REPORT

Asset Inventory and Asset Management Investment Plan

URBAN systems
Urban Systems Ltd.
T: 250.374.8311
urbansystems.ca

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1.0 Executive Summary

The Village of Port Clements owns and maintains a portfolio of infrastructure assets upon which it greatly relies for the delivery of services to the community. The assets included in this stage of Port Clements program include; transportation, storm, sanitary and water systems as well as incorporates community buildings and other assets that were previously included in the Village's Tangible Capital Asset (TCA) inventory.

Some of the assets, such as community buildings, date back to the 1910-1920's. These assets, and others, have served the community well; however, many of these assets are now nearing the end of their useful lifespans and will eventually need to be replaced or rehabilitated.

Asset management planning sets out to answer the following questions:

1) *How much are our assets worth?*
2) *How much remaining life do our assets have?*
3) *How much value of our assets is consumed?*
4) *What is our infrastructure deficit?*
5) *How much do we need to invest to sustain our assets?*
6) *When do our assets need to be replaced?*

By understanding the answer to these questions, the Village will be able to budget and plan for the replacement of their infrastructure. Failure to plan would put the community at risk of service disruptions, emergency repairs and the need for sudden and significant tax and user fee increases. By being proactive today, the Village can ensure that services are sustainable so that current and future generations can enjoy the same levels of service as well as reasonable tax rates and user fees.

In summary, the total value of assets included in this study is $68M. On average, these assets have 54% remaining life which means they are more than half way through their life span and approximately 5% of the community's infrastructure has passed its expected life span (a.k.a. infrastructure deficit). In order to ensure these assets can continue to provide service, decision makers must determine the appropriate funding target for asset replacement and be prepared to apply for capital grants as they become available.

What is Asset Management?

The process of bringing together the skills and activities of people; with information about the community's physical infrastructure assets and financial resources to ensure long term sustainable service delivery.

Sound asset management practices support sustainable service delivery by considering community priorities, informed by an understanding of the trade-offs between the available resources, risk and the desired services.

Sustainable service delivery ensures that current community services are delivered in a social, economic, and environmentally responsible manner that does not compromise the ability of future generations to meet their own needs.

Figure 1.1.1- Asset Management Framework

Table 1.1 below summarizes several key infrastructure metrics that can be used to assist the Village with setting long-term funding targets.

Table 1.1 Asset Management Planning Results

Asset Category	Infrastructure Value Distribution	Replacement Value	Expected Remaining Life	Infrastructure Deficit (Backlog)	20 Year Total	Average Annual Life Cycle Investment (AALCI)
Water System	33.3%	$22,647,000	57%	$794,000	$2,234,000	$348,000
Wastewater System	38.3%	$26,025,000	43%	$2,488,000	$8,098,000	$439,000
Stormwater System	6.4%	$4,326,000	41%	$-	$52,000	$70,000
Roadway System	8.6%	$5,866,000	71%	$-	$187,000	$120,000
Buildings	8.9%	$6,080,000	73%	$-	$472,000	$75,000
Parks & Recreation	3.5%	$2,385,000	70%	$4,000	$175,000	$31,000
Vehicles	0.6%	$415,000	33%	$500	$455,000	$20,000
Equipment	0.4%	$250,000	40%	$45,000	$443,000	$21,000
Total Renewal	**100%**	**$67,994,919**	**54%**	**$3,331,500**	**$12,116,000**	**$1,124,000**

*Refer to Terms and Definitions of replacement cost, infrastructure deficit, % remaining life, value consumed, AALCI

Each of the metrics above (% remaining life, consumption, deficit, AALCI) provide key insights into the health of the Village's infrastructure (for more information refer to the terms and definitions). In particular, the AALCI metric can provide guidance to the Village when setting long-term funding targets for asset replacement and pursuing capital grants. Setting appropriate long-term funding targets is critical to the future health of the Village's infrastructure and directly affects the future level of service, risk, and fees paid by community members.

In order to assist the community with setting the long-term funding targets for asset replacement, we have calculated the Average Annual Lifecycle Investment (AALCI) using asset lifecycle values based on Industry Best Practices, the Village's TCA records, Engineering input, and input from the Village's Public Works staff. The AALCI is the savings required every year, over the entire life of an asset, to replace it exactly as it is now. It is conservative and an indicator of the cost of future infrastructure assuming that all future infrastructure will be entirely funded from available savings. The life span of assets and costs can be significantly refined as more detailed information becomes available such as asset condition and performance values and a more detailed breakdown of asset by lifecycle components. The AALCI also does not consider premature asset failure, extended life due to maintenance, or legislative changes that can impact what the current assets will need to be replaced with.

Moving forward, the Village should review their long-term financial plan to determine the future impact to reserves, revenues and debt to meet the presented funding targets. If revenues are not enough to meet the presented funding targets, the Village could consider increasing revenues or be reliant on grant funding in order to undertake capital renewal. If revenue increases are not possible, the Community could consider taking on more risk or reducing the level of service.

TERMS AND DEFINITIONS

ASSET

A physical component of a system that has value, enables services to be provided, and has an economic life of greater than1 year.

REPLACEMENT COST

The cost required to replace all assets in current dollars based on like for like replacement.

INFRASTRUCTURE DEFICIT

Infrastructure deficit is calculated to measure of the current cost of infrastructure that has passed its theoretical service life but still provides service to the community. It is important to note that the infrastructure deficit is significantly impacted by the service life estimates used in the Village's ARF.

% REMAINING LIFE

Remaining life is an estimate of the percentage of life left in an asset before it needs to be theoretically replaced and can be used as a proxy for condition. The remaining life is calculated by taking the number of remaining years before replacement and dividing it by its estimated service life.

ASSET CONSUMPTION

Asset Consumption is a measure of the financial value of the asset that has been consumed to date.

Example:
Asset Value: $10
Service Life: 10 Years
AALCI (Amortization): $1/yr.
Age: 5 Years Old
Asset Consumption: 5 Years old x AALCI ($1) = $5

AVERAGE ANNUAL LIFE CYCLE INVESTMENT (AALCI)

Represents the average amount of money the Village would have to save annually in order to fully fund the replacement of assets when they reach the end of their estimated useful life. The estimated service lifespan used for the Port Clements' ARF is based on service life estimates derived from Industry Best Practice (IBP) documentation, engineering estimates, input from staff and the Village's TCA records. It is important to note that these service life estimates are typically conservative and can lead to unrealistic funding targets. The formula used to calculate the AALCI is:

$$\sum \frac{\text{Replacement Cost}}{\text{Expected Useful Life}}$$

LEVEL OF SERVICE
A measure of the quality, quantity, and reliability of a service from the perspective of residents, businesses, and customers in the community.

REVENUE
The income received from taxes, user fees, government transfers and other sources.

RISK(S)
Events or occurrences that will have an undesired impact on services (Risk = Consequence of Failure x Likelihood of Failure)

CONSEQUENCE OF FAILURE (COF)
A measure of the impact that an asset failure would have relative to other assets. Typically, Consequence of Failure (COF) considers triple bottom line thinking which considers the environmental, social and financial aspects.

LIKELIHOOD OF FAILURE (LOF)
A measure of the probability of an asset failure relative to other assets.

SERVICE LIFE INDUSTRY BEST PRACTICE (IBP)
The length of time an asset will theoretically last before it requires replacement or rehabilitation based on published industry standards.

2.0 What is Asset Management?

Asset management is a continual improvement process which focuses on bringing together the skills and activities of people, combined with information about assets and finances to enable long-term sustainable service delivery. Sustainable service delivery ensures that current community services are delivered in a social, economic, and environmentally responsible manner that does not compromise the ability of future generations to meet their own needs. Sound asset management practices support sustainable service delivery by considering community priorities, informed by an understanding of the trade-offs between the available resources, risk and the desired service levels. In order to help guide communities through their asset management journeys, the Ministry of Community Sport and Health, UBCM and Asset Management BC with consulting help from Urban Systems developed the "Asset Management for Sustainable Service Delivery Framework."

It is important to note, there is no right spot to start on the framework, rather it is up to each community to determine their specific asset management needs and build their program based on their individual priorities.

Figure 2.1 Asset Management for Sustainable Service Delivery, ABC Framework

2.1 Why Is Asset Management Important?

Communities across Canada are currently faced with infrastructure and organizational challenges. Many are realizing that most of their infrastructure was installed decades ago and has continually provided service to the community with little to no service disruption. These assets, which have provided significant value to the community, are now nearing the end of their service life; however, many local governments have not fully planned for their replacement.

With increasing cost pressures and unsustainable funding approaches, communities are beginning to realize they need to change the way they think about managing their assets, recovering revenues, and delivering services. Communities are now embracing the need to integrate asset management principals and thinking into their organization with the following goals in mind:

- Be financially sustainable over the long term.
- Reduce the need to place a large financial burden on future generations.
- Increase the likelihood that user fees and property taxes are stable and consistent and reduce the need to have large 'one-off' increases.
- Increase the likelihood that service levels can be maintained over the long term.

With this understanding, the Village of Port Clements invested in improving their understanding of long-term costs associated with asset replacement through Asset Management Planning.

2.2 Background

The Village of Port Clements strives to be a sustainable and resilient community with the necessary infrastructure to deliver services for its residents. The key to sustainably delivering services lies in how the Village manages its infrastructure. The Village of Port Clements first completed a financial report in 2008 that provided information on its Tangible Capital assets "TCA." The "TCA" exercise was backward looking in that it used historical costs to amortize and depreciate the Village's assets over an estimated lifespan. Although this exercise was helpful, the Village understands the need to move towards more of a forward-looking approach, which will focus on setting long term funding targets based on replacement costs rather than historical costs. The Village pursued and successfully received funding though both Union of BC Municipalities (UBCM) and the Federation of Canadian Municipalities (FCM) to develop the first Asset Management Inventory and Asset Management Investment Plan for the Village of Port Clements.

The following sections summarize the approach used to develop this plan.

Step 1: Establish Inventory

The inventory is the foundation of the Asset Management Plan in that it represents the information that directly informs the outputs of the Asset Replacement Forecast (ARF). Prior to the asset inventory work, most knowledge of the infrastructure assets was in the Public Works Superintendent's knowledge and ad-hoc records. Existing Village staff have not worked for the Village for long and expressed the significant time and effort spend looking for records when responding to operational issues. Staff expressed the need to compile an inventory of asset and associated mapping to support several initiatives.

To establish the asset inventory, available and relevant digital and paper records were used to prepare a comprehensive inventory of the water, sewer, drainage, road corridor assets and community buildings assets. Asset that are tied to a specific location were compiled in a Geographic Information System (GIS) database in ESRI ArcGIS (.gdb) format. Infrastructure assets were georeferenced to the latest parcel base available from the Province (ParcelMapBC). Non-location-based assets were compiled in the excel-based ARF spreadsheet. Primary sources of information included; available digital and scanned paper records drawings, survey and GPS records and VPC staff knowledge. For road assets, a high-resolution video camera was used to record the current state of the road surface and provide a future reference for the asset inventory compilation team. All records including the GIS information were provided to the Village for internal use and reference. Below are clipped section of the GIS-based water and wastewater system maps for reference.

Figure 2.2.2 Water Systems Map and Fire Hydrant Photo by Community Hall

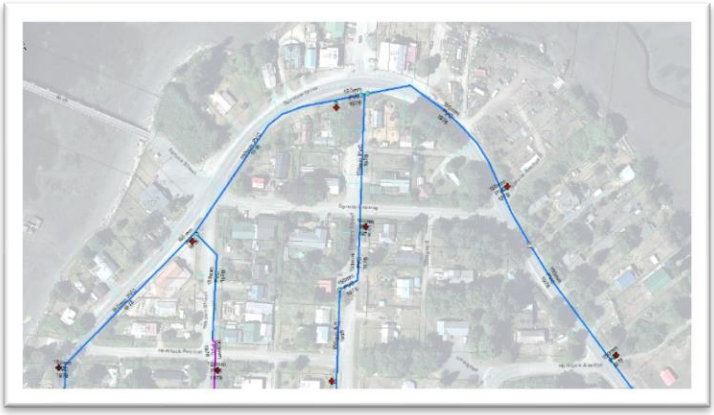


Figure 2.2.23 Wastewater System Map and Jasper Avenue Sewer Liftstation Photo

The resulting information will be useful to support both operations as well as Administration, Finance and Council. The gathered information is the property of the Village of Port Clements and has been provided to the Village for their use.

A summary of the sources of information used to develop the asset inventory can be found in **Appendix A**

It is encouraged that the asset inventory is kept up-to-date as existing assets are renewed or replaced, and as new assets are added. In addition, as more detailed information (such as asset condition, appraisal values, etc.) becomes available, the asset inventory and the ARF should be updated to reflect those changes.

Step 2: Update Replacement Costs

The 2019 replacement costs were developed using a combination of recent tender prices provided by the Village of Masset, input from Adventure Paving, Engineering and Village staff input and TCA historic cost values that were indexed forward using the Engineering News Record (ENR) price index.

A summary of the replacement costs sources is provided in **Appendix B**

Step 3: Service Lives

Service life estimates were assigned based on industry best practices, Engineering and Village staff input and TCA useful life estimates. These service lives could be conservative as they are based on age and not based on known

condition, as this information was not available at the time of this report. Over time, it is important to refine the industry best practice service life estimates based on condition and local understanding of assets.

A summary of Service Lives sources can be found in **Appendix C**

Step 4: Develop Asset Replacement Forecast (ARF)

The last step of this process was to integrate the inventory, replacement costs and the service lives into the Asset Replacement Forecast (ARF) model. The results and findings from the model are detailed below in Section 3.0.

3.0 Asset Management Plan

The Asset Management Plan is informed by values calculated in the asset replacement forecast (ARF) that can be used to inform long-term funding decisions for each of the major asset categories. The ARF is developed based on "like for like" replacement and does not consider any demand for new infrastructure or specific service level improvements. Adequate asset replacement funding will ensure services can be reliably provided into the future.

The ARF is designed to answer the following best practice asset management questions:

1) *How much are our assets worth?*
2) *How much remaining life do our assets have?*
3) *How much value of our assets is consumed?*
4) *What is our infrastructure deficit?*
5) *How much do we need to invest to sustain our assets?*

An Asset Management Plan can:	» Build awareness with staff, Council and the Village on the magnitude and timing of potential infrastructure investments; » Identify revenue requirements over the long-term; » Assist with setting rates and taxes and; » Inform the urgency of investments.
Asset Management Plan is not:	» A capital plan that sets out specific projects for the community to undertake; » An infrastructure cost tool that can be used for construction tenders and provides accurate project costing; or » A complete asset management program which is an on-going initiative used to help inform decisions.

Each of the best practice asset management questions are further explained in the following sections.

3.1 How much are our assets worth?

Understanding the replacement value of the Village's assets provides the organization with a deeper understanding of the magnitude of infrastructure that it is responsible for managing and replacing. These cost figures directly affect the AALCI and are a driver for future revenue requirements. Asset replacement costs are in current dollars, are based on "like for like" replacement and do not consider new infrastructure required to satisfy regulatory requirements, growth/ expansion, safety improvements, or economic development. The costs also do not consider the effect of maintenance practices on the theoretical life of an asset.

3.2 How much remaining life do our assets have?

Remaining life provides an estimate of the amount of life left in an asset before it needs to be theoretically replaced. The remaining life is calculated by taking the number of remaining years before replacement and dividing it by its estimated service life.

> ***Example:***
> *# of Remaining years before replacement: 40 years*
> *Estimated Service Life: 100 Years*
> *% Remaining life: 40/100 = 40% (approx. over half way through the assets life)*

Asset remaining life is one indicator that can be used to understand the condition of an asset and can be used to inform replacement and inspection programs. Remaining useful life should not be the only trigger condition for capital works as it is an indicator that the asset may require renewal.

3.3 What is our current infrastructure deficit?

The infrastructure deficit is a measure of the infrastructure value that has passed its estimated service life but still provides a service to the community. The infrastructure deficit can be presented as a dollar value or as a percentage of the total infrastructure value.

> ***Example:***
> *Infrastructure Deficit (Expressed as a dollar value): $10*
> *Infrastructure Deficit (expressed as a % of total value) = Infrastructure Deficit ($10) / Replacement Cost ($50) = 20%*

It's important to note that an infrastructure deficit, to a certain point, is healthy, as it provides insights that assets are lasting longer than estimated. This could be resulting from good maintenance practices or provide insights that the estimated service lives were too conservative. It is recommended that assets within a deficit get inspected to determine if replacement is required or if the service life can be further extended.

3.4 How much do we need to invest to sustain our assets?

Estimating and setting long-term funding targets for asset replacement is critical to the future health of the Village's infrastructure and directly affects the future level of service, risk and fees paid by residents. In order to assist the Village with setting the long-term funding targets for asset replacement the AALCI was calculated; the AALCI is briefly described below:

- **AALCI:** represents the Average Annual Life Cycle Investment required to replace assets based on Industry Best Practice as well as Engineering and Village staff input for service life estimates. Taking this approach is conservative and can lead to unrealistic funding targets.

Moving forward, the Village should consider the funding targets in their financial modeling exercises to determine the future impact to reserves, revenues and debt. If revenues are not enough to meet the presented funding targets, the Community could consider increasing revenues or seek grants to fund asset renewal. If revenue increases are not possible, the Community could consider taking on more risk or reducing the level of service.

3.5 When do our assets need to be replaced?

Understanding the general timing (i.e. replacement schedule) of when assets need to be replaced is important when financially preparing for the future. The replacement schedule provides insight into the magnitude of investment required in the short, medium and long term which can inform the urgency of investment. It's important to note that

the replacement schedule is not a capital plan but rather shows the general timing of individual assets. It is recommended that the Village perform condition assessments to confirm the need to replace the assets, group individual asset replacements into projects and align the capital projects with those of neighboring communities to take advantage of savings of mobilization of contractors.

4.0 The Results

The inventory, replacement costs and service life data were directly input into the ARF spreadsheet model to answer the following 5 main questions.

- How much are our assets worth?
- How much remaining life do our assets have?
- What is our infrastructure deficit?
- How much do we need to invest to sustain our assets?
- When do our assets need to be replaced?

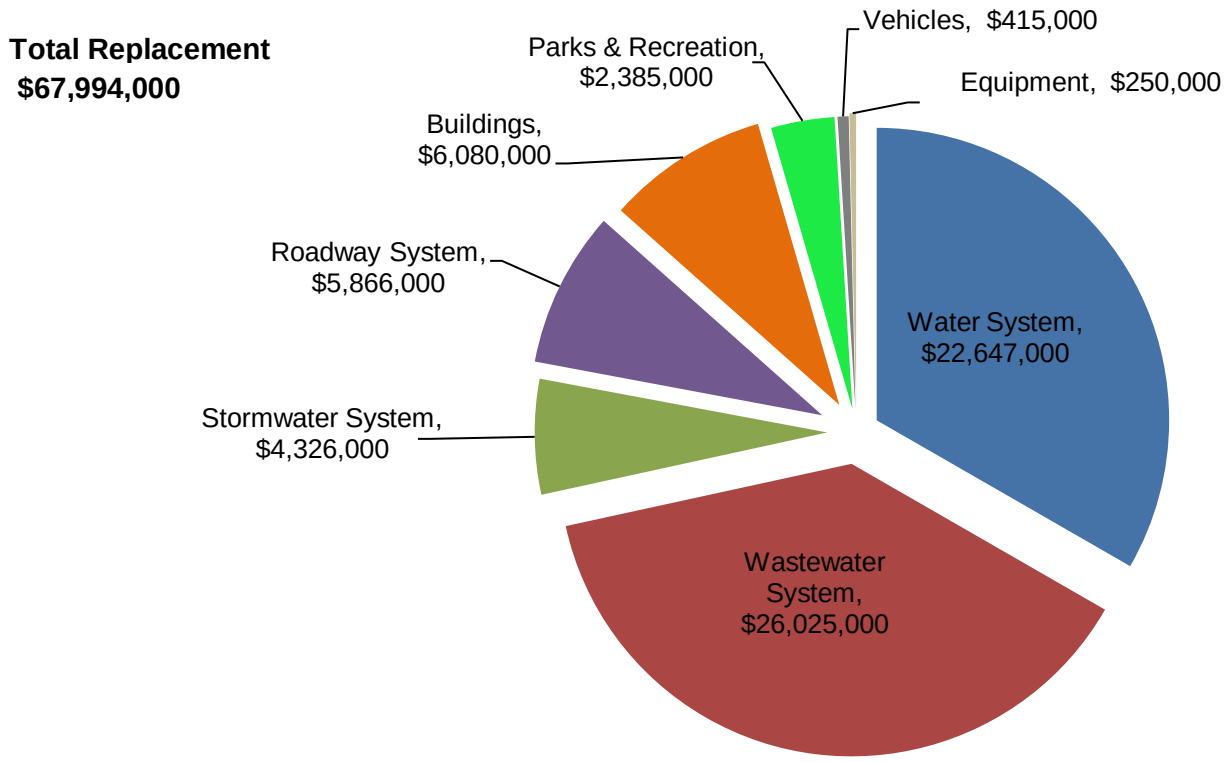


Figure 4.1 How much are the Village's assets worth?

Observations:

- *Roadway system, wastewater and water assets total replacement cost is approximately: $60M*
- *Water and Wastewater assets make up 72% of the replacement value*
- *Parks and Recreation carry have the lowest replacement value of the Village's portfolio*

Table 4.1 Asset Replacement Forecast Summary Table

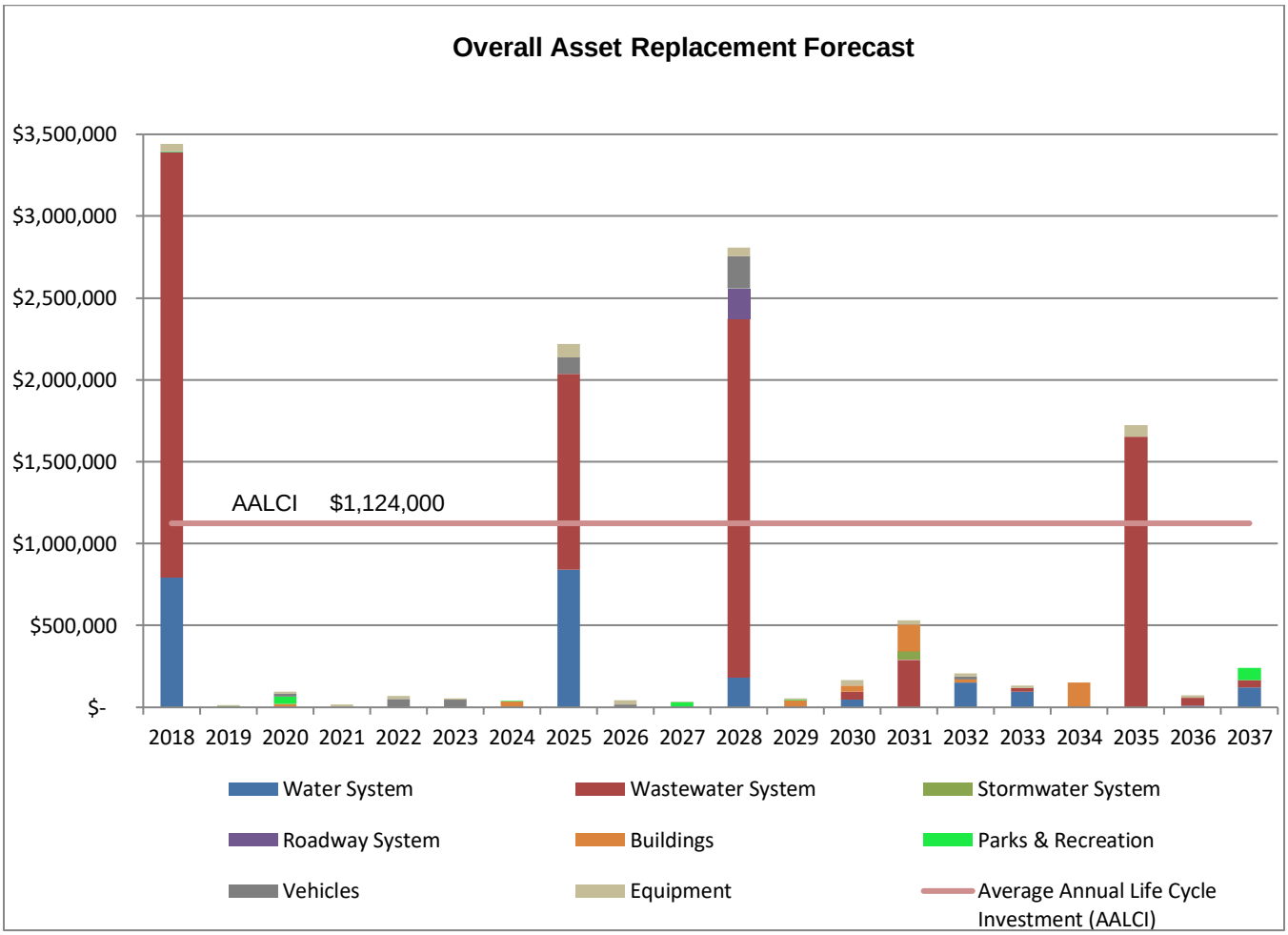
Asset Category	Infrastructure Value Distribution	Replacement Value	Expected Remaining Life	Infrastructure Deficit (Backlog)	20 Year Total	Average Annual Life Cycle Investment (AALCI)
Water System	33.3%	$22,647,000	57%	$794,000	$2,234,000	$348,000
Wastewater System	38.3%	$26,025,000	43%	$2,488,000	$8,098,000	$439,000
Stormwater System	6.4%	$4,326,000	41%	$-	$52,000	$70,000
Roadway System	8.6%	$5,866,000	71%	$-	$187,000	$120,000
Buildings	8.9%	$6,080,000	73%	$-	$472,000	$75,000
Parks & Recreation	3.5%	$2,385,000	70%	$4,000	$175,000	$31,000
Vehicles	0.6%	$415,000	33%	$500	$455,000	$20,000
Equipment	0.4%	$250,000	40%	$45,000	$443,000	$21,000
Total Renewal	**100%**	**$67,994,000**	**54%**	**$3,332,000**	**$12,116,000**	**$1,124,000**

AALCI Note: Does not consider the Village's willingness to pay, decreases to level of service & financing ability (debt, reserves, grants etc.). These considerations can be reviewed in more detail as part of a subsequent phase of the Village's asset management planning.

Observations:

- *Asset categories on average have 54% remaining life which means the Village's asset are almost half way through their estimated service life*
- *The water, wastewater and drainage assets make up 80% of the Village's assets and they are approximately 50% through their anticipated useful life*
- *Port Clements roadway assets have the largest remaining life (71%) whereas wastewater and drainage asset are just under half (43% wastewater and 41% drainage) of their anticipated useful life remaining*
- *We are aware that the Village has engaged an Engineer (Paul Turge) to investigate the current wastewater treatment facility. Once this information is available, it can be easily incorporated in to ARF and used to update this report*
- *On average, 4.9% of the assets included in this assessment are past their expected service life (i.e. within a deficit)*
- *The water system has the largest deficit (3.5%) The deficit levels shown similar forecasts in other BC communities*
- *Condition inspections should be focused on assets that are within a deficit*
- *Water, Wastewater and Road assets have the largest AALCI whereas storm and parks and recreation have the smallest AALCI.*
- *Like most communities in BC, we understand there is a funding gap between the current infrastructure investment levels and what is required to sustain the assets over the long term*

Figure 4.Overall Asset Replacement Forecast



The above chart is a snapshot of what is generated in the ARF spreadsheet model. The ARF spreadsheet tool has been provided to the Village and Village staff have received instruction on how to upkeep and update the ARF model.

The chart illustrates each of the Village's asset categories and highlights the current infrastructure backlog shown in the 2018 column on the left side of the chart. It is important to note that the backlog is not an indication of asset failure and there is no expectation that the current backlog will be addressed in the next couple of years using existing budget constraints. It is however an indication of further investigation that should occur to refine the ARF and systematically incorporate these projects into the Village's capital plan.

Observations:

- *Significant investment into water and sanitary assets will be required over the next 20 years.*
- *Water assets appear to have the highest short term need for investment (5-year horizon)*
- *Road renewal will likely be done as water and wastewater replacements occur or as paving contractors are on Haida Gwaii. It is recommended that Village align their capital works with the neighboring communities to save on mobilization costs.*
- *Before any asset replacements are scheduled, it is recommended that the Village perform a condition assessment to confirm the need to the replace the asset*

5.0 Working Session with Key Village Staff and Council

A working session with staff is scheduled for mid-April followed by a presentation and working session with Village Council.

The working session with staff includes an overview of the approach used for preparing the asset inventory as well as a working session with the Asset Replacement Forecast spreadsheet model. The ARF session with key staff will include an overview of the approached used for cost estimating the replacement values and how to update the ARF spreadsheet model.

The presentation and working session with Council will occur the following day to provide an overview of the Asset Management Plan, the inventory of the Village's assets and the results from the ARF.

6.0 Conclusion

In summary, the total replacement cost of assets included in this study is $68 million in infrastructure. On average, the assets have 54% remaining life which means they are almost halfway through their life span and approximately 5% of the infrastructure in this assessment has passed its expected life span (a.k.a. infrastructure deficit). In order to ensure these assets can continue to provide service, decision makers must determine what level of investment is appropriate for the Village.

The below table summarizes several key infrastructure indicators that can be used to assist the community with setting long-term funding targets.

Table 6.1 ARF Summary

Asset Category	Infrastructure Value Distribution	Replacement Value	Expected Remaining Life	Infrastructure Deficit (Backlog)	20 Year Total	Average Annual Life Cycle Investment (AALCI)
Water System	33.3%	$22,647,000	57%	$794,000	$2,234,000	$348,000
Wastewater System	38.3%	$26,025,000	43%	$2,488,000	$8,098,000	$439,000
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Total Renewal	**100%**	**$67,994,000**	**54%**	**$3,332,000**	**$12,116,000**	**$1,124,000**

*Refer to Terms and Definitions of replacement cost, infrastructure deficit, % remaining life, value consumed, AALCI

Recommendations and Next Steps

Based on the results of the ARF and the process outlined in the Asset Management for Sustainable Service Delivery, A BC Framework, we've outlined possible next steps and priorities for consideration in order to continue to improve the Village's asset management Program. The steps outlined below are organized deliberately in order to promote successful implementation:

1. Implement a GIS viewer so staff can directly interact with the compiled asset inventory and mapping
2. Incorporate the findings from the wastewater study work by Paul Turge to better reflect the wastewater treatment facility and anticipated replacement cost
3. Seek capital funding to replace the wastewater treatment facility, water well and AC watermain
4. Further refine the ARF for building, wharf, fleet and park assets to incorporate the condition of these assets and useful remain life of their components. These results can be incorporate into the ARF document to paint the picture of the overall health of the Village's assets
5. Have a building inspector assess the Village's buildings to inform the useful life of these assets
6. Undertake a review of the Village's funding levels and tax rates and compare to the finding from the ARF against the Village's financing to replace assets at a sustainable rate
7. Conduct a condition assessment of the wastewater and drainage networks to refine industry best practice service lives based on readily available condition information and operator knowledge
8. Undertake a risk assessment and criticality review of the water and wastewater systems to inform the priority of capital renewal

APPENDIX A

Asset Inventory

The below table summarizes the sources of information where the asset inventory was exported from for the development of the ARF. For a detailed list of the asset inventory, please refer to the ARF excel model.

Table A.1 Asset Inventory Source Summary

Asset Category	
Transportation	A location based Geographic Information System (GIS) in ArcGIS (.gdb) was developed. This included spatial location of each asset and attaching attributes such as road width, length and material. Road condition valves were determined from a visual assessment from high resolution video taken during the summary of 2018, Video and GIS files have been provided to the Village.
Storm	A location based Geographic Information System (GIS) in ArcGIS (.gdb) was developed. This included spatial location of each asset and attaching attributes such as year of installation, diameter, material. Replacement cost and service life values were added into the ARF for these assets.
Sanitary	A location based Geographic Information System (GIS) in ArcGIS (.gdb) was developed. This included spatial location of each asset and attaching attributes such as year of installation, diameter, material. Replacement cost and service life values were added into the ARF for these assets. For non-linear assets such as facilities the inventory was compiled in excel using operator knowledge and the TCA values provided by the Village.
Water	A location based Geographic Information System (GIS) in ArcGIS (.gdb) was developed. This included spatial location of each asset and attaching attributes such as year of installation, diameter, material. Replacement cost and service life values were added into the ARF for these assets. For non-linear assets such as facilities the inventory was compiled in excel using operator knowledge and the TCA values provided by the Village.
Parks and Recreation	Park and Recreation assets such as facilities the inventory was compiled in excel using TCA values provided by the Village. Replacement cost and service life values were added into the ARF for these assets.
Buildings and Structures	Building and Structure assets such as facilities the inventory was compiled in excel using TCA values provided by the Village. Replacement cost and service life values were added into the ARF for these assets.
Fleet and Equipment	Fleet and Equipment assets were compiled in excel using TCA values provided by the Village. Replacement cost and service life values were added into the ARF for these assets.

APPENDIX B

Replacement Costs

Replacement cost estimates were developed for each asset using the following sources of information:

Table B.1 Replacement Cost Source Summary

Asset	Source
Transportation System	Replacement cost estimates were developed based tender documents from the region, Adventure Paving and Village staff input and the Village's TCA records provided to Urban Systems
Storm System	
Sanitary System	
Water System	
Parks and Recreation	Village's TCA records
Buildings and Structures	Village's TCA records
Fleet and Equipment	Village's TCA records

Please refer to the ARF excel model for details on unit replacement costs by asset

The following inflation cost factors were applied to each of the unit cost estimates to account for engineering, mobilization/demobilization, bonding and insurance and contingency and asset disposal as shown in Table B.2 below.

Table B.2 Mobilization and Contingency Allowances

Description	Water	Sanitary	Storm	Roads
Engineering	20%	20%	20%	20%
Mobilization/Demobilization, Bonding and Insurance	15%	15%	15%	15%
Contingency	20%	20%	20%	20%
Total	**55%**	**55%**	**55%**	**55%**

APPENDIX C

Service Life

Service life estimates were assigned based on industry best practice documents, Engineering and Village staff input as well as the Village's TCA reporting document as shown table C.1 below.

Table C.1 Service Life Sources

Asset	Source
Transportation System	"Guide to the Amortization of Tangible Captial Assets" produced by the Local Government Infrastructure and Finance Division, Engineering and Village staff input as well as the Village's TCA report
Storm System	
Sanitary System	
Water System	
Parks and Recreation	Village's TCA records
Buildings and Structures	Village's TCA records
Fleet and Equipment	Village's TCA records

Please refer to the ARF excel model for a detailed list of service lives by asset. Below are example service life lookup value tables from the ARF for reference. Each asset category has service life estimate look up values like the ones shown here.

Code	Material	Service Life	TCA Useful Life
AC	Asbestos Cement[2]	60	50
CI	Cast Iron[2]	60	50
CONC	Concrete	80	50
DI	Ductile Iron	60	50
HDPE	High Density Polyethylene	80	70
PVC	PVC	80	70
ST	Steel	60	70
UNK	Unknown	60	50

Code	Service Life	TCA Useful Life
Hydrants	75	50
Valve	25	25
Meter Chamber	10	10
Air Release Valve	25	25
Blowoff Valve	25	25
Well	30	30