infrastructure Solutions

Non-infrastructure solutions are policies, processes or strategies that reduce asset related costs (operating, maintaining, rehabilitation, replacement, expansion) or improve asset performance and extend service life. These solutions help the Municipality manage infrastructure and other assets without having to replace existing assets.

The Municipality of Red Lake currently utilizes the following solutions, in varying degrees:

- Integrated Infrastructure Planning - aligning capital plans for linear infrastructure to coordinate construction timelines, reduce duplication, and minimize overall costs
- Insurance – transfers the financial risk of unforeseen or uncontrollable asset losses to insurance providers, reducing the impact of emergencies on capital budgets
- Land Use Planning – guiding development to ensure land is used efficiently and that new infrastructure is built in a cost-effective, serviceable manner, minimizing long-term asset demands
- Managed Failures – using asset condition data, risk assessments, and service level targets to identify where controlled asset failure is acceptable, allowing limited resources to be directed toward higher-priority needs
- Streamlined Procurement Processes - increase the receipt of competitive bids to attract more competitive bids, accelerate project delivery, and achieve better value for money

The Municipality plans to implement demand management which helps to manage and forecast the demand for services within the municipality. This will be critical to help maintain levels of service as the need for municipal services grows.

Maintenance Activities

The Municipality's maintenance activities include regularly scheduled costs to inspect or maintain assets and one-time repair costs that are not considered rehabilitation, renewal, or replacement costs. More specifically, for all assets, maintenance activities are those activities that do not increase service capacity from the original design.

The following table outlines the maintenance activities for each asset category covered under this plan.

Asset Type	Activities
Water Distribution System	• Annual hydrant flushing, winterizing, and cleaning • Leak detection • Break repairs • Annual frost protection including utilization of heat trace • Thawing frozen assets • Exercising valves • Corrosion control measures
Wastewater Collection System	• Flushing of low-pressure sewers (Madsen, Cochenour Crescent, and McKenzie Island) • Blockage and collapse repairs including thawing frozen assets • Jetting, cleaning, and inspection of gravity sewers

Asset Type	Activities
	• Hydrovac of sanitary manholes • Repair of grates and manhole covers
Water and Wastewater Buildings	• See Municipal website for detailed description of all maintenance activities performed
Stormwater Pipes	• Blockage removal including thawing frozen assets • Hydrovac of stormwater catch basins and manholes • Repair of frame, grates, and access lids
Stormwater Culverts and Other Assets	• Blockage removal including thawing frozen assets • Debris removal and excavation • Ditch brushing and mowing • Tree harvesting from ditches • Minor culvert replacement
Bridges and Structural Culverts	• Snow removal and sediment collection • Activities as outlined in bi-annual bridge inspection • Erosion protection (slope stabilization) • Concrete and asphalt sealing • Expansion joint repairs Guard rail repair
Paved Roads	• Street sweeping • Pothole filling • Crack sealing • Line painting • Subgrade repairs • Asphalt patching
Gravel Roads	• Snow removal and grading • Gravel replacement • Dust control • Subgrade repairs
Sidewalks	• Visual inspections for cracking, heaving, and trip hazards • Grinding or patching of uneven surfaces • Replacement of broken or failed sidewalk panels • Snow and ice removal • Weed and vegetation control along edges • Cleaning and sweeping to remove debris
Fleet	• Scheduled preventative maintenance (oil changes, fluid checks, filter replacements) • Annual safety inspections and certifications • Tire rotation and replacement • Seasonal equipment setup and storage (e.g., plows, sanders) • Minor mechanical repairs and troubleshooting • Equipment calibration (e.g., plow blades, lift arms) • Fueling, washing, and regular condition checks

Asset Type	Activities
Facilities and Land Improvements	• Routine inspections for structural, mechanical, and safety issues • HVAC servicing and filter replacement • Janitorial and sanitation services • Fire extinguisher and alarm system inspections • Lighting, electrical, and plumbing maintenance • Seasonal landscaping and snow removal • Parking lot grading, line painting, and patching • Playground inspections and repairs • Minor renovations and accessibility improvements

When looking at the long-term plan, specific assets having consistently high maintenance costs were flagged for special consideration.

Replacement and Renewal/Rehabilitation Activities

The Municipality's renewal and rehabilitation activities include significant repairs that extend asset life and enhances service capacity from the original design whereas the Municipality's replacement activities include replacing one asset with another. When looking whether renewal/rehabilitation or replacement is necessary the Municipality uses a bottom-up approach which includes weighing the cost and new useful life with the potential costs of additional maintenance or repairs, remaining useful life and the risk of asset failure.

Expansion Activities

Expansion activities involve adding new assets or enhancing existing systems to accommodate growth, improve service coverage, or meet evolving community needs. The Municipality of Red Lake undertakes expansion projects based on identified service gaps, development pressures, and strategic priorities.

Current needs driving expansion include:

- Anticipated Growth Related to Mining Sector Activity – the increased mining activity in the area is expected to generate significant population and employment growth, increasing demand for residential development, transportation infrastructure, and utility services.
- Increased Demand from Surrounding Indigenous Communities – the construction of the Berens River bridge creating a year-round access road north of Red Lake is anticipated to increase traffic volumes and demand for health, social, and commercial services in the community.
- Service Gaps in Underserved Areas – the Municipality is addressing localized gaps in water, wastewater, stormwater, and active transportation infrastructure to improve safety and accessibility, especially in developing subdivisions and rural nodes.
- Facility Capacity and Programming Pressures – recreation, administration, and emergency service facilities and land improvements are under review to determine whether facility expansions or redevelopments are required to accommodate growing service demands and improve energy efficiency.

Expansion projects are prioritized through infrastructure master planning, and capital budgeting processes to ensure alignment with long-term service objectives and financial capacity.

Disposal Activities

Disposal activities refer to the formal decommissioning, divestment, or removal of municipal assets that have reached the end of their useful life, are no longer required, or are being replaced as part of renewal or upgrade programs.

Considerations when planning asset disposals include:

- Condition and Risk Assessment – assets in poor condition that present safety or environmental risks are prioritized for disposal, especially if they are no longer cost-effective to maintain.
- Redundancy or Obsolescence – assets rendered redundant due to system upgrades, service realignment, or changes in land use may be decommissioned or repurposed
- Environmental or Regulatory Compliance – disposal activities are conducted in compliance with environmental legislation and best practices, including safe removal of hazardous materials where applicable
- Maximizing Value Recovery – where feasible, assets are sold, auctioned, or salvaged to recover residual value or materials.

Examples of disposal activities include removal of obsolete fleet vehicles or equipment through public auction or demolition or repurposing of outdated municipal facilities.

Disposal planning is integrated into the Municipality's capital planning and lifecycle strategies to optimize the use of resources and reduce long-term liabilities.

Considerations for Plan Priorities

To create the long-term plan, there were a number of factors that were taken into account to determine priorities including:

- Risk
- Growth requirements
- Public value

Risk

To assign a risk factor to assets the Municipality looked at:

- Probability of failure – what is the chance the asset will fail?
- Consequences of failure – what is the impact to the Municipality if the asset fails?
- Mitigation/redundancy – are their risk mitigation processes or procedures in place to reduce the overall risk?

The probability of failure is generally related to the condition of the asset. If an asset is in very good condition, the likelihood of failure is likely to be rare or very unlikely. If an asset in is poor or failing condition, the likelihood of failure should be likely or almost certain. Other factors that affect the probability of failure include asset capacity and function as if the asset does not function correctly or does not meet the needed capacity, it is considered to be failing.

The table below illustrates the overall methodology used by the Municipality to assign the probability of failure.

Score	Likelihood of Failure	Failure Descriptor	Probability of Occurrence
1	Rare	May occur in only in exceptional circumstances	More than 20 years
2	Unlikely	Could occur at some time	Within 10 - 20 years
3	Possible	Might occur at some time	Within 3 - 5 years
4	Likely	Will probably occur in most circumstances	Within 2 years
5	Almost Certain	Expected to occur in most circumstances	Within 1 year

Consequences of failure are determined using a combination of qualitative and quantitative metrics. For each asset category, different metrics were used to ensure appropriate impacts were measured.

Water Distribution Network

Metrics used to establish the consequences of failure for the water distribution network include the following:

- Main size – the diameter of the main
- Cost impacts – the cost to replace the asset
- Location impacts – the impact of asset failure on provision of essential services

The table below outlines the scoring methodology for each of the metrics.

		Impacts		
Score	**Consequence**	**Cost**	**Main Size**	**Location**
1	Insignificant	Less than $10,000	1 mm – 50 mm	No impact on essential services
2	Minor	$10,001 - $50,000	51 mm – 100 mm	Minor impact on essential services
3	Moderate	$50,001 - $200,000	101 mm – 150 mm	Moderate impact on essential services
4	Major	$200,001 - $1,000,000	151 mm – 200 mm	Major impact on essential services
5	Significant	More than $1,000,000	Greater than 200 mm	Significant impact on essential services

When assigning a factor to the consequence of failure, the Municipality averages the score from all three impact areas to determine an overall consequence rating.

Metrics used to establish the consequence of failure for the water distribution network include the following:

- Main size – the diameter of the main
- Main type – the function of the main
- Cost impacts – the cost to replace the asset
- Location impacts – the impact of asset failure on provision of essential services

The table below outlines the scoring methodology for each of the metrics.

		Impacts			
Score	**Consequence**	**Cost**	**Main Size**	**Main Type**	**Location**
1	Insignificant	Less than $5,000	1 mm – 75 mm		No impact on essential services
2	Minor	$5,000 - $50,000	76 mm – 150 mm	Gravity	Minor impact on essential services
3	Moderate	$50,001 - $500,000	151 mm – 225 mm		Moderate impact on essential services
4	Major	$500,001 - $5,000,000	226 mm – 300 mm	Low Pressure System	Major impact on essential services
5	Significant	More than $5,000,000	Greater than 300 mm	Force Main	Significant impact on essential services

When assigning a factor to the consequence of failure, the Municipality averages the score from all four impact areas to determine an overall consequence rating.

Stormwater Management Assets

Metrics used to establish the consequence of failure for the stormwater management assets include the following:

- Cost impacts – the cost to replace the asset
- Location impacts – the impact of asset failure on provision of essential essential services

The table below outlines the scoring methodology for each of the metrics.

		Impacts	
Score	**Consequence**	**Cost**	**Location**
1	Insignificant	Less than $10,000	No impact on essential services
2	Minor	$10,001 - $50,000	Minor impact on essential services
3	Moderate	$50,001 - $200,000	Moderate impact on essential services
4	Major	$200,001 - $1,000,000	Major impact on essential services
5	Significant	More than $1,000,000	Significant impact on essential services

When assigning a factor to the consequence of failure, the Municipality averages the score from both impact areas to determine an overall consequence rating.

Roads

Metrics used to establish the consequences of failure for paved roads and gravel roads include:

- Cost impacts – the cost to replace the asset
- Road type – the function of the road
- Surface type – the surface material
- Traffic count– average number of vehicles per day
- Location impacts – the impact of asset failure based on proximity to essential services

The table below outlines the scoring methodology for each of the metrics.

		Impacts				
Score	**Consequence**	**Cost**	**Road Type**	**Surface Type**	**Traffic Count**	**Location**
1	Insignificant	Less than $10,000	[redacted]	Gravel	Nominal	No impact on essential services
2	Minor	$10,001 - $50,000	Local	LCB	Up to 49	Minor impact on essential services
3	Moderate	$50,001 - $200,000	Minor Collector	Asphalt Overlay	50 - 199	Moderate impact on essential services
4	Major	$200,001 - $1,000,000	Arterial	HCB	200 - 399	Major impact on essential services
5	Significant	More than $1,000,000	[redacted]		400 - 999	Significant impact on essential services

When assigning a factor to the consequence of failure, the Municipality averages the score from all five impact areas to determine an overall consequence rating.

Sidewalks

Metrics used to establish the consequences of failure for sidewalks include:

- Cost impacts – the cost to replace the asset
- Usage type – whether the asset is located in a residential, commercial or institutional area
- Service delivery impacts – impact on mobility and access, especially for priority users (ie seniors, persons with disabilities, school routes)
- Location impacts – the impact of asset failure based on proximity to essential services

The table below outlines the scoring methodology for each of the metrics.

		Impacts			
Score	**Consequence**	**Cost**	**Usage Type**	**Service Delivery**	**Location**
1	Insignificant	Less than $2,500	Residential only	No interruptions	No impact on essential services
2	Minor	$2,500 - $10,000	Mixed use	Minor interruptions	Minor impact on essential services
3	Moderate	$10,001 - $50,000	Commercial or institutional frontage	Moderate interruptions	Moderate impact on essential services
4	Major	$50,001 - $200,000	High-use pedestrian zone	Major interruptions	Major impact on essential services
5	Significant	More than $200,000	Essential service access	Significant interruptions	Significant impact on essential services

When assigning a factor to the consequence of failure, the Municipality averages the score from all four impact areas to determine an overall consequence rating.

Fleet

Metrics used to establish the consequences of failure for fleet assets include:

- Cost impacts – the cost to replace the asset
- Equipment type – the criticality of the unit to municipal operations
- Operational impacts – the effect on the Municipality's ability to provide essential services
- Safety impacts – risks posed to the public due to equipment failure

The table below outlines the scoring methodology for each of the metrics.

		Impacts			
Score	**Consequence**	**Cost**	**Equipment Type**	**Operational Impacts**	**Safety Impacts**
1	Insignificant	Less than $50,000	Non-essential	No interruptions	No safety concern
2	Minor	$50,001 - $150,000	Light duty, seasonal	Minor interruptions	Low safety concern
3	Moderate	$150,001 - $500,000	Multi-purpose or shared-use	Moderate interruptions	Moderate safety concern
4	Major	$500,001 - $1,000,000	Critical operations unit	Major interruptions	Major safety concern
5	Significant	More than $1,000,000	Single point of failure unit	Significant interruptions	Significant safety concern

When assigning a factor to the consequence of failure, the Municipality averages the score from all four impact areas to determine an overall consequence rating.

Facilities and Land Improvements

Metrics used to establish the consequences of failure for facilities and land improvements (including water and wastewater facilities) include:

- Cost impacts – the cost to replace the asset
- Social impacts – the potential harm or disruption to residents or municipal staff
- Environmental impacts – the impact of asset failure on the environment
- Service delivery impacts – the impact of asset failure on the municipality's ability to provide service at the desired levels or potential service delivery interruptions
- Location impacts – the impact of asset failure on provision of essential services

The table below outlines the scoring methodology for each of the metrics.

		Impacts				
Score	**Consequence**	**Cost**	**Social**	**Environmental**	**Service Delivery**	**Location**
1	Insignificant	Less than $50,000	No disruption or harm	No impact	No interruptions	No impact on essential services
2	Minor	$50,000 - $250,000	Minor disruption and no harm	Short-term/minor impact - fixable	Minor interruptions	Minor impact on essential services
3	Moderate	$250,001 - $2,500,000	Moderate disruption or minor harm	Medium term impact - fixable	Moderate interruptions	Moderate impact on essential services
4	Major	$2,500,001 - $5,000,000	Major disruption or moderate harm	Long-term impact - fixable	Major interruptions	Major impact on essential services
5	Significant	More than $5,000,000	Significant disruption or major/significant harm	Long-term impact - permanent	Significant interruptions	Significant impact on essential services

When assigning a factor to the consequence of failure, the Municipality averages the score from all five impact areas to determine an overall consequence rating.

Overall Risk

To determine the overall risk factor, the Municipality uses a weight of 60% to probability and 40% to consequence for each asset. Some individual assets have been grouped together to create segments in cases where there is underground infrastructure under a road or where there is water and wastewater infrastructure in the same area. In these cases, weight as been assigned to each individual asset as follows:

- If there is only a paved road – 40% to road asset, 30% to water asset, 15% to wastewater asset, 10% to stormwater management assets and 5% to sidewalk assets
- If it is only a gravel road – 30% to road asset, 40% to water asset, 15% to wastewater asset, 10% to stormwater management assets and 5% to sidewalk assets
- If there is a paved road and a gravel road – 36% to paved road, 4% to gravel road, 30% to water asset, 15% to wastewater asset, 10% to stormwater management assets and 5% to sidewalk assets

In instances where one asset type does not make up part of the segment, that component is excluded from the calculation creating a lower overall risk asset for the Municipality.

When the overall risk factor has been determined, it is classified under the following categories:

- Extreme Risk (Score > 4) – Risk well beyond acceptable levels and is shown below in red
- High Risk (Score > 3 or =/< 4) – Risk is beyond acceptable levels and is shown below in orange
- Medium Risk (Score > 2 or =/< 3) – Risk at acceptable level but monitoring is required to ensure risk does not become high and is shown below in yellow
- Low Risk (Score </= 2) – Risk is at or below acceptable levels and is shown below in green

Risk Matrix					
	Consequence of Failure				
Probability of Failure	Insignificant	Minor	Moderate	Major	Significant
Rare	1.0	1.6	2.2	2.8	3.4
Unlikely	1.4	2.0	2.6	3.2	3.8
Possible	1.8	2.4	3.0	3.6	4.2
Likely	2.2	2.8	3.4	4.0	4.6
Almost Certain	2.6	3.2	3.8	4.4	5.0

If a risk falls under the extreme risk or high-risk category, the Municipality must look for ways to mitigate the risk by implementing redundancy measures or increasing emphasis on one of the lifecycle activities.

When looking at the long-term plan, assets without redundancies or without the ability to mitigate with cost effective efforts were assigned a higher probability of failure score.

Risk Associated with Deferred Lifecycle Activities

The infrastructure funding gap means that some lifecycle activities may need to be deferred beyond their preferred timing. Deferral does not eliminate the requirement and may result in accelerated deterioration, higher maintenance costs, reduced reliability, service interruptions, shortened asset life, higher rehabilitation or replacement costs, emergency repairs, regulatory exposure or health, safety and environmental consequences.

Deferred activities will be assessed through the risk methodology in this Plan. Interim measures may include increased inspection, preventive maintenance, localized repairs, operational changes, contingency planning or temporary measures intended to maintain service until the permanent activity can be completed. The Municipality will consider condition, performance, maintenance history, redundancy, regulatory requirements and consequence of failure rather than relying solely on age or accounting useful life.

Growth Requirements

The financial strategy uses a conservative annual weighted-assessment growth assumption of approximately 0.26% and does not rely on substantial growth to eliminate the existing infrastructure funding gap. This reduces the risk of establishing permanent obligations based on temporary resource-sector conditions.

Growth may generate additional assessment and utility revenues, but it can also require new assets and create operating, maintenance, rehabilitation and replacement obligations. Growth-related infrastructure will therefore be evaluated on a full lifecycle basis, including initial construction, ongoing operations, future renewal, staffing and equipment requirements, incremental revenues, third-party contributions and capacity within existing systems.

Red Lake's infrastructure requirements are influenced by population, housing, mining-sector activity, commercial and industrial development and the Municipality's role as a regional service centre. These factors may increase demand for roads, water, wastewater, stormwater, recreation, emergency services and municipal facilities.

Public Benefit

The mandate of the Municipality is to provide the greatest benefit to the greatest number of people. When all other things equal, the highest public value (calculated as the lowest cost per affected resident) were given a higher priority.

Lifecycle Management Strategy Scenarios

The following section outlines the different lifecycle management activity timing scenarios for each group of assets.

Roads

The lifecycle management strategy scenarios for paved roads are based off of the lifecycle costs for 100 m of paved roads and include the following scenarios:

- Scenario 1 - An annual allocation for potholes based on anticipated PCI rating, aggressive preventative maintenance in years 3 and 10, replacing the surface in year 30 with preventative maintenance in years 33 and 40 and replacing the road in year 50.

- Scenario 2 - An annual allocation for potholes based on anticipated PCI rating, moderate preventative maintenance in year 10, surface replacement in year 25, preventative maintenance in year 35 and replacing the road in year 45.
- Scenario 3 - An annual allocation for potholes based on anticipated PCI rating, no preventative maintenance, surface replacement in year 20 and replacing the road in year 40.

When assessing the financial impacts of the lifecycle activities the following assumptions were made:

- Aggressive preventative maintenance would maintain the PCI of a new road to, at minimum, 80 in the first 10 years
- Moderate preventative maintenance would maintain the PCI of a new road to, at a minimum, 70 in the first 10 years
- Average annual PCI decrease in the first 10 years of a new road is 3-4 points per year depending on preventative maintenance and approximately 2-3 points per year in subsequent years
- Average annual PCI decrease for a new overlayed surface is approximately 5 points per year for the first 5 years and approximately 3 points per year in subsequent years

These assumptions are based on historical information of the Municipality of Red Lake and other surrounding municipalities and are subject to fluctuations based on climate conditions.

The inflated lifetime costs and the net present value of each scenario is provided below:

	Inflated Costs	**Net Present Value**
Option 1	1,328,457.59	420,591.90
Option 2	1,265,038.50	440,760.40
Option 3	1,206,817.67	464,126.87

The inflated costs were calculated using 3% inflation per year over 50 years. The net present value calculation is based off of a discount rate of 5.01%, which is the Municipality's current cost of borrowing. The detailed calculation of the costs can be found in Appendix J.

Scenario 1 provides the lowest cost in today's dollars coupled with the highest level of service as the aggressive preventative maintenance prolongs the life of the road long enough for the Municipality to realize savings. By maintaining the roads to a higher standard, it reduces the likelihood of failure resulting in a lower occurrence of accidents, property damage and potential injuries. As current underground infrastructure materials have a useful life of 50 years, scenario 1 better aligns the useful life of the road with the useful life of the underground assets allowing the municipality to integrate replacement of underground assets with road replacement.

Water Distribution Network

The lifecycle management strategies for the water distribution network are based off of the lifecycle costs for 100 m of water mains and include the following scenarios:

- Scenario 1 - Blasting rock to ensure adequate line depth to prevent freezing lines and using a lining method to renew the pipe at the end of its useful life (50 years)
- Scenario 2 - Blasting rock to ensure adequate line depth to prevent freezing lines and completely replacing the old pipe at the end of its useful life (50 years)

- Scenario 3 - Laying pipe at the adequate depth to prevent freezing lines where ground type permits, using heat trace and insulation where desired depth is not achievable and using a lining method to renew the pipe at the end of its useful life (50 years)
- Scenario 4 - Laying pipe at the adequate depth to prevent freezing lines where ground type permits, using heat trace and insulation where desired depth is not achievable and completely replacing the old pipe at the end of its useful life (50 years)

When assessing the financial impacts of the lifecycle activities the following assumptions were made:

- There were no limitations on the ability to use a lining method to renew the pipe such as undersized mains, improper fill material, and inadequate capacity
- Heat trace would last for approximately 35 years after which a bleeder line or aqua flow unit would be required
- The cost to line the pipe is 70% of the material costs and 20% of the earthworks cost of replacing the pipe and is required to be completed 5 years earlier
- Anticipated water breaks at 25 years and 40 years for scenario 1 and 2 and at year 33 for scenario 3 and 4 based on historical water break data

The inflated lifetime costs and the net present value of each scenario is provided below:

	Inflated Costs	**Net Present Value**
Option 1	532,624.78	287,259.14
Option 2	774,891.96	302,378.92
Option 3	441,457.01	211,922.29
Option 4	676,295.88	226,366.17

The inflated costs were calculated using 3% inflation per year over 50 years. The net present value calculation is based off of a discount rate of 5.01%, which is the Municipality's current cost of borrowing. The detailed calculation of the costs can be found in Appendix J.

In instances where pipe lining is a viable option (water mains are properly sized, fill material provides the proper foundation for the pipe and existing size meets the current and future capacity needs) scenario 3 provides the lowest cost in today's dollars. In instances where pipe lining is not a viable option, scenario 4 is the next best option. It should also be noted that in areas with high usage, the likelihood of freezing is low and may not require heat trace for scenarios 3 and 4. Heat trace should be assessed on an individual basis during the engineering phase of a project and the NPV of the project should be reassessed.

While scenario 1 and 2 would provide the highest level of service due to the lower likelihood of lines freezing, the infrastructure costs are higher than the corresponding scenario without blasting. In addition, blasting rock creates additional potential liability in regard to damage to nearby structures. As Ontario has joint and several liability, the nearby structures become an even greater risk to the Municipality of Red Lake and is not recommended where avoidable.

Wastewater Collection System

The lifecycle management strategies for the wastewater collection system are based off of the lifecycle costs for 100 m of sewer mains and include the following scenarios:

- Scenario 1 - Blasting rock to ensure adequate line depth to allow for a gravity sewer and using a lining method to renew the pipe at the end of its useful life (50 years)
- Scenario 2 - Blasting rock to ensure adequate line depth to allow for a gravity sewer and completely replacing the old pipe at the end of its useful life (50 years)
- Scenario 3 – Using a low-pressure system with heat trace in low use areas and using a lining method to renew the pipe at the end of its useful life (50 years)
- Scenario 4 - Using a low-pressure system with heat trace in low use areas and completely replacing the old pipe at the end of its useful life (50 years)

When assessing the financial impacts of the lifecycle activities the following assumptions were made:

- There were no limitations on the ability to use a lining method to renew the pipe such as undersized mains, improper fill material, and inadequate capacity
- Heat trace would last for approximately 35 years
- The cost to line the pipe is 70% of the material costs and 20% of the earthworks cost of replacing the pipe and is required to be completed 5 years earlier
- Anticipated main breaks at year 33 for scenario 1 and 2 and at year 39 for scenario 3 and 4 based on historical break data
- Low pressure system has an allocation of $1,000 per year for additional repairs due to the decentralized mechanisms and potential airlocks

The inflated lifetime costs and the net present value of each scenario is provided below:

	Inflated Costs	**Net Present Value**
Scenario 1	449,059.63	209,893.50
Scenario 2	494,011.98	209,324.10
Scenario 3	416,099.86	152,019.33
Scenario 4	461,052.22	151,449.93

The inflated costs were calculated using 3% inflation per year over 50 years. The net present value (NPV) was determined using a discount rate of 5.01%, reflecting the Municipality's current cost of borrowing. Detailed calculations for each scenario are provided in Appendix J.

Based on the NPV analysis, Scenario 4 offers the lowest lifecycle cost in today's dollars, assuming full pipe replacement using a low-pressure system. Scenario 3, which uses pipelining instead of full replacement for a low-pressure system, is the next most cost-effective option.

Where pipe lining is feasible, meaning the sewer mains are properly sized, have adequate fill material, and meet current and future capacity needs—Scenario 3 may be preferable due to lower inflated costs and deferred capital outlay. However, the cost difference between Scenarios 3 and 4 is minimal, and either approach is more cost-effective than gravity-based options when NPV is considered.

Although gravity sewer systems remain the standard in many applications, low-pressure systems represent a more cost-effective solution for planned infrastructure investments in areas with challenging topography or lower flows. It is important to note that unplanned repairs or system failures in low-pressure systems—such as grinder pump issues—can increase overall lifecycle costs. To mitigate this risk, the Municipality may consider assigning ownership and maintenance responsibilities for grinder pumps to individual property owners.

Finally, implementing a gravity sewer system in rock-heavy areas would typically require blasting to achieve the necessary depth and slope. This introduces additional risks, especially with regard to potential damage to nearby structures. Given Ontario's joint and several liability framework, the financial risk to the Municipality could be significant. Therefore, blasting should be avoided where viable alternatives exist.

Other Assets

Stormwater Management Assets

Stormwater management assets exist to prevent flooding to protect municipal and private infrastructure. The Municipality currently does not have adequate historical data on service levels to provide a meaningful assessment for the Stormwater Management Assets. The management plan will consist of best practice utilization including street sweeping, hydro-vacing catch basins, and annual ditch maintenance until reliable data can be captured. Further, there is no evidence that a change in maintenance plans increases the useful life of the asset but rather the maintenance levels reduce failure frequency and operational disruptions.

Stormwater management assets do not provide a direct service but rather a service to other assets, it makes the most sense to renew, rehabilitate and replace in tandem with the road and linear water/wastewater assets the stormwater assets are protecting.

Water and Wastewater Buildings

Water and wastewater buildings—such as treatment plants, pumping stations, and storage facilities—are essential for delivering safe drinking water and effective wastewater collection and treatment. These assets operate under strict provincial regulations and are governed by Environmental Compliance Approvals (ECAs) issued by the Ministry of the Environment, Conservation and Parks (MECP).

Due to the regulatory environment, there is limited flexibility in lifecycle planning for these facilities. Preventative maintenance and component renewals must follow the requirements outlined in the ECAs, and failure to comply can result in service interruptions, enforcement actions, or health and environmental risks.

The Municipality of Red Lake has retained Northern Waterworks Inc. (a subsidiary of PUC Services Inc.) as its accredited operating authority. Northern Waterworks is responsible for developing and implementing preventative maintenance strategies for all water and wastewater facilities in accordance with regulatory requirements, industry standards, and manufacturer recommendations.

Lifecycle activities typically include routine inspections, calibration of process controls, mechanical and electrical servicing, and capital replacement of major components such as HVAC, SCADA, and pumping equipment. Due to the critical nature of these facilities, asset renewal is prioritized through the capital plan and based on condition, performance, and regulatory compliance.

The Municipality continues to coordinate closely with its operating authority to ensure that lifecycle strategies align with operational needs, funding capacity, and provincial standards.

Bridges and Culverts

Bridges and structural culverts play a critical role in the Municipality's transportation network, ensuring safe, year-round access for people, goods, and emergency services. Due to their structural complexity and high safety implications, these assets are managed in accordance with provincial guidelines and the Ontario Structure Inspection Manual (OSIM).

Preventative maintenance opportunities for bridges and large culverts are limited. Instead, the Municipality relies on bi-annual OSIM inspections, completed by qualified engineers, to assess condition and identify required maintenance, rehabilitation, or replacement activities.

Common maintenance activities include snow and debris removal, sealing of expansion joints and concrete surfaces, slope stabilization, and minor deck or barrier repairs. Major renewals are based on inspection findings and prioritized based on structural condition, safety, and connectivity needs.

All recommendations from OSIM inspections are reviewed and considered as part of the Municipality's capital planning process. Lifecycle strategies focus on ensuring safety and minimizing long-term rehabilitation costs by acting on deficiencies before structural deterioration accelerates.

As with other core linear assets, bridge renewal is often coordinated with adjacent road or drainage infrastructure upgrades to reduce costs and service disruptions.

Sidewalks

Sidewalks are an essential component of the Municipality's transportation network, supporting pedestrian mobility and accessibility across residential, commercial, and institutional areas. While sidewalks contribute to overall service delivery and public safety, they are often lower priority in terms of lifecycle planning when compared to roads and underground infrastructure.

The Municipality currently has limited historical data on sidewalk condition ratings, usage patterns, and maintenance outcomes. As a result, a comprehensive lifecycle scenario model has not yet been developed. Instead, the Municipality uses a practical, risk-based approach that prioritizes repairs and replacements based on observed condition, location, and public safety risk—particularly in high-use or high-vulnerability areas such as near schools, health centers, and seniors' facilities.

Sidewalk maintenance activities should include annual inspections, trip hazard grinding, panel replacements, and snow and ice control. While preventative maintenance can help delay deterioration, it has a limited effect on extending the overall life of a sidewalk panel once underlying subgrade or frost damage occurs.

Sidewalk renewals are typically coordinated with road reconstruction or underground servicing projects to maximize efficiency and reduce disruption. As sidewalk condition data is further collected and refined, the Municipality will work toward developing more formal lifecycle planning models to support long-term budgeting and service level performance tracking.

Fleet

Fleet assets support the delivery of essential municipal services, including public works, fire protection, and parks and recreation. Due to the varied nature of municipal vehicles and equipment—and the influence of usage, age, operator practices, and maintenance quality—the Municipality does not apply a uniform lifecycle scenario model to fleet assets.

Instead, the Municipality relies on best practice asset management principles, including preventative maintenance schedules, safety inspections, and should utilize replacement planning based on usage hours, condition, and service criticality. Historical data on downtime, repair costs, and inspection failures are used to identify units approaching the end of their economic life.

While preventative maintenance can delay major repairs and extend the useful life of some equipment, it does not eliminate the need for timely replacement. Vehicles critical to winter control, emergency response, or regulatory compliance are prioritized for renewal to minimize service disruptions and safety risks.

Fleet replacement is coordinated through the capital budgeting process, with consideration for inflation, market availability, and salvage value. Lifecycle cost tracking will be improved as more consistent data is collected through asset tracking software.

Facilities and Land Improvements

Facilities and land improvements provide essential space and infrastructure to support municipal operations, community programming, and public safety. These assets include administrative buildings, fire halls, recreation centers, parks, and associated site features such as retaining walls, trails, and lighting.

Due to the wide range of building types and components, the Municipality does not apply a single lifecycle strategy scenario. Instead, facility maintenance and renewal are guided by condition assessments, regulatory standards (e.g., building code, fire code, accessibility), and service demands.

Where regulated (e.g., fire safety systems, HVAC servicing), maintenance follows prescribed schedules. For other components, preventative maintenance is implemented where it provides value (e.g., roof inspections, elevator servicing, seasonal HVAC maintenance). Accessibility upgrades, energy retrofits, and compliance-driven renovations are included in long-range capital planning.

Parks and land improvements are typically maintained based on safety, use, and aesthetics, with renewal occurring as part of larger redevelopment or community improvement initiatives.

As data quality improves through condition assessments and digital asset records, the Municipality will enhance its lifecycle forecasting for these asset types.

Capital Priorities

By using an integrated approach to new capital projects, the Municipality can realize further savings:

Pipe Lining is Viable

	Inflated Costs	Net Present Value
Individually	2,263,926.57	841,838.29
Integrated	2,040,712.38	707,138.69
Savings	**223,214.19**	**134,699.60**

Pipe Lining is Not Viable

	Inflated Costs	Net Present Value
Individually	2,344,165.77	841,942.98
Integrated	2,205,836.79	713,173.69
Savings	**138,328.98**	**128,769.28**

Appendix K provides a list of assets and asset segments for linear infrastructure where the overall risk to the Municipality is equal to or greater than 3.0. The list does not include all individual linear assets or fleet assets, as those replacements will be incorporated into the Municipality's capital plan. Appendix K also does not establish priority rankings because project delivery remains dependent on available funding. When applying for funding opportunities, the Municipality will assess which project best aligns with the applicable program requirements.

As a further note, the condition of the facilities listed in Appendix K were initially assessed based solely on age. The Municipality is initiating a detailed engineering building condition assessment, which will provide a more accurate understanding of each facility's physical condition. The results will replace age based assumptions with evidence-based data and support the identification and prioritization of appropriate lifecycle activities.

Lifecycle Costs

The lifecycle costs include operating and capital costs over the next 10 years.

Operating Costs

Operating costs consist of regular maintenance activities but exclude emergency repair activities and include:

- Water and Wastewater
    - Heat trace costs based on an average cost per year of the last five years
    - Sewer jetting/flushing costs based on an average cost per year of the last five years
    - Building and component maintenance costs as performed by Northern Waterworks
- Stormwater Management
    - No allocation made as maintenance performed on assets is generally emergency in nature
- Bridges
    - Maintenance as outlined in the bridge inspection report and an allocation based on an average cost per year over the last five years
- Roads
    - Potholing costs based on the anticipated PCI of road surfaces
    - Crack sealing based on the age of the road
- Sidewalks
    - Sidewalk maintenance costs based on an average of the last five years
- Fleet costs
    - Approximately 50% of annual fleet maintenance costs to account for preventative maintenance only
- Facilities and Land Improvements
    - Approximately 50% of annual facility maintenance costs to account for preventative maintenance only.

Also included is 60% of Public Works operator costs and 75% of Facility Maintenance staff costs to account for labour costs to perform regular maintenance activities.

The average annual operating requirement is approximately $1,179,778. A detailed breakdown is provided in Appendix I.

Capital Costs

- Identified annual funding, grants and capital reserves provide approximately $16.5 million over the ten-year period, resulting in an estimated ten-year infrastructure funding deficit of approximately $122.5 million.
- The average annual capital requirement for existing infrastructure is approximately $13.9 million, or approximately $139 million over the ten-year period.
- More than $81 million would be required in the first year to address the identified backlog.

Capital costs consist of renewal, rehabilitation or replacement activities required for existing assets to meet service levels. A detailed annual breakdown is provided in Appendix I.

Development Costs

Development costs consist of expansion activities to support growth within the Municipality. Over the next five to ten years, growth may be influenced by the Berens River bridge project, improved regional access and increased mining activity in the Red Lake area.

The Municipality is in the process of finalizing a purchase of crown land to provide areas for residential and commercial development. It is estimated that this beginning phase of development will cost approximately $11.2 million (including road and water/wastewater infrastructure) however, no engineering or other studies have been done. The actual costs will become more refined as the project progresses. It is intended that this development will be funded through Municipal property sales with the possibility of Provincial or Federal funding. It is not anticipated that this development will significantly impact the lifecycle costs of existing assets.

Financial Strategy

This section describes how the Municipality plans to fund the infrastructure needs identified in this Plan. It outlines the principles and assumptions behind the forecast, the annual funding targets, the current funding position, and the proposed tax-supported and water and wastewater funding strategies.

Purpose and Approach

The financial strategy identifies the investment required to support the proposed levels of service, the funding projected to be available from 2026 through 2036, the resulting funding gaps, options considered to increase funding and the approach to managing activities that cannot be undertaken within available resources.

The annual funding target is the recurring amount the Municipality would need to invest each year to renew its infrastructure over the long term. It is calculated from updated 2026 replacement values and asset-specific reinvestment rates, and is compared with the recurring capital-related funding currently available to identify the annual funding gap. It is a benchmark for sustainable funding, not a budget or a commitment to spend a set amount in any one year.

The forecasts are planning estimates rather than commitments to specific tax, utility rate, debt or project decisions. Council will continue to approve these matters through the annual operating and capital budget processes.

Financial Strategy Principles

- Affordability: balance infrastructure sustainability with the capacity of taxpayers and water and wastewater users.
- Service sustainability: direct funding toward activities that maintain regulatory compliance, reliability and continuity of service.
- Risk-based prioritization: prioritize health and safety, environment, regulatory requirements, service criticality, condition and consequence of failure.
- Lifecycle optimization: use preventive maintenance, rehabilitation and timely renewal where these actions reduce total lifecycle cost.
- Intergenerational equity: use reserves and, where appropriate, debt to share the cost of long-lived assets between current and future users.
- Financial resilience: maintain reserve capacity and avoid depending on uncertain grants for recurring renewal requirements.
- Funding-source alignment: primarily fund tax-supported infrastructure through taxation and water and wastewater infrastructure through system revenues.
- Conservative external funding: include recurring or confirmed funding in the base forecast and treat unconfirmed funding as an opportunity rather than a certainty.

Planning Assumptions

The table below summarizes the key assumptions used in the financial strategy model, including the forecast period, inflation rates, debt terms and reserve assumptions.

Assumption	Financial Strategy Model
Forecast Period	2026 to 2036
Capital Inflation	3.71% per year
Operating Inflation	2.21% per year
New Debt	15-year amortization at 3.5%
Reserve Earnings	2.0% annually
Reserve Floor	10% of average forecast capital expenditures
Weighted assessment growth	0.26% annually

Annual Infrastructure Funding Targets

The annual funding target is a long-term reinvestment benchmark calculated from updated replacement values and asset-specific reinvestment rates. It does not represent the amount that must be spent in each individual year. Actual expenditures will fluctuate with condition, risk, project timing, construction capacity and grant availability.

Asset Group	2026 Replacement Value	2026 Annual Funding Target
Tax-supported assets	$191.07 million	$5.41 million
Water and wastewater assets	$343.16 million	$7.12 million
Combined	$534.23 million	$12.53 million

Current Funding Position

The table below compares the 2026 annual funding target for each asset group with the recurring capital-related funding currently available, and shows the resulting funding gap and the percentage of the target that is funded.

Asset Group	2026 Funding Target	Recurring Capital-related Funding	Funding Gap	Percentage Funded
Tax-supported	$5.41 million	$2.71 million	$2.71 million	50.0%
Water and wastewater	$7.12 million	$0.58 million	$6.53 million	8.2%
Combined	$12.53 million	$3.29 million	$9.24 million	26.3%

Relationship to the 10-Year Lifecycle Forecast

The lifecycle figures in this section are based on the updated final 2024 Asset Management Plan analysis: approximately $138.97 million in ten-year capital requirements, approximately $1.18 million in average annual operating requirements and an estimated ten-year funding deficit of approximately $122.45 million.

The ten-year lifecycle analysis and the financial strategy use different methodologies. The lifecycle forecast identifies the timing and estimated cost of specific activities, including the existing backlog. The financial strategy uses an annual reinvestment approach based on updated replacement values,

reinvestment rates and projected recurring funding. The measures serve different purposes and should not be directly compared.

Actual annual capital expenditures may be higher or lower than the annual funding target. Significant grant- or debt-financed spending in a particular year does not necessarily mean that the recurring annual funding requirement has been addressed.

Tax-Supported Funding Strategy

The model progressively increases tax-supported recurring capital funding from approximately $2.71 million in 2026 to approximately $7.79 million in 2036, reducing the calculated annual gap to nil while maintaining the tax-supported reserve floor.

Year	Capital Funding	Annual Target	Funding Gap	Percentage Funded
2026	$2.71 million	$5.41 million	$2.71 million	50.0%
2028	$3.42 million	$5.82 million	$2.40 million	58.7%
2030	$4.25 million	$6.26 million	$2.01 million	67.8%
2032	$5.04 million	$6.73 million	$1.69 million	74.9%
2034	$6.32 million	$7.24 million	$0.92 million	87.2%
2036	$7.79 million	$7.79 million	$0	100.0%

The model projects an annual target levy increase of approximately 5.77%. After forecast assessment growth, the estimated annual tax-rate increase is approximately 5.50%. This increase supports operating inflation, debt requirements and increased capital contributions and is not solely attributable to asset management. The forecast demonstrates the financial implications of reaching the target and is not an automatic annual tax decision.

Water and Wastewater Funding Strategy

The model progressively increases water and wastewater capital-related funding from approximately $585,000 in 2026 to approximately $10.24 million in 2036, reducing the calculated annual gap to nil and rebuilding utility reserves.

Year	Capital Funding	Annual Target	Funding Gap	Percentage Funded
2026	$0.58 million	$7.12 million	$6.53 million	8.2%
2028	$1.87 million	$7.65 million	$5.78 million	24.5%
2030	$3.31 million	$8.23 million	$4.92 million	40.2%
2032	$5.31 million	$8.85 million	$3.54 million	60.0%
2034	$7.48 million	$9.52 million	$2.05 million	78.5%
2036	$10.24 million	$10.24 million	$0	100.0%

The model indicates that total water and wastewater revenues would need to increase by approximately 12.33% annually under its assumptions. Because this would have a significant compounding effect on customer bills, the rate path should be reconciled with the Municipality's water

financial plan and supported by periodic rate studies addressing customer classes, fixed and variable charges, consumption, affordability, debt and reserves.

Reserves, Debt and External Funding

- Reserves will be used to manage fluctuations in annual capital spending, respond to unexpected failures and reduce borrowing for routine renewal. Withdrawals should be accompanied by a strategy to restore balances.
- Debt may be used selectively for major, long-lived assets where repayment remains affordable, the term does not exceed the expected useful life and the project supports an approved level of service.
- Remaining below the provincial Annual Repayment Limit does not by itself establish affordability. The Municipality should maintain an internal debt threshold that preserves capacity for emergencies and regulatory work.
- The Municipality will continue to pursue Ontario Community Infrastructure Fund, Canada Community-Building Fund, Northern Ontario Resource Development Support and other federal, provincial and third-party funding. Unconfirmed grants will not be treated as a permanent solution to recurring requirements.

Options Considered to Maximize Funding

The table below lists the funding options the Municipality considered to support infrastructure renewal, with notes on how each option applies and the factors to weigh.

Option	Application and Considerations
Incremental tax-supported capital contributions	Predictable recurring funding, balanced against taxpayer affordability
Water and wastewater rate increases	Aligns cost with system users; requires rate and affordability analysis
Reserve contributions	Reduces future debt reliance but competes with operating pressures
Long-term debt	Supports intergenerational equity for major long-lived assets; increases total cost and repayment obligations
External grants and transfers	Reduces local burden but may be restricted or uncertain
Partnerships and third-party contributions	Shares cost where benefits are shared; lifecycle obligations must be considered
Asset rationalization	May reduce operating and renewal costs where assets are underused or duplicated
Level-of-service adjustments	May reduce costs but can increase risk or reduce service and requires Council direction
Operational and procurement efficiencies	May reduce lifecycle costs but should not be assumed to eliminate the gap without evidence

Treatment of Unfunded Lifecycle Activities

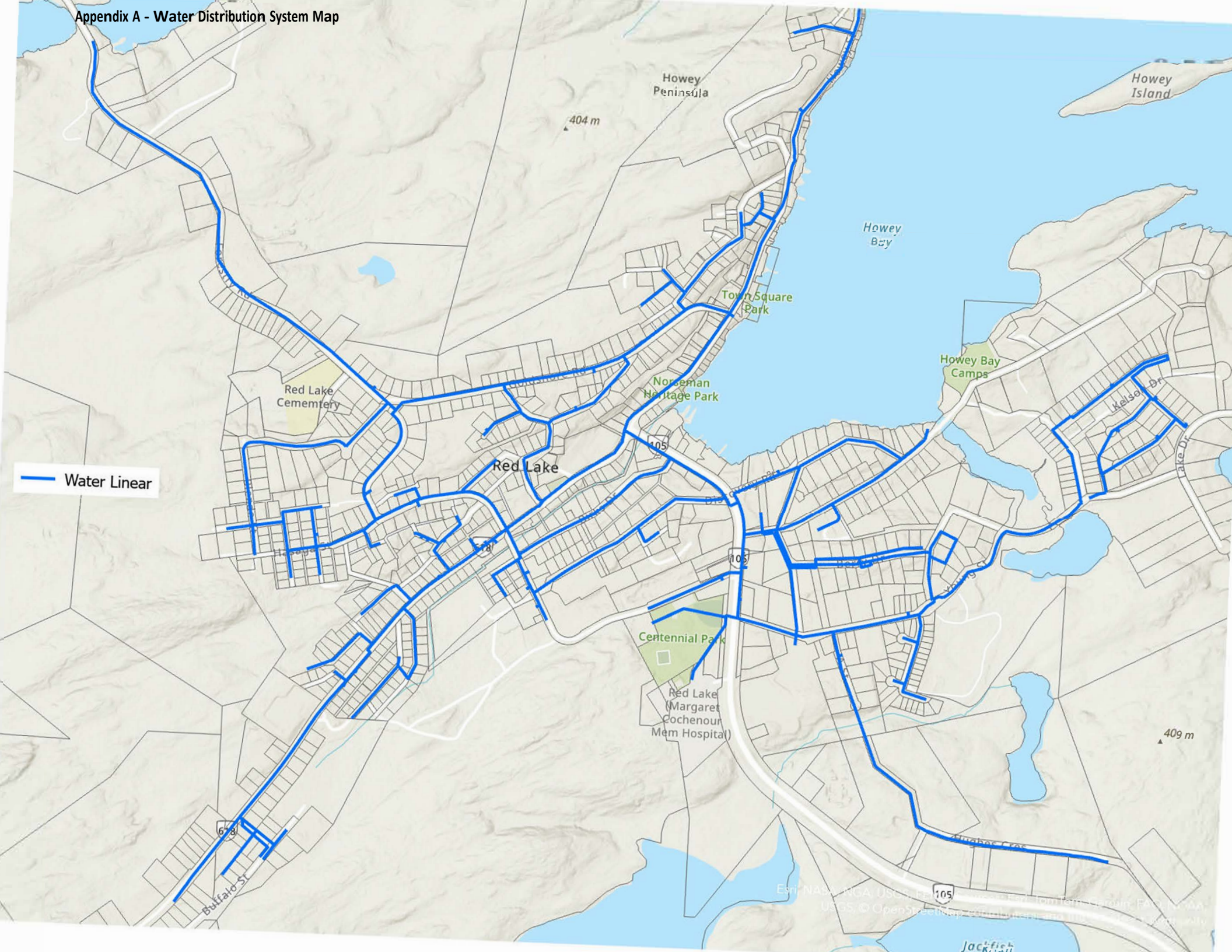
Where sufficient funding is unavailable, activities may be deferred, reduced in scope, coordinated with another project, replaced by interim maintenance or advanced only if external funding is secured. Deferral does not eliminate the need. Material deferrals will be documented with the affected asset,

reason, condition and risk, consequence of deferral, interim mitigation, reconsideration trigger and responsible department.

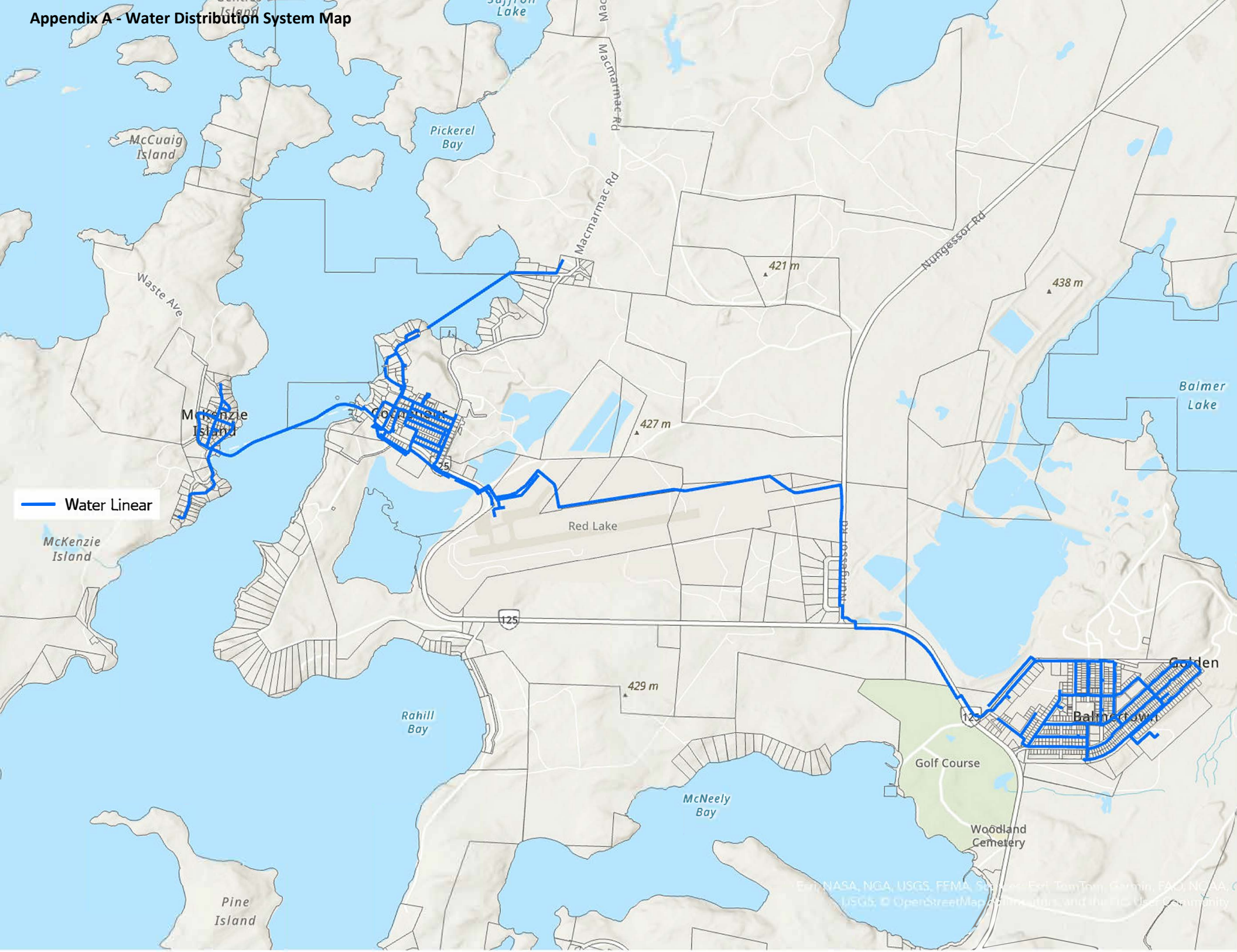
Implementation and Annual Reporting

- Reconcile the Asset Management Plan with the annual capital budget and rolling ten-year capital forecast.
- Validate replacement values, condition information and project timing.
- Maintain separate tax-supported and rate-supported forecasts and reserves.
- Monitor progress toward proposed levels of service and the annual funding targets.
- Report projects completed, deferred or advanced and high-risk activities not undertaken.
- Review reserve balances, debt, external funding, construction inflation, assessment growth and affordability.
- Update the strategy where material assumptions, project scope, proposed levels of service or financial capacity change.

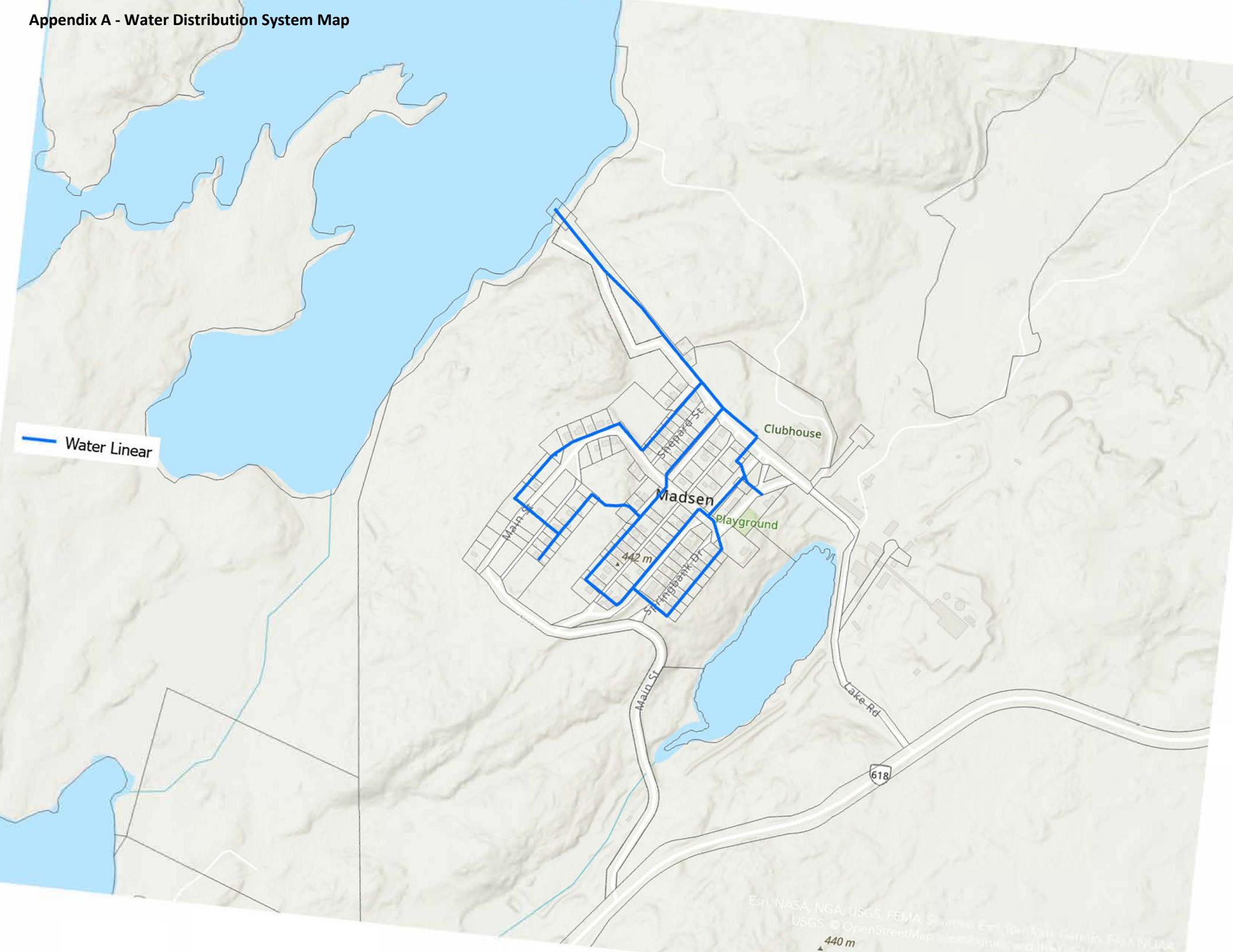
Appendix A - Water Distribution System Map



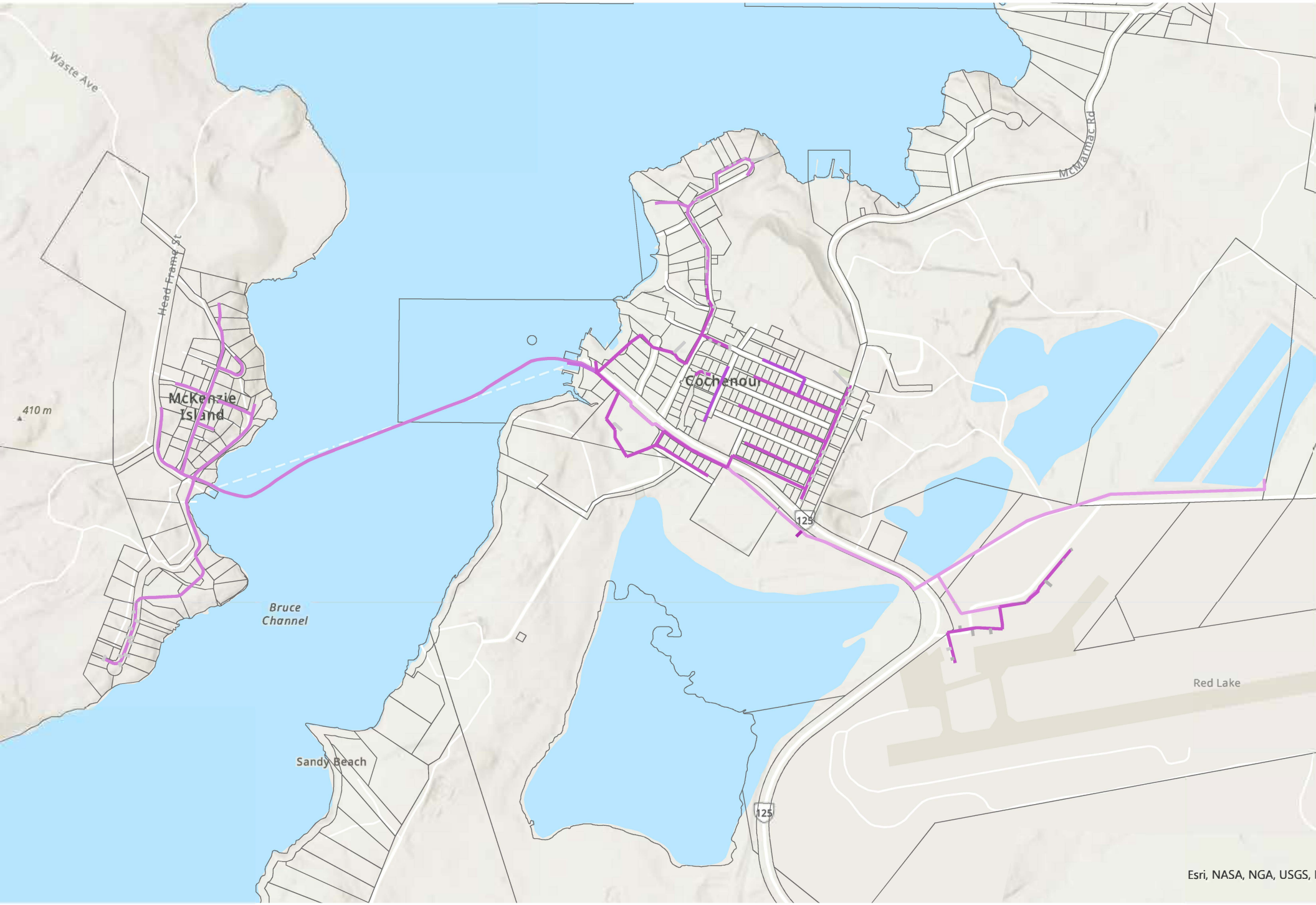
Appendix A - Water Distribution System Map



Appendix A - Water Distribution System Map



Appendix B - Wastewater Collection System Map



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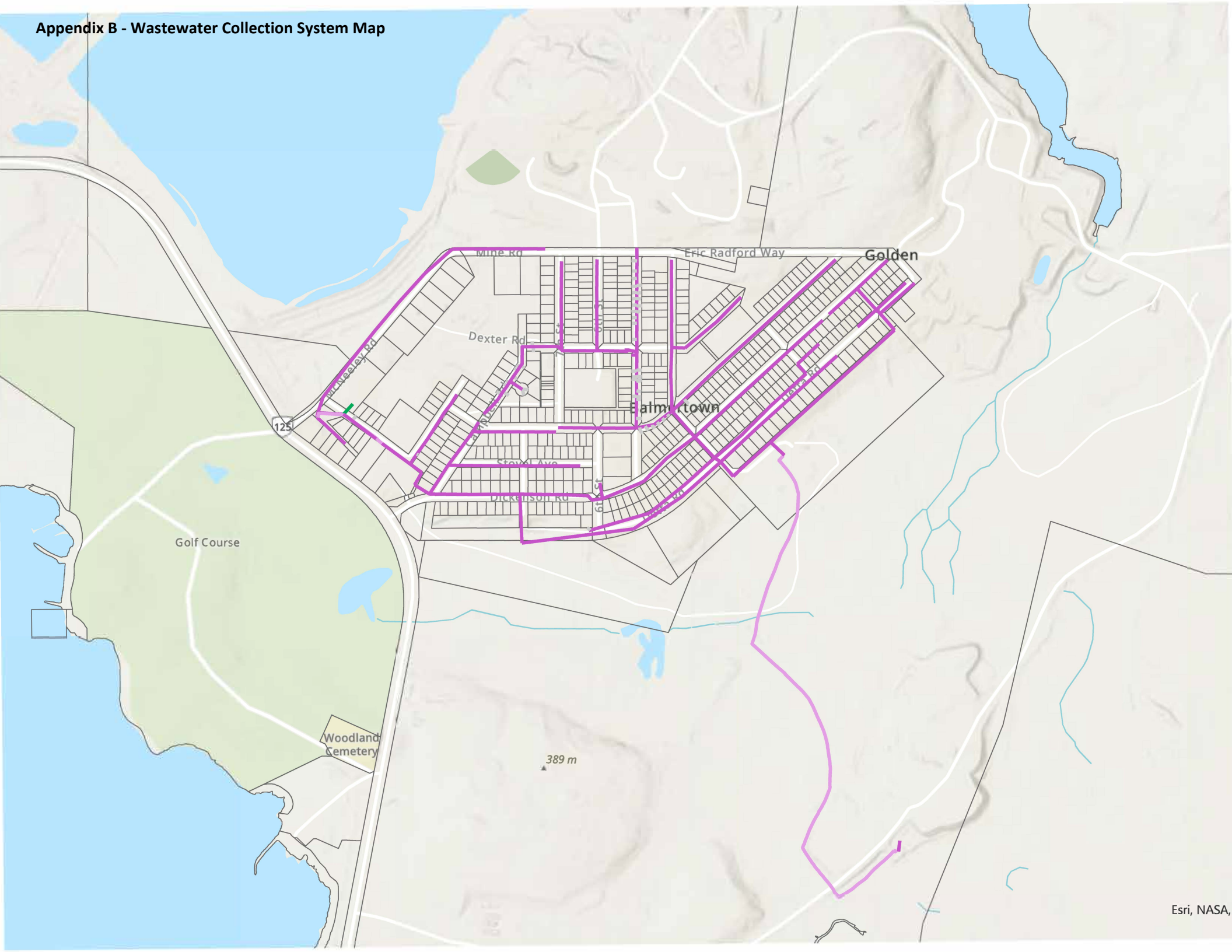

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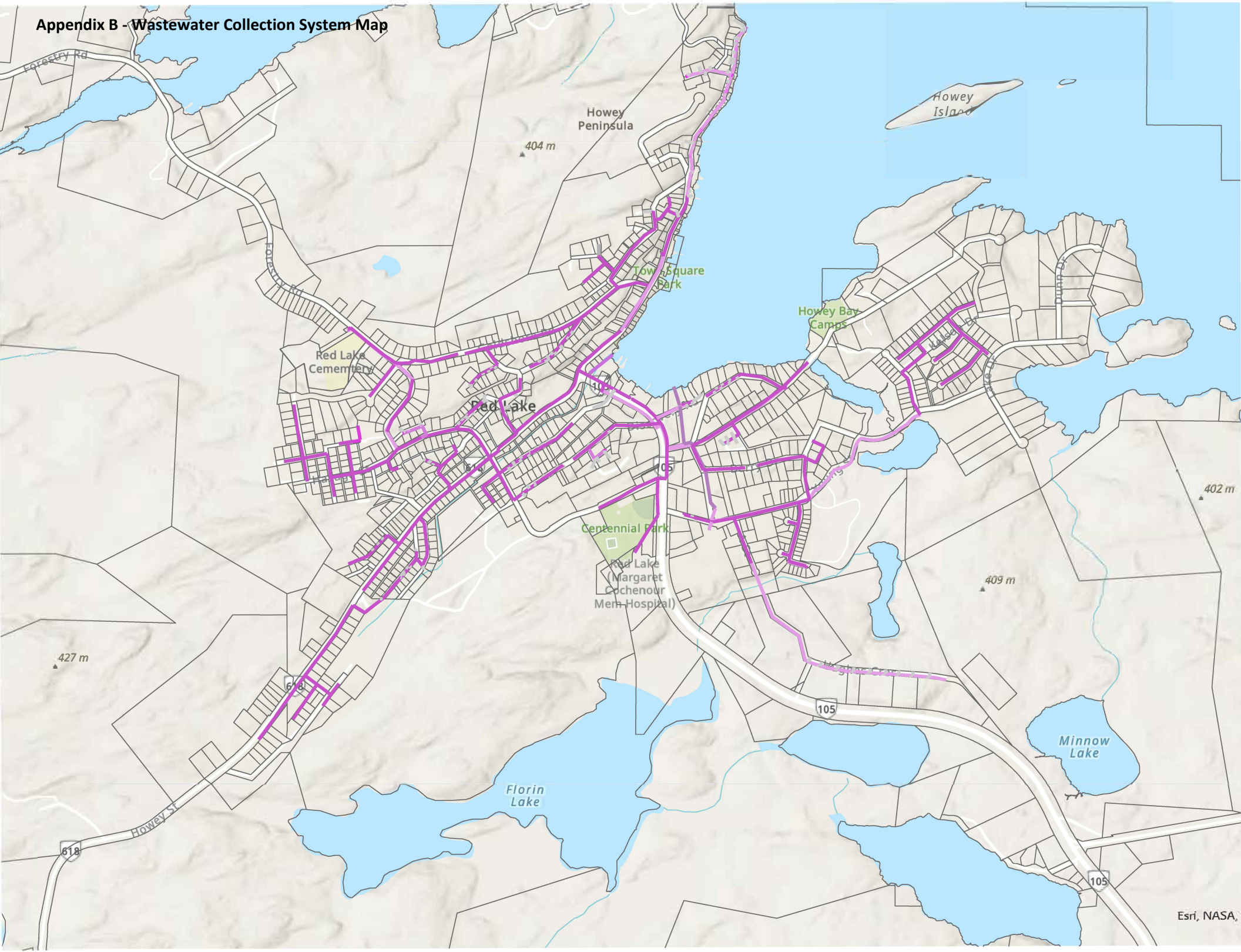

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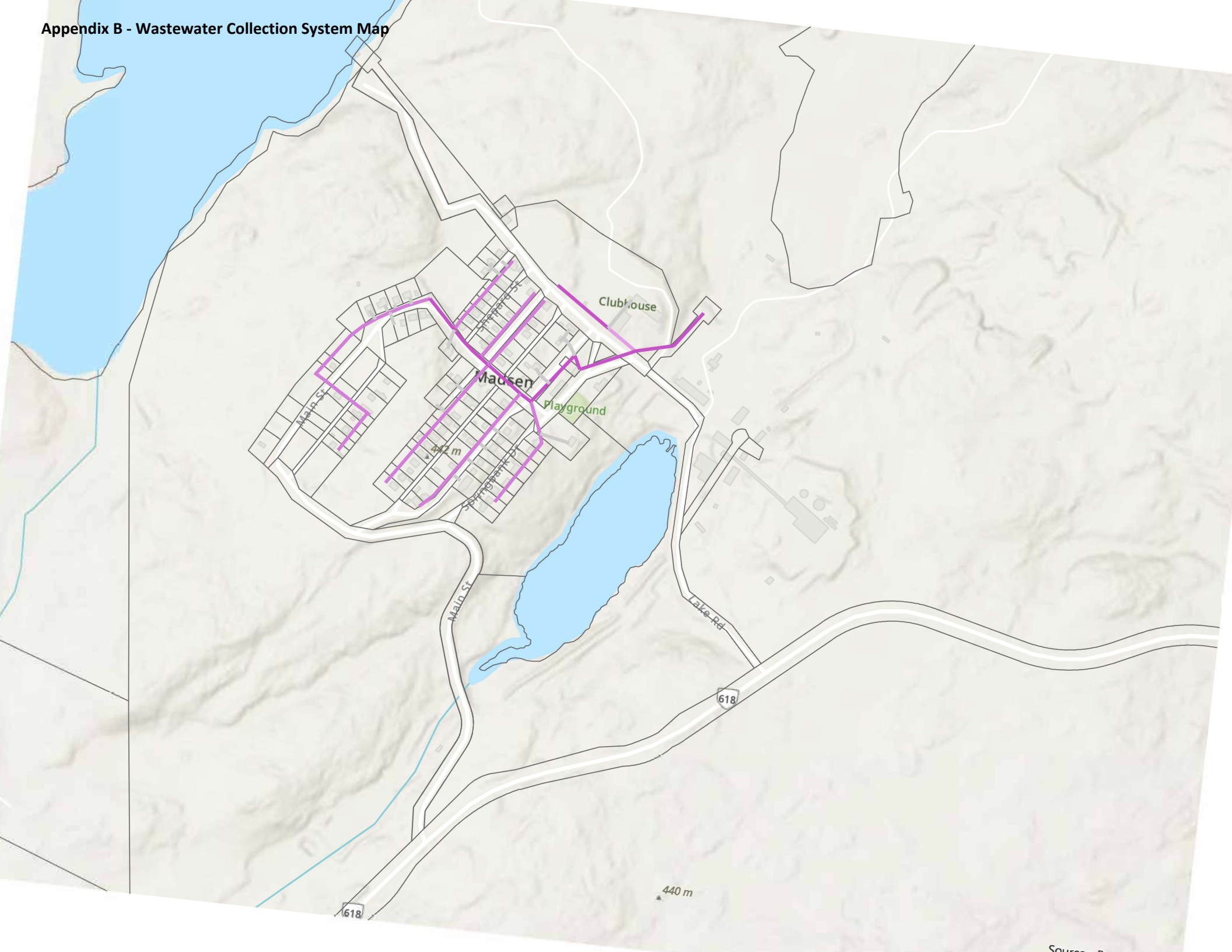
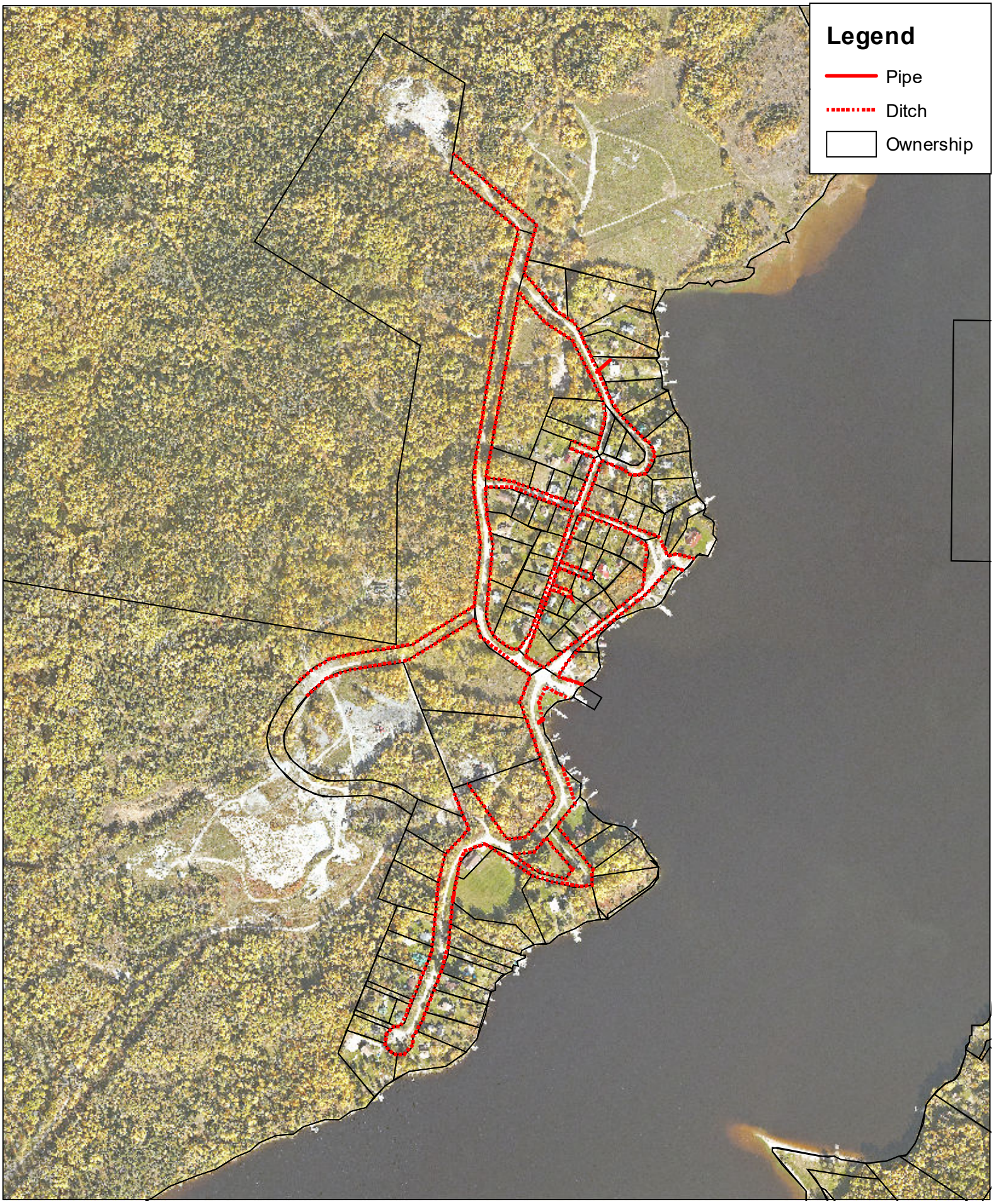


Appendix C – Water and Wastewater Building Condition Assessment Criteria

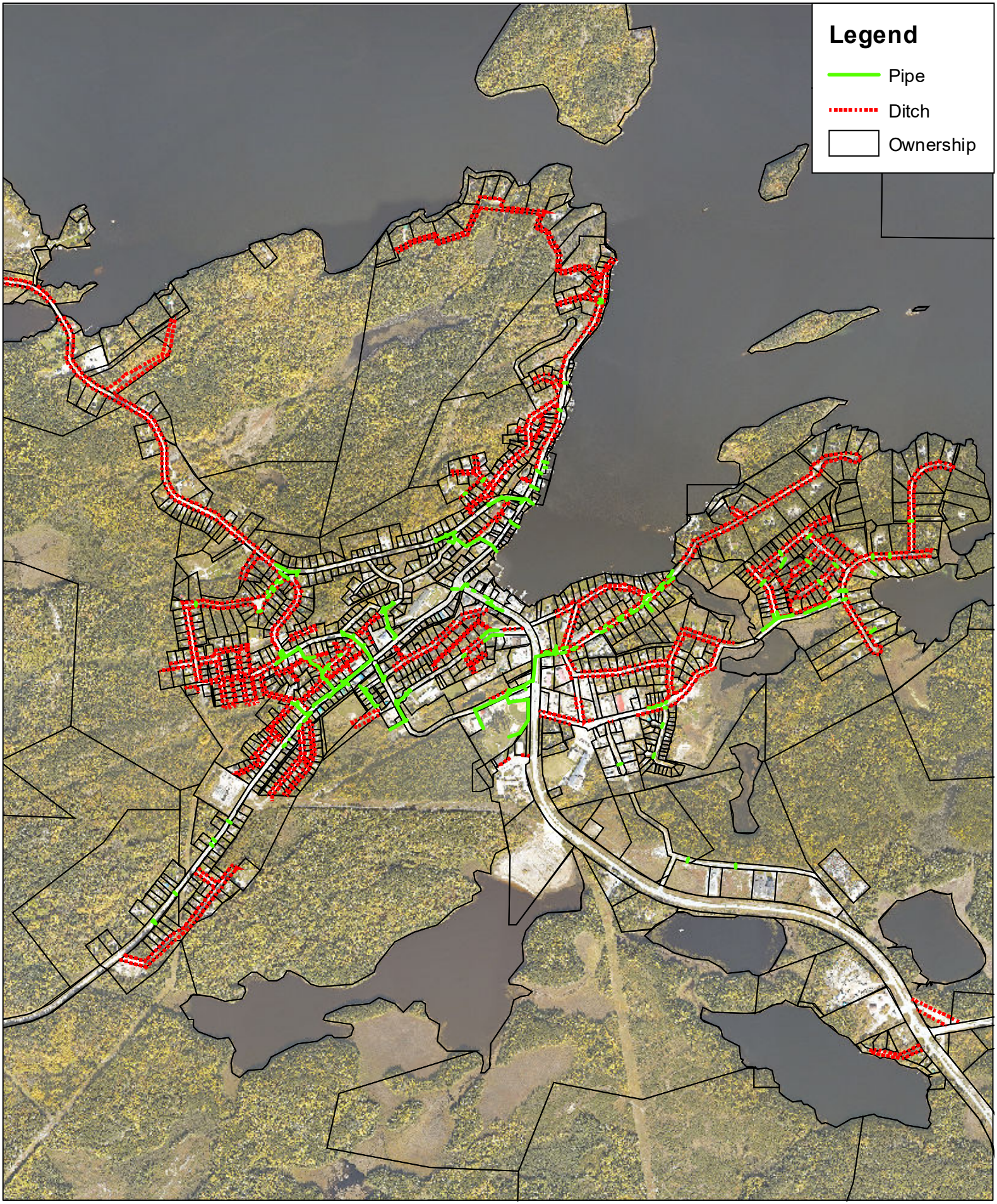
Rating Scale		System								
Grade	Condition	Structural/Building	Mechanical	Electrical	Process Equipment	Site Civil	Instrumentation	Environmental	Performance	Operability
1	Very Good	Building structure is physically sound. Well maintained and secure weatherproof structure.	Equipment is physically sound and performing as designed/intended.	No abnormalities and resembles brand new.	Equipment is brand new or well-maintained with no defects.	Acess to the site is ideal. Security features (lighting, fencing, cameras, etc.) are as expected for such a facility. Suitable space for parking and asset maintenance. No observable drainage issues.	Instrumentation is fully functional and well maintained. No defects.	No obvious risk to flooding. No obsverable odours or noise issues at the site. Adjacent and downstream environment does not appear to be sensitive in the event of overflows or asset failure.	Little or no maintenance required, asset never experiences downtime. Very infrequent alarms, and system is operating below its rated capacity.	Asset is easily accessible with a service truck, and does not require any special equipment to access. Asset is generally laid out well, with no confined spaces. Operators describe it as one of their ideal sites.
2	Good	Stucture is performing as intended. Some maintenance needed to prevent initial stages of decay or dereliction.	Minor signs of equipment deterioration such as minor vibrations, looseness, misalignment, slight leaks. Protective coating and enclosure still functioning.	Minor signs of deterioration. Requires infrequent/minor repairs, but does not affect performance or its ability to properly function.	Equipment may not be the current generation/model manufactured, but is in good shape and all replacement components are available from the supplier.	Access to the site is not a significant issue. Security features are present and operable, but show some signs of wear. Minor drainage issues that do not impact accessibility or operation.	No deterioration on fittings or displays that impacts safety, strength or appearance. Minor wear and tear but no impacts on operation. All replacement components are still available.	-	-	-
3	Fair	Showing deterioration, with some components physically deficient. Structure appearance affected by minor cracking, staining, peeling, paintwork or minor leakage.	Obvious signs of deterioration. Minor failures with increasing corrosion of metal components, bearings and or gland	Showing signs of deterioration, which is beginning to effect the safety, efficiency and operation of the system.	Showing signs of deterioration. Equipment may not be compatible with the current standard (obsolete design, no longer manufactured) but spare parts are available.	Acess to the site has some limitations, with space for only 1 service vehicle. Most security features are present, but some are either missing or inoperable. There are signs of some drainage issues.	Instruments show signs of deterioration. May not be compatible with current standards (obsolete design or no longer manufactured), but spare parts are available.	Visual signs or operator input imply a low-moderate risk of flooding. Some odours and noises, but generally limited to the immediate surroundings. Immediately adjacent environment does not appear sensitive, but such an environment exists downstream.	Routine maintenace required, but with infrequent downtime. Asset gives off routine alarms or requires routing operator visits. System is operating at our around its rated capacity.	Asset is accessible, but not ideal. Traffic control required to work on some parts of the site. Site layout is fair, but there are some areas that are difficult to access or service.
4	Poor	Major portion of the structure is physically deficient. Structure is still operating as intended, but showing signs of stability loss or deformation. Potential problems include lekage, rotting woodwork and decayed brickwork.	Significant leaks, vibration, looseness, misalignment or out of balance. Parts and components function but require significant maintenance to remain operational.	The performance and serviceaility is becoming a maintenance issue. System is functioning, but significant maintenance is required.	Asset functions, but with frequent problems and significant defects. Difficult/impossible to maintain spare parts, or costs/lead times are excessive.	Access to the site is fairly limited. Little no dedicated parking, and obvious drainage issues. Most of the security features are either not present or not functional.	Instruments function, but have frequent problems due to significant defects. Requires constant and frequent maintenance. Difficult to obtain spare parts.	-	-	-
5	Critical	Physically unsound. Serious structural problems having a deterimental efect on the performance of the building.	Unreliable with frequet breadowns and adverse impacts on performance. Equipment now incurring excessive maintenance.	High risk of breakdowns with a serious impact on system safety, efficiency and operation. The remaining life is exceeded and excessive maintenance is required.	Asset has surpassed its useful life. If a serious failure occurs, a complete replacement is required.	Access to the site is a nightmare, with no parking (or parking impacts adjacent traffic). No security features (fencing, cameras, lighting, etc.) present, and standing water/drainage issues are evident.	Asset is past the end of its useful life, and no replacment or spare parts are available. Significant signs of wear and tear. Measurements cannot be trusted due to inaccuracies.	Asset appears to be in a floodplain, or his recent issues of flooding. Foul odours/loud noises are evident as you approach the site, and the adjacent environment is sensitive.	Asset requires frequent and major maintenance. Significant downtime due to failing equipment. Asset operates above its rated capacity or does not meet design requirements.	Asset is very difficult to access, and traffic control is always required. Several confined spaces, and site layout is very poor.

Appendix D – Stormwater Management Asset Map



Storm Water Collection Map - McKenzie Island

Appendix D – Stormwater Management Asset Map



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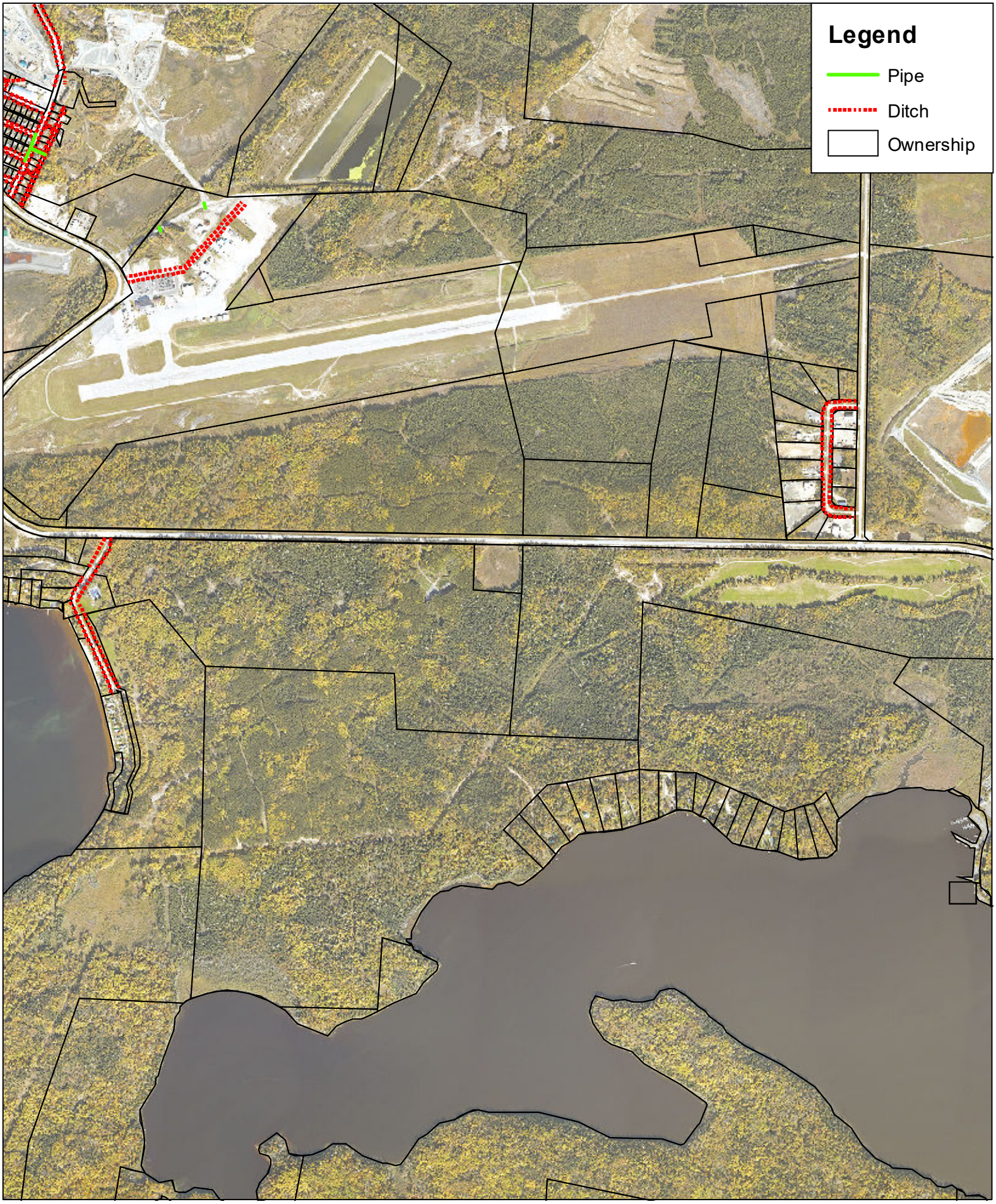

Storm Water Collection Map - Rahill&Industrial Park

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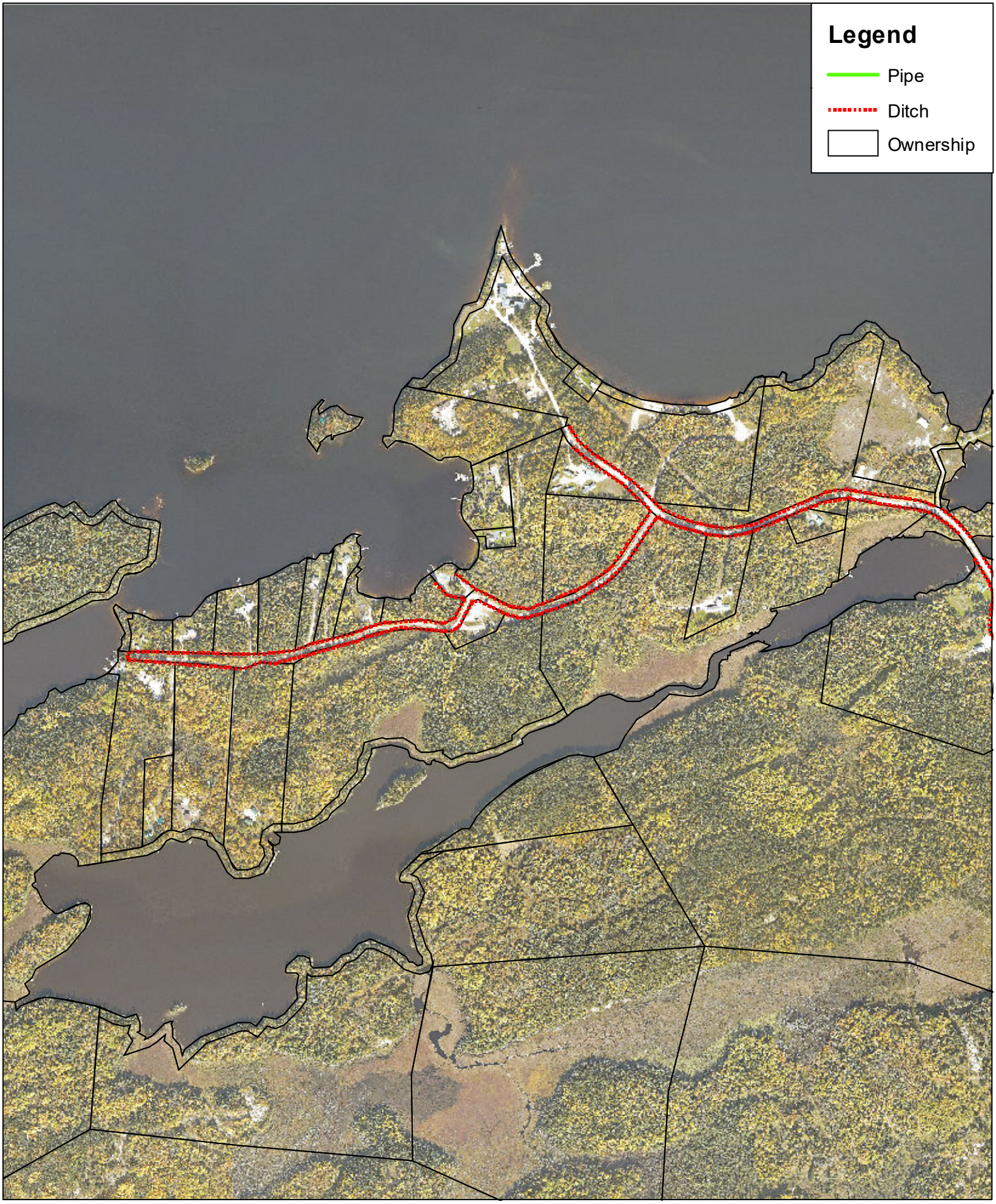

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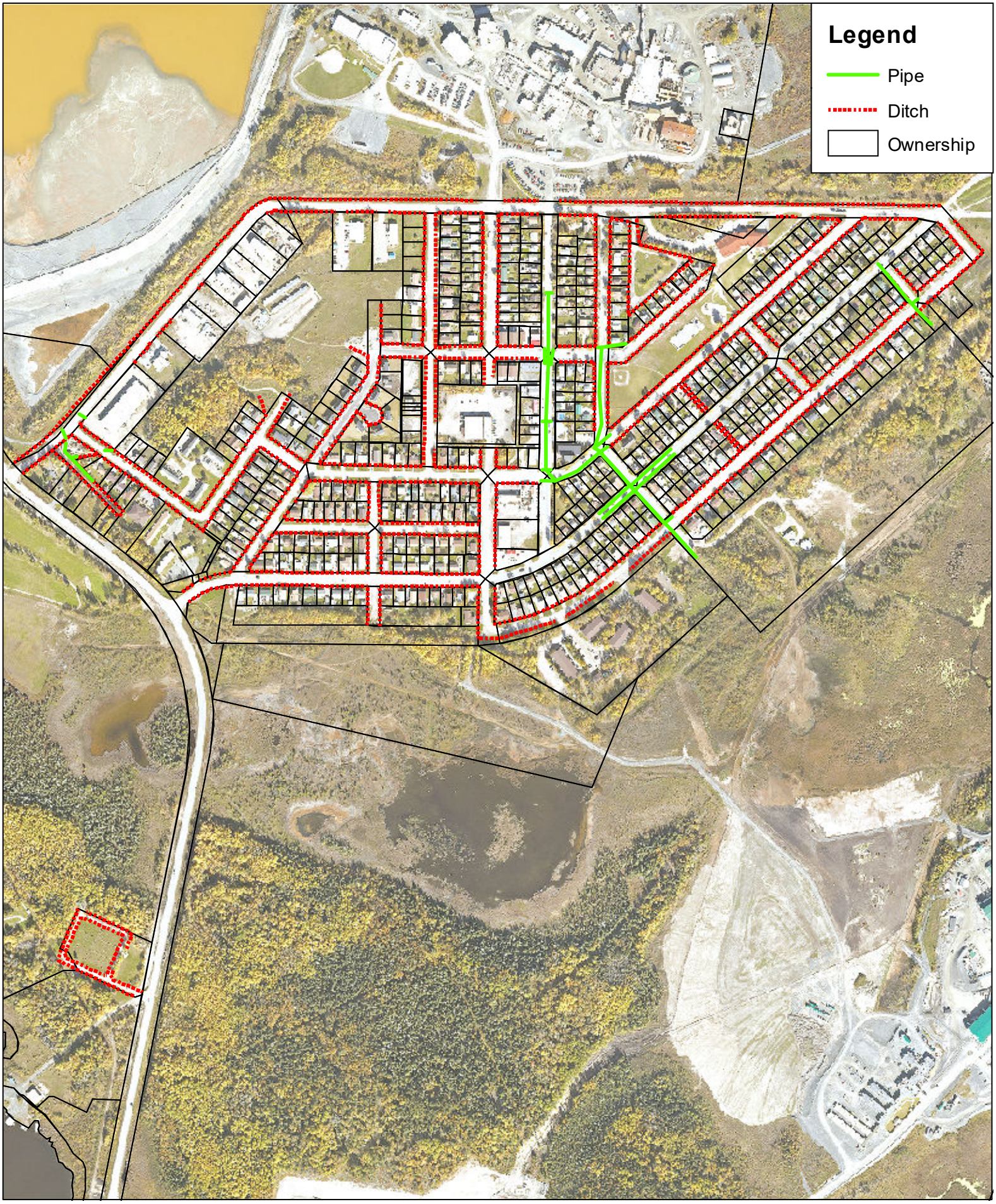

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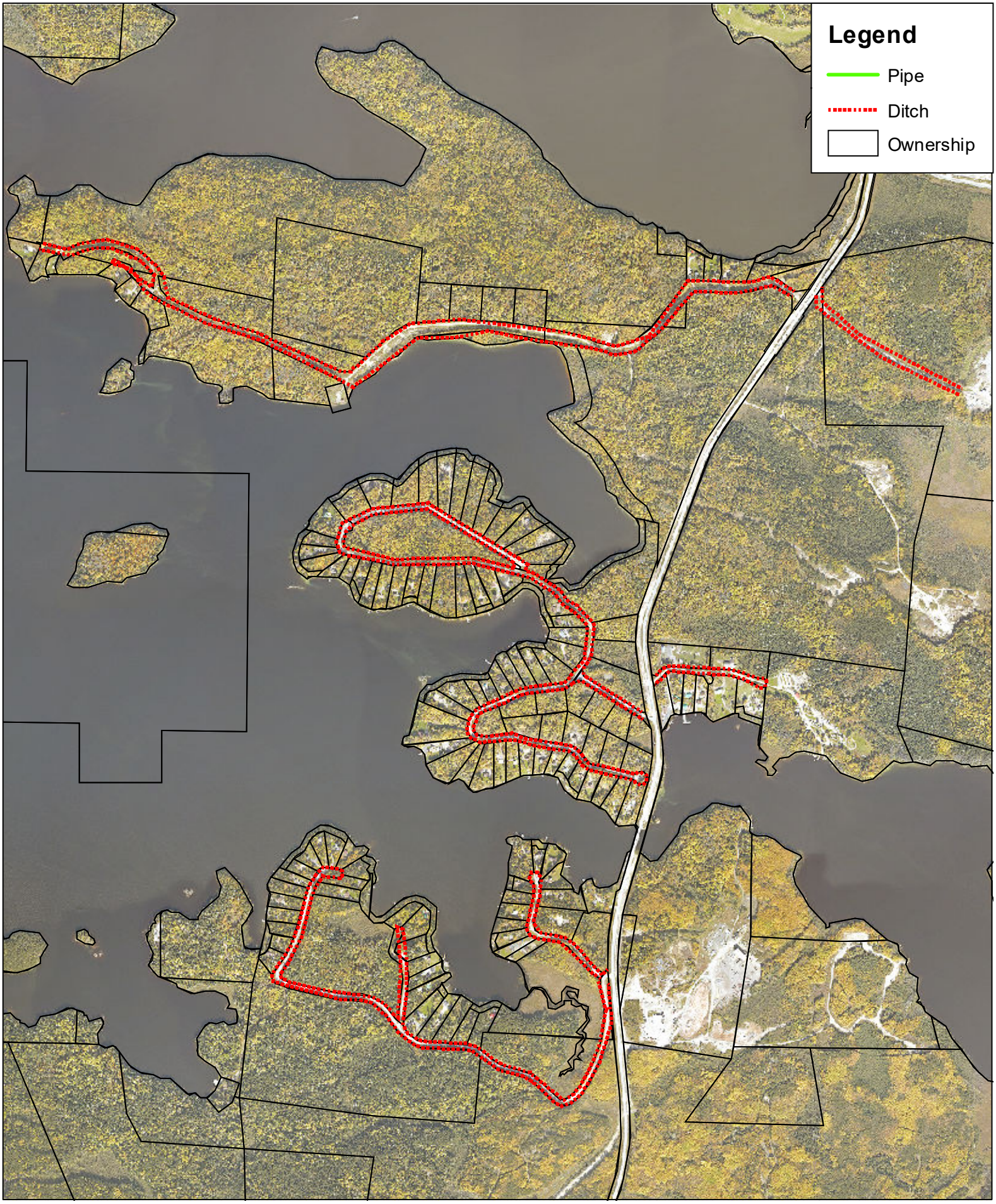

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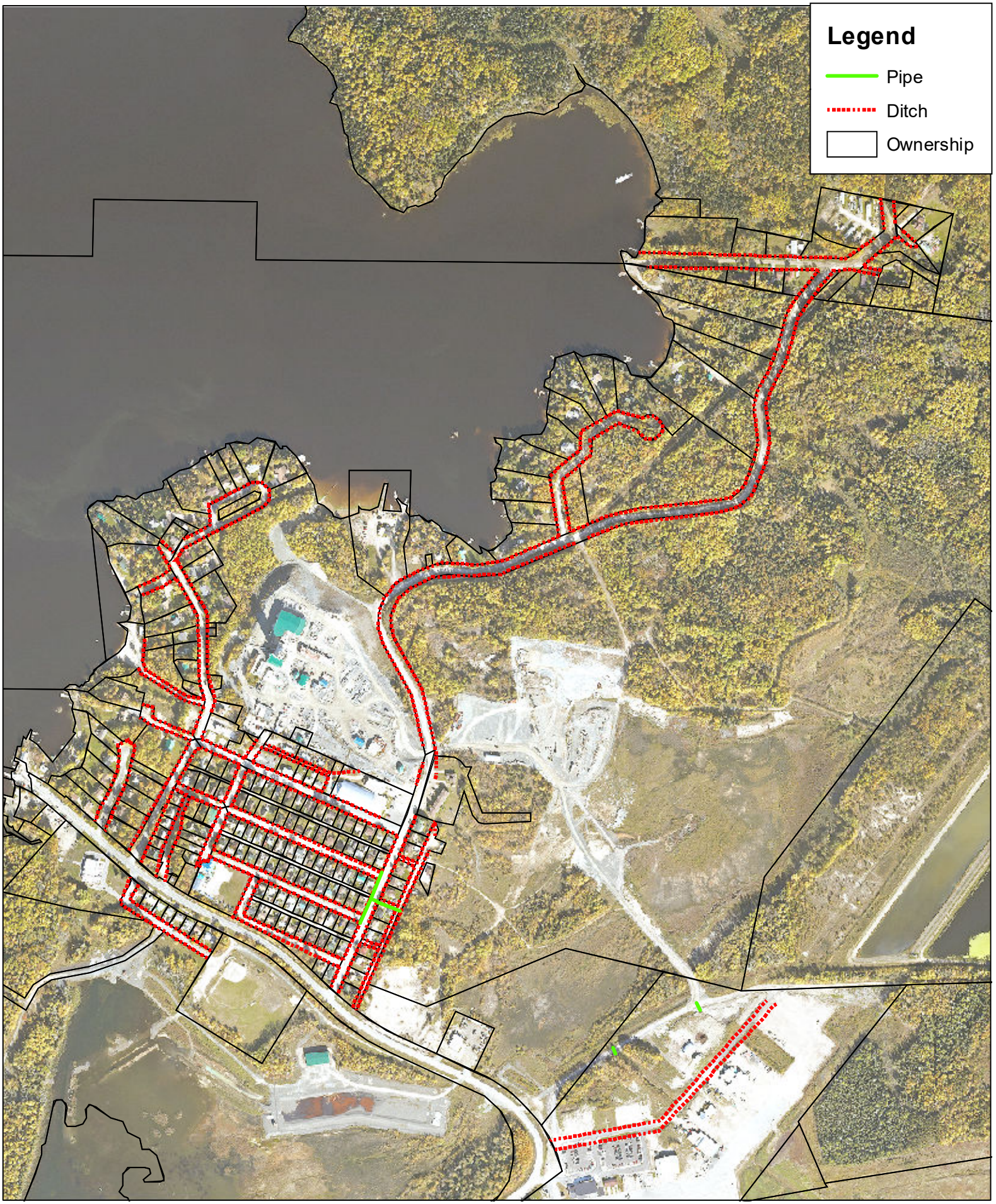

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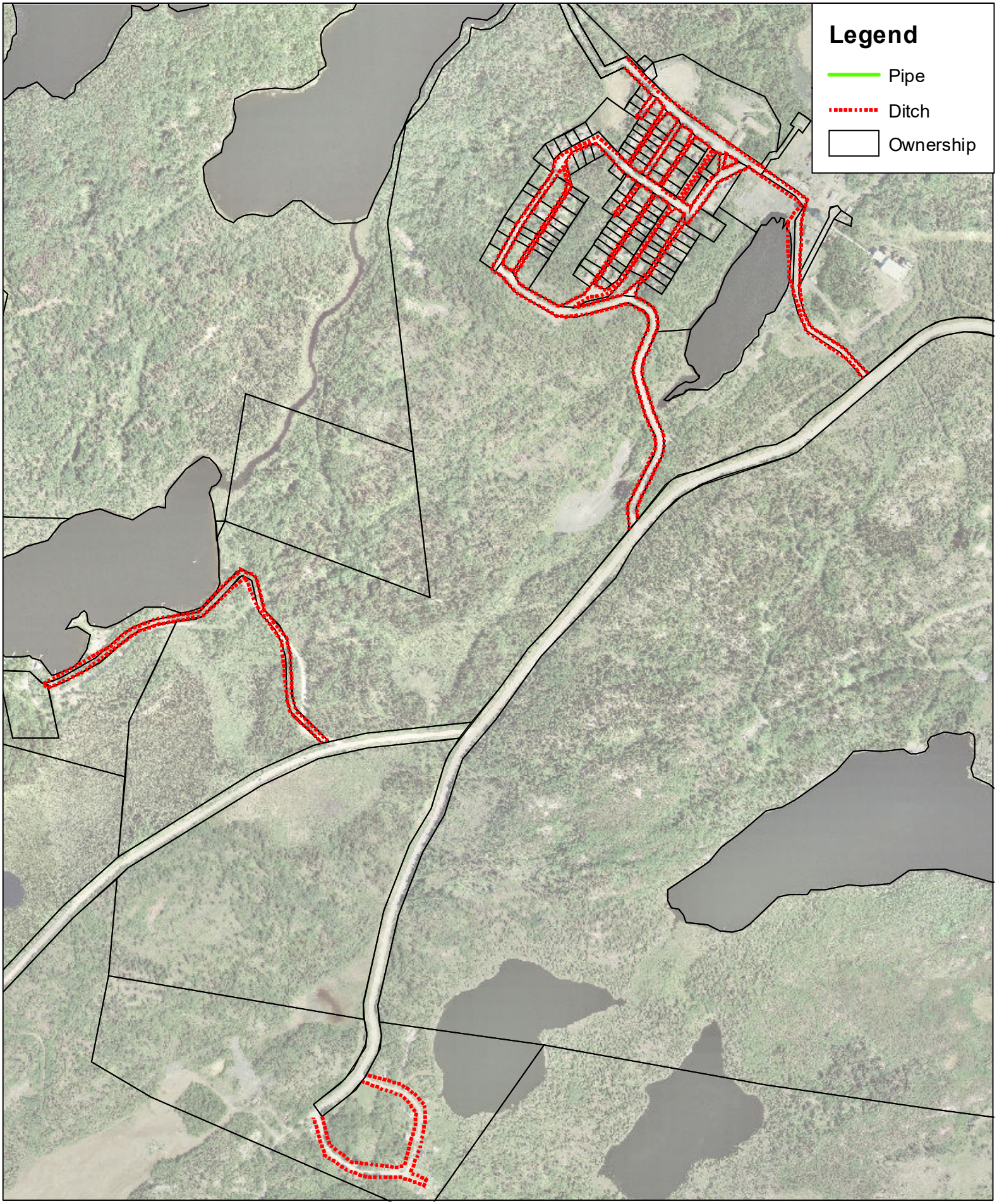

Appendix E – Municipal Road Map



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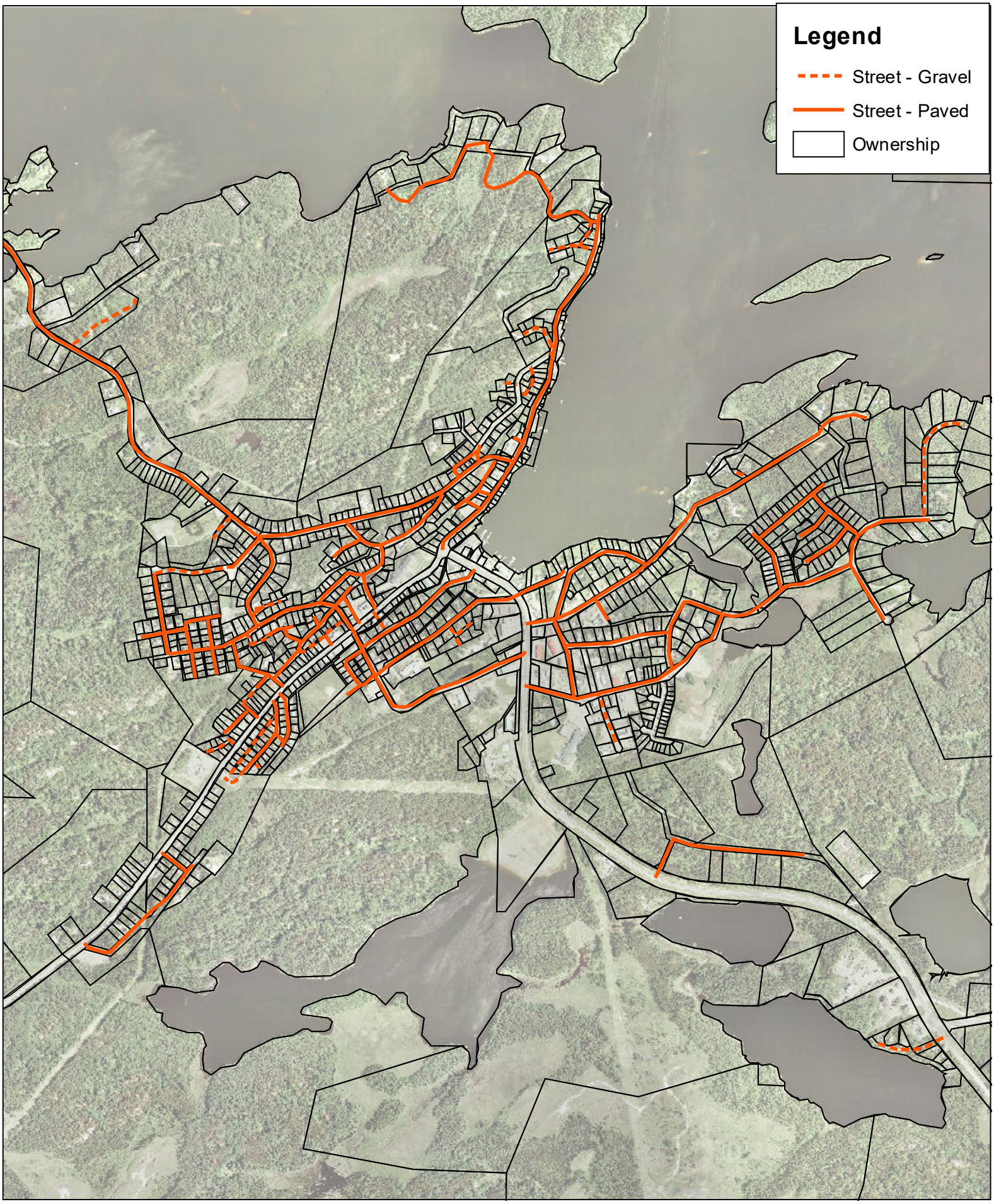
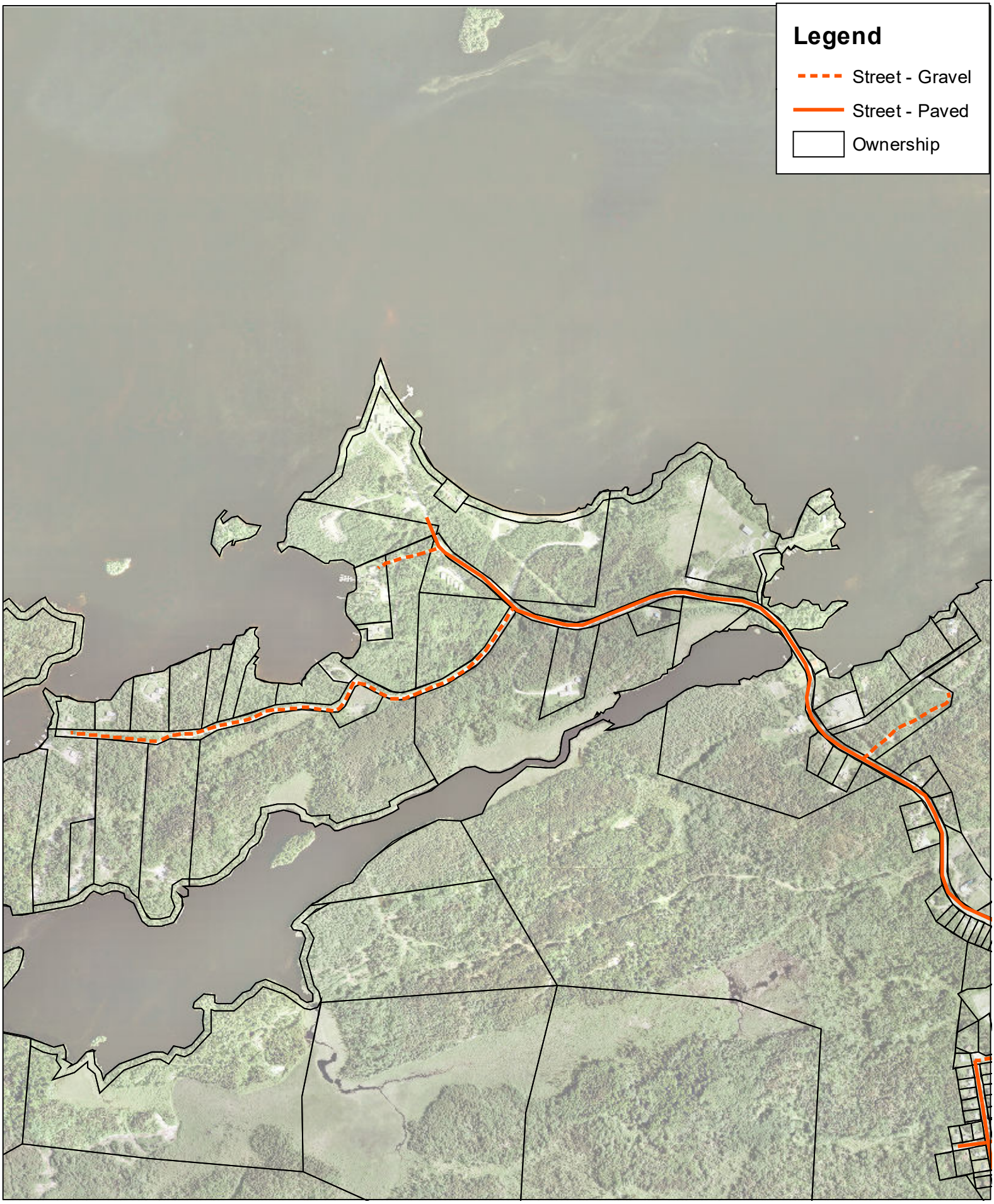


Appendix E – Municipal Road Map



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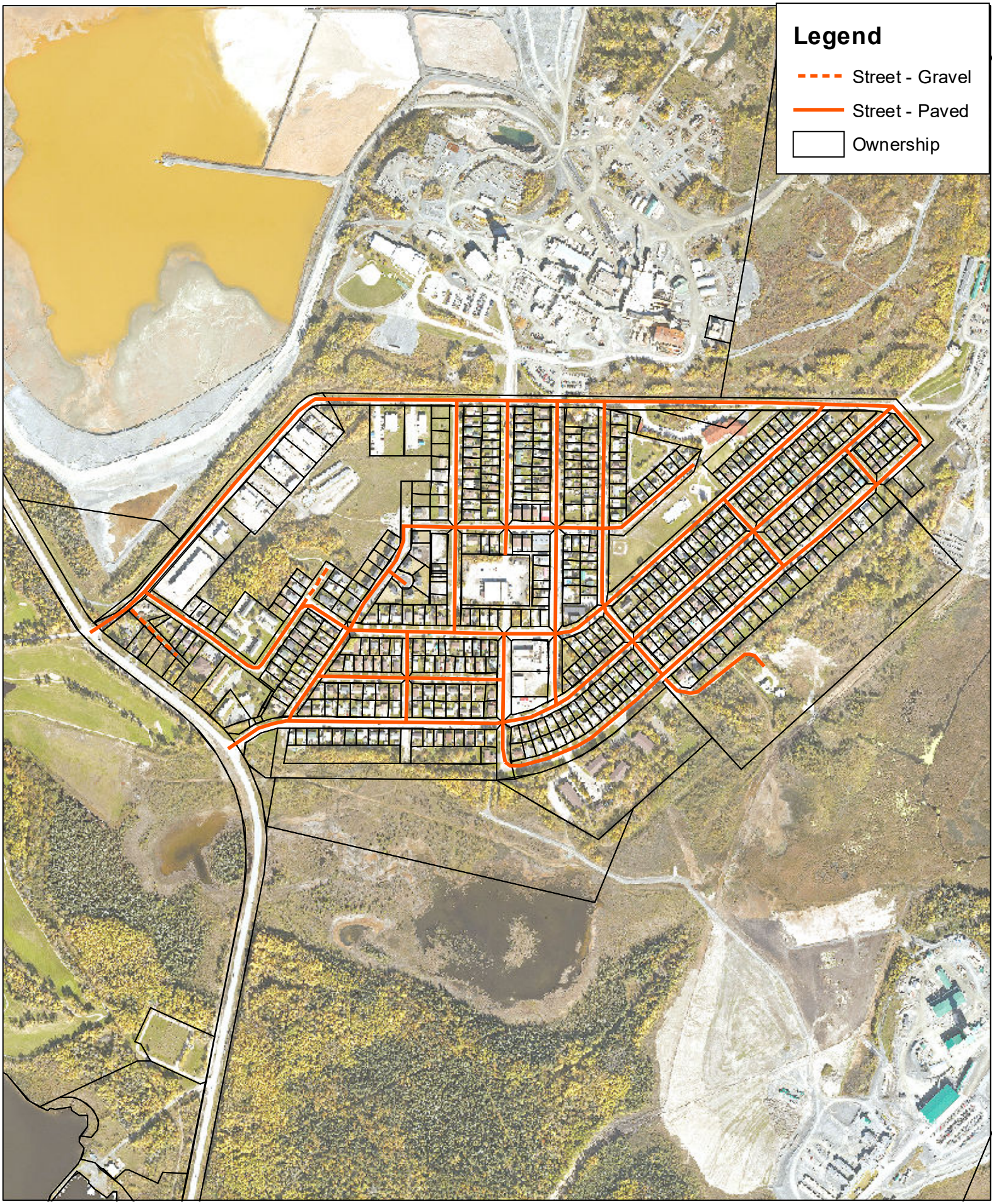

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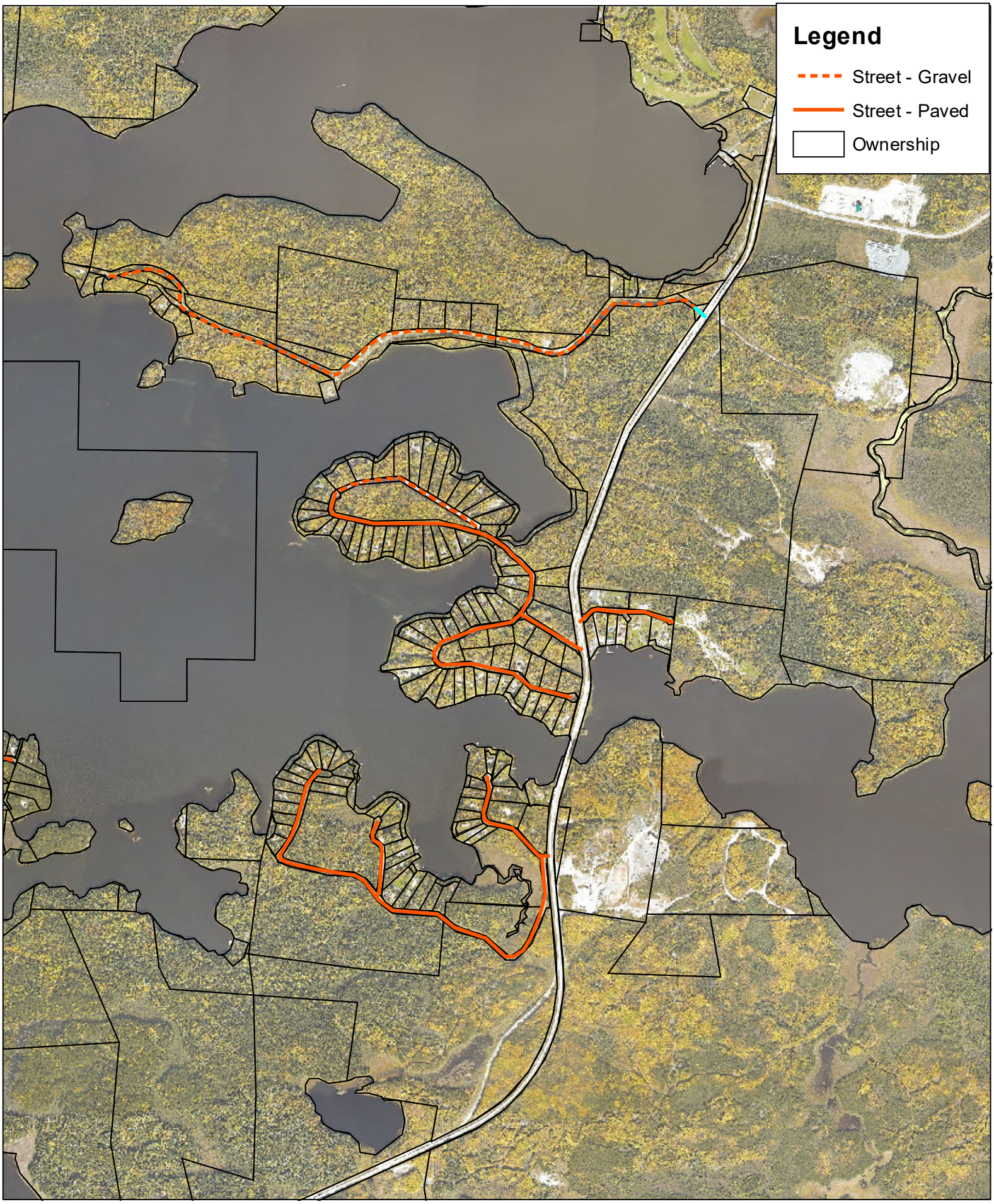

Street Map - Chukuni

Appendix E – Municipal Road Map



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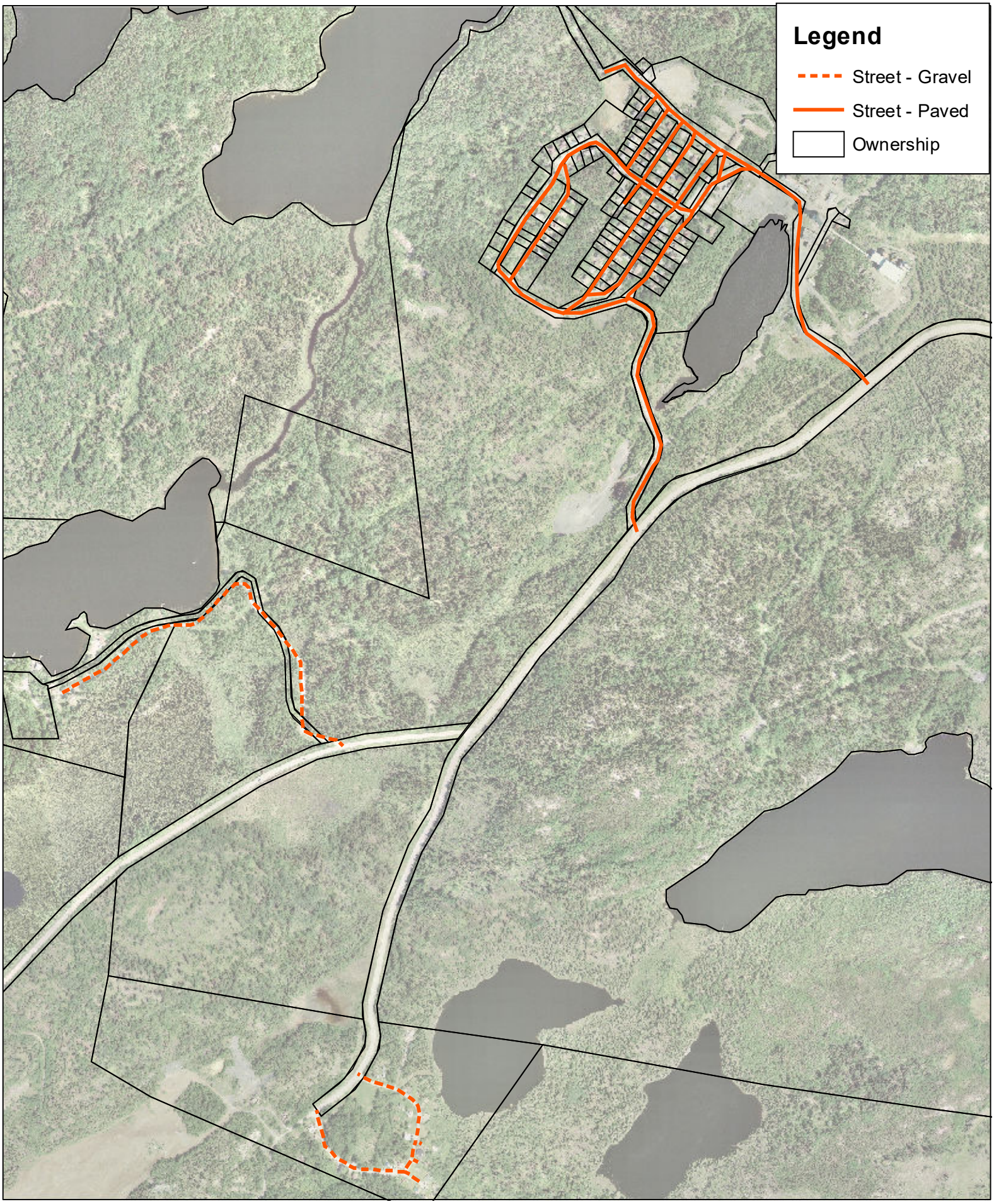
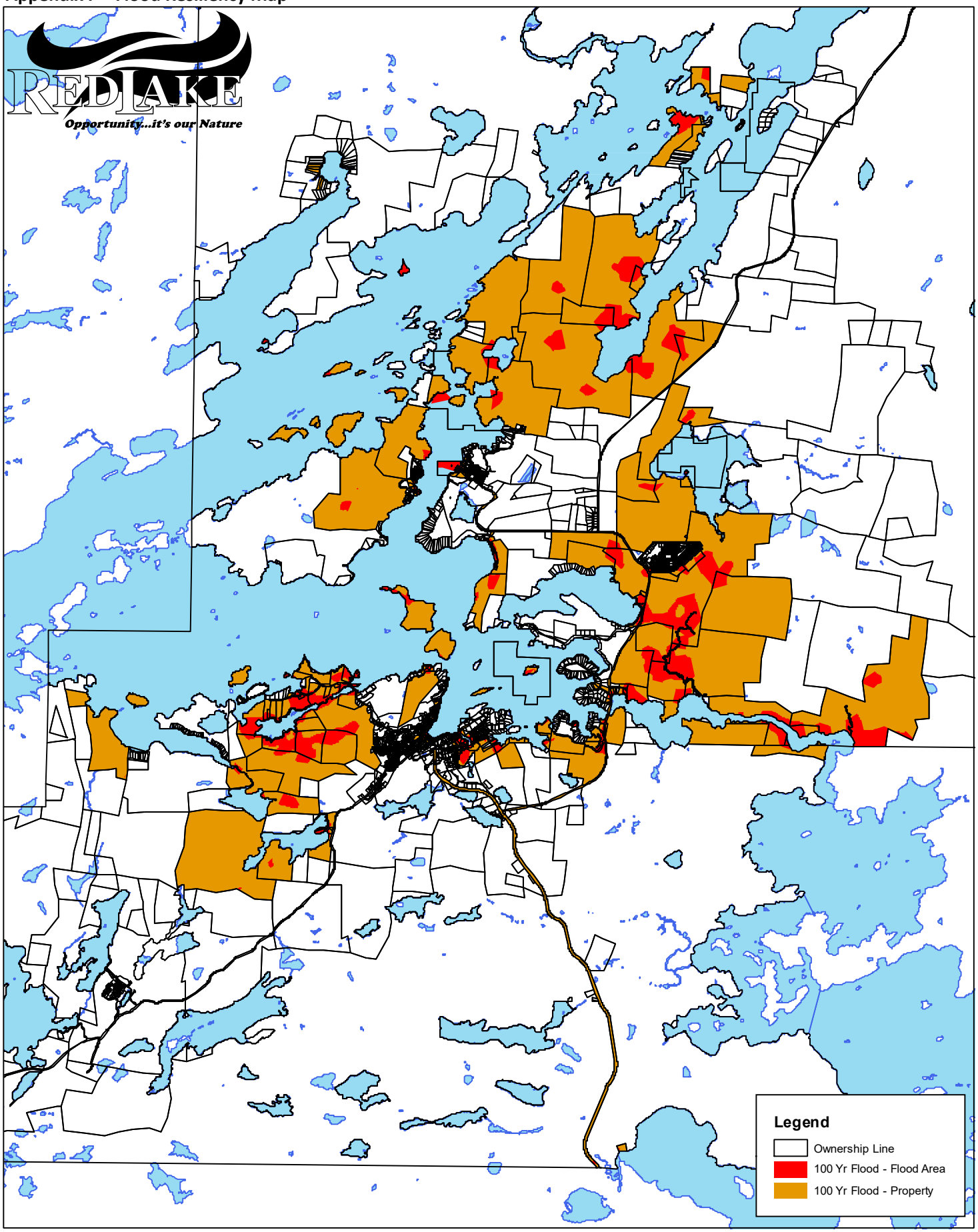


Appendix E – Municipal Road Map

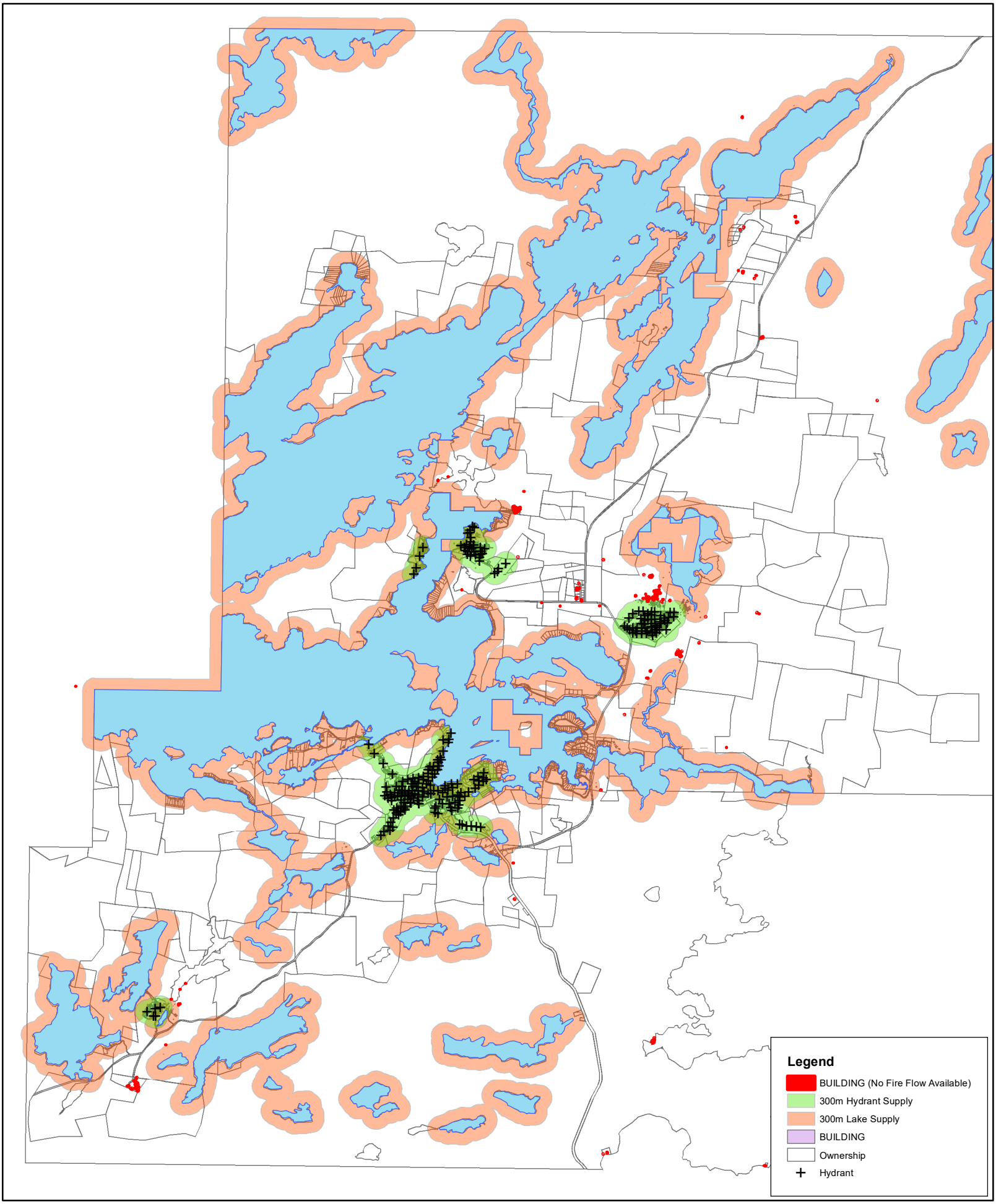


Appendix F – Flood Resiliency Map



Properties affected by a 100yr storm flood (lake level above 357m) having a flooded area greater than 10 square meters: 400.

Appendix G - Fire Flow Area Map



Fire Coverage Map

The Municipality of Red Lake owns two (2) extended aeration wastewater treatment plants, one (1) seasonal retention facultative lagoon, and one (1) community septic tank that provides primary treatment only. None of the facilities currently provide total phosphorus removal. The overall goal of the treatment process at all facilities is to reduce or remove contaminants from influent wastewater (raw sewage) to a level that will not adversely impact or impair receiving waters, including preventing the introduction of pathogens that could affect downstream users. A description of the effluent that is discharged from the respective treatment facilities is provided below.

1. Red Lake Water Pollution Control Plant

The Red Lake Water Pollution Control Plant is an extended aeration (mechanical) treatment plant that provides secondary treatment and disinfection, with an average daily rated capacity of 2,460 m^3/day. The entirety of the sewage works serve the urban area of the Red Lake town site and consist of nominally separated sanitary sewers, sewage pumping stations and associated force-mains, and an extended aeration water pollution control plant. Sanitary sewers collect wastewater and direct it to multiple pumping stations located throughout the community, which in turn deliver the wastewater either to pumping station no. 1 or 3. Forcemains from these two pumping stations convey sewage to the water pollution control plant for treatment.

The facility includes a preliminary treatment system consisting of grit removal channels and a stationary bar screen for debris removal, two circular secondary treatment units designated as the small plant and the large plant each containing an aeration reactor and secondary clarifier, a common aerobic digester integrated into the large treatment unit, a chlorine contact chamber for effluent disinfection configured with a temporary dechlorination chemical feed system, and an outfall sewer discharging final effluent to Howey Bay, Red Lake.

The facility is regulated by the terms and conditions of amended Environmental Compliance Approval no. 3803-BTFLQ3, issued to the Municipality of Red Lake on December 22, 2020. The effluent discharged by the facility meets the effluent compliance limits provided in the ECA and summarized in the table below. The facility is classified as an extended aeration plant without total phosphorus removal as per Ministry Guideline F-5-1, and effluent total phosphorus and total ammonia nitrogen are not regulated parameters at the facility.

Effluent Criteria for the Red Lake Water Pollution Control Plant			
Parameter	**Sample Frequency & Type**	**Averaging Calculator**	**Compliance Limit**
CBOD5	Weekly Composite	Monthly Average Concentration	25 mg/L
Total Suspended Solids	Weekly Composite	Monthly Average Concentration	25 mg/L
Total Ammonia Nitrogen	Weekly Composite	Monthly Average Concentration	10 mg/L
E. coli	Weekly Grab	Monthly Geometric Mean Density	200 CFU/100 mL

Toxicity to Rainbow Trout and Daphnia magna	Quarterly Grab	Single Sample Result	Non-acutely lethal (no more than 50% mortality)
Total Residual Chlorine	Weekly Grab	Single Sample Result	0.02 g/L

2. Balmertown Water Pollution Control Plant

The Balmertown Water Pollution Control Plant is an extended aeration (mechanical) treatment plant that provides secondary treatment and has an average daily rated capacity of 1,224 m^3/day. The entirety of the sewage works serve the urban area of Balmertown and consist of nominally separated sanitary sewers, a sewage pumping station and associated force-main, and an extended aeration water pollution control plant.

The facility includes a sewage pumping station that accepts raw sewage from the sanitary sewage collection system, a preliminary treatment system consisting of grit removal channels and a stationary bar screen for debris removal, one circular secondary treatment that includes an aeration reactor, secondary clarifier and aerobic digester, an effluent chamber, and an outfall system consisting of 160 m of 600 mm diameter outfall sewer discharging to an open swale east of the effluent chamber and 130 m of open swale outfall discharging to Balmer Creek approximately 290 m east of the effluent chamber.

The facility is regulated by the terms and conditions of amended Certificate of Approval no. 1376-5C3K4N, issued to the Municipality of Red Lake on July 19, 2002. The effluent discharged by the facility meets the effluent compliance limits provided in the Certificate of Approval and summarized in the table below. The facility does not provide total phosphorus removal, and in accordance with Ministry Guideline F-5-1 there are no effluent limits for total phosphorus and total ammonia nitrogen.

Effluent Criteria for the Balmertown Water Pollution Control Plant			
Parameter	**Sample Frequency & Type**	**Averaging Calculator**	**Compliance Limit**
CBOD5	Monthly Composite	Annual Average Concentration	25 mg/L
Total Suspended Solids	Monthly Composite	Annual Average Concentration	25 mg/L
pH	3 Grab Samples per Week	Single Sample Result	6.0 – 9.5

3. Cochenour Sewage Lagoon

The Cochenour Sewage Lagoon is a seasonal retention facultative lagoon that provides secondary treatment, with an average daily rated capacity of 767 m^3/day. The entirety of the sewage works serves the communities of Cochenour and McKenzie Island and consists of sanitary gravity sewers, a main raw

sewage pumping station, a sanitary force-main, two (2) sewage stabilization ponds and a discharge system that conveys treated effluent to Bruce Channel, Red Lake.

The facility is regulated by the terms and conditions of amended Environmental Compliance Approval no. 9838-9Q7K9B, issued to the Municipality of Red Lake on November 17, 2014. The effluent discharged by the facility meets the effluent compliance limits and design objective provided in the ECA and summarized in the table below. Although the facility is classified as a seasonal retention lagoon without total phosphorus removal as per Ministry Guideline F-5-1, the ECA does include design objectives pertaining to total phosphorus and total ammonia nitrogen.

Effluent Criteria for the Cochenour Sewage Lagoon			
Compliance Limits			
Parameter	**Sample Frequency & Type**	**Averaging Calculator**	**Compliance Limit/Design Objective**
CBOD5	Twice-weekly Grab during seasonal discharge period	Seasonal Average Effluent Concentration	25 mg/L
Total Suspended Solids	Twice-weekly Grab during seasonal discharge period	Seasonal Average Effluent Concentration	25 mg/L
pH	Twice-weekly Grab during seasonal discharge period	Single Sample Result	6.0 – 9.5
Design Objectives			
Total Phosphorus	Twice-weekly Grab during seasonal discharge period	Seasonal Average Effluent Concentration	1.0 mg/L
Total Ammonia Nitrogen	Twice-weekly Grab during seasonal discharge period	Seasonal Average Effluent Concentration	10 g/L

4. Madsen Sewage Works

The Madsen Sewage Works consist of domestic (household) components, a low pressure and gravity sewer system, and a septic tank serving the community of Madsen. Raw sewage is collected in tanks in individual homes and is pumped through low pressure sewers to gravity collector sewers. The gravity sewers direct sanitary sewage to the 260,000 L twin-compartment concrete community septic tank, which provides primary treatment only.

Appendix H - Effluent Discharge

As a primary treatment facility, the Madsen Sewage Works relies upon physical treatment (i.e., settling) to process incoming wastewater. Solids may settle in the septic tank, but a sizable portion of biochemical oxygen demand and suspended solids passes through the tank and is continuously discharged to an industrial sewage works. Water exiting the septic tank and industrial sewage works flows through Slobozian Lake and ultimately drains to Coin Creek and Red Lake.

The construction, operation and maintenance of the Madsen Sewage Works is governed by several regulatory instruments. Generally, the current system-specific approval issued by the Ministry is the most significant regulatory instrument governing the operation of a system. However, Certificate of Approval Number 3-0543-82-006 pertaining to the Madsen Sewage Works is outdated and does not include effluent compliance limits or design objectives. In accordance with Ministry Guideline F-5-1, effluent guidelines for primary treatment facilities without total phosphorus removal are 30% and 50% removal of BOD5 and suspended solids, respectively. The facility is generally capable of achieving these effluent guidelines over the course of a calendar year but may not achieve one or both objectives in a given calendar month. The 2021 annual BOD5 removal was 59% and the annual TSS removal was 60%.

Effluent Criteria for the Madsen Sewage Works			
Parameter	**Sample Frequency & Type**	**Averaging Calculator**	**Guideline**
BOD5	Monthly Composite	N/A	30% Removal
Total Suspended Solids	Monthly Composite	N/A	50% Removal

Appendix I - 10 Year Lifecycle Costs

Operating Costs

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Water and Wastewater	177,022	163,989	163,989	163,989	163,989	163,989	163,989	163,989	163,989	163,989
Stormwater Management	-	-	-	-	-	-	-	-	-	-
Bridges	41,700	22,556	22,556	16,917	16,917	16,917	16,917	16,917	16,917	16,917
Roads and Sidewalks	114,427	88,314	105,639	113,540	143,435	119,831	117,204	118,185	113,672	126,758
Fleet	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Facilities and Land Improvements	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
Staff Costs	571,607	571,607	588,755	606,418	624,610	643,349	662,649	682,529	703,005	724,095
	1,144,755	**1,086,465**	**1,120,939**	**1,140,864**	**1,188,951**	**1,184,086**	**1,200,759**	**1,221,619**	**1,237,582**	**1,271,759**

Average Annual Operating Costs **1,179,778**

Capital Costs

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Water and Wastewater	16,302,799	7,712,967	321,004	3,019,144	1,131,233	3,187,697	4,196,111	1,163,767	2,056,536	2,387,273
Stormwater Management	1,560,761	-	20,377	-	-	410,349	-	-	254,833	115,920
Bridges	-	-	1,357,560	437,917	-	-	-	-	-	-
Roads and Sidewalks	12,487,896	1,206,426	173,549	35,460	813,428	3,044,242	1,242,958	5,274,970	2,433,321	2,532,576
Fleet	6,657,673	958,356	1,406,661	832,896	264,970	1,455,112	1,094,311	17,630	824,894	1,803,644
Facilities and Land Improvements	44,006,449	-	2,901,809	-	377,924	220,171	-	711,022	417,528	140,262
	81,015,578	**9,877,749**	**6,180,960**	**4,325,417**	**2,587,555**	**8,317,571**	**6,533,380**	**7,167,389**	**5,987,112**	**6,979,675**

Total Capital Costs **138,972,386**

Annual Funding	
OCIF	747,840
Gas Tax	268,158
	1,015,998

Funding Sources	
Annual Funding (10 years)	10,159,980
W&S Reserves	1,498,147
Facilities Reserves	3,318,918
Fleet Reserves	176,845
Roads Reserves	31,965
Gas Tax Reserve	820,051
OCIF Reserve	514,766
	16,520,672

Funding Deficit **122,451,714**

Integrated Costs - Summary

	Blast - Rehab - PVC			Blast - Replace - PVC		
Year	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price
0	531,016.13	0%	531,016.13	531,016.13	0%	531,016.13
1	2,481.11	3%	2,555.54	2,481.11	3%	2,555.54
2	2,497.27	6%	2,647.11	2,497.27	6%	2,647.11
3	2,819.44	9%	3,073.19	2,819.44	9%	3,073.19
4	2,497.27	12%	2,796.95	2,497.27	12%	2,796.95
5	2,513.44	15%	2,890.46	2,513.44	15%	2,890.46
6	2,529.60	18%	2,984.93	2,529.60	18%	2,984.93
7	2,545.77	21%	3,080.38	2,545.77	21%	3,080.38
8	2,561.93	24%	3,176.80	2,561.93	24%	3,176.80
9	2,578.10	27%	3,274.19	2,578.10	27%	3,274.19
10	3,437.21	30%	4,468.38	3,437.21	30%	4,468.38
11	2,545.77	33%	3,385.87	2,545.77	33%	3,385.87
12	2,556.55	36%	3,476.90	2,556.55	36%	3,476.90
13	2,567.32	39%	3,568.58	2,567.32	39%	3,568.58
14	2,578.10	42%	3,660.90	2,578.10	42%	3,660.90
15	2,584.87	45%	3,748.05	2,584.87	45%	3,748.05
16	2,599.65	48%	3,847.49	2,599.65	48%	3,847.49
17	2,610.43	51%	3,941.75	2,610.43	51%	3,941.75
18	2,621.21	54%	4,036.66	2,621.21	54%	4,036.66
19	2,631.98	57%	4,132.21	2,631.98	57%	4,132.21
20	2,637.87	60%	4,220.59	2,637.87	60%	4,220.59
21	2,648.02	63%	4,316.27	2,648.02	63%	4,316.27
22	2,664.31	66%	4,422.76	2,664.31	66%	4,422.76
23	2,675.09	69%	4,520.90	2,675.09	69%	4,520.90
24	2,685.86	72%	4,619.69	2,685.86	72%	4,619.69
25	2,696.64	75%	4,719.12	2,696.64	75%	4,719.12
26	2,707.42	78%	4,819.20	2,707.42	78%	4,819.20
27	2,718.19	81%	4,919.93	2,718.19	81%	4,919.93
28	2,728.97	84%	5,021.31	2,728.97	84%	5,021.31
29	2,739.75	87%	5,123.33	2,739.75	87%	5,123.33
30	87,064.40	90%	165,422.35	87,064.40	90%	165,422.35
31	2,508.05	93%	4,840.54	2,508.05	93%	4,840.54
32	2,534.99	96%	4,968.59	2,534.99	96%	4,968.59
33	2,846.38	99%	5,664.30	2,846.38	99%	5,664.30
34	2,534.99	102%	5,120.69	2,534.99	102%	5,120.69
35	1,942.11	105%	3,981.32	1,942.11	105%	3,981.32
36	1,288.37	108%	2,679.82	1,288.37	108%	2,679.82
37	1,308.55	111%	2,761.04	1,308.55	111%	2,761.04
38	1,324.71	114%	2,834.88	1,324.71	114%	2,834.88
39	1,340.88	117%	2,909.70	1,340.88	117%	2,909.70
40	2,190.59	120%	4,819.31	2,190.59	120%	4,819.31
41	1,313.94	123%	2,930.08	1,313.94	123%	2,930.08
42	1,335.49	126%	3,018.21	1,335.49	126%	3,018.21
43	1,367.82	129%	3,132.31	1,367.82	129%	3,132.31
44	1,389.37	132%	3,223.34	1,389.37	132%	3,223.34
45	141,751.06	135%	333,115.00	1,410.93	135%	3,315.67
46	2,052.30	138%	4,884.49	1,432.48	138%	3,409.30
47	2,073.86	141%	4,998.00	1,454.03	141%	3,504.22
48	2,095.41	144%	5,112.80	1,475.58	144%	3,600.43
49	2,115.71	147%	5,225.80	1,495.88	147%	3,694.83
50	330,641.71	150%	826,604.26	531,016.13	150%	1,327,540.32
		NPV	707,138.69		NPV	$713,173.69
			2,040,712.38			2,205,836.79

Pipe Lining is Viable

	Inflated Costs	Net Present Value
Individually	2,263,926.57	841,838.29
Integrated	2,040,712.38	707,138.69
Savings	**223,214.19**	**134,699.60**

Pipe Lining is Not Viable

	Inflated Costs	Net Present Value
Individually	2,344,165.77	841,942.98
Integrated	2,205,836.79	713,173.69
Savings	**138,328.98**	**128,769.28**

Integrated Costs - Per 100 m

	Lining Pipe				Replacing Pipe			
Year	*Road*	*Water*	*Sewer*	*Total*	*Road*	*Water*	*Sewer*	*Total*
0	328,837.26	109,306.42	92,872.45	531,016.13	328,837.26	109,306.42	92,872.45	531,016.13
1	-	676.67	1,804.44	2,481.11	-	676.67	1,804.44	2,481.11
2	16.16	676.67	1,804.44	2,497.27	16.16	676.67	1,804.44	2,497.27
3	338.33	676.67	1,804.44	2,819.44	338.33	676.67	1,804.44	2,819.44
4	16.16	676.67	1,804.44	2,497.27	16.16	676.67	1,804.44	2,497.27
5	32.33	676.67	1,804.44	2,513.44	32.33	676.67	1,804.44	2,513.44
6	48.49	676.67	1,804.44	2,529.60	48.49	676.67	1,804.44	2,529.60
7	64.66	676.67	1,804.44	2,545.77	64.66	676.67	1,804.44	2,545.77
8	80.82	676.67	1,804.44	2,561.93	80.82	676.67	1,804.44	2,561.93
9	96.99	676.67	1,804.44	2,578.10	96.99	676.67	1,804.44	2,578.10
10	956.10	676.67	1,804.44	3,437.21	956.10	676.67	1,804.44	3,437.21
11	64.66	676.67	1,804.44	2,545.77	64.66	676.67	1,804.44	2,545.77
12	75.44	676.67	1,804.44	2,556.55	75.44	676.67	1,804.44	2,556.55
13	86.21	676.67	1,804.44	2,567.32	86.21	676.67	1,804.44	2,567.32
14	96.99	676.67	1,804.44	2,578.10	96.99	676.67	1,804.44	2,578.10
15	103.76	676.67	1,804.44	2,584.87	103.76	676.67	1,804.44	2,584.87
16	118.54	676.67	1,804.44	2,599.65	118.54	676.67	1,804.44	2,599.65
17	129.32	676.67	1,804.44	2,610.43	129.32	676.67	1,804.44	2,610.43
18	140.10	676.67	1,804.44	2,621.21	140.10	676.67	1,804.44	2,621.21
19	150.87	676.67	1,804.44	2,631.98	150.87	676.67	1,804.44	2,631.98
20	156.76	676.67	1,804.44	2,637.87	156.76	676.67	1,804.44	2,637.87
21	166.91	676.67	1,804.44	2,648.02	166.91	676.67	1,804.44	2,648.02
22	183.20	676.67	1,804.44	2,664.31	183.20	676.67	1,804.44	2,664.31
23	193.98	676.67	1,804.44	2,675.09	193.98	676.67	1,804.44	2,675.09
24	204.75	676.67	1,804.44	2,685.86	204.75	676.67	1,804.44	2,685.86
25	215.53	676.67	1,804.44	2,696.64	215.53	676.67	1,804.44	2,696.64
26	226.31	676.67	1,804.44	2,707.42	226.31	676.67	1,804.44	2,707.42
27	237.08	676.67	1,804.44	2,718.19	237.08	676.67	1,804.44	2,718.19
28	247.86	676.67	1,804.44	2,728.97	247.86	676.67	1,804.44	2,728.97
29	258.64	676.67	1,804.44	2,739.75	258.64	676.67	1,804.44	2,739.75
30	84,583.29	676.67	1,804.44	87,064.40	84,583.29	676.67	1,804.44	87,064.40
31	26.94	676.67	1,804.44	2,508.05	26.94	676.67	1,804.44	2,508.05
32	53.88	676.67	1,804.44	2,534.99	53.88	676.67	1,804.44	2,534.99
33	365.27	676.67	1,804.44	2,846.38	365.27	676.67	1,804.44	2,846.38
34	53.88	676.67	1,804.44	2,534.99	53.88	676.67	1,804.44	2,534.99
35	80.82	56.84	1,804.44	1,942.11	80.82	56.84	1,804.44	1,942.11
36	103.76	56.84	1,127.78	1,288.37	103.76	56.84	1,127.78	1,288.37
37	123.93	56.84	1,127.78	1,308.55	123.93	56.84	1,127.78	1,308.55
38	140.10	56.84	1,127.78	1,324.71	140.10	56.84	1,127.78	1,324.71
39	156.26	56.84	1,127.78	1,340.88	156.26	56.84	1,127.78	1,340.88
40	1,005.98	56.84	1,127.78	2,190.59	1,005.98	56.84	1,127.78	2,190.59
41	129.32	56.84	1,127.78	1,313.94	129.32	56.84	1,127.78	1,313.94
42	150.87	56.84	1,127.78	1,335.49	150.87	56.84	1,127.78	1,335.49
43	183.20	56.84	1,127.78	1,367.82	183.20	56.84	1,127.78	1,367.82
44	204.75	56.84	1,127.78	1,389.37	204.75	56.84	1,127.78	1,389.37
45	226.31	76,514.04	65,010.71	141,751.06	226.31	56.84	1,127.78	1,410.93
46	247.86	676.67	1,127.78	2,052.30	247.86	56.84	1,127.78	1,432.48
47	269.41	676.67	1,127.78	2,073.86	269.41	56.84	1,127.78	1,454.03
48	290.97	676.67	1,127.78	2,095.41	290.97	56.84	1,127.78	1,475.58
49	311.27	676.67	1,127.78	2,115.71	311.27	56.84	1,127.78	1,495.88
50	328,837.26	676.67	1,127.78	330,641.71	328,837.26	109,306.42	92,872.45	531,016.13

Water Mains - Summary

	Blast - Rehab - PVC			Blast - Replace - PVC			No Blast - Rehab - HDPE			No Blast - Replace - HDPE		
Year	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price
0	267,195.22	0%	267,195.22	267,195.22	0%	267,195.22	182,611.93	0%	182,611.93	182,611.93	0%	182,611.93
1	-	3%	-	-	3%	-	676.67	3%	696.97	676.67	3%	696.97
2	-	6%	-	-	6%	-	676.67	6%	717.27	676.67	6%	717.27
3	-	9%	-	-	9%	-	676.67	9%	737.57	676.67	9%	737.57
4	-	12%	-	-	12%	-	676.67	12%	757.87	676.67	12%	757.87
5	-	15%	-	-	15%	-	676.67	15%	778.17	676.67	15%	778.17
6	-	18%	-	-	18%	-	676.67	18%	798.47	676.67	18%	798.47
7	-	21%	-	-	21%	-	676.67	21%	818.77	676.67	21%	818.77
8	-	24%	-	-	24%	-	676.67	24%	839.07	676.67	24%	839.07
9	-	27%	-	-	27%	-	676.67	27%	859.37	676.67	27%	859.37
10	-	30%	-	-	30%	-	676.67	30%	879.67	676.67	30%	879.67
11	-	33%	-	-	33%	-	676.67	33%	899.97	676.67	33%	899.97
12	-	36%	-	-	36%	-	676.67	36%	920.27	676.67	36%	920.27
13	-	39%	-	-	39%	-	676.67	39%	940.57	676.67	39%	940.57
14	-	42%	-	-	42%	-	676.67	42%	960.87	676.67	42%	960.87
15	-	45%	-	-	45%	-	676.67	45%	981.17	676.67	45%	981.17
16	-	48%	-	-	48%	-	676.67	48%	1,001.47	676.67	48%	1,001.47
17	-	51%	-	-	51%	-	676.67	51%	1,021.77	676.67	51%	1,021.77
18	-	54%	-	-	54%	-	676.67	54%	1,042.07	676.67	54%	1,042.07
19	-	57%	-	-	57%	-	676.67	57%	1,062.37	676.67	57%	1,062.37
20	-	60%	-	-	60%	-	676.67	60%	1,082.67	676.67	60%	1,082.67
21	-	63%	-	-	63%	-	676.67	63%	1,102.97	676.67	63%	1,102.97
22	-	66%	-	-	66%	-	676.67	66%	1,123.27	676.67	66%	1,123.27
23	-	69%	-	-	69%	-	676.67	69%	1,143.57	676.67	69%	1,143.57
24	-	72%	-	-	72%	-	676.67	72%	1,163.87	676.67	72%	1,163.87
25	12,953.65	75%	22,668.88	12,953.65	75%	22,668.88	676.67	75%	1,184.17	676.67	75%	1,184.17
26	-	78%	-	-	78%	-	676.67	78%	1,204.47	676.67	78%	1,204.47
27	-	81%	-	-	81%	-	676.67	81%	1,224.77	676.67	81%	1,224.77
28	-	84%	-	-	84%	-	676.67	84%	1,245.07	676.67	84%	1,245.07
29	-	87%	-	-	87%	-	676.67	87%	1,265.37	676.67	87%	1,265.37
30	-	90%	-	-	90%	-	676.67	90%	1,285.67	676.67	90%	1,285.67
31	-	93%	-	-	93%	-	676.67	93%	1,305.97	676.67	93%	1,305.97
32	-	96%	-	-	96%	-	676.67	96%	1,326.27	676.67	96%	1,326.27
33	-	99%	-	-	99%	-	676.67	99%	1,346.57	676.67	99%	1,346.57
34	-	102%	-	-	102%	-	676.67	102%	1,366.87	676.67	102%	1,366.87
35	-	105%	-	-	105%	-	56.84	105%	116.52	56.84	105%	116.52
36	-	108%	-	-	108%	-	56.84	108%	118.23	56.84	108%	118.23
37	-	111%	-	-	111%	-	56.84	111%	119.93	56.84	111%	119.93
38	-	114%	-	-	114%	-	56.84	114%	121.64	56.84	114%	121.64
39	-	117%	-	-	117%	-	56.84	117%	123.34	56.84	117%	123.34
40	12,953.65	120%	28,498.03	12,953.65	120%	28,498.03	56.84	120%	125.05	56.84	120%	125.05
41	-	123%	-	-	123%	-	56.84	123%	126.75	56.84	123%	126.75
42	-	126%	-	-	126%	-	56.84	126%	128.46	56.84	126%	128.46
43	-	129%	-	-	129%	-	56.84	129%	130.16	56.84	129%	130.16
44	-	132%	-	-	132%	-	56.84	132%	131.87	56.84	132%	131.87
45	91,175.59	135%	214,262.65	-	135%	-	91,175.59	135%	214,262.65	56.84	135%	133.57
46	-	138%	-	-	138%	-	676.67	138%	1,610.47	56.84	138%	135.28
47	-	141%	-	-	141%	-	676.67	141%	1,630.77	56.84	141%	136.98
48	-	144%	-	-	144%	-	676.67	144%	1,651.07	56.84	144%	138.69
49	-	147%	-	-	147%	-	676.67	147%	1,671.37	56.84	147%	140.39
50	-	150%	-	182,611.93	150%	456,529.83	676.67	150%	1,691.67	182,668.77	150%	456,671.93
		NPV	$287,259.14		NPV	$302,378.92		NPV	$211,922.29			$226,366.17
			532,624.78			774,891.96			441,457.01			676,295.88

	Inflated Costs	Net Present Value
Option 1	532,624.78	287,259.14
Option 2	774,891.96	302,378.92
Option 3	441,457.01	211,922.29
Option 4	676,295.88	226,366.17

Water Mains
Per 100 Meters

	Blast - Rehab - PVC				Blast - Replace - PVC				No Blast - Rehab - HDPE					No Blast - Replace - HDPE				
Year	*Breaks*	*Pipe Replacement*	*Construction*	*Total*	*Breaks*	*Pipe Replacement*	*Construction*	*Total*	*Breaks*	*Heat Trace Costs*	*Pipe Replacement*	*Construction*	*Total*	*Breaks*	*Heat Trace Costs*	*Pipe Replacement*	*Construction*	*Total*
0	-	-	267,195.22	267,195.22	-	-	267,195.22	267,195.22	-	-	-	182,611.93	182,611.93	-	-	-	182,611.93	182,611.93
1	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
2	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
3	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
4	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
5	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
6	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
7	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
8	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
9	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
10	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
11	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
12	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
13	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
14	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
15	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
16	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
17	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
18	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
19	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
20	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
21	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
22	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
23	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
24	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
25	12,953.65	-	-	12,953.65	12,953.65	-	-	12,953.65	-	676.67	-	-	676.67	-	676.67	-	-	676.67
26	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
27	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
28	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
29	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
30	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
31	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
32	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
33	-	-	-	-	-	-	-	-	4,537.17	676.67	-	-	676.67	4,537.17	676.67	-	-	676.67
34	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	676.67	-	-	676.67
35	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
36	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
37	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
38	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
39	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
40	12,953.65	-	-	12,953.65	12,953.65	-	-	12,953.65	-	56.84	-	-	56.84	-	56.84	-	-	56.84
41	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
42	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
43	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
44	-	-	-	-	-	-	-	-	-	56.84	-	-	56.84	-	56.84	-	-	56.84
45	-	91,175.59	-	91,175.59	-	-	-	-	-	-	91,175.59	-	91,175.59	-	56.84	-	-	56.84
46	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	56.84	-	-	56.84
47	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	56.84	-	-	56.84
48	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	56.84	-	-	56.84
49	-	-	-	-	-	-	-	-	-	676.67	-	-	676.67	-	56.84	-	-	56.84
50	-	-	-	-	-	182,611.93	-	182,611.93	-	676.67	-	-	676.67	-	56.84	182,611.93	-	182,668.77

Sewer Mains - Summary

	Blast - Rehab - PVC			Blast - Replace - PVC			No Blast - Rehab - HDPE			No Blast - Replace - HDPE		
Year	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price
0	182,194.65	0%	182,194.65	182,194.65	0%	182,194.65	92,872.45	0%	92,872.45	92,872.45	0%	92,872.45
1	-	3%	-	-	3%	-	1,804.44	3%	1,858.58	1,804.44	3%	1,858.58
2	-	6%	-	-	6%	-	1,804.44	6%	1,912.71	1,804.44	6%	1,912.71
3	532.31	9%	580.22	532.31	9%	580.22	1,804.44	9%	1,966.84	1,804.44	9%	1,966.84
4	-	12%	-	-	12%	-	1,804.44	12%	2,020.98	1,804.44	12%	2,020.98
5	-	15%	-	-	15%	-	1,804.44	15%	2,075.11	1,804.44	15%	2,075.11
6	532.31	18%	628.13	532.31	18%	628.13	1,804.44	18%	2,129.24	1,804.44	18%	2,129.24
7	-	21%	-	-	21%	-	1,804.44	21%	2,183.38	1,804.44	21%	2,183.38
8	-	24%	-	-	24%	-	1,804.44	24%	2,237.51	1,804.44	24%	2,237.51
9	532.31	27%	676.03	532.31	27%	676.03	1,804.44	27%	2,291.64	1,804.44	27%	2,291.64
10	-	30%	-	-	30%	-	1,804.44	30%	2,345.78	1,804.44	30%	2,345.78
11	-	33%	-	-	33%	-	1,804.44	33%	2,399.91	1,804.44	33%	2,399.91
12	532.31	36%	723.94	532.31	36%	723.94	1,804.44	36%	2,454.04	1,804.44	36%	2,454.04
13	-	39%	-	-	39%	-	1,804.44	39%	2,508.18	1,804.44	39%	2,508.18
14	-	42%	-	-	42%	-	1,804.44	42%	2,562.31	1,804.44	42%	2,562.31
15	532.31	45%	771.85	532.31	45%	771.85	1,804.44	45%	2,616.44	1,804.44	45%	2,616.44
16	-	48%	-	-	48%	-	1,804.44	48%	2,670.58	1,804.44	48%	2,670.58
17	-	51%	-	-	51%	-	1,804.44	51%	2,724.71	1,804.44	51%	2,724.71
18	532.31	54%	819.76	532.31	54%	819.76	1,804.44	54%	2,778.84	1,804.44	54%	2,778.84
19	-	57%	-	-	57%	-	1,804.44	57%	2,832.98	1,804.44	57%	2,832.98
20	-	60%	-	-	60%	-	1,804.44	60%	2,887.11	1,804.44	60%	2,887.11
21	532.31	63%	867.67	532.31	63%	867.67	1,804.44	63%	2,941.24	1,804.44	63%	2,941.24
22	-	66%	-	-	66%	-	1,804.44	66%	2,995.38	1,804.44	66%	2,995.38
23	-	69%	-	-	69%	-	1,804.44	69%	3,049.51	1,804.44	69%	3,049.51
24	532.31	72%	915.57	532.31	72%	915.57	1,804.44	72%	3,103.64	1,804.44	72%	3,103.64
25	-	75%	-	-	75%	-	1,804.44	75%	3,157.78	1,804.44	75%	3,157.78
26	-	78%	-	-	78%	-	1,804.44	78%	3,211.91	1,804.44	78%	3,211.91
27	532.31	81%	963.48	532.31	81%	963.48	1,804.44	81%	3,266.04	1,804.44	81%	3,266.04
28	-	84%	-	-	84%	-	1,804.44	84%	3,320.18	1,804.44	84%	3,320.18
29	-	87%	-	-	87%	-	1,804.44	87%	3,374.31	1,804.44	87%	3,374.31
30	532.31	90%	1,011.39	532.31	90%	1,011.39	1,804.44	90%	3,428.44	1,804.44	90%	3,428.44
31	-	93%	-	-	93%	-	1,804.44	93%	3,482.58	1,804.44	93%	3,482.58
32	-	96%	-	-	96%	-	1,804.44	96%	3,536.71	1,804.44	96%	3,536.71
33	32,996.50	99%	65,663.04	32,996.50	99%	65,663.04	1,804.44	99%	3,590.84	1,804.44	99%	3,590.84
34	-	102%	-	-	102%	-	1,804.44	102%	3,644.98	1,804.44	102%	3,644.98
35	-	105%	-	-	105%	-	1,804.44	105%	3,699.11	1,804.44	105%	3,699.11
36	532.31	108%	1,107.21	532.31	108%	1,107.21	1,127.78	108%	2,345.78	1,127.78	108%	2,345.78
37	-	111%	-	-	111%	-	1,127.78	111%	2,379.61	1,127.78	111%	2,379.61
38	-	114%	-	-	114%	-	1,127.78	114%	2,413.44	1,127.78	114%	2,413.44
39	532.31	117%	1,155.11	532.31	117%	1,155.11	1,127.78	117%	2,447.28	1,127.78	117%	2,447.28
40	-	120%	-	-	120%	-	1,127.78	120%	2,481.11	1,127.78	120%	2,481.11
41	-	123%	-	-	123%	-	1,127.78	123%	2,514.94	1,127.78	123%	2,514.94
42	532.31	126%	1,203.02	532.31	126%	1,203.02	1,127.78	126%	2,548.78	1,127.78	126%	2,548.78
43	-	129%	-	-	129%	-	1,127.78	129%	2,582.61	1,127.78	129%	2,582.61
44	-	132%	-	-	132%	-	1,127.78	132%	2,616.44	1,127.78	132%	2,616.44
45	80,204.13	135%	188,479.70	532.31	135%	1,250.93	80,799.59	135%	189,879.05	1,127.78	135%	2,650.28
46	-	138%	-	-	138%	-	1,127.78	138%	2,684.11	1,127.78	138%	2,684.11
47	-	141%	-	-	141%	-	1,127.78	141%	2,717.94	1,127.78	141%	2,717.94
48	532.31	144%	1,298.84	532.31	144%	1,298.84	1,127.78	144%	2,751.78	1,127.78	144%	2,751.78
49	-	147%	-	-	147%	-	1,127.78	147%	2,785.61	1,127.78	147%	2,785.61
50	-	150%	-	92,872.45	150%	232,181.12	1,127.78	150%	2,819.44	94,000.23	150%	235,000.56
		NPV	$209,893.50		NPV	$209,324.10		NPV	$152,019.33			$151,449.93
			449,059.63			494,011.98			416,099.86			461,052.22

	Inflated Costs	Net Present Value
Scenario 1	449,059.63	209,893.50
Scenario 2	494,011.98	209,324.10
Scenario 3	416,099.86	152,019.33
Scenario 4	461,052.22	151,449.93

Sewer Main
Per 100 Meters

	Blast - Rehab - PVC					Blast - Replace - PVC					No Blast - Rehab - HDPE					No Blast - Replace - HDPE				
Year	*Breaks*	*Jetting*	*Pipe Replacement*	*Construction*	*Total*	*Breaks*	*Jetting*	*Pipe Replacement*	*Construction*	*Total*	*Breaks*	*Additional Maintenance*	*Heat Trace*	*Pipe Replacement*	*Construction*	*Total*	*Breaks*	*Additional Maintenance*	*Heat Trace*	*Pipe Replacement*	*Construction*	*Total*
0	-	-	-	182,194.65	182,194.65	-	-	-	182,194.65	182,194.65	-	-	-	-	92,872.45	92,872.45	-	-	-	-	92,872.45	92,872.45
1	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
2	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
3	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
4	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
5	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
6	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
7	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
8	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
9	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
10	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
11	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
12	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
13	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
14	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
15	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
16	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
17	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
18	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
19	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
20	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
21	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
22	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
23	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
24	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
25	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
26	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
27	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
28	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
29	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
30	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
31	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
32	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
33	32,464.19	532.31	-	-	32,996.50	32,464.19	532.31	-	-	32,996.50	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
34	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
35	-	-	-	-	-	-	-	-	-	-	-	1,127.78	676.67	-	-	1,804.44	-	1,127.78	676.67	-	-	1,804.44
36	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
37	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
38	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
39	-	532.31	-	-	532.31	-	532.31	-	-	532.31	18,407.58	1,127.78	-	-	-	1,127.78	18,407.58	1,127.78	-	-	-	1,127.78
40	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
41	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
42	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
43	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
44	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
45	-	532.31	79,671.82	-	80,204.13	-	532.31	-	-	532.31	-	1,127.78	-	79,671.82	-	80,799.59	-	1,127.78	-	-	-	1,127.78
46	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
47	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
48	-	532.31	-	-	532.31	-	532.31	-	-	532.31	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
49	-	-	-	-	-	-	-	-	-	-	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	-	-	1,127.78
50	-	-	-	-	-	-	-	92,872.45	-	92,872.45	-	1,127.78	-	-	-	1,127.78	-	1,127.78	-	92,872.45	-	94,000.23

Paved Roads - Summary

	Highest Level			Mid Level			Lowest Level		
Year	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price	Current Year	Inflation Rate	Inflationary Price
0	328,837.00	0%	328,837.00	328,837.00	0%	328,837.00	328,837.00	0%	328,837.00
1	-	3%	-	-	3%	-	-	3%	-
2	16.92	6%	17.93	17.00	6%	18.02	17.00	6%	18.02
3	338.33	9%	368.78	38.22	9%	41.66	38.22	9%	41.66
4	16.92	12%	18.95	57.33	12%	64.21	57.33	12%	64.21
5	33.83	15%	38.91	76.44	15%	87.91	76.44	15%	87.91
6	50.75	18%	59.88	92.00	18%	108.56	92.00	18%	108.56
7	-	21%	-	114.67	21%	138.75	114.67	21%	138.75
8	84.58	24%	104.88	133.78	24%	165.89	133.78	24%	165.89
9	101.50	27%	128.90	152.00	27%	193.04	152.00	27%	193.04
10	958.61	30%	1,246.19	1,220.00	30%	1,586.00	167.22	30%	217.39
11	-	33%	-	109.89	33%	146.15	181.56	33%	241.47
12	78.94	36%	107.36	124.22	36%	168.94	195.89	36%	266.41
13	90.22	39%	125.41	138.56	39%	192.59	210.22	39%	292.21
14	101.50	42%	144.13	152.00	42%	215.84	224.56	42%	318.87
15	112.78	45%	163.53	167.22	45%	242.47	238.89	45%	346.39
16	124.06	48%	183.60	181.56	48%	268.70	253.00	48%	374.44
17	135.33	51%	204.35	195.89	51%	295.79	267.56	51%	404.01
18	146.61	54%	225.78	210.22	54%	323.74	281.89	54%	434.11
19	157.89	57%	247.89	224.56	57%	352.55	291.45	57%	457.57
20	169.17	60%	270.67	238.89	60%	382.22	84,583.00	60%	135,332.80
21	180.44	63%	294.12	253.00	63%	412.39	253.00	63%	412.39
22	191.72	66%	318.26	267.56	66%	444.14	263.00	66%	436.58
23	203.00	69%	343.07	281.89	69%	476.39	273.00	69%	461.37
24	214.28	72%	368.56	269.00	72%	462.68	283.00	72%	486.76
25	225.56	75%	394.72	84,583.00	75%	148,020.25	293.00	75%	512.75
26	236.83	78%	421.56	23.89	78%	42.52	303.00	78%	539.34
27	248.11	81%	449.08	47.78	81%	86.48	313.00	81%	566.53
28	259.39	84%	477.28	71.67	84%	131.87	323.00	84%	594.32
29	270.67	87%	506.15	92.00	87%	172.04	333.00	87%	622.71
30	84,583.00	90%	160,707.70	109.89	90%	208.79	343.00	90%	651.70
31	28.19	93%	54.42	124.22	93%	239.75	353.00	93%	681.29
32	56.39	96%	110.52	138.56	96%	271.57	363.00	96%	711.48
33	366.52	99%	729.38	152.00	99%	302.48	373.00	99%	742.27
34	56.39	102%	113.91	167.22	102%	337.79	383.00	102%	773.66
35	84.58	105%	173.40	1,247.44	105%	2,557.26	393.00	105%	805.65
36	112.78	108%	234.58	133.78	108%	278.26	403.00	108%	838.24
37	129.69	111%	273.66	148.11	111%	312.52	413.00	111%	871.43
38	146.61	114%	313.75	162.45	114%	347.63	423.00	114%	905.22
39	163.53	117%	354.86	176.00	117%	381.92	433.00	117%	939.61
40	1,015.00	120%	2,232.99	191.11	120%	420.45	328,837.00	120%	723,441.40
41	135.33	123%	301.79	205.45	123%	458.14	17.00	123%	37.91
42	157.89	126%	356.83	219.78	126%	496.70	38.22	126%	86.38
43	191.72	129%	439.04	234.11	129%	536.12	57.33	129%	131.29
44	214.28	132%	497.12	248.45	132%	576.39	76.44	132%	177.35
45	236.83	135%	556.56	328,837.00	135%	772,766.95	92.00	135%	216.20
46	259.39	138%	617.35	-	138%	-	114.67	138%	272.91
47	281.94	141%	679.49	17.00	141%	40.97	133.78	141%	322.41
48	304.50	144%	742.98	38.22	144%	93.26	152.00	144%	370.88
49	327.06	147%	807.83	57.33	147%	141.61	167.22	147%	413.04
50	328,837.00	150%	822,092.50	76.44	150%	191.11	181.56	150%	453.89
		NPV	$420,591.90		NPV	$440,760.40		NPV	$464,126.87
			1,328,457.59			1,265,038.50			1,206,817.67

	Inflated Costs	Net Present Value
Option 1	1,328,457.59	$420,591.90
Option 2	1,265,038.50	$440,760.40
Option 3	1,206,817.67	$464,126.87

Paved Road - No Underground Infrastructure
Per 100 Meters

	Highest Level							Mid Level							Lowest Level						
Year	*Activity*	*PCI*	*Pot Hole Allocation*	*Crack Sealing*	*Rehabilitation*	*Replacement*	*Total*	*Activity*	*PCI*	*Pot Hole Allocation*	*Crack Sealing*	*Rehabilitation*	*Replacement*	*Total*	*Activity*	*PCI*	*Pot Hole Allocation*	*Crack Sealing*	*Rehabilitation*	*Replacement*	*Total*
0	Construct					328,837.00	328,837.00	Construct					328,837.00	328,837.00	Construct					328,837.00	328,837.00
1	Defer	100	-				-	Defer	100	-				-	Defer	100	-				-
2	Defer	97	16.92				16.92	Defer	96	17.00				17.00	Defer	96	17.00				17.00
3	Crack Seal	100	-	338.33			338.33	Defer	92	38.22				38.22	Defer	92	38.22				38.22
4	Defer	97	16.92				16.92	Defer	88	57.33				57.33	Defer	88	57.33				57.33
5	Defer	94	33.83				33.83	Defer	84	76.44				76.44	Defer	84	76.44				76.44
6	Defer	91	50.75				50.75	Defer	80	92.00				92.00	Defer	80	92.00				92.00
7	Defer	88	-				-	Defer	76	114.67				114.67	Defer	76	114.67				114.67
8	Defer	85	84.58				84.58	Defer	72	133.78				133.78	Defer	72	133.78				133.78
9	Defer	82	101.50				101.50	Defer	68	152.00				152.00	Defer	68	152.00				152.00
10	Crack Seal	90	56.39	902.22			958.61	Crack Seal	80	92.00	1,128.00			1,220.00	Defer	65	167.22				167.22
11	Defer	88	-				-	Defer	77	109.89				109.89	Defer	62	181.56				181.56
12	Defer	86	78.94				78.94	Defer	74	124.22				124.22	Defer	59	195.89				195.89
13	Defer	84	90.22				90.22	Defer	71	138.56				138.56	Defer	56	210.22				210.22
14	Defer	82	101.50				101.50	Defer	68	152.00				152.00	Defer	53	224.56				224.56
15	Defer	80	112.78				112.78	Defer	65	167.22				167.22	Defer	50	238.89				238.89
16	Defer	78	124.06				124.06	Defer	62	181.56				181.56	Defer	47	253.00				253.00
17	Defer	76	135.33				135.33	Defer	59	195.89				195.89	Defer	44	267.56				267.56
18	Defer	74	146.61				146.61	Defer	56	210.22				210.22	Defer	41	281.89				281.89
19	Defer	72	157.89				157.89	Defer	53	224.56				224.56	Defer	39	291.45				291.45
20	Defer	70	169.17				169.17	Defer	50	238.89				238.89	Overlay	49			84,583.00		84,583.00
21	Defer	68	180.44				180.44	Defer	47	253.00				253.00	Defer	47	253.00				253.00
22	Defer	66	191.72				191.72	Defer	44	267.56				267.56	Defer	45	263.00				263.00
23	Defer	64	203.00				203.00	Defer	41	281.89				281.89	Defer	43	273.00				273.00
24	Defer	62	214.28				214.28	Defer	38	269.00				269.00	Defer	41	283.00				283.00
25	Defer	60	225.56				225.56	Overlay	100	-		84,583.00		84,583.00	Defer	39	293.00				293.00
26	Defer	58	236.83				236.83	Defer	95	23.89				23.89	Defer	37	303.00				303.00
27	Defer	56	248.11				248.11	Defer	90	47.78				47.78	Defer	35	313.00				313.00
28	Defer	54	259.39				259.39	Defer	85	71.67				71.67	Defer	33	323.00				323.00
29	Defer	52	270.67				270.67	Defer	80	92.00				92.00	Defer	31	333.00				333.00
30	Overlay	100	-		84,583.00		84,583.00	Defer	77	109.89				109.89	Defer	29	343.00				343.00
31	Defer	95	28.19				28.19	Defer	74	124.22				124.22	Defer	27	353.00				353.00
32	Defer	90	56.39				56.39	Defer	71	138.56				138.56	Defer	25	363.00				363.00
33	Crack Seal	95	28.19	338.33			366.52	Defer	68	152.00				152.00	Defer	23	373.00				373.00
34	Defer	90	56.39				56.39	Defer	65	167.22				167.22	Defer	21	383.00				383.00
35	Defer	85	84.58				84.58	Crack Seal	75	119.44	1,128.00			1,247.44	Defer	19	393.00				393.00
36	Defer	80	112.78				112.78	Defer	72	133.78				133.78	Defer	17	403.00				403.00
37	Defer	77	129.69				129.69	Defer	69	148.11				148.11	Defer	15	413.00				413.00
38	Defer	74	146.61				146.61	Defer	66	162.45				162.45	Defer	13	423.00				423.00
39	Defer	71	163.53				163.53	Defer	63	176.00				176.00	Defer	11	433.00				433.00
40	Crack Seal	80	112.78	902.22			1,015.00	Defer	60	191.11				191.11	Rebuild					328,837.00	328,837.00
41	Defer	76	135.33				135.33	Defer	57	205.45				205.45	Defer	96	17.00				17.00
42	Defer	72	157.89				157.89	Defer	54	219.78				219.78	Defer	92	38.22				38.22
43	Defer	66	191.72				191.72	Defer	51	234.11				234.11	Defer	88	57.33				57.33
44	Defer	62	214.28				214.28	Defer	48	248.45				248.45	Defer	84	76.44				76.44
45	Defer	58	236.83				236.83	Rebuild					328,837.00	328,837.00	Defer	80	92.00				92.00
46	Defer	54	259.39				259.39	Defer	100	-				-	Defer	76	114.67				114.67
47	Defer	50	281.94				281.94	Defer	96	17.00				17.00	Defer	72	133.78				133.78
48	Defer	46	304.50				304.50	Defer	92	38.22				38.22	Defer	68	152.00				152.00
49	Defer	42	327.06				327.06	Defer	88	57.33				57.33	Defer	65	167.22				167.22
50	Rebuild					328,837.00	328,837.00	Defer	84	76.44				76.44	Defer	62	181.56				181.56

Appendix K - Capital Porject List

Integrated Assets With Risk Greater Than 3.0

Segment	Community	Type	Street Name	Description	Road Length	Water Length	Sewer Length	Sidewalk Length	Replacement Cost
1008	Balmertown	Linear Infrastructure	Lassie Rd	Fifth St to Eric Radford Way	1,108.86	1,204.95	1,064.61	694.78	5,502,744
1039	Balmertown	Linear Infrastructure	Brewis	Campbell Rd to Fifth St	205.78	226.86	209.74	197.05	1,073,959
1004	Balmertown	Linear Infrastructure	Sixth St	Dickenson Rd to Detta Rd	504.61	654.10	215.82	352.14	2,560,794
1014	Balmertown	Linear Infrastructure	Stovel Av	Campbell Rd to Sixth St	335.13	406.96	311.85	-	1,580,907
5040	Red Lake	Linear Infrastructure	Howey St	McDougall St to End	1,397.90	1,558.02	2,123.00	983.99	7,668,619
5001	Red Lake	Linear Infrastructure	Forestry Rd	Hammell Rd to End (including bridge)	2,623.22	1,406.38	449.98	-	6,363,514
5040	Red Lake	Linear Infrastructure	Young St	Hwy 105 to Paisk Cr	1,366.09	1,155.43	1,455.49	170.24	5,096,994
5040	Red Lake	Linear Infrastructure	NA	Centennial Park - Buried Infrastructure	-	383.65	312.68	978.59	1,781,429
NA	Red Lake	WPCP - Process Equipment	NA	Chemical Metering and Storage Building	NA	NA	NA	NA	3,700,450
NA	Red Lake	Linear Infrastructure	NA	Red Lake Forcemain	360.00	NA	1,366.00	NA	4,011,821
NA	Balmertown	Facility	NA	Balmertown Fire Hall	NA	NA	NA	NA	1,318,450
NA	Red Lake	Facility	NA	Public Works Garage	NA	NA	NA	NA	24,062,581
NA	Cochenour	Facility	NA	Arena	NA	NA	NA	NA	15,230,030
NA	Cochenour	Facility	NA	Cochenour Hall	NA	NA	NA	NA	1,217,116
NA	Red Lake	Facility	NA	Maintenance Garage - Red Lake	NA	NA	NA	NA	184,389
NA	Madsen	Facility	NA	Madsen Playground	NA	NA	NA	NA	160,000
NA	Cochenour	Facility	NA	Cochenour Playground	NA	NA	NA	NA	160,000
NA	Balmertown	Facility	NA	Municipal Office	NA	NA	NA	NA	2,874,550
NA	Balmertown	Facility	NA	Library - Balmertown	NA	NA	NA	NA	1,718,878
NA	Red Lake	Facility	NA	Cemetery Garage	NA	NA	NA	NA	166,000
NA	Red Lake	Facility	NA	Red Lake Fire Hall	NA	NA	NA	NA	1,349,756
NA	Cochenour	Facility	NA	Cochenour Fire Hall	NA	NA	NA	NA	561,287
NA	McKenzie Island	Facility	NA	McKenzie Island Fire Hall	NA	NA	NA	NA	667,329
NA	Cochenour	Facility	NA	Boat House	NA	NA	NA	NA	421,200
NA	Cochenour	Facility	NA	Rahill Rest Rooms	NA	NA	NA	NA	160,000
NA	Cochenour	Facility	NA	Sand Shed	NA	NA	NA	NA	97,200
NA	Cochenour	Facility	NA	Electrical Building	NA	NA	NA	NA	176,389
NA	Balmertown	Facility	NA	Transfer Station HHW	NA	NA	NA	NA	120,000
NA	Cochenour	Facility	NA	Rahill Park Playground	NA	NA	NA	NA	160,000
NA	Red Lake	Facility	NA	Young St Playground	NA	NA	NA	NA	160,000
NA	Red Lake	Facility	NA	Community Centre	NA	NA	NA	NA	3,865,235
NA	Cochenour	Facility	NA	Maintenance Garage - Airport	NA	NA	NA	NA	550,300
NA	Cochenour	Facility	NA	Cold Storage	NA	NA	NA	NA	31,100
NA	Red Lake	Facility	NA	Library - Red Lake	NA	NA	NA	NA	2,598,510
NA	Red Lake	Facility	NA	Pharmacy	NA	NA	NA	NA	2,794,788