prepared for
The Village of Anmore

ASSET MANAGEMENT INVESTMENT PLAN

July 2017

URBAN systems

TERMS AND DEFINITIONS

The following commonly used terms are defined as they relate to the Asset Management Investment Plan (AMIP).

ASSET

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

ASSET CONDITION

Asset remaining life is one indicator that can be used as a proxy for condition when the physical condition of the asset is not known. The remaining life of an asset is calculated using the following formula:

Asset Remaining Life = Asset Remaining Value/Asset Replacement Value

The remaining life is then grouped into a condition rating system using the following criteria:

Remaining Life	Condition Group
<0	Very Poor
0-25	Poor
25-50	Average
50-75	Good
75-100	Very Good

LEVEL OF SERVICE

A measure of the quality, quantity, and/or reliability of a service from the perspective of residents, businesses, and customers in the community.

REPLACEMENT COST

The investment required (in today's dollars) to replace an asset and ensure it provides the same function as it did before.

Note: The replacement costs used in this report should not be used for capital planning and should only be used for high-level, long-term financial planning.

REVENUE

The income received by the City from taxes, user fees, government transfers and other sources. Own-source revenue refers to income received from taxation, user fees, and any interest income.

RISK(S)

Events or occurrences that will have an undesired impact on services (Risk = Impact x Likelihood).

SERVICE LIFE (SL)

The length of time an asset will theoretically last before it requires replacement or rehabilitation.

SERVICE LIFE SCENARIOS

Three service life scenarios analyzed within the AMIP include:

- Scenario 1: Standard Asset Service Life
- Scenario 2: Service Life Increased by 25%
- Scenario 3: Service Life Increased by 50%

Note: Infrastructure investment refers to investing funds to renew existing infrastructure (capital expenditure) or saving funds in a protected reserve for future asset renewal.

Investment Level Indicators

ANNUAL AVERAGE LIFE CYCLE INVESTMENT (AALCI)

The Average Annual Life Cycle Investment (AALCI) is defined as the summation of each asset's annual depreciation. It represents the annual investment needed to sustain existing infrastructure over its service life (over the next 20 years and beyond).

Note: AALCI must be considered in conjunction with infrastructure deficit as this is a forward-looking parameter that does not consider the past.

20 YEAR AVERAGE ANNUAL INVESTMENT (20 YEAR AAI)

The 20 Year Average Annual Investment (20 Year AAI) is defined as the summation of expenditures over a 20 year planning horizon divided by 20. It represents the annual investment needed to pay for expected infrastructure replacements over the next 20 years (within the 20 year horizon).

INFRASTRUCTURE DEFICIT

Infrastructure Deficit is a measure of the amount of infrastructure that has passed its theoretical service life but still provides service to the community. This infrastructure should be inspected to determine if replacement is necessary or if replacement timing can be adjusted.

Note: The presented indicators do not take into account level of service, risk, future capital needs, or willingness to take on risk. Over time, as the community gathers more information and further develops their asset management system, these investment figures should be further refined and adjusted.

ASSET MANAGEMENT INVESTMENT PLAN

The Asset Management Investment Plan (AMIP) is an asset renewal forecast that can be used to inform long-term funding decisions. Adequate funding of asset renewal will ensure services can be reliably provided into the future. The AMIP is designed to answer the following questions:

1) What assets do we own?
2) How much are our assets worth?
3) What condition are our assets in?
4) When will our assets pass their service life?
5) How much do we need to invest in our assets?

Through answering these questions, the community can begin to:

- build awareness with staff, Council and the community on the magnitude and timing of potential infrastructure investments;
- understand revenue requirements over the long term; and
- understand the urgency of investments.

It is important to clarify that the AMIP 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 predict exact replacement costs; or
- a complete asset management program.

The AMIP is just one component of a larger framework that should be considered in developing an effective asset management program.

Figure1: Asset Management for Sustainable Service Delivery, A BC Framework

Asset management is a continual improvement process which focuses on bringing together the skills and activities of people in combination with information about assets and finances to enable long-term sustainable service delivery. 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.

CANADIAN'S INFRASTRUCTURE CHALLENGE

Communities across Canada are currently faced with infrastructural and organizational challenges. Many are realizing that the majority 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 useful life; however, many local governments have not fully planned for their replacement

FCM recently completed a study that concluded that estimates Canada's infrastructure deficit to be 123 billion and growing. A recent study by BCWWA, titled "Are our water systems at risk?" found that the majority of BC water and sewer systems are not recovering the full cost of service delivery through user fees.

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 goal to:

- 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; and
- increase the likelihood that service levels can be maintained over the long term

With this understanding, the Village of Anmore has invested in developing an Asset Management Investment Plan (AMIP) as the first step in better understanding their own unique infrastructure challenges.

ASSET QUESTIONS

1 What assets do we own?

Taking stock of assets within a community is foundational to the development of an AMIP. The first step in building an inventory is gathering all available data, then collecting important attributes for each asset such as: quantity, diameter, year of installation, material, etc.

The value of this inventory extends well beyond this project as this database can now be used as the central source of asset information moving forward.

The methodology used to compile this inventory is detailed in Appendix A.

2 How much are our assets worth?

Calculating the replacement cost of a community'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 asset reinvestment level and are a driver for future revenue requirements. Replacement costs presented in this report represents the magnitude of investment required to replace all assets as they exist today. The asset replacement costs do not account for new investment required to satisfy; regulatory requirements, growth/ expansion, safety improvements, or economic development.

The assumptions and methodologies used to develop replacement cost figures are detailed in Appendix C & E.

3 What is the condition of our asset?

Remaining life of an asset is one indicator that can be used to understand the theoretical condition of an asset. The condition of the asset can then inform asset reinvestment and inspection programs.

Since the actual physical condition of the asset is not known, the age of the asset is used to estimate its condition (refer to Terms and Definitions)

4 When do our assets need to be replaced?

Accurately predicting when infrastructure will need to be replaced is difficult, if not impossible, to do. The service life (how long an asset will last) is a highly uncertain parameter that is affected by many factors such as material, environment, and construction techniques. Nonetheless, mapping replacement timing is valuable in helping communities begin planning for future expenditures. For example, the investment cost forecast may show a significant expenditure in 2025, representing a large number of watermains that are predicted to need replacing. While it is unlikely that all of these watermains would need to be replaced at the same time, replacement timing estimates provide an indication that a large investment might occur and that further investigation is required to confirm the urgency of these investments.

The asset service lives can be found in Appendix D.

5 How much do we need to invest in our assets?

Predicting the right investment level needed for infrastructure renewal requires significant thought and discussion amongst stakeholders. To better understand a community's initial long-term investment needs, three indicators have been calculated.

Investment Level Indicators:

1) Average Annual Life Cycle Investment (AALCI)
2) 20 Year Average Annual Investment (20 Year AAI)
3) Infrastructure deficit

(refer to Terms and Definitions)

Each of these indicators are calculated using replacement costs (Appendix C) and service life estimates (Appendix D). Accurately predicting when infrastructure will need to be replaced is very difficult to do. For this reason, lifespan estimates are generally based on rule of thumb values. Most rule of the thumb lifespans applied by engineers are conservative (on the safe side). In practice, many assets could last much longer (25% longer or possibly more) than these estimates. For these reasons, we have developed three service life scenarios (refer to terms and definitions) which will help highlight how investments level would change depending on the various lifespan assumptions.

Each of these questions (1 to 5) is graphically presented in the body of this report.

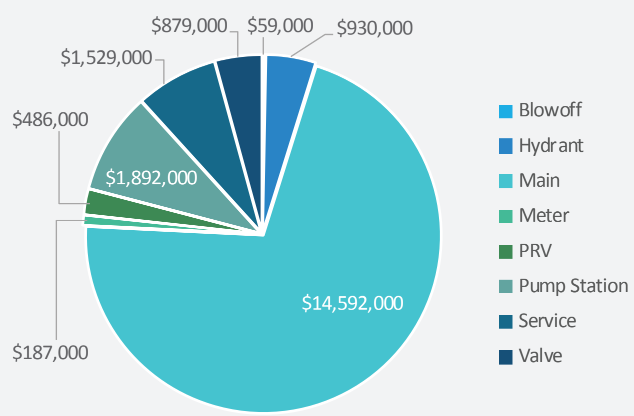
WATER SYSTEMS

What assets do we own?

Watermain	Pumping Station	Valves	Hydrants
23 km	3	250	150

How much are our assets worth?

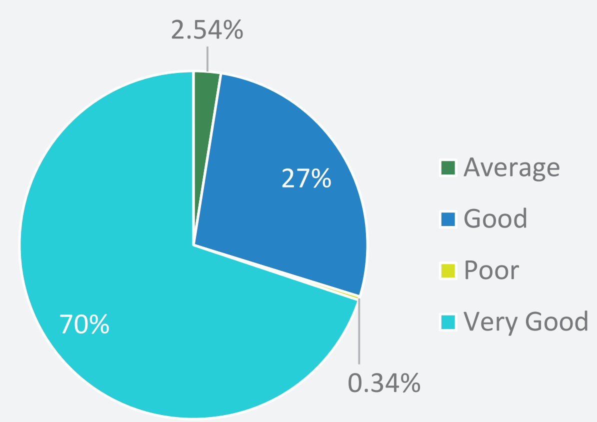
Total infrastructure value: $20.6M



Comments

- 80% of infrastructure is made up of the watermains and pump stations

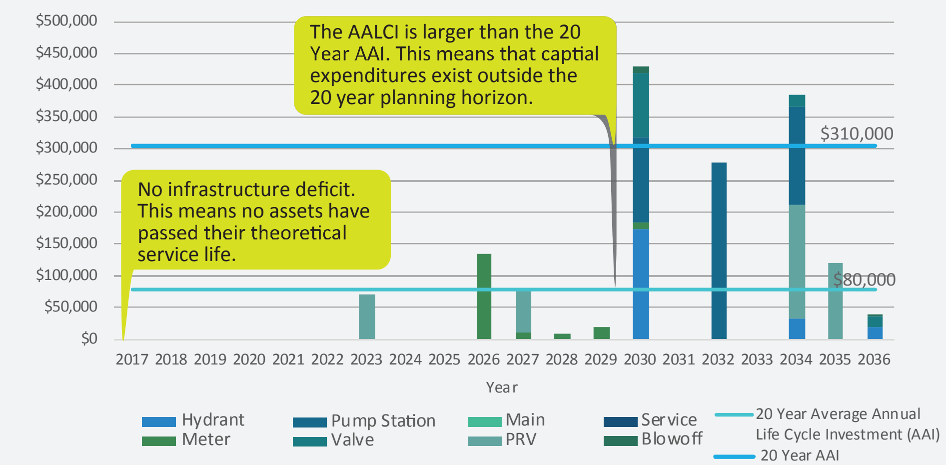
What condition are our assets in?



Comments

- Physical condition of the asset is not known, the age of the asset is used to estimate it condition (refer to terms and definitions)
- Majority of assets are in very good condition (predominately installed in 1996)

When do our assets need to be replaced?



Comments

- Confirm the need to replace assets shown in the graph above through performing visual condition assessments

Note: The graph above is based on service life scenario 1

How much do we need to invest in our assets?

Average Annual Life Cycle Investment (AALCI)

Asset Category	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Blowoff	$1,500	$1,200	$980
Hydrant	$24,000	$19,000	$16,000
Main	$147,000	$117,000	$98,000
Meter	$13,000	$10,000	$8,400
PRV	$20,000	$16,000	$13,000
Pump Station	$62,000	$49,000	$41,000
Service	$20,000	$16,000	$13,000
Valve	$22,000	$18,000	$15,000
Total	**$310,000**	**$246,000**	**$205,000**

Comments

- AACLI can be reduced from $310,000 to 205,000 (33%) if service life is increased by 50%
- Watermains and pump stations represent majority of the AALCI (70% in scenario 1)

20 Year Average Annual Investment (20 Year AAI)

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Blowoff	$640	$0	$0
Hydrant	$12,000	$0	$0
Main	$0	$0	$0
Meter	$9,400	$0	$0
PRV	$22,000	$0	$0
Pump Station	$29,000	$6,800	$0
Service	$0	$0	$0
Valve	$6,800	$0	$0
Total	**$80,000**	**$7,000**	**$0**

Comments

- 20 Year AAI can be reduced from $80,000 to $0 (100%) if service life is increase by 50%. This does not mean the investments disappears but instead they are pushed outside the 20 year planning horizon.
- PRV and Pump Stations represent majority of the 20 Year AAI (65% in Scenario 1). This means majority of the community's investments over the next 20 years could be expected in these assets.

Infrastructure Deficit

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Blowoff	$0	$0	$0
Hydrant	$0	$0	$0
Main	$0	$0	$0
Meter	$0	$0	$0
PRV	$0	$0	$0
Pump Station	$0	$0	$0
Service	$0	$0	$0
Valve	$0	$0	$0
Total	**$0**	**$0**	**$0**

Comments

- The Village currently has no infrastructure deficit which means no assets have passed their theoretical service life. This is mostly driven by the fact that the community is relatively new and majority of the assets are long lived (>50 years).

Level 1 Summary | Water Systems

Asset Category	Replacement Value	Remaining Value	Infrastructure Deficit	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Blowoff	$59,000	$37,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hydrant	$930,000	$583,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Main	$14,592,000	$12,307,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Meter	$187,000	$121,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$135,600
PRV	$486,000	$291,000	$0	$0	$0	$0	$0	$0	$0	$71,000	$0	$0	$0
Pump Station	$1,892,000	$1,588,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Service	$1,529,000	$1,210,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Valve	$879,000	$577,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$20,554,000**	**$16,714,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$71,000**	**$0**	**$0**	**$136,000**

Asset Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total – 20 Years	20 Year AAI	AALCI
Blowoff	$0	$0	$0	$11,000	$0	$0	$0	$0	$0	$1,900	$13,000	$640	$1,500
Hydrant	$0	$0	$0	$173,000	$0	$0	$0	$34,000	$0	$20,000	$226,000	$12,000	$24,000
Main	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$147,000
Meter	$12,000	$9,200	$20,000	$12,000	$0	$0	$0	$0	$0	$0	$187,000	$9,400	$13,000
PRV	$69,000	$0	$0	$0	$0	$0	$0	$179,000	$121,000	$0	$438,000	$22,000	$20,000
Pump Station	$0	$0	$0	$135,000	$0	$278,000	$0	$156,000	$0	$0	$568,000	$29,000	$62,000
Service	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$20,000
Valve	$0	$0	$0	$101,000	$0	$0	$0	$18,000	$0	$16,000	$135,000	$6,800	$22,000
Total	**$81,000**	**$9,200**	**$20,000**	**$432,000**	**$0**	**$278,000**	**$0**	**$387,000**	**$121,000**	**$38,000**	**$1,567,000**	**$80,000**	**$310,000**

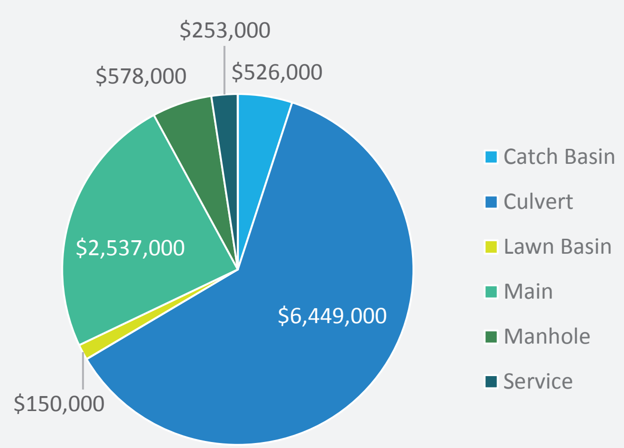
STORM SYSTEM

What assets do we own?

Main	Manholes	Catch Basins	Lawn Basins
10 km	120	110	50

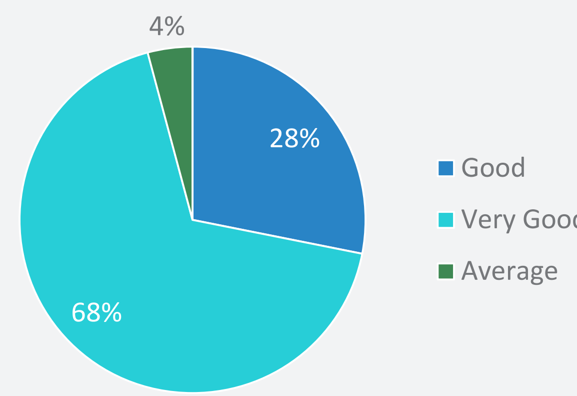
How much are our assets worth?

Total infrastructure value: 10.5M



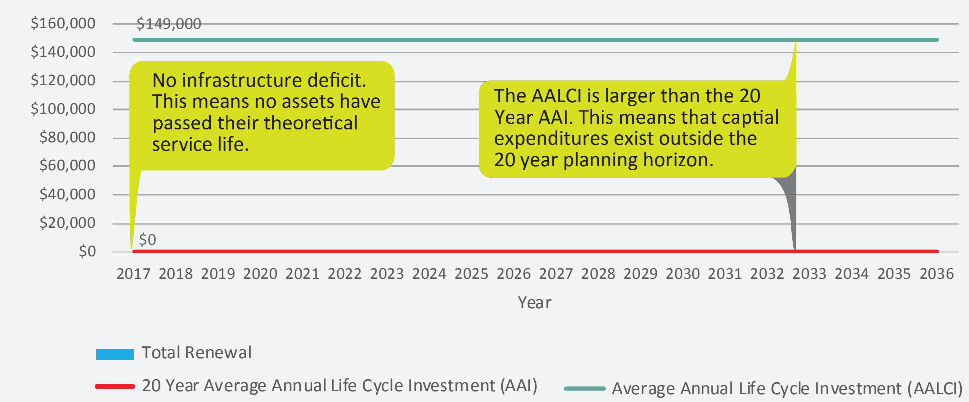
Comments
- 86% of infrastructure is made up storm pipes (including mains and culverts)

What condition are our assets in?



Comments
- Physical condition of the asset is not known, the age of the asset is used to estimate it condition (refer to terms and definitions)
- Majority of assets are in very good condition as majority of assets were installed in 1996.

When do our assets need to be replaced?



Comments
- See bubbles in diagram above

Note: The graph above is based on service life scenario 1 (Standard Service Life)

How much do we need to invest in our assets?

Average Annual Life Cycle Investment (AALCI)

Asset Category	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Catch Basin	$6,600	$5,300	$4,400
Culvert	$89,000	$71,000	$60,000
Lawn Basin	$1,900	$1,500	$1,300
Main	$38,000	$31,000	$26,000
Manhole	$9,700	$7,800	$6,500
Service	$3,300	$2,600	$2,200
Total	**$149,000**	**$119,000**	**$100,000**

Comments
- AACLI can be reduced from $149,000 to 100,000 (33%) if service life is increased by 50%.
- Culverts and mains represent majority of the AALCI. (85% in scenario 1)

20 Year Average Annual Investment (20 Year AAI)

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Catch Basin	$0	$0	$0
Culvert	$0	$0	$0
Lawn Basin	$0	$0	$0
Main	$0	$0	$0
Manhole	$0	$0	$0
Service	$0	$0	$0
Total	**$0**	**$0**	**$0**

Comments
- The 20 year AAI is $0 for all service life scenarios. This means that all assets are relatively new and have a service life which schedules the asset replacement outside the 20 year planning horizon.

Infrastructure Deficit

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Catch Basin	$0	$0	$0
Culvert	$0	$0	$0
Lawn Basin	$0	$0	$0
Main	$0	$0	$0
Manhole	$0	$0	$0
Service	$0	$0	$0
Total	**$0**	**$0**	**$0**

Comments
- The Village currently has no infrastructure deficit which means no assets have passed their theoretical service life. This is mostly driven by the fact that the community is relatively new and majority of assets are long lived (>50 years).

Level 1 Summary | Storm System

Asset Category	Replacement Value	Remaining Value	Infrastructure Deficit	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Catch Basin	$526,000	$433,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Culvert	$6,449,000	$5,112,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Basin	$150,000	$123,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Main	$2,537,000	$2,052,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Manhole	$578,000	$457,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Service	$253,000	$203,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$10,493,000**	**$8,380,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Asset Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total – 20 Years	20 Year AAI	AALCI
Catch Basin	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$6,600
Culvert	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$89,000
Lawn Basin	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,900
Main	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$38,000
Manhole	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$9,700
Service	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,300
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$149,000**

ROAD SYSTEM

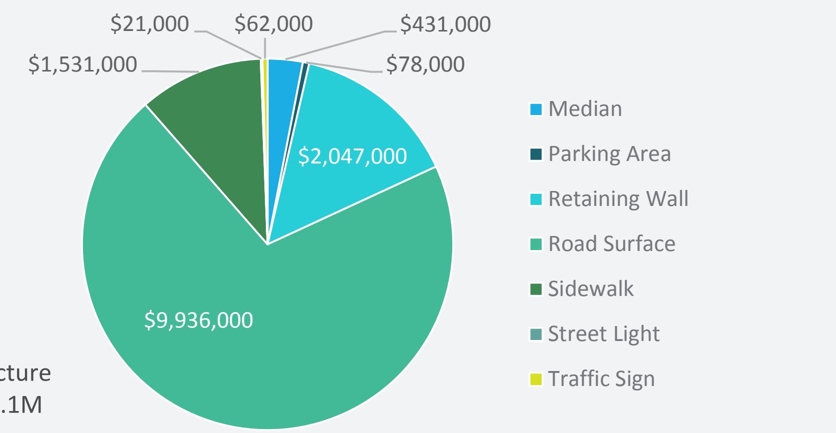
What assets do we own?

Road Surfaces
20 km

Sidewalk
10 km

Streetlights and Traffic Signs
Various

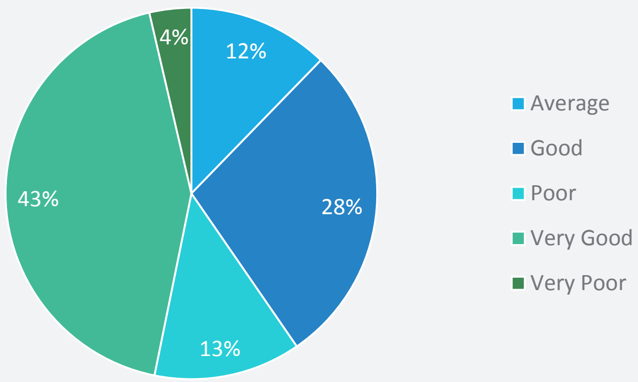
How much are our assets worth?



Total infrastructure value: 14.1M

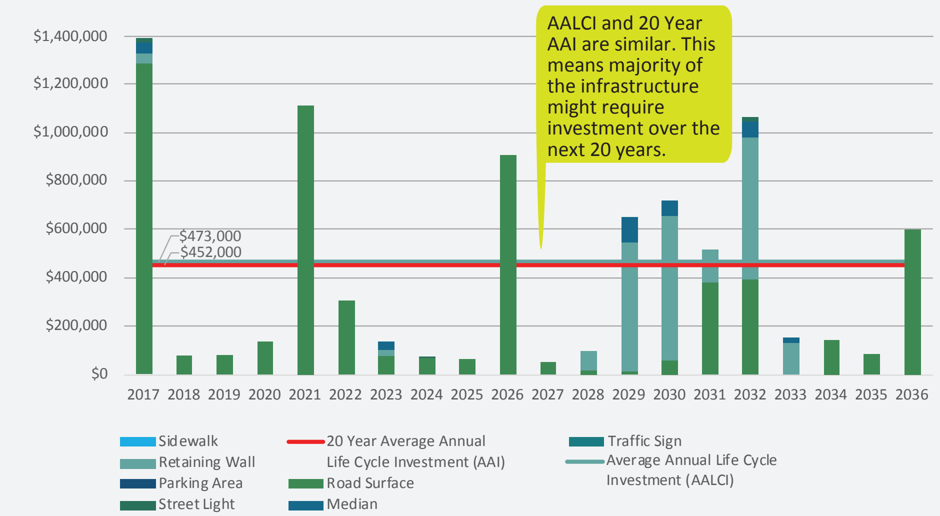
Comments
- 95% of infrastructure is made up road surfaces, retaining walls and sidewalks.

What condition are our assets in?



Comments
- The physical condition of the asset was based on condition a study completed by EBA.

When do our assets need to be replaced?



Comments
- Confirm the need to replace assets shown in the graph above through performing visual condition assessments

Note: The graph above is based on service life scenario 1 (Standard Service Life)

How much do we need to invest in our assets?

Average Annual Life Cycle Investment (AALCI)

Asset Category	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Median	$22,000	$18,000	$15,000
Parking Area	$1,600	$1,300	$1,100
Retaining Wall	$103,000	$82,000	$69,000
Road Surface	$310,000	$247,000	$207,000
Sidewalk	$31,000	$25,000	$21,000
Street Light	$1,400	$1,200	$930
Traffic Sign	$4,200	$3,300	$2,800
Total	**$473,000**	**$378,000**	**$317,000**

Comments
- AALCI can be reduced from $473,000 to $317,000 (33%) if service life is increased by 50%.
- Retaining Wall and road surface represent majority of the AALCI (90% in scenario 1)

20 Year Average Annual Investment (20 Year AAI)

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Median	$22,000	$18,000	$6,400
Parking Area	$0	$1,300	$0
Retaining Wall	$103,000	$82,000	$4,500
Road Surface	$322,000	$205,000	$116,000
Sidewalk	$150	$0	$0
Street Light	$1,900	$1,200	$0
Traffic Sign	$3,100	$3,300	$0
Total	**$452,000**	**$311,000**	**$127,000**

Comments
- 20 Year AAI can be reduced from $452,000 to $127,000 (72%) if service life is increase by 50%. This does not mean the investments disappears but instead they are pushed outside the 20 year planning horizon.
- Road Surface and retaining walls represent majority of the 20 Year AAI (95% in Scenario 1). This means majority of the community's investments over the next 20 years could be expected in these assets.

Infrastructure Deficit

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Median	$88,000	$0	$0
Parking Area	$0	$0	$0
Retaining Wall	$63,000	$0	$0
Road Surface	$1,204,000	$0	$0
Sidewalk	$0	$0	$0
Street Light	$17,000	$17,000	$0
Traffic Sign	$0	$0	$0
Total	**$1,372,000**	**$17,000**	**$0**

Comments
- Infrastructure deficit can be reduced from $1,372,000 to $0 (100%) if service life is increased by 50%.
- The Villages infrastructure deficit (service life scenario 1) represent the median, retaining wall, road surface and streetlight assets. It is recommended that these assets get inspected to confirm their condition and the need to replace them.

Level 1 Summary | Road System

Asset Category	Replacement Value	Remaining Value	Infrastructure Deficit	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Sidewalk	$1,531,000	$1,070,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Road Surface	$9,936,000	$4,664,000	$1,204,000	$1,204,000	$107,000	$104,000	$175,000	$1,109,000	$329,000	$94,000	$85,000	$82,000	$950,000
Retaining Wall	$2,047,000	$1,331,000	$63,000	$63,000	$0	$0	$0	$0	$0	$27,000	$0	$0	$0
Median	$431,000	$212,000	$88,000	$88,000	$0	$0	$2,700	$0	$0	$34,000	$1,700	$1,900	$0
Parking Area	$78,000	$33,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Traffic Sign	$62,000	$30,000	$0	$0	$0	$0	$0	$0	$0	$43,000	$2,700	$1,100	$0
Street Light	$21,000	$1,900	$17,000	$17,000	$0	$0	$0	$0	$0	$0	$4,100	$0	$0
Total	**$14,106,000**	**$7,342,000**	**$1,372,000**	**$1,372,000**	**$107,000**	**$104,000**	**$178,000**	**$1,109,000**	**$329,000**	**$198,000**	**$94,000**	**$85,000**	**$950,000**

Asset Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total – 20 Years	20 Year AAI	AALCI
Sidewalk	$0	$0	$0	$0	$0	$3,000	$0	$0	$0	$0	$3,000	$150	$31,000
Road Surface	$64,000	$22,000	$18,000	$73,000	$380,000	$696,000	$0	$184,000	$109,000	$610,000	$6,389,000	$320,000	$310,000
Retaining Wall	$0	$79,000	$489,000	$597,000	$81,000	$588,000	$128,000	$0	$0	$0	$2,047,000	$103,000	$103,000
Median	$0	$0	$146,000	$65,000	$0	$68,000	$25,000	$0	$0	$0	$431,000	$22,000	$22,000
Parking Area	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,600
Traffic Sign	$10,000	$5,800	$0	$0	$0	$0	$0	$0	$0	$0	$62,000	$3,100	$4,200
Street Light	$0	$0	$0	$0	$0	$17,000	$0	$0	$0	$0	$38,000	$1,900	$1,400
Total	**$74,000**	**$107,000**	**$653,000**	**$735,000**	**$461,000**	**$1,372,000**	**$153,000**	**$184,000**	**$109,000**	**$610,000**	**$8,970,000**	**$450,000**	**$473,000**

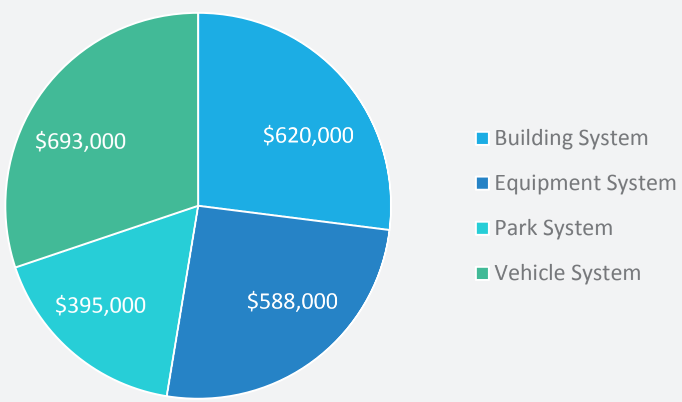
OTHER ASSETS

What assets do we own?

Park	Vehicles	Equipment
Various	Various	Various

How much are our assets worth?

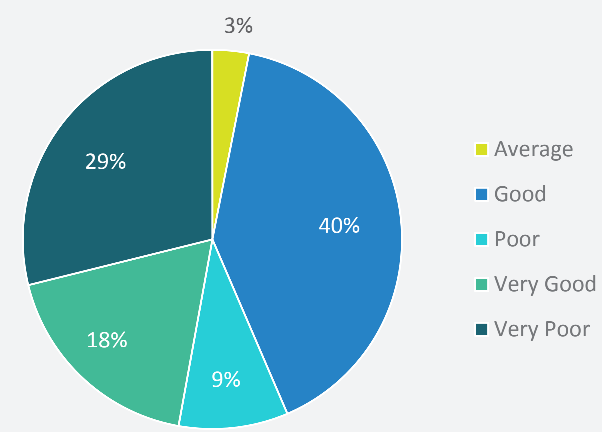
Total infrastructure value: 2.3M



Comments

- Majority of infrastructure is made up of building, equipment, and parks systems

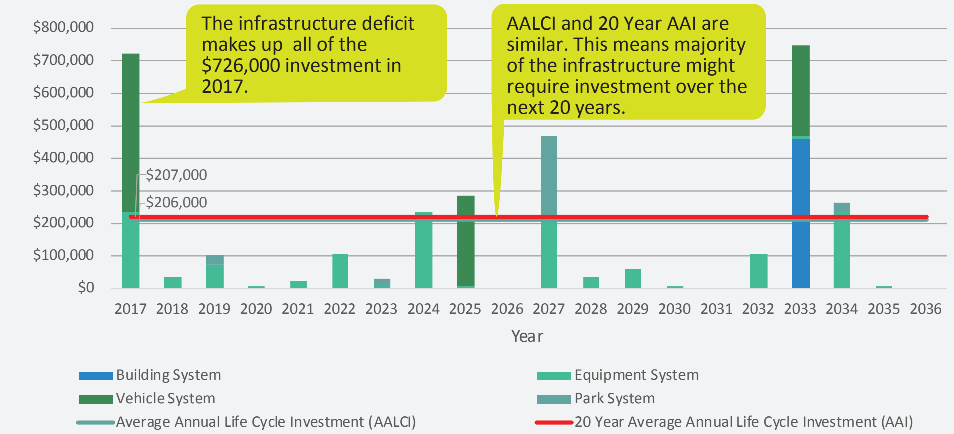
What condition are our assets in?



Comments

- Physical condition of the asset is not known, the age of the asset is used to estimate it condition (refer to terms and definitions)

When do our assets need to be replaced?



Comments

- Confirm the need to replace assets shown in the graph above through performing visual condition assessments.

Note: The graph above is based on service life scenario 1 (Standard Service Life)

How much do we need to invest in our assets?

Average Annual Life Cycle Investment (AALCI)

Asset Category	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Building System	$24,000	$20,000	$16,000
Equipment System	$75,000	$60,000	$50,000
Park System	$20,000	$16,000	$13,000
Vehicle System	$87,000	$70,000	$58,000
Total	**$206,000**	**$166,000**	**$137,000**

Comments

- AACLI can be reduced from $206,000 to $137,000 (33%) if service life is increased by 50%.
- Equipment and vehicle assets represent majority of the AALCI (80% in scenario 1)

20 Year Average Annual Investment (20 Year AAI)

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Building System	$17,000	$0	$0
Equipment System	$72,000	$57,000	$40,000
Park System	$17,000	$15,000	$13,000
Vehicle System	$101,000	$70,000	$28,000
Total	**$207,000**	**$142,000**	**$81,000**

Comments

- 20 Year AAI can be reduced from $207,000 to $81,000 (60%) if service life is increase by 50%. This does not mean the investments disappears but instead they are pushed outside the 20 year planning horizon.
- Road Surface and retaining walls represent majority of the 20 Year AAI (90% in Scenario 1). This means majority of the community's investments over the next 20 years could be expected in these assets.

Infrastructure Deficit

Asset Categories	Scenario 1 Standard Service Life (SL)	Scenario 2 SL Increased by 25%	Scenario 3 SL Increased by 50%
Building System	$0	$0	$0
Equipment System	$236,000	$166,000	$90,000
Park System	$0	$0	$0
Vehicle System	$490,000	$445,000	$278,000
Total	**$726,000**	**$611,000**	**$368,000**

Comments

- Infrastructure deficit can be reduced from $726,000 to $368,000 (50%) if service life is increased by 50%
- The Villages infrastructure deficit represent the equipment and vehicle assets (scenario 1). It is recommended that these assets get inspected to confirm their condition and the need to replace them.

Level 1 Summary | Other Assets

Asset Category	Replacement Value	Remaining Value	Infrastructure Deficit	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Building System	$620,000	$419,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Equipment System	$588,000	$194,000	$236,000	$236,000	$36,000	$73,000	$6,700	$23,000	$109,000	$12,000	$237,000	$6,700	$0
Vehicle System	$693,000	$66,000	$490,000	$490,000	$140,000	$0	$0	$0	$0	$64,000	$0	$490,000	$0
Park System	$395,000	$217,000	$0	$0	$0	$28,000	$0	$0	$0	$18,000	$0	$0	$140,000
Total	**$2,296,000**	**$896,000**	**$726,000**	**$726,000**	**$176,000**	**$101,000**	**$7,000**	**$23,000**	**$109,000**	**$30,000**	**$237,000**	**$497,000**	**$140,000**

Asset Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total – 20 Years	20 Year AAI	AALCI
Building System	$0	$0	$0	$0	$0	$0	$340,000	$0	$0	$0	$340,000	$17,000	$24,000
Equipment System	$219,000	$36,000	$62,000	$6,700	$0	$109,000	$12,000	$237,000	$6,700	$0	$1,422,000	$72,000	$75,000
Vehicle System	$0	$0	$0	$0	$0	$0	$490,000	$140,000	$0	$0	$2,015,000	$101,000	$87,000
Park System	$250,000	$0	$0	$0	$64,000	$0	$0	$28,000	$0	$0	$323,000	$17,000	$20,000
Total	**$469,000**	**$36,000**	**$62,000**	**$6,700**	**$64,000**	**$109,000**	**$842,000**	**$405,000**	**$6,700**	**$0**	**$4,100,000**	**$207,000**	**$206,000**

CONCLUSION AND NEXT STEPS

FUNDING LEVEL RECOMMENDATIONS

The AMIP provides a comprehensive overview of the replacement costs for all the water, storm, road, building, equipment and fleet assets. In addition, the AMIP provides the approximate timing for the replacement of these assets.

Since it is very difficult (if not impossible) to predict with any certainty when any given asset will fail, we have had to rely on accepted industry standards combined with the valuable input and experience of the Village of Anmore operations staff in order to establish our best approximation of the expected lifespans. This represents the “base case” life spans as presented in Scenario 1. It is possible that the asset may last longer than our base case estimates. To see the impact on funding levels if we assume the assets last 25% longer or even 50% longer than the base case, we have also prepared Scenarios 2 and 3 respectively.

In addition to the three scenarios described above, we have also provided two separate planning horizons; a full asset lifecycle planning horizon which considers expenditures that are 20 years and beyond (AALCI) and a twenty-year planning horizon (20 year AAI) which only considers investments required in the next 20 years

It is now the responsibility of the council to answer two key questions for each asset category in order to set long-term funding targets for each asset category:

1. What planning horizon should the community plan for (AALCI or 20 Year AAI)?
2. What service life scenario is the community going to fund (scenario 1, 2 or 3)?

The best approach for Anmore will be one that balances affordability, inter- generational equity, future risk and desired levels of service. This will require a fulsome discussion by the council and input from the various stakeholders.

To help guide this discussion, the pro’s and con’s of each are provided;

STEP 1 What planning horizon should the community plan for (AALCI or 20 Year AAI)?

AALCI (>20 Years)

Pros

- Lower risk that service levels could be affected
- Lower risk that financial burdens are placed on future generations

Cons

- Does not directly consider the infrastructure deficit
- Will require a larger increase to the revenues than funding the 20 Year AAI
- Stakeholders today will be investing in assets they might not get the benefit of enjoying

20 Year AAI (<20 Years)

Pros

- Considers the infrastructure deficit
- Will require less revenue increase than funding the AALC

Cons

- Higher risk that service levels could be affected
- Higher risk that financial burdens could be placed on future generations

STEP 2 What service life scenario is the community going to fund? (scenario 1, 2 or 3)?

Service Life Scenario 1

Pros

- Fiscally conservative
- Lower risk that service levels could be affected
- Lower risk that financial burdens are placed on future generations

Cons

- Will require larger revenue increases than in scenario 2 and 3
- It is possible that the assets will last longer and that users will be over paying
- May accumulate large reserves that could be better used for other purposes

Service Life Scenarios 2 and 3 (Assume assets large 25% and 50% longer respectively)

Pros

- It is possible the assets may last this long or longer
- As an interim measure it could provide some additional time to further investigate, analyze and refined the expected life spans

Cons

- Higher risk to future service levels than in scenario 1
- Higher risk that financial burdens could be placed on future generations than in scenario 1

For most communities in BC, the AALCI and 20 Year AAI are typically difficult to fund in the short term. Instead communities have used these financial indicators as a long-term funding target that they work towards over the long term. As the community evolves it asset management plan, the long-term funding target can be refined based on better understanding risk (triple bottom line), level of service, ability to borrow and willingness to pay.

APPENDIX A

AMIP METHODOLOGY

The two main steps followed to develop the AMIP are detailed below:

Step 1: Inventory Details

Through this project, an asset inventory was developed for the community's major linear and non-linear assets. Inventory data for each major asset category was compiled using CAD and record drawings, TCA records, and staff knowledge. This information is now in a consolidated inventory. Assumptions made in the inventory can be found within the location-based system (GIS) and excel model developed.

Appendix E – Data Assumptions.

Step 2: Develop Asset Management Investment Plan (AMIP)

Once the inventory was developed, it was imported into the Asset Management Investment Plan (AMIP) excel-based model so that each asset could be evaluated. Key information calculated for each asset category is summarized in Table 1 (left.)

Table 1: AMIP Attributes

Attributes	Question Addressed
Asset Service Life	How long will the asset last? (Appendix D)
Replacement Value	How much will it cost to replace the asset? (Appendix C)
Remaining Life	When does the asset need to be replaced?
Infrastructure Deficit	Which assets have passed their theoretical service lives and need to be inspected for condition?
Total 20 Year Total Investment	How much should theoretically be invested over the next 20 years to renew existing infrastructure?
20 Year Average Annual Investment (20 Year AAI)	How much are we theoretically expected to invest on average per year to address the 20 year total investment?
Average Annual Life Cycle Investment (AALCI)	How should we spend annually to sustain infrastructure over the long term? Note: AALCI must be considered in conjunction with infrastructure renewal deficit (backlog) as this is forward looking parameter that does not consider historical expenditures.
Timing of each infrastructure replacement	When should we be anticipating infrastructure expenditures?

Note: If the 20 year AAI is greater than the AALCI, this means that there are many assets that may need replacement after field condition is verified.

APPENDIX B

INVESTMENT LEVEL INDICATORS

Average Annual Life Cycle Investment (AALCI)

The Average Annual Life Cycle Investment (AALCI) is defined as the summation of each asset's annual depreciation, based on the asset's replacement cost and service life.

$$\sum \frac{\textbf{Replacement Cost}}{\textbf{Service Life}}$$

The AALCI is the ideal funding level for sustaining existing infrastructure and should be a long-term target for the community. When planned for appropriately, the AALCI can be used to ensure revenue stability, prevent unnecessary risk, and enable a community to apply for one-time funding to support new asset needs (instead of relying on such funding for addressing emergency situations).

AALCI is sensitive to changes in the service life so it's important to understand how the investment level could change based on how long an asset provides service. Understanding this sensitivity will help decision makers decide on what investment level is best for the community.

Note: AALCI is a forward-looking parameter that does not take into account the infrastructure deficit. Therefore, it is important to consider AALCI and the infrastructure deficit together.

20 Year Average Annual Capital Expenditure

The 20 Year Average Annual Investment (20 Year AAI) is defined as the summation of expenditures over a 20 year planning horizon divided by 20.

$$\frac{\textbf{20 Year Total Anticipated Capital Expenditure}}{\textbf{20}}$$

This indicator provides an idea of how much should be spent on an annual basis to fund asset replacements anticipated over the next 20 years and fund the infrastructure deficit (further defined below)

Service life directly affects the 20 year expenditures as it dictates when an asset is scheduled for replacement. For example, if an asset service life is extended, the replacement year might change from 2030 to 2040, which would push the project outside of the 20 year planning horizon and reduce 20 Year AAI. It is important to note that this does not make the expenditure disappear, just postpones it. This is why the AALCI is a better financial indicator because it accounts for replacements outside the planning horizon. Although AALCI takes a longer term vision to funding, it does not account for the infrastructure renewal deficit. Therefore, it is important to consider AALCI and infrastructure renewal deficit together.

Infrastructure Deficit

Infrastructure deficit is a measure of the amount of infrastructure that has passed its theoretical service life but continues to provide service to the community.

Current Year > Year of Asset Replacement

Although the asset is still providing service, it is typically nearing the end of its life and will require field investigation to determine if the asset needs to be replaced or not.

Changes in the asset service life can turn a future expenditure into an infrastructure deficit or vice versa. For example, an asset that is scheduled for replacement in 2016 is now past its theoretical service life and would be recorded as an infrastructure deficit. If that asset's service life is extended to a future year, it would be recorded as an asset replacement and not a liability.

APPENDIX C

ASSET UNIT COST

Water Pipe Distribution Replacement Costs								
Description	**Units**	**Diameter**						
		300	**250**	**200**	**150**	**100**	**75**	**50**
Pipe	$/m	$845	$650	$650	$650	$520	$520	$520
Services	each	$2,600	$2,600	$2,600	$2,600	$2,600	$2,600	$2,600
***Based on Opus Dayton and Knight Water Utility Master Plan Assume PVC pipe will be replaced with PVC**								

Other Water Distribution Systems Replacement Costs		
Description	**Unit**	**Unit Cost***
Water Meter	each	Tangible Capital Assets
Hydrant	each	$6,500*
***Includes engineering and contingency**		

Other Storm System Replacement Costs		
Description	**Units**	**Unit Cost**
Catch Basin	each	$4,600
Lawn Basin	each	$3,200
Manhole	each	$5,000
***Includes engineering and contingency**		

Asset	**Installation Year**	**Initial Cost**	**% of Total Costs**	**Replacement Cost (2017 dollars)***
Pinnacle Ridge Pump station	2012	$802,000		
Civil			40%	$320,686
Mechanical			30%	$240,515
Electrical			25%	$200,429
Instrumentation/Controls			5%	$40,086
Uplands Pump Station	2010	$390,000		
Civil			40%	$155,969
Mechanical			30%	$116,977
Electrical			25%	$97,481
Instrumentation/Controls			5%	$19,496
Chlorine Booster Station	2014	$450,000		
Civil			58%	$260,110
Mechanical			12%	$53,816
Electrical			7%	$31,393
Chlorine Dosing and Booster Pump			23%	$103,147

- Replacement costs are from the Opus Dayton and Knight Water Utility Master Plan
- Replacement costs were based on final progress payment therefore assume engineering and contingency was included in the price

Storm System Pipe Replacement Costs																			
Description	**Units**	**Diameter**																	
		200	**250**	**300**	**350**	**375**	**400**	**450**	**525**	**600**	**650**	**675**	**750**	**900**	**1150**	**1200**	**1500**	**2000**	**2500**
Main	$/m	455	510	600	620	620	N/A	760	920	N/A	N/A	1200	1400	1600	N/A	N/A	N/A	N/A	N/A
Culvert	$/m	390	450	840	875	900	975	975	N/A	1200	1300	N/A	N/A	1800	2200	N/A	2500	3200	4200
*** Includes engineering and contingency**																			

Note: The replacement costs used in this report should not be used for capital planning and should only be used for high-level,long-term financial planning.

Additional Project Costs				
Asset Category	**Planning**	**Design**	**CA**	**Contingency**
Water System*				
Storm System System	3%	5%	7%	35%
***Based on Opus Dayton and Knight Water Utility Master Plan**				

APPENDIX D

ASSET SERVICE LIVES

Pipe Service Lives (Water, Storm)	
Pipe Type	**Life Expectancy**
AC	70
DI	100
GI	70
PVC	80
HDPE	80

Water System Service Lives	
Hydrant	40
Meter	20
Valve	40
Pumping Station *	
Mechanical	30
Electrical	20
Instrumentation/Controls	20
Civil	50

*Note: based on Opus Dayton and Knight Water Utility Master Plan

Storm System Service Lives	
Manhole	60
Catch Basin	80
Lawn Basin	80

Road System Service Lives
Based on EBA pavement condition assessment & Tangible Capital Assets records

Other Assets (buildings, parks equipment)
Based on Tangible Capital Assets records

APPENDIX E

ASSUMPTIONS

Data Management Tracker	
Asset	**Description**
Water System	
Mains, Services, Valves, Hydrants etc..	**Replacement Costs:** Opus Dayton and Knight Water Utility Master Plan **Quantity:** GIS **Year of Install/Size/Material:** GIS
Facilities (Pumping Stations, wells, PRV, Reservoirs)	**Replacement Costs:** Estimated **Quantity:** Opus Dayton and Knight Water Utility Master Plan **Year of Install/Size:** Opus Dayton and Knight Water Utility Master Plan
Storm System	
Mains, Service, Manholes etc..	**Replacement Cost:** Estimated **Quantity:** GIS **Year of Install:** GIS
Road System	
Surface, Sidewalk, Culverts	**Replacement Cost:** EBA pavement condition report/spreadsheet **Quantity:** EBA pavement condition report/spreadsheet **Year of Install:** EBA pavement condition report/spreadsheet • Assets not included in EBA's report such as retaining walls, medians, parking areas, traffic signs and streetlights were based on the TCA. Infrastructure replacement costs were developed by indexing TCA costs to 2017 dollars using ENR cost index, 10% was added for contigiency / unknowns
Other Assets	
Building, Equipment, Fleet	**Replacement Cost:** Index'd TCA cost to 2017 dollars using ENR cost index **Quantity:** TCA **Year of Install:** TCA

APPENDIX F

OTHER CONSIDERATIONS

The following sections are included to introduce some additional topics related to asset management implementation to support on-going, informed infrastructure decision-making.

1.1 Decision-making through an Understanding of Service, Risk, and Cost

Making good decisions requires that the right people have the right information at the right time. Achieving this requires communication and ongoing information management. Asset management is not about having perfect information; it is about ensuring decisions are informed by the best information available, and then working to improve information where appropriate.

The collection and use of information about services, risk, and cost can be integrated into the existing budget processes based on the Figure 9.1.

Often, the best way to implement asset management is not through building new and complicated processes, but through making incremental improvements to your current processes. The collection and use of information about services, risk, and cost can be integrated into the existing budget processes.

Figure 1: Typical Budget Process

What to do:

- Include considerations of level of service, risk, and cost at each stage of the budget process.
- Service, risk, cost, and revenues cannot be fully understood in isolation—each component should be brought together to understand connections and trade-offs.
- Use the best information available at the time.
- If there are gaps or updates needed in important information, include actions to fill those data gaps (or update information such as master plans) in your budget.

UNDERSTANDING SERVICE AND RISK

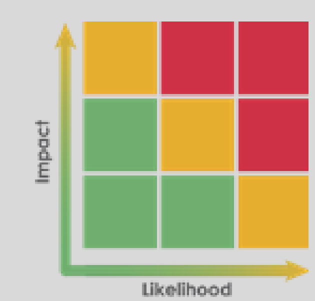
Level of service is a measure of the quality, quantity, and/or reliability of a service from the perspective of members, businesses, and customers in the community. Understanding service means having a clear and consistent understanding of:

1) the types of services you provide;
2) the groups of residents, businesses, and institutions that you provide them to;
3) the level of service being delivered currently (your performance); and
4) the level of service you're aiming to provide (your target).

Infrastructure is not inherently valuable; it is only as valuable as the service it provides to the community. Rather than jumping straight to pipe breakage rates or pavement quality index, start with defining the service in terms that residents and businesses would understand—for example, water service outages, driving comfort, etc. This helps to ensure the priorities for limited resources are aligned with what the community values.

Risk(s) are events or occurrences that will have undesired impacts on services (Risk = Impact x Likelihood). Some events that impact delivery of services will have a higher probability or greater impact than others, which make them a bigger risk. Often, with the right planning and actions, the likelihood or impact of these events can be reduced. To understand risk, you need to understand:

1) what your risks are and where they are;
2) the impacts and likelihood of these risks;
3) what can be done to control or mitigate them and what resources are required; and
4) whether they are worth mitigating or if they should be tolerated.



Risks are assessed by identifying the impact and the likelihood of the event, and then finding the corresponding level of risk. Doing this for each risk helps you to figure out which are your biggest risks and which risks are not as important to worry about.

Figure 2: Information Management Process

1.2 Information Management

As circumstances change over time, information needs to be updated or improved. Information updates may be done on an ongoing basis or may be completed as part of an annual process. Updates should reflect new assets, retired assets, refurbished or replaced assets, replacement cost changes, updates to operating costs to repair and maintain, and asset condition information.

Updates may also be made to improve the accuracy of information, such as replacing anecdotal condition information with results from a condition assessment. Collecting more data or more accurate data can be very valuable in decision making, but it can be time consuming and expensive; it's not worth investing in unless you know it will improve your decision making. When working with vendors or consultants, ask them (at the beginning of the project) to provide you information in a format that makes updating your inventory as easy as possible.

1.3 Communication and Engagement

Communication is considered to be a set of ongoing activities that are applied within each stage of the asset management process. The purpose of communicating is to ensure that people and departments within an organization are aligned, working towards the same goals, and efficiently implementing asset management by applying the information and outputs in decision-making and programming. Communication and engagement are also important for obtaining support for asset management from Council, staff, members, and other ratepayers. Common topics for asset management communication and engagement include:

- The importance of infrastructure in service delivery
- State of assets
- State of finances and funding challenges
- Levels of service
- Service delivery costs and trade-offs
- The organization's approach to asset management
- Staff and community members' roles
- The work being done to ensure long-term sustainable service delivery

It is often advisable to develop internal alignment and an understanding of assets, services, and related costs and risks prior to external communication and engagement.

1.4 Natural Assets

There is a growing recognition of the pivotal role that all natural areas play in providing services to communities. Natural Capital Assets are defined as the natural assets which provide a value and service to the community over time and are essential to the delivery of services.

It will be important for community to identify and quantify the economic benefits of protecting its natural assets and understand the costs associated with replicating these natural functions in response to the loss or destruction of any components of these 'eco-assets'. Natural Capital Assets do not have a market value so assessing their importance and assigning an economic value will aid in raising awareness of their importance to the community. The substitutes for natural capital can be much more expensive to duplicate and operate than those provided by nature. Also, there are many services only nature can provide.

We suggest that the community identify all of its significant natural capital assets and the value they provide. This value could be considered in future infrastructure decision-making, planning, and budgeting for the protection of these assets and the services they provide.