



Agenda No:	7.1
Mtg Date:	May 9/19

Governance & Services Committee Report

TO: Governance & Services Committee

FROM: David Komaika
Director of Engineering

DATE: May 1, 2019

SUBJECT: Water System Fees and Charges Update

Purpose: To provide the Governance & Services Committee with an update on the water system fees and charges for each Regional District owned water system and recommend the Regional Board adopt amendment bylaws approving the new rate structure for each of the water systems.

Executive Summary:

The Regional District owns and operates six water systems which service more than 1,000 users and more than 1,600 properties. The largest has almost 300 users and the smallest only 8. Notwithstanding the size of the system or the number of households served, all are required to meet the same Drinking Water Guidelines and Standards.

The long-term viability of the water systems needs to be balanced with the growing infrastructure deficit. The current replacement cost of the water systems is more than \$62,000,000 and current reserve funding contributions will not be adequate.

The current water fees are composed of User Fees and Asset Renewal Fees. The User Fees apply to all lots where the water service is turned on and are intended to cover all annual operational costs of the water system. The Asset Renewal Fees apply to all lots within the service area and are intended to fund capital reserves that will be utilized on capital projects.

The User Fees are intended to fund the operation of the water systems and these fees have not changed since January 2016. The Asset Management Investment Plan ("AMIP") which forecasts the asset renewal needs to sustain the utilities was last updated in 2012.

The proposed bylaw amendments will allow the gradual increase in user fees over the next 3 ½ years by the anticipated rate of inflation – 2.0%. A separate bylaw amendment to the Water Systems Regulations Bylaw No. 1370 will adjust the fees recovered for water meters, new service connections, etc.

RECOMMENDATION:

THAT the Governance & Services Committee receive for information the water system fees and charges update for RDCO water systems; and recommends the Regional Board give

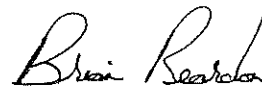
consideration and approve Water System Fees & Charges Bylaws No. 1435, 1436, 1437, 1438, 1439 and 1440.

Respectfully Submitted:



David Komaika
Director of Engineering

Approved for Committee's Consideration



Brian Reardon, CAO

Prepared by: Clarke Kruiswyk, Environmental Services Analyst

Implications of Recommendation:

General: Accountability and sustainability

Financial: Updates to water system rates for water systems located in the electoral areas.

Background:

The Regional District of Central Okanagan (RDCO) owns and operates six distinct water systems in the East and West Electoral areas. All of the water users are residential with the exception of the Sunset Ranch Golf Clubhouse and Westshore Estates Community Park. A summary of each system is provided in the table below.

Water System	Location	Number of Users ¹	Number of Lots ¹	Water Source	Age of System ¹
Killiney Beach	West Electoral Area. North of Fintry Provincial Park.	288	423	Okanagan Lake	39
Falcon Ridge	East Electoral Area. Joe Rich.	55	55	Mission Creek	30
Sunset Ranch	East Electoral Area. Ellison Area.	274	276	Groundwater	17
Dietrich	West Electoral Area near Peachland.	8	8	Trepanier Creek	29
Westshore	West Electoral Area. North of Fintry Provincial Park.	268	522	Okanagan Lake	49
Upper Fintry	West Electoral Area. Upslope from Fintry Provincial Park	110	327	Groundwater	7

¹ As of March, 2019

The current water fees are composed of User fees and Asset Renewal fees. The User fees apply to all lots where the water service is turned on and are intended to cover all annual

operational costs of the water system. The Asset Renewal fees apply to all lots within the service area and are intended to fund capital reserves that will be utilized on capital projects.

The current User fee structure is composed of a basic fee and a consumption fee. The basic fee is a flat fee that applies to all lots where the water service is turned on. The consumption fee is based on actual individual metered water consumption. The current water fee structure, including the 4-tiered consumption fee, is the same for all RDCO water systems; however, the specific fee values vary. The intention of the basic fee is to fund the fixed costs to operate each system (i.e., administration, wages, permits, insurance, and testing). The consumption fee is to fund the variable operating costs of each system (i.e., electricity to pump water, treatment, equipment wear and tear). In general for an average user, the consumption fee is approximately 20% of the basic fee which is the approximate ratio of variable operating costs to fixed operating costs.

User fee and Asset Renewal fee revenue is not pooled or shared between water system service areas or other RDCO cost centres. Revenue from each water system is only used to cover operational and capital costs within the water system where the revenue originated.

The last review updated the User fees effective January 1, 2016 and did not update the Asset Renewal fees. All fees have not changed since 2016. This review's primary focus is to update the Asset Renewal fees but also proposes updates to the basic fee of the User fees.

Asset Management Investment Plan

The Regional District engaged a third party consultant, Urban Systems, to update our Asset Management Investment Plan ("AMIP") which forecasts the asset renewal needs for the Regional District Environmental Services Department. The previous AMIP was completed in 2012 and the update accounts for changes in infrastructure and in construction costs. The AMIP outlines the following:

- Current replacement value;
- Remaining value;
- Expected life remaining;
- Required improvements;
- Infrastructure deficit;
- 20 year Average Annual Investment ("AAI"); and
- Average Annual Life Cycle Investment ("AALCI").

The AMIP is included in Appendix A and outlines that the Regional District Environmental Service Department owns infrastructure with a replacement value of approximately \$159 million in water systems, sanitary systems, and solid waste assets. The table below summarizes the results by water system:

Water System	100% Replacement Value	Expected Remaining Life	Infrastructure Deficit (Backlog)	20 Year Average Annual Investment (AAI)	Average Annual Life Cycle Investment (AALCI)
Killiney Beach	\$ 19,273,855	39%	\$ -	\$ 486,783	\$ 324,569
Falcon Ridge	\$ 4,206,342	59%	\$ 165,000	\$ 19,819	\$ 60,523
Sunset Ranch	\$ 7,964,002	78%	\$ -	\$ 41,115	\$ 127,326
Dietricht	\$ 657,710	56%	\$ -	\$ 16,571	\$ 13,965
Westshore	\$ 17,513,365	22%	\$ 1,684,901	\$ 793,798	\$ 358,992
Upper Fintry	\$ 12,752,730	92%	\$ -	\$ 17,771	\$ 172,145

It is recommended that the AALCI be used to establish investment levels as it accounts for all assets and not just those that require replacing in the 20 year time horizon; however, the AAI should be considered if significant funds are required in the near term for immediate improvements (i.e., additional water treatment).

The Asset Renewal reserve levels for the water systems as of December 31, 2018 and projected to December 31, 2019 are listed in the table below:

Water System	Equipment and Capital Facility Reserves	
	2018 (actual)	2019 (projected)
Killiney Beach	\$ 681,926	\$ 339,916
Falcon Ridge	\$ 15,769	\$ 4,993
Sunset Ranch	\$ 373,081	\$ 416,345
Dietricht	\$ 1,008	\$ 2,395
Westshore	\$ 1,487,165	\$ 1,494,715
Upper Fintry	\$ 304,710	\$ 365,732

A portion of these reserve balances should be held for equipment replacements not included in the AMIP review (i.e., vehicle replacement, other minor replacements) but the remainder of the current reserves can be used to partially offset the required annual replacement costs.

The Asset Renewal fees approved in 2012 were based on funding 50% of the annual replacement costs. It was assumed that the remaining 50% would be funded through grants or borrowing. The table below summarizes the 2019 budgeted Asset Renewal revenue against the annual investment contribution at different funding levels and accounts for the current available reserve balance:

Water System	Budgeted 2019 Asset Renewal Revenue	Annual Replacement Cost at:		
		100%	75%	50%
Killiney Beach	\$ 277,254.00	\$ 474,783	\$ 356,087	\$ 237,392
Falcon Ridge	\$ 25,245.00	\$ 60,523	\$ 45,392	\$ 30,262
Sunset Ranch	\$ 65,844.00	\$ 109,326	\$ 81,995	\$ 54,663
Dietricht	\$ 6,056.00	\$ 16,571	\$ 12,428	\$ 8,286
Westshore	\$ 303,222.00	\$ 724,048	\$ 543,036	\$ 362,024
Upper Fintry	\$ 63,800.00	\$ 156,395	\$ 117,296	\$ 78,198

Based on the updated AMIP and maintaining the 50% funding ratio, the Asset Renewal fees could be adjusted as outlined in the table below:

Water System	Current Rate		50% Replacement Cost			
	Quarterly	Annual	Quarterly	Annual	Annual Change	Adjustment
Killiney Beach ¹	\$ 164.25	\$ 657.00	\$ 164.25	\$ 657.00	\$ -	0.0%
Falcon Ridge	\$ 114.75	\$ 459.00	\$ 138.00	\$ 552.00	\$ 93.00	20.3%
Sunset Ranch ²	\$ 54.75	\$ 219.00	\$ 54.75	\$ 219.00	\$ -	0.0%
Dietricht	\$ 189.25	\$ 757.00	\$ 259.00	\$ 1,036.00	\$ 279.00	36.9%
Westshore	\$ 145.50	\$ 582.00	\$ 173.00	\$ 692.00	\$ 110.00	18.9%
Upper Fintry	\$ 50.00	\$ 200.00	\$ 60.00	\$ 240.00	\$ 40.00	20.0%

¹ - AMIP suggested a rate decrease was possible to maintain the 50% replacement cost; however, the rate has been maintained due to the expected large capital costs in the near future related to water treatment improvements.

² - AMIP suggested a rate decrease was possible to maintain the 50% replacement cost; however, the rate has been maintained as it is more sustainable over the long term.

User Fees

As outlined above, the User fees are intended to fund the operation of the water systems and the fees have not changed since 2016. It is proposed that the User fees are updated in conjunction with the proposed changes to the Asset Renewal fees. The User fees review has focused on updating the basic fee only to bring revenue in line with projected operating costs, rather than a full rate structure review similar to what was completed with the last fee changes in 2016.

The operating costs over the past five years for all water systems combined has shown variability in total annual costs. The projected costs were based on a weighted average of the actual historical costs for the past few years and the 2019 budget. This weighted average helps alleviate the annual variability in operating costs. These weighted costs were projected forward using an inflation factor to determine the required revenue and associated fees. The operating costs have increased for all water systems; however, some of the water systems have benefitted from additional users to share the costs.

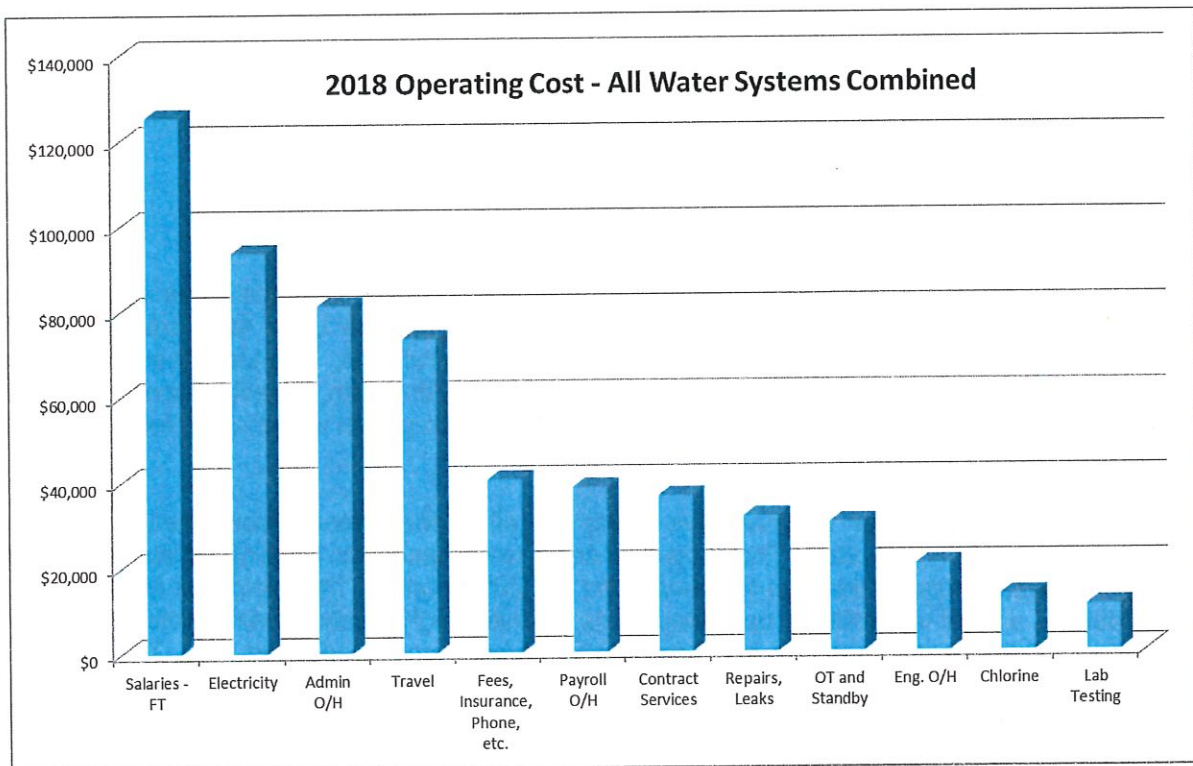
The analysis suggests that the following rate adjustments to the basic User fees are warranted:

Water System	Current Rate		Calculated Adjustment			
	Quarterly	Annual	Quarterly	Annual	Annual Change	Adjustment
Killiney Beach	\$ 116.50	\$ 466.00	\$ 128.00	\$ 512.00	\$ 46.00	9.9%
Falcon Ridge ¹	\$ 137.00	\$ 548.00	\$ 185.00	\$ 740.00	\$ 192.00	35.0%
Sunset Ranch	\$ 90.00	\$ 360.00	\$ 95.00	\$ 380.00	\$ 20.00	5.6%
Dietrich	\$ 403.00	\$ 1,612.00	\$ 524.00	\$ 2,096.00	\$ 484.00	30.0%
Westshore	\$ 137.50	\$ 550.00	\$ 144.00	\$ 576.00	\$ 26.00	4.7%
Upper Fintry	\$ 172.50	\$ 690.00	\$ 198.00	\$ 792.00	\$ 102.00	14.8%

¹ - A subsequent adjustment is proposed in 2020 to account for additional increase partially attributable to the increased operating costs of the new treatment equipment (UV and filtration).

Breakdown of Operating Costs

The figure below itemizes the 2018 cost of operating all water systems. Salaries continue to be the highest itemized cost of operation. The 2018 salaries of approximately \$126,000 is a portion of the compensation for four Operators, two Lab Technicians, and one Instrument/Electrician which are positions shared between the water systems, wastewater collection, and wastewater treatment cost centers. Electricity is the second major operating costs used to power the facilities for lighting, heating, monitoring, and pumping.



How do the fees compare?

Water fees differ between each of the RDCO water systems and amongst water systems throughout the region for numerous reasons including, but not limited to:

- factors that impact economies of scale (e.g., number of users, service area),
- types and cost of water treatment,
- population density,
- age and efficiency of infrastructure,
- elevation of water source and users (i.e., pumping vs. gravity), and
- funding, asset replacement planning, and subsidizations.

Given the range of different water rate structures and funding methods in the region, it is difficult to do an accurate comparison of fees, particularly at different levels of water consumption. It is anticipated that water systems that are older, have or require additional treatment, or have fewer number of connections will have higher fees.

Resident Communication

The last three Regional District Water Talk newsletters (i.e., Spring 2018, Fall 2018, Spring 2019) have informed residents that a fee review is underway and that new fees are planned to be implemented July 1, 2019. If the fee changes are approved, the residents will be informed of the actual fee changes through:

- Information package mail out;
- Email notification to those subscribed to e-notification services;
- Detail in the next Water Talk newsletter; and
- Update to the “Estimator Tool” which residents can use to calculate their cost of water based on their individual consumption.

Residents would receive their third quarter invoices reflecting the new fees in the Fall of 2019.

Recommendation

Overall, the fees are recommended to change as outlined in the table below for each RDCO water system. For illustrative purposes, the User consumption fee for an “average” user has been included to show total costs. Some of the increases are significant, particularly for the smaller systems with no growth in the number of users, but the adjustments are necessary to fund the water system’s operation and capital reserve contributions. Please note that as the fees are proposed to be implemented mid-year 2019 the annual impact of the change will be spread over two years as can be seen in the “Annual Change” figures in the table.

With the exception of Killiney Beach and Sunset Ranch, the recommended Asset Renewal fees are based on maintaining the funding ratio of 50%; however, a higher asset replacement funding ratio could be considered in the future.

The table also includes future rate adjustments to the basic User fee and Asset Renewal fee to account for future inflation. These adjustments are based on an inflation factor of 2% which is approximately equivalent to the current Consumer Price Index (CPI). These annual adjustments for inflation should reduce the need for larger increases at future rate reviews. Throughout the annual budget review process the revenue for each system will be projected to determine if

specific fees need to be adjusted in advance of the next rate review. The next major review is planned for 2022. Please note that due to the magnitude of the basic User fee increase for Falcon Ridge, a subsequent increase of 10% is proposed for 2020. This subsequent increase is partially attributable to the increased operating costs of the recently installed UV disinfection and filtration water treatment equipment.

Each water system has their own Fees and Charges Bylaw. It is recommended that each bylaw be updated with the quarterly fees outlined in the table for July, 2019 through to December 31, 2022.

While each water system has their own Fees and Charges Bylaw, they all share the same Water Systems Regulations Bylaw No. 1370. In conjunction with the Fees Bylaw update, it is recommended that Schedule A of the Regulations Bylaw also be updated with the following:

- Update water meter fees to reflect current costs; and
- Update Extensions & Additional Service Connection costs based on current costs.

Alternate Consideration

Should the Committee wish to have additional public information distributed to the ratepayers about the proposed rate increases the following alternate resolution is provided:

“AND FURTHER THAT the Governance & Services Committee recommends the Regional Board approve First Reading for Water System Fees & Charges Bylaws No. 1435, 1436, 1437, 1438, and 1439.”

Water System	Fee Type	Current Jan, 2016	2019 Jul, 2019 ²	2020 Jan, 2020	2021 Jan, 2021	2022 Jan, 2022
Killiney Beach	User - Basic	\$ 116.50	\$ 128.00	\$ 131.00	\$ 134.00	\$ 137.00
	User - Consumption ¹	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00
	Asset Renewal	\$ 164.25	\$ 164.25	\$ 168.00	\$ 171.00	\$ 174.00
	Total	\$ 305.75	\$ 317.25	\$ 324.00	\$ 330.00	\$ 336.00
	Annual Cost	\$ 1,223.00	\$ 1,246.00	\$ 1,296.00	\$ 1,320.00	\$ 1,344.00
	Annual Change	N/A	\$ 23.00	\$ 50.00	\$ 24.00	\$ 24.00
Falcon Ridge	User - Basic	\$ 137.00	\$ 185.00	\$ 204.00	\$ 208.00	\$ 212.00
	User - Consumption ¹	\$ 32.46	\$ 32.46	\$ 32.46	\$ 32.46	\$ 32.46
	Asset Renewal	\$ 114.75	\$ 138.00	\$ 141.00	\$ 144.00	\$ 147.00
	Total	\$ 284.21	\$ 355.46	\$ 377.46	\$ 384.46	\$ 391.46
	Annual Cost	\$ 1,136.85	\$ 1,279.35	\$ 1,509.85	\$ 1,537.85	\$ 1,565.85
	Annual Change	N/A	\$ 142.50	\$ 230.50	\$ 28.00	\$ 28.00
Sunset Ranch	User - Basic	\$ 90.00	\$ 95.00	\$ 97.00	\$ 99.00	\$ 101.00
	User - Consumption ¹	\$ 23.94	\$ 23.94	\$ 23.94	\$ 23.94	\$ 23.94
	Asset Renewal	\$ 54.75	\$ 54.75	\$ 56.00	\$ 57.00	\$ 58.00
	Total	\$ 168.69	\$ 173.69	\$ 176.94	\$ 179.94	\$ 182.94
	Annual Cost	\$ 674.75	\$ 684.75	\$ 707.75	\$ 719.75	\$ 731.75
	Annual Change	N/A	\$ 10.00	\$ 23.00	\$ 12.00	\$ 12.00
Dietrich	User - Basic	\$ 403.00	\$ 524.00	\$ 534.00	\$ 545.00	\$ 556.00
	User - Consumption ¹	\$ 186.50	\$ 186.50	\$ 186.50	\$ 186.50	\$ 186.50
	Asset Renewal	\$ 189.25	\$ 259.00	\$ 264.00	\$ 269.00	\$ 274.00
	Total	\$ 778.75	\$ 969.50	\$ 984.50	\$ 1,000.50	\$ 1,016.50
	Annual Cost	\$ 3,115.00	\$ 3,496.50	\$ 3,938.00	\$ 4,002.00	\$ 4,066.00
	Annual Change	N/A	\$ 381.50	\$ 441.50	\$ 64.00	\$ 64.00
Westshore	User - Basic	\$ 137.50	\$ 144.00	\$ 147.00	\$ 150.00	\$ 153.00
	User - Consumption ¹	\$ 33.73	\$ 33.73	\$ 33.73	\$ 33.73	\$ 33.73
	Asset Renewal	\$ 145.50	\$ 173.00	\$ 176.00	\$ 180.00	\$ 184.00
	Total	\$ 316.73	\$ 350.73	\$ 356.73	\$ 363.73	\$ 370.73
	Annual Cost	\$ 1,266.90	\$ 1,334.90	\$ 1,426.90	\$ 1,454.90	\$ 1,482.90
	Annual Change	N/A	\$ 68.00	\$ 92.00	\$ 28.00	\$ 28.00
Upper Fintry	User - Basic	\$ 172.50	\$ 198.00	\$ 202.00	\$ 206.00	\$ 210.00
	User - Consumption ¹	\$ 22.31	\$ 22.31	\$ 22.31	\$ 22.31	\$ 22.31
	Asset Renewal	\$ 50.00	\$ 60.00	\$ 61.00	\$ 62.00	\$ 63.00
	Total	\$ 244.81	\$ 280.31	\$ 285.31	\$ 290.31	\$ 295.31
	Annual Cost	\$ 979.25	\$ 1,050.25	\$ 1,141.25	\$ 1,161.25	\$ 1,181.25
	Annual Change	N/A	\$ 71.00	\$ 91.00	\$ 20.00	\$ 20.00

¹ - Based on 2018 annual average consumption per connection by water system

² - Annual cost for 2019 based on July, 2019 effective date

Attachment(s):

Asset Management Investment Plan, Urban Systems 2018

Asset Management Investment Plan

(An Asset Renewal Forecast)



prepared for:
Regional District
of Central Okanagan

NOVEMBER 2018

URBAN
systems



TERMS AND DEFINITIONS

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

ANNUAL AVERAGE LIFE CYCLE INVESTMENT (AALCI): Annual budget based on annual average of the total replacement value of an asset over its expected service life determined by the asset management plan

ASSET: A physical component of a system that has value, enables services to be provided, and has an economic life of greater than 12 months

ASSET CONDITION: The state of an asset, particularly regarding its appearance, quality, or working order

ASSET MANAGEMENT: The process of making decisions about the use and care of infrastructure to deliver services in a way that considers current and future needs, manages risks and opportunities, and makes the best use of resources

ASSET MANAGEMENT PLAN: A long term plan to identify asset management needs, establish longer term financing means, and regularly schedule maintenance, rehabilitation and replacement works for the long-term sustainability of the asset

ASSET MANAGEMENT POLICY: Principles and mandated requirements derived from, and consistent with, the organizational strategic plan, providing a framework for the development and implementation of the asset management strategy and the setting of the asset management objectives

ASSET MANAGEMENT STRATEGY: Long-term optimized approach to management of the assets, derived from, and consistent with, the organizational strategic plan and the asset management policy

ASSET RENEWAL: Work on an asset (or component) that brings the asset back to new condition or the complete replacement of the asset (in situ) with a new asset providing the original (intended) level of service

COST: In asset management, the financial and human resources required throughout the lifecycle of the asset

INFRASTRUCTURE RENEWAL DEFICIT (BACKLOG): A measure of the amount of infrastructure that has passed its theoretical service life but is still providing service to the community

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

LIFE CYCLE COSTS: The total costs estimated to be incurred in the design, construction, operation, maintenance, and final disposition of a physical asset or system over its anticipated useful life span

LIFE CYCLE MANAGEMENT: Retaining an asset as near as practicable to its original condition, from the point when a need for it is first established, through its design, construction, acquisition, operation and any maintenance or renewal, to its disposal

REVENUE: The income received by the RDOO from taxes, user fees, government transfers and other sources. Own sources revenues is 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)

Asset Risk – An event where an asset failing to perform as you need it to. Examples of asset risks are a broken sewer pipe or potholed road surface.

Strategic Risk – Events or occurrences that impact your ability to achieve objectives.

REGULATORY REQUIREMENT: Capital works to meet existing or new provincially or federally legislated standards.

SERVICE: A system that fulfills a public need such as transportation and sewage collection

SERVICE LIFE: The estimated lifespan of a depreciable fixed asset, during which it can be expected to contribute to a municipality's operations/service delivery

TANGIBLE CAPITAL ASSET (TCA): An Asset that has a physical form for use in the operations and delivery of services. Tangible assets include fixed assets, such as water, sewer, roadways and buildings (fixed assets are sometimes referred to as 'plant'). Tangible capital assets must be accounted for and reported as assets on the Statement of Financial Position as part of PS 3150.

TRIPLE BOTTOM LINE APPROACH: Utilizing economic, social and environmental metrics (i.e. quantifiable impacts to costs, mobility, and watercourses/habitats) in assessing and/or prioritizing investments.

USEFUL LIFE: The minimum life expectancy commonly used for asset life. This is typically used for TCA reporting (as opposed to for asset management purposes).

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 unfunded liability 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

Unfunded Liability 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, existing reserve balances, risk, all future capital needs (water treatment is included), 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.



EXECUTIVE SUMMARY

The Regional District of Central Okanagan (RDCO) Environmental Services Department owns and maintains a large portfolio of infrastructure assets upon which it greatly relies for the delivery of services to the region. This infrastructure includes the ESD's water systems, sewer systems, solid waste assets as well as a wide variety of vehicles.

Some of the RDCO's assets, such as the Killiney Beach water system, date back to the 1960's while the sewer system is relatively young at 1990'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.

The Asset Management Investment Plan (AMIP) provides a review of RDCO's Water, Sanitary, and Solid Waste assets to answer the following questions:

- 1 What assets does the RDCO own?
- 2 What is the forecasted cost to replace the asset?
- 3 How much money needs to be invested annually (on average) to sustain the RDCO's assets?

By understanding the answer to these questions, the RDCO 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 RDCO can ensure that services are sustainable so that current and future generations can enjoy the same levels of service as well as user fees and charges.

Table 1.1: 20 Year Average Annual Investment and Average Annual Life Cycle Investment

Asset Category	20 Year Average Annual Investment (\$M)	Average Annual Life Cycle Investment (\$M)
Killiney Water System	\$486,783	\$294,509
Falcon Ridge Water System	\$19,819	\$40,523
Star Place Water System	\$16,571	\$13,965
Ranch Water System	\$41,115	\$127,236
Westshore Water System	\$793,796	\$556,993
Flinty Water System	\$17,771	\$172,465
Sanitary Sewer System		
Wastewater Collection	\$57,888	\$354,806
Treatment	\$1,498,799	\$1,828,463
Sunset Sanitary	50	\$18,798
Solid Waste	\$582,278	\$583,828
Total	\$3,215,422	\$3,869,818

WHAT ASSETS DOES THE REGIONAL DISTRICT OWN?

For the purposes of the AMIP the RDCO's assets have been separated into 3 categories: water system, sanitary system, and solid waste.

The sanitary sewer is comprised of approximately 20km of sewer pipes in addition to manholes, lift stations, force mains and treatment facilities.

The water system is comprised of six separate water systems which include Killiney Beach, Falcon Ridge, Sunset Ranch, Westshore, Flinty and Star Place, each of which have a series of water pipes, reservoirs, pumps and treatment facilities.

The solid waste category includes the curbside carts and transfer stations.

All of these infrastructure assets are required to deliver the services that are valued by the residents of Central Okanagan.

WHAT IS THE COST TO REPLACE THE ASSETS?

The total replacement value of the RDCO's infrastructure is approximately \$140 million, based on current construction costs. Broken down as follows:

	Sanitary System	\$85M
	Water Systems	\$62M
	Solid Waste	\$12M

The water and sewer systems make up the majority of the infrastructure value (91%) with solid waste accounting for 9% of the total value. The Wastewater Treatment Plant is valued at \$50M or 36% of the total infrastructure value.

HOW MUCH MONEY NEEDS TO BE INVESTED ANNUALLY?

There is no single "correct" answer to this question. Accurately predicting when infrastructure will need to be replaced is very difficult if not impossible to do. The service life of an asset such as a pipe depends on many factors such as the materials it is constructed from, the properties of the soils that it is buried in, how it was installed and many, many other factors. For this reason lifespan estimates are generally based on "rule of thumb" values. Most rule of thumb lifespans applied by engineers are conservative (on the safe side). In reality many assets could actually last much longer (50% longer or possibly more) than these estimates. For this reason, we have included two indicators for informing the targeted annual investment amount: the annual average life cycle investment (AALCI) and the 20 year average annual investment (AAI). See Table 1.1 for details.

The AALCI is presented at \$3.8M/yr using the conservative rule of thumb lifespan. The AAI is \$3.5M/yr for the twenty year horizon using the same service life estimates. By assuming the assets will last longer (lower annual investment level) the RDCO assumes more risk. It is at the discretion of the RDCO Board to decide what level of risk they are comfortable with and to revisit those assumptions on a regular basis. The focus of this report supports the conservative measure of funding the AALCI; however, the AAI should be considered if more funds are required in the near term for immediate improvements.

INTRODUCTION

Many governments, like RDCO, are turning toward asset management as a process for making informed infrastructure decisions, build financial capacity to renew, operate and maintain existing infrastructure so that the RDCO can continue to provide services, effectively manage risks, and provide tax payers with the best value for money.

A key next step for RDCO in achieving this outcome is to improve its understanding of costs through completing a detailed asset assessment (cost forecast) of the community's future infrastructure renewal investment requirements. This forecast will provide staff with improved information (cost and timing) and key indicators to inform infrastructure investment decision-making and assist in aligning priorities and setting utility rates. To accomplish this, the RDCO engaged Urban Systems to complete a long term (integrated) Asset Management Investment Plan (AMIP).

The AMIP is based on the BC Framework (see Figure 1.1) and was developed to identify and assess the expected replacement costs and needs for each of RDCO's assets. The AMIP (Appendix A) consolidates all of the long term costs and timing for a community's major infrastructure categories into a long-term asset renewal forecast. This enables the RDCO to see a forecast of their infrastructure's life cycle cost pressures in one place, at a glance. The AMIP is also an ideal tool to engage rate payers by showing how infrastructure performance and age is linked to annual investments (into reserves or renewal projects). The AMIP includes details and summaries of:

- current replacement value
- infrastructure deficit
- looming future costs
- AALCI required for on-going investment planning
- forecasted renewal of public infrastructure (AAI)

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.

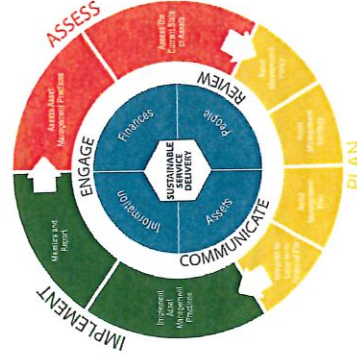


Figure 1.1: Asset Management for Sustainable Service Delivery, A BC Framework

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:

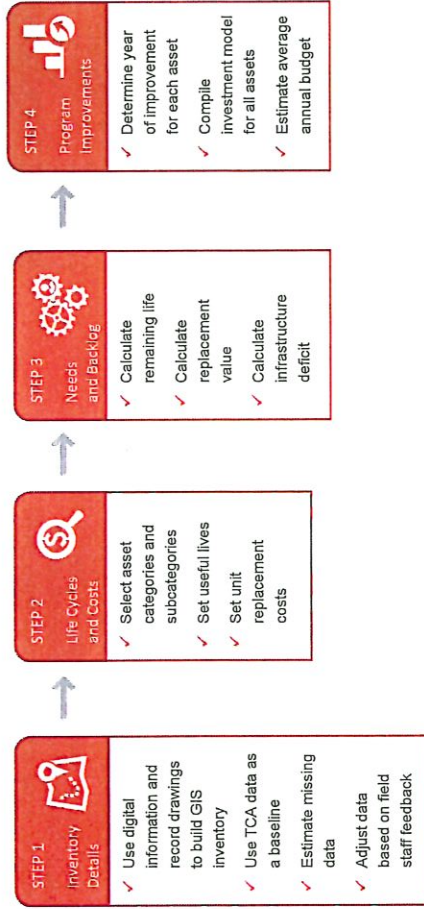
- be financially sustainable over the long term;
- reduce the need to place a large financial burden on future generations;
- increase the likelihood that user fees and rates are stable and consistent and reduce the need to have large 'one-off' increases; and
- increase the likelihood that service levels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

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

AMIP METHODOLOGY

The AMIP forecast is predominantly based upon infrastructure service lives, but also considers condition assessment information where available. To develop the AMIP, a 4-Step analytical approach was used (see Figure 2.1 below).

Figure 2.1: AMIP Development Steps



The AMIP outlines the following:

- Current replacement value;
- Remaining value;
- Expected life remaining;
- Required improvements;
- Infrastructure deficit (backlog);
- 20 year renewal costs and timing (including future looming costs); and,
- Average Annual Life Cycle Investment (AALCI)

The AMIP is a spreadsheet which is delivered in three (3) inter-connected levels:

- 1** Summary for investment planning and decision-makers;
- 2** Detailed data for ongoing reporting, operations and maintenance; and
- 3** Highly detailed segment by segment information regarding the linear infrastructure such as pipe and roads.

RDCO's AMIP for asset renewal was built using the best linear and non-linear asset data available. The most recent digital infrastructure information for RDCO has been reviewed for use in developing the AMIP. This information is primarily based on compiled infrastructure record drawings and GIS datasets received from the RDCO, coupled with information from the Tangible Capital Assets (TCA) inventory. An estimate was made for missing data where possible. The GIS information was the primary source used for the majority of the asset inventory which was cross checked against the operations department's record information and anecdotal knowledge of the systems.

As a next step in the evolution of the RDCO's asset management process, the AMIP inventory should be built upon to develop a prioritized capital plan based on risk, service and cost. It also is suggested that the RDCO continue to undertake an on-going program for improving data collection in order to refine the complete data set for long term asset management purposes.

¹The expected life remaining is a ratio between remaining life and replacement value. This is based on straight line depreciation of the asset over its service life.

²AALCI is the annual depreciation of the replacement value. The AALCI represents the ideal annual budget allocation. Annual surpluses would go into reserves and be drawn upon for renewal of assets. When the annual budget is less than the AALCI, the sustainability gap grows.

The benefits of the AMIP's Level 1 summary include:

- Presents a complete and concise summary of all infrastructure assets on 1 page;
- Provides a comprehensive focus and format for community infrastructure outreach programs;
- Uses very detailed information from Level 2, which provides invaluable asset details for more credible and defensible decisions on infrastructure re-investment; and
- Encourages exploration of sustainable infrastructure renewal funding levels.

HOW TO USE THE INVESTMENT PLAN MODEL

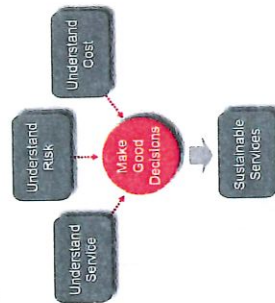
The forecast model is driven by input tables; however, when sufficient data is not available for the input tables, or asset-specific changes are made, then estimates are done in the excel worksheets. In addition to its financial information, the investment plan database also uses the following asset attributes:

- Location
- Material or Make
- Size or Model
- Dimensions
- Quantity
- Year Built
- Service Life
- Condition rating (where available) and
- Installation cost:
- *Recent Tendered Construction costs;*
- *Construction contingency costs;*
- *Planning and design costs;*
- *Project management costs;* and
- *Construction administration costs.*

The AMIP model is designed to keep calculating year after year. The AMIP can be updated each year by adjusting the model to the current year (Input Table), updating unit costs and other replacement values to reflect inflation, and updating the asset inventory to include annual project renewals, decommissioning, and new acquisitions.

The power of the AMIP model is that it uses actual replacement costs, service lives based upon healthy maintenance programs, and summarizes all infrastructure information in Level 1 to assist RDCO in better understanding their cost pressures to help inform their budgeting and infrastructure decisions (Figure 2.2).

Figure 2.2 Informed Decision Making



AMIP RESULTS

The AMIP's Level 1 summary presents a one page overview of asset renewal needs, rolled-up for all asset categories and sub-categories in RDCO. It presents the current renewal investment forecast for RDCO's major asset categories over a 20 year period, using a conservative life span estimate and includes indicators for forecasting a sustainable infrastructure funding level.

This AMIP scenario assumes that an adequate annual operations and maintenance (O&M) budget is in place to optimize asset service lives. Reduced or inadequate O&M budget levels would reduce the service lives. More detailed information regarding each individual asset categories can be seen in the level 2 summaries (section 4). Table 1.2 summarizes the key results of the AMIP.

Table 1.2: AMIP Summary

Asset Category	100% Replacement Value	Expected Remaining Life	Infrastructure Deficit (Backlog)	20 Year Average Annual Investment (AAI)	Average Annual Life Cycle Investment (AALCI)
Killiney Water System	\$19,273,855	39%	\$0	\$486,783	\$324,569
Falcon Ridge Water System	\$4,206,342	69%	\$165,000	\$19,819	\$60,523
Star Place Water System	\$657,710	56%	\$0	\$16,571	\$13,985
Sunset Ranch Water System	\$7,964,002	78%	\$0	\$41,115	\$127,326
Westshore Water System	\$17,513,365	22%	\$1,684,901	\$793,798	\$358,992
Flinty Water System	\$12,752,730	92%	\$0	\$17,771	\$172,145
Sanitary Sewer System					
Westside Collection	\$24,315,287	70%	\$850,000	\$57,888	\$354,808
Treatment	\$56,381,162	65%	\$7,636,441	\$1,498,799	\$1,828,863
Sunset Sanitary	\$3,872,645	87%	\$0	\$0	\$38,798
Solid Waste	\$11,682,562	53%	\$0	\$582,878	\$583,828
Total	\$158,619,663	60%	\$10,336,342	\$9,515,422	\$3,863,818

Average Annual Life Cycle Investment (AALCI): forecasted annual investment needed to sustain existing infrastructure over its service life (over the next 20 years and beyond).

20 Year Average Annual Investment (AAI): total forecasted investment needed to replace infrastructure that has passed its theoretical service within the next 20 years.

Infrastructure Deficit (Unfunded Liability): is a measure of the amount of infrastructure that has already passed its theoretical service life but is still providing service to the community. This infrastructure should be inspected to determine if replacement is necessary or not.

ASSET REPLACEMENT VALUE

The estimated full replacement value of RDCO's major infrastructure assets is approximately \$158 million (2018) based on current tender prices in the BC Interior region and best practices for setting service lives. A copy of the inputs (unit costs and service lives) is located in Appendix B.

Table 1.2 (above) provides a summary of the replacement value of existing infrastructure, with some regulatory requirements for the water system included. The AMIP should be used to inform the development of a comprehensive capital plan so that these items can be integrated together.

Figure 3.2 illustrates the percent breakdown of RDCO's infrastructure value by asset category.

Approximately 90% of RDCO's infrastructure is made of up Water and Sanitary assets which mean majority of the total long term expenditures should be on these assets. On average, RDCO assets are considered to be in fair to good condition with an average expected remaining life of 67% and there are assets (\$10.3M) that have passed their theoretical service life which should be inspected in the field prior to investing in their replacement. In the twenty year horizon there is approximately \$67M forecasted in assets that may need to be renewed. These results are comparable to other communities of similar size and age to RDCO.

INFRASTRUCTURE DEFICIT (UNFUNDED LIABILITY)

Infrastructure deficit (\$10.3M) is a measure of the amount of infrastructure that has passed its theoretical service life but is still providing service to the community.

Current Year > Year of Asset Renewal

Figure 3.2 Infrastructure Value Distribution

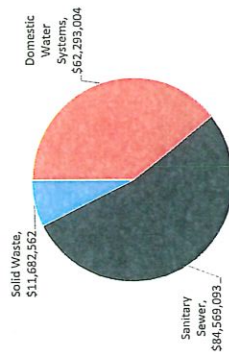
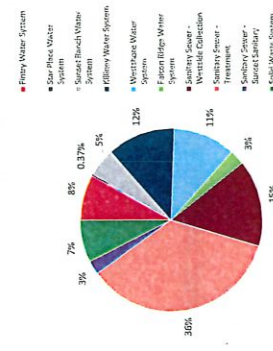


Figure 3.3 AALCI Value Distribution



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 future expenditures to a deficit or vice versa. For example: an asset is scheduled for replacement in 2018 which means the asset has passed its theoretical service life and will be recorded as a deficit. If that assets service life is extended, the asset is now scheduled in a future year as an asset replacement and not a deficit.

AVERAGE ANNUAL LIFE CYCLE INVESTMENT (AALCI)

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

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

The AALCI (\$3.8M) is the forecasted ideal (maximum) funding level for sustaining existing infrastructure over the life cycle of the assets and should be a long term target for the community. When planned for appropriately, the AALCI can be used in ensuring long term revenue stability, preventing unnecessary risk, and enabling a community to apply one-time funding to support new asset/capital needs as opposed to addressing emergency situations.

Ideally RDCO should endeavor, depending on risk tolerance and service levels, to budget for this amount each year, and what is not spent goes into infrastructure reserve accounts for future renewal. Figure 3.3 illustrates the value and percent breakdown of RDCO's AALCI distribution based on the conservative estimate of service life scenario.

20 YEAR AVERAGE ANNUAL INVESTMENT (AAI)

Another indicator that can be used to determine the appropriate investment level is the 20 Year Average Annual Investment (AAI).

Total Anticipated 20 Year Capital Expenditure
20 Years

This indicator provides a value of how much should be invested on an annual basis at a minimum to fund asset replacements anticipated over the next 20 years (\$3.5M).

Service life directly affects the timing of the 20 year expenditures as it dictates when an asset is scheduled for replacement. For example: If the asset service life is extended, the replacement year might change from 2035 to 2045 which defers the project outside the 20 year planning horizon and reduces 20 Year AAI. It is important to note that this does not make the expenditure disappear but instead it just postpones it. This is why the AALCI may be better long term financial indicator (target) because it accounts for replacements outside the planning horizon.

RDCO should consider its affordability limits, costs, risk and service in determining the annual investment amount into infrastructure. Later sections of this report provides some considerations and recommendations for RDCO in considering its sustainable infrastructure funding levels.

STATE OF RDCO'S INFRASTRUCTURE

This section details the AMIP findings by each of the RDCO's asset categories (Level 2).

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 typically do not account for new investment required to satisfy: regulatory requirements, growth/ expansion, safety improvements, or economic development. In this report, we have at the request of RDCO, included cost for future regulatory requirements (ie. UV Treatment)

3

How much life is left in our assets?

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 will our assets pass their estimated service life?

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 water mains that are predicted to need replacing. While it is unlikely that all of these water mains 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.

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 (Unfunded Liability)
- (refer to Terms and Definitions)

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

- These investment level indicators do not account for existing reserves balances or future grants. These indicators are to be used as a forecast of costs to inform the RDCO's revenue requirements.

- Each of these indicators are calculated using replacement costs and service life estimates. 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.

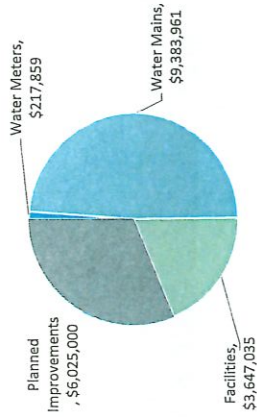


WATER SYSTEMS – KILLINEY

What assets do we own?



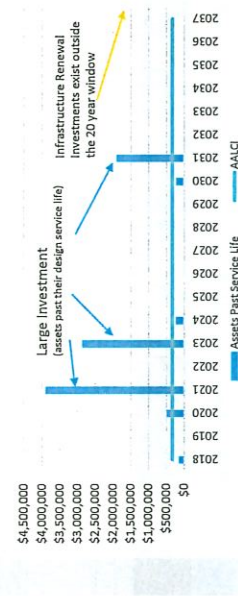
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

Asset Description		Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Water Meters	Sub-category			
Water Mains	Diameter (mm)			
>= 600		0%	\$0	\$0
500		0%	\$0	\$0
450		0%	\$0	\$0
400		0%	\$0	\$0
350		0%	\$0	\$0
300		65%	\$154,400	\$1,544
250		62%	\$1,267,793	\$12,678
200		62%	\$3,908,554	\$39,086
150		36%	\$4,053,216	\$40,532
<150		51%	\$9,383,961	\$93,840
Facilities				
Reservoirs		83%	\$1,770,035	\$22,125
Pumphouse		62%	\$1,427,000	\$35,675
Intakes		56%	\$300,000	\$3,750
PRV's		0%	\$150,000	\$4,286
Total without Planned Improvements		56%	\$3,647,035	\$65,836
			\$13,248,855	\$170,569
Planned Improvements				
Back-up Generator (3)		0%	\$225,000	\$9,000
Treatment		0%	\$5,800,000	\$145,000
		0%	\$6,025,000	\$154,000
Grand Total		39%	\$19,273,855	\$324,569

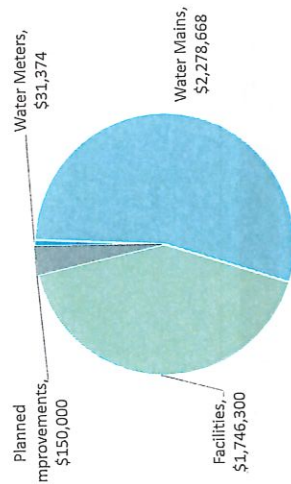


WATER SYSTEMS – FALCON RIDGE

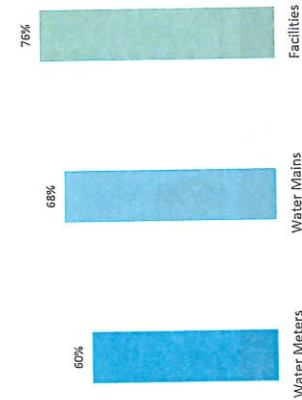
What assets do we own?



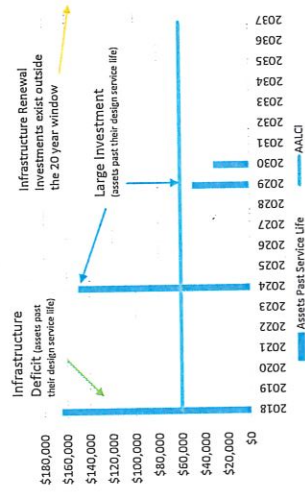
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

How much do we need to invest in our assets?

Sub-category		Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Water Meters			\$31,374	60%	\$1,569	\$1,569
		Diameter (mm)				
Water Mains			\$0	0%	\$0	\$0
200			\$1,563,690	71%	\$0	\$15,637
150			\$714,978	63%	\$0	\$9,201
100			\$2,278,668	68%	\$0	\$24,838
Facilities						
WELL KIOSK			\$15,000	0%	\$750	\$600
WELL			\$150,000	0%	\$7,500	\$6,000
PUMPHOUSE			\$50,000	28%	\$2,500	\$1,250
INTAKE			\$150,000	98%	\$0	\$3,000
RESERVOIRS + UV			\$1,381,300	84%	\$0	\$17,266
			\$1,746,300	76%	\$10,750	\$28,116
Total without Planned Improvements			\$4,056,342	72%	\$12,319	\$54,523
Planned Improvements						
Back-up Generator (2)			\$150,000	0%	\$7,500	\$6,000
			\$4,206,342	69%	\$19,819	\$69,523
Grand Total						

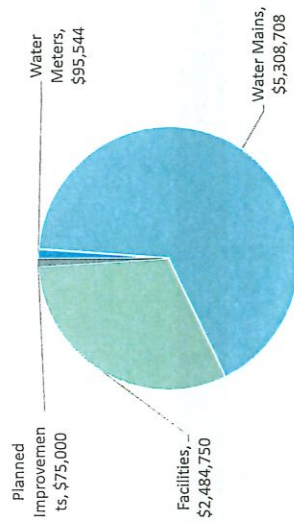


WATER SYSTEMS – SUNSET RANCH

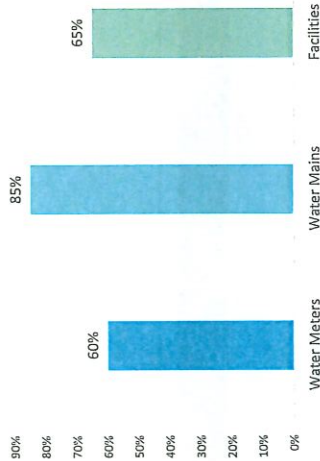
What assets do we own?



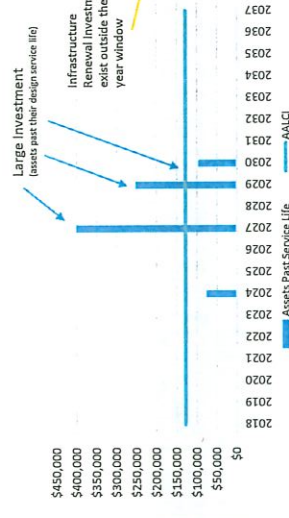
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Water Meters					
Water Mains					
250	Diameter (mm)	\$95,544	60%	\$4,777	\$4,777
200		\$220,919	89%	\$0	\$2,763
150		\$3,178,960	88%	\$0	\$31,309
<150		\$1,862,382	80%	\$0	\$24,868
		\$26,445	89%	\$0	\$264
		\$5,308,708	85%	\$0	\$59,204
Facilities					
Manholes, Sampling, Chlorination		\$91,750	41%	\$3,838	\$3,370
PRV		\$75,000	36%	\$3,750	\$3,000
RESERVOIR		\$918,000	80%	\$0	\$11,475
PUMP HOUSE		\$900,000	68%	\$0	\$22,500
WELL		\$500,000	40%	\$25,000	\$20,000
		\$2,484,750	65%	\$12,488	\$60,345
		\$7,889,002	78%	\$37,965	\$124,326
Total without Planned Improvements					
Planned Improvements		\$75,000	0%	\$3,750	\$3,000
Planned Back-up Generator (s)		\$7,964,002	78%	\$41,115	\$127,326
Subtotal					

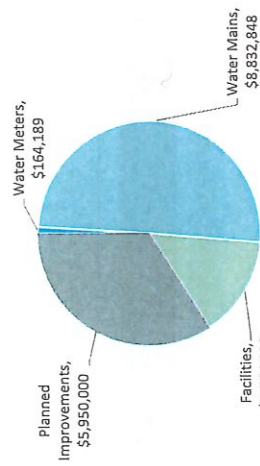


WATER SYSTEMS – WESTSHORE

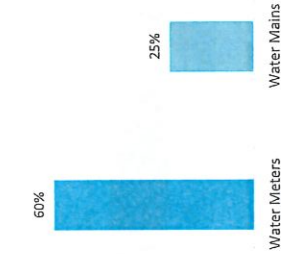
What assets do we own?



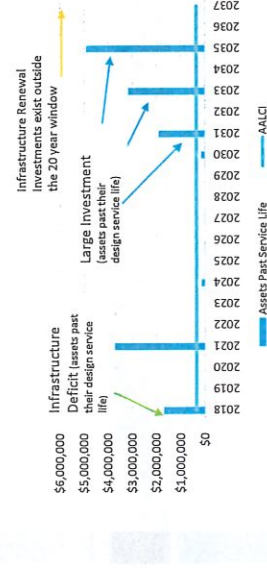
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Water Meters					
Water Mains	Diameter (mm)				
450		\$0	0%	\$0	\$0
400		\$0	0%	\$0	\$0
350		\$0	0%	\$0	\$0
300		\$28,507	28%	\$1,425	\$475
250		\$1,206,429	28%	\$60,321	\$20,107
200		\$1,395,696	27%	\$69,671	\$23,262
150		\$5,148,691	27%	\$257,435	\$85,812
<150		\$1,053,525	11%	\$50,486	\$23,183
		\$8,832,848	25%	\$439,338	\$152,838
Facilities					
Reservoirs		\$1,441,328	99%	\$0	\$18,017
Intake		\$300,000	0%	\$15,000	\$7,500
Pumphouse		\$600,000	0%	\$30,000	\$15,000
PRVs		\$225,000	59%	\$3,750	\$6,429
		\$2,566,328	61%	\$48,750	\$16,945
		\$11,561,365	34%	\$499,298	\$207,993
Total without Planned Improvements					
Planned Improvements					
Back-up Generator (2)		\$150,000	0%	\$7,500	\$5,000
Treatment		\$5,800,000	0%	\$290,000	\$145,000
		\$5,950,000	0%	\$297,500	\$151,000
Grand Total		\$17,513,365	22%	\$793,798	\$358,993

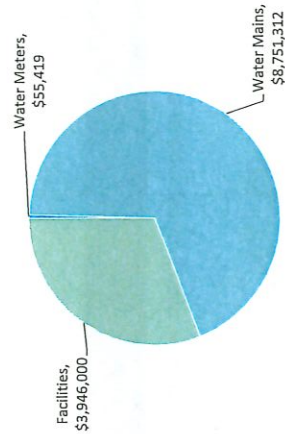


WATER SYSTEMS – FINTRY

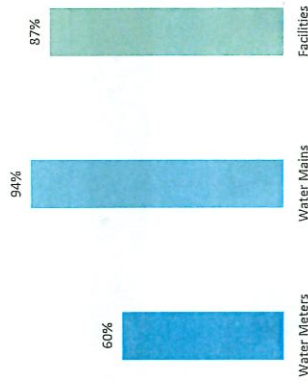
What assets do we own?



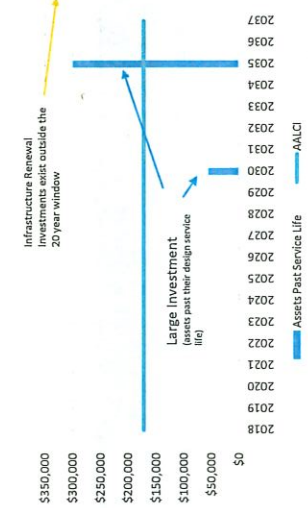
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Water Meters					
Water Mains		\$55,419	60%	\$2,771	\$2,771
>= 600		\$0	0%	\$0	\$0
500		\$0	0%	\$0	\$0
450		\$0	0%	\$0	\$0
400		\$0	0%	\$0	\$0
350		\$3,822,416	94%	\$0	\$38,224
300		\$902,138	94%	\$0	\$9,021
250		\$1,884,976	94%	\$0	\$18,850
200		\$1,709,334	94%	\$0	\$17,093
150		\$432,448	94%	\$0	\$4,324
<150		\$8,751,312	94%	\$0	\$87,513
Facilities					
PRESSURE REDUCING		\$150,000	83%	\$0	\$4,286
PUMP HOUSE		\$1,750,000	83%	\$0	\$43,750
RESERVOIR		\$1,746,000	93%	\$0	\$21,625
WELL		\$300,000	68%	\$15,000	\$12,000
		\$3,946,000	87%	\$15,000	\$81,861
Total		\$12,752,730	93%	\$17,771	\$172,145

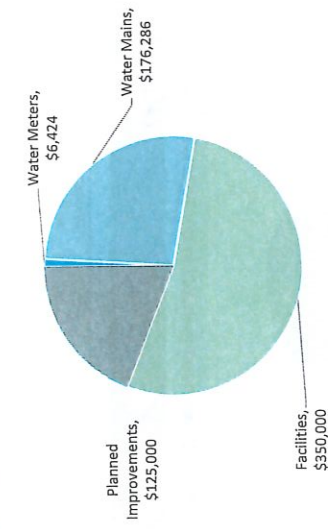


WATER SYSTEMS – STAR PLACE

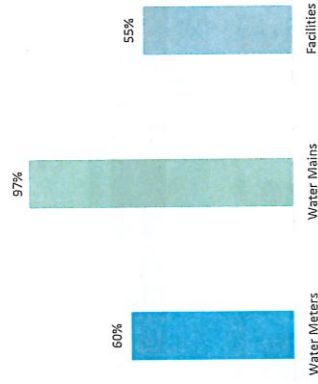
What assets do we own?



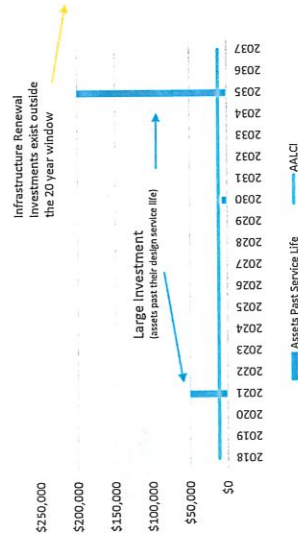
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Water Meters		\$6,424	60%	\$321	\$321
Water Mains	Diameter (mm)				
300	\$0	0%	\$0	\$0	\$0
250	\$0	0%	\$0	\$0	\$0
200	\$0	0%	\$0	\$0	\$0
150	\$176,286	97%	\$0	\$0	\$2,518
<150	\$176,286	97%	\$0	\$0	\$2,518
Facilities		\$350,000	55%	\$10,000	\$6,875
Reservoir and Pump House		\$532,740	69%	\$10,321	\$9,715
Total without Planned Improvements					
Planned Improvements					
Back-up Generator (1)	\$75,000	0%	\$3,750	\$3,000	\$3,000
Treatment (UV/Filtration)	\$50,000	0%	\$2,500	\$2,500	\$1,250
	\$125,000	0%	\$6,250	\$6,250	\$4,250
Grand Total	\$657,740	56%	\$16,571	\$16,571	\$13,965

SANITARY SYSTEM – COLLECTION SYSTEM

What assets do we own?



Mains

19.4 km



Force mains

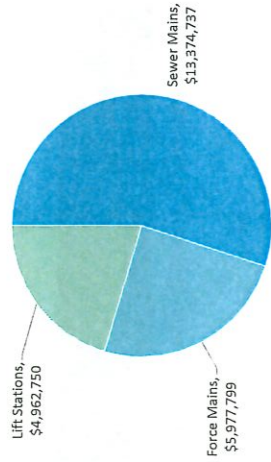
9.9 km



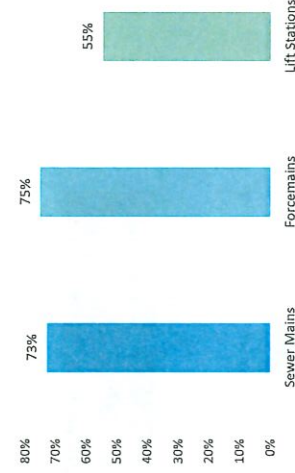
Lift Stations

2

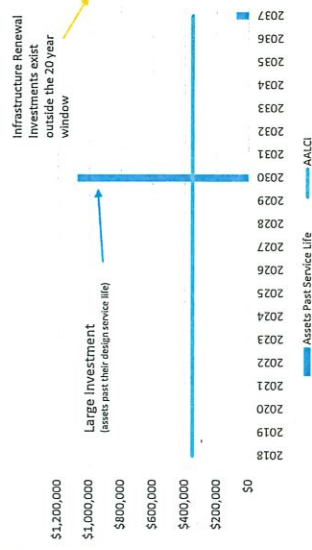
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

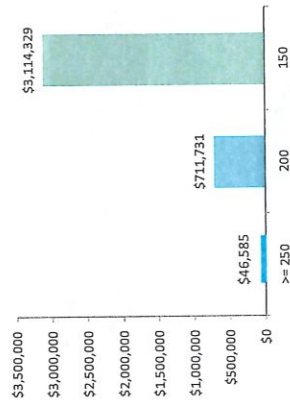
Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Gravity Mains					
Sewer Mains	Diameter				
>= 600	>= 600	\$4,737,861	69%	\$0	\$51,888
525	525	\$1,099,013	73%	\$0	\$11,699
450	450	\$1,682,214	70%	\$0	\$18,459
375	375	\$3,978,158	77%	\$0	\$40,546
300	300	\$4,005,316	79%	\$0	\$10,772
250	250	\$276,116	74%	\$0	\$2,761
200	200	\$596,058	76%	\$0	\$5,961
		\$13,374,737	73%	\$0	\$143,785
		\$5,977,799	75%	\$0	\$75,698
Force mains					
Lift Stations					
Casa Loma		\$1,944,000	58%	\$43,200	\$56,700
East Trunk		\$3,018,750	53%	\$14,688	\$80,625
		\$4,962,750	55%	\$57,888	\$137,325

SANITARY SYSTEM – SUNSET SANITARY SYSTEM

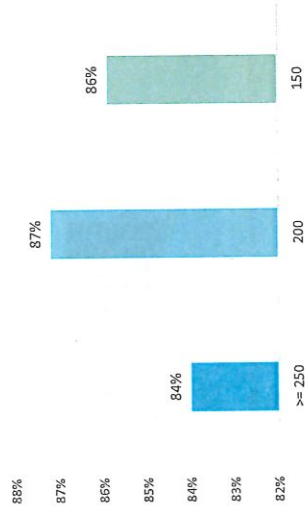
What assets do we own?



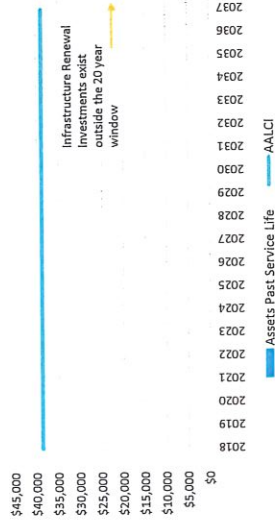
How much are our assets worth?



How much life is left in our assets?



When will our assets pass their estimated service life?



How much do we need to invest in our assets?

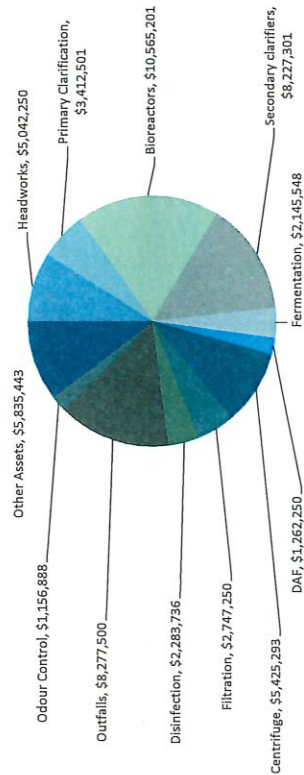
Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Sunset Sanitary System					
>= 250	Diameter >= 250	\$711,731	84%	\$0	\$7,117
200	200	\$3,114,329	87%	\$0	\$31,215
150	150	\$46,585	86%	\$0	\$466
		\$3,872,645	87%	\$0	\$38,798

SANITARY SYSTEM - WWTP

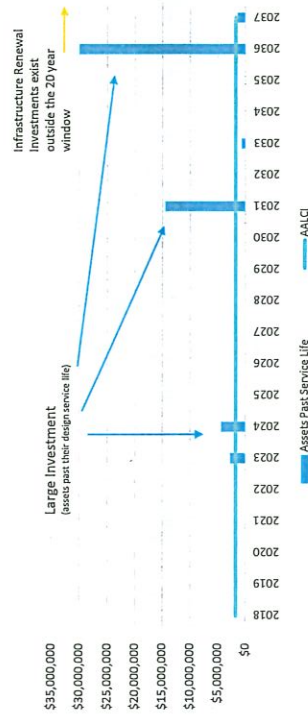
What assets do we own?



How much are our assets worth?



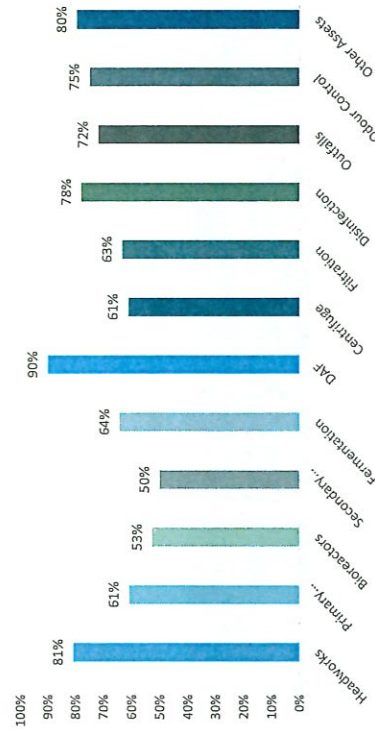
When will our assets pass their estimated service life?



How much do we need to invest in our assets?

Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Treatment					
Headworks		\$5,042,250	8%	\$139,050	\$167,316
Primary Clarification		\$3,412,501	6%	\$38,843	\$71,766
Bioreactors		\$10,565,201	53%	\$364,500	\$405,440
Secondary clarifiers		\$8,227,301	50%	\$292,941	\$322,547
Fermentation		\$2,145,548	6%	\$54,290	\$67,537
DAF		\$1,262,250	90%	\$33,750	\$41,091
Centrifuge		\$5,425,293	6%	\$162,000	\$189,316
Filtration		\$2,747,250	63%	\$108,000	\$115,341
Disinfection		\$2,283,736	78%	\$78,689	\$87,563
Outfalls		\$8,277,500	73%	\$77,625	\$161,688
Odour Control		\$1,156,888	75%	\$57,237	\$71,389
Other Assets		\$5,835,443	80%	\$91,905	\$141,872
		\$56,381,162	65%	\$1,498,799	\$1,828,863

How much life is left in our assets?



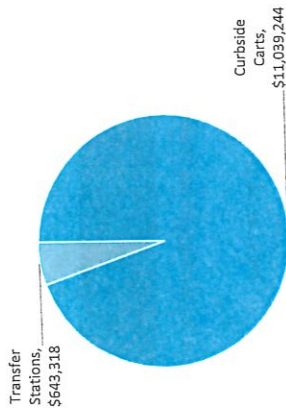
SOLID WASTE SYSTEM

What assets do we own?



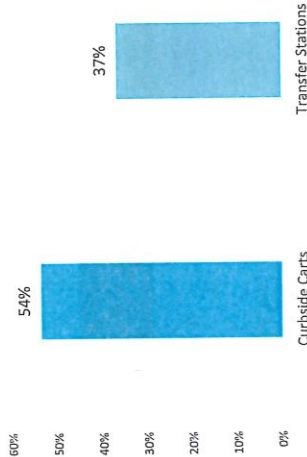
Curbside Carts

178,532



How much are our assets worth?

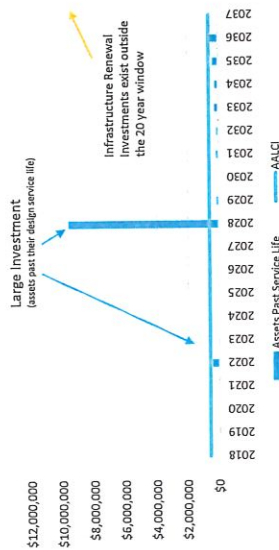
How much life is left in our assets?



Transfer Stations

3

When will our assets pass their estimated service life?



How much do we need to invest in our assets?

Sub-category	Asset Description	100% Replacement Value	Expected Remaining Life	20 Year Average Annual Investment	Average Annual Life Cycle Investment (AALCI)
Curbside Carts					
Kelowna	120L	\$ 2,064,480	54%	\$ 103,224	\$ 103,224
	240L	\$ 4,300,956	51%	\$ 215,048	\$ 215,048
	360L	\$ 897,450	69%	\$ 44,873	\$ 44,873
Sub-Total		\$ 7,262,886	54%	\$ 363,144	\$ 363,144
West Kelowna	120L	\$ 547,740	50%	\$ 27,387	\$ 27,387
	240L	\$ 1,312,344	53%	\$ 65,617	\$ 65,617
	360L	\$ 229,125	68%	\$ 11,456	\$ 11,456
Sub-Total		\$ 2,089,209	53%	\$ 104,460	\$ 104,460
Lake Country	120L	\$ 221,799	50%	\$ 11,090	\$ 11,090
	240L	\$ 552,354	54%	\$ 27,618	\$ 27,618
	360L	\$ 135,400	71%	\$ 6,270	\$ 6,270
Sub-Total		\$ 899,553	55%	\$ 44,978	\$ 44,978
Peachland	120L	\$ 133,518	50%	\$ 6,676	\$ 6,676
	240L	\$ 315,678	50%	\$ 15,784	\$ 15,784
	360L	\$ 25,800	50%	\$ 1,290	\$ 1,290
Sub-Total		\$ 474,996	50%	\$ 23,750	\$ 23,750
RDCC	120L	\$ 89,709	52%	\$ 4,485	\$ 4,485
	240L	\$ 206,316	51%	\$ 10,316	\$ 10,316
	360L	\$ 16,575	50%	\$ 829	\$ 829
Sub-Total		\$ 312,600	51%	\$ 15,630	\$ 15,630
Total		\$ 11,039,244	54%	\$ 551,962	\$ 551,962

Transfer Stations					
092 WESTSIDE TRANSFER STATION		\$568,304	31%	\$28,415	\$29,115
		\$25,000	77%	\$0	\$2,500
093 WESTSIDE LANDFILL		\$50,014	80%	\$2,501	\$2,501
Sub-Total		\$ 643,318	37%	\$30,916	\$31,866

MOVING FORWARD

Based on the results of the AMIP, the previously completed assessment of current practices, and the process outlined in the Asset Management for Sustainable Service Delivery, A BC Framework, the following section outlines a matrix with a list of steps (tools) and priorities for consideration of an advanced level of practicing asset management.

The steps outlined below are organized deliberately in order to promote successful implementation and improve understanding in the three pillars that inform infrastructure decisions – Cost, Risk and Service.

Number	Priority Name	BC Asset Management Framework Process	Description
1	Cross-Functional Team	People	Create a collaborative cross functional team made up of core departmental representatives to support and mentor on infrastructure decision-making and budgeting within the RDCO and their respective departments.
2	Asset Management/Financial Policy	Plan	Develop an asset management policy that encompasses procedures for data handling/tracking/updating and sharing, project prioritization, risk, and infrastructure investment decisions. The policy could include statements on how infrastructure investment will be funded whether it's through building reserves, debt or taxes, etc.
3	Setting Annual Infrastructure Investment Levels and Update Water and Sewer Rates	Plan	Consider the results of the AMIP, DCC and policy discussions to determine the affordable annual contribution to infrastructure investment (likely somewhere between the AAJ and the AALCI amounts depending on risk tolerance and service levels). Update the water and sewer rate bylaws to increase revenues to achieve the desired investment levels for renewal.
5	Maintenance Management Plans	Implement Asset Management Practices	The importance of maintenance in extending service lives of assets and deferring their inevitable replacement (reducing the annual capital investment) is paramount to provide acceptable levels of service with fewer financial resources. Develop plans (including work orders, standard operating procedures, etc) for the O&M of assets to optimize/extend asset service lives.
6	Communications/Engagement	Core Element	Develop asset management/infrastructure communications with staff and the public (e.g. benefits, requirements, products, progress). Community buy-in will be essential for setting levels of service and achieving financial sustainability/full cost recovery for service delivery.
7	Performance Measures	Measure and Report	Develop performance metrics to measure and report out on the RDCO's service delivery/asset management status to the Board and the community. These would include a set of both "leading" and "lagging" indicators that evaluate the sustainability of services (E.g. number of m of pipe replaced, number of m ² of pavement replaced or avoided etc).
8	Refine Asset Inventory	Information	Continually update and refine your infrastructure data over time with new spatial and attribute data to improve accuracy as it becomes available through field activities. Consider completing an inventory and valuation of your natural Assets.

APPENDIX A

AMIP LEVEL 1

RDCO Asset Management Investment Plan (AMIP) Level 1 - Summary of Water, Sanitary and Solid Waste Infrastructure												
Asset Category	Total Replacement Value	Less in Value	Remaining Value	Expected Remaining Life	Infrastructure (Backup)	2018	2019	2020	2021	2022	2023	2024
Domestic Water Systems												
Renewal												
Water Meters	\$55,419	\$22,168	\$33,251	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mains	\$5,383,861	\$1,588,862	\$3,794,999	94%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Facilities	\$3,484,000	\$513,164	\$2,970,836	87%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$13,752,710	\$1,062,410	\$11,690,300	92%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Star Place Water System												
Renewal												
Water Meters	\$6,424	\$2,469	\$3,954	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mains	\$376,286	\$4,961	\$371,325	97%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Facilities	\$350,000	\$158,125	\$191,875	55%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Planned Improvements	\$725,000	\$0	\$725,000	0%	\$0	\$0	\$0	\$0	\$50,000	\$0	\$0	\$75,000
Total	\$1,457,710	\$165,655	\$1,292,054	56%	\$0	\$0	\$0	\$0	\$50,000	\$0	\$0	\$75,000
Sunset Ranch Water System												
Renewal												
Water Meters	\$95,544	\$38,218	\$57,326	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mains	\$5,308,708	\$800,116	\$4,508,592	85%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Facilities	\$2,484,750	\$870,380	\$1,614,370	65%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Planned Improvements	\$725,000	\$0	\$725,000	0%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$75,000
Total	\$7,994,002	\$1,708,714	\$6,285,288	78%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$75,000
Kilgus Water System												
Renewal - Treatment												
Water Meters	\$217,859	\$87,144	\$130,715	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mains	\$3,883,861	\$4,961	\$3,878,900	91%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Facilities	\$1,113,593	\$1,113,593	\$0	0%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Planned Improvements	\$5,025,000	\$0	\$5,025,000	0%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$225,000
Total	\$10,237,855	\$5,817,655	\$4,420,200	33%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$225,000
Westshore Water System												
Renewal - Treatment												
Water Meters	\$164,189	\$65,676	\$98,513	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mains	\$8,832,848	\$6,610,130	\$2,222,718	25%	\$709,501	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Facilities	\$2,566,328	\$1,010,159	\$1,556,169	61%	\$975,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Planned Improvements	\$5,950,000	\$0	\$5,950,000	0%	\$0	\$0	\$0	\$3,900,000	\$0	\$0	\$0	\$0
Total	\$17,513,365	\$7,685,865	\$9,827,500	23%	\$1,684,501	\$0	\$0	\$3,900,000	\$0	\$0	\$0	\$0
Palon Ridge Water System												
Renewal												
Water Meters	\$31,374	\$12,549	\$18,824	60%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mains	\$2,278,668	\$720,300	\$1,558,368	68%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Facilities	\$1,746,800	\$421,010	\$1,325,790	76%	\$165,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Planned Improvements	\$3,600,000	\$0	\$3,600,000	0%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$150,000
Total	\$7,656,842	\$1,153,859	\$6,502,983	69%	\$165,000	\$0	\$0	\$0	\$0	\$0	\$0	\$150,000
Total Water	\$52,368,004	\$7,599,667	\$44,768,337	52%	\$1,849,501	\$450,000	\$0	\$10,671,556	\$50,000	\$0	\$15,385,259	\$600,000
Sanitary Sewer												
Renewal												
Sewer Mains	\$13,374,237	\$3,024,483	\$10,349,754	73%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Force Mains	\$5,877,799	\$1,481,081	\$4,396,718	75%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lift Stations	\$4,862,750	\$2,247,775	\$2,614,975	55%	\$850,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sunset Ranch Sewer Mains	\$4,862,750	\$2,247,775	\$2,614,975	55%	\$850,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Treatment	\$3,872,645	\$3,333,233	\$539,412	87%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Planned Improvements	\$56,381,362	\$3,094,325	\$53,287,037	0%	\$7,638,441	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$84,368,693	\$27,886,787	\$56,481,906	67%	\$8,488,441	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Solid Waste												
Renewal												
Combinde Cans	\$11,039,244	\$5,102,825	\$5,936,419	54%	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Transfer Stations	\$643,318	\$406,612	\$236,706	37%	\$0	\$19,997	\$0	\$0	\$0	\$0	\$451,247	\$0
Total	\$11,682,562	\$5,509,437	\$6,173,125	53%	\$0	\$19,997	\$0	\$0	\$0	\$0	\$451,247	\$0

APPENDIX B

INPUTS

UNIT COST DERIVATION

The following is intended to outline how the unit costs included in the Asset Management Investment Plan were developed. The primary basis for most unit costs for the water and sewer assets is based on recently tendered projects in the Central Okanagan region.

Sanitary Sewer

Inputs

Pipe, Appurtenances (connection, manholes, services), road restoration, removals, engineering and contingency

In order to determine a per metre price, it was assumed a 100m long segment would include:

- 1 manhole (incl. 1m riser), 1 tie-in connection, 6 services
- 3.5m wide trench wide- asphalt removal, trench restoration, and asphalt restoration
- Soft Costs- engineering and contingency

Pipe

Per metre price:

Diameter (mm)	Unit Cost	Diameter (mm)	Unit Cost
200	\$165	525	\$410
250	\$170	600	\$500
300	\$205	750	\$640
350	\$235	900	\$790
375	\$235	1050	\$950
450	\$320	1200	\$1,350

Appurtenances

- 6 services (assume 10m long c/w IC) = (6 x \$2,600ea) /100m = \$156.00/m
- 1 Connection = (1 x \$3,500 ea) /100m = \$35.00/m
- 1 Manhole = (1 x \$3,505 ea) /100m = 35.05/m
- Total = \$226.05/m

Road Restoration (3.5m wide trench per metre of pipe)

Asphalt (assume 75mm thick unit price)
\$25.30m² x 3.5m x 1m = \$88.55 /m

Base gravel (assume 100m thick)
\$51.28 m³ x 3.5m x 1m x 0.1m = \$17.95/m
Total = \$106.50/m

Removals (3.5m wide trench per metre of pipe)

Asphalt removal
\$4.28 m² x 3.5m x 1m = \$14.98/m

Engineering & Contingency

Design - 7%, CA - 8%, Contingency - 20% = 35%

Total per m = Pipe cost per metre + \$226.05 + \$106.50 + \$14.98 + 40%

Water

Inputs

Pipe, Appurtenances (connection, fittings, services), road restoration, removals, engineering and contingency

In order to determine a per metre price, it was assumed a 100m long segment would include:

- 4 fittings, 2 tie-in connections, 6 services
- 3.5m wide trench wide- asphalt removal, trench restoration, and asphalt restoration
- Soft Costs- engineering and contingency

Pipe
Per metre price:

Diameter (mm)	Unit Cost	Diameter (mm)	Unit Cost
50	\$60	350	\$250
100	\$120	375	\$325
150	\$140	400	\$420
200	\$165	450	\$470
250	\$210	525	\$510
300	\$240	600	\$600

Appurtenances

6 services (assume 10m long c/w IC) = \$156.00/m
(6 x \$2,600 ea) /100m=

2 Connections = (2 x \$3,000 ea)/100m = \$60.00/m

4 Fittings = (4 x \$750 ea) /100m = \$30.00/m

Total = \$246.00/m

Road Restoration (3.5m wide trench per metre of pipe.)

- Asphalt (assume 75mm thick unit price)
\$25.30m² x 3.5m x 1m = \$88.55 /m
 - Base gravel (assume 100m thick)
\$51.28 m³ x 3.5m x 1m x 0.1m = \$17.95/m
- Total = \$106.50/m

Removals (3.5m wide trench per metre of pipe).

- Asphalt removal
\$4.28 m² x 3.5m x 1m = \$14.98/m

Engineering & Contingency

Design -7%, CA-8%, Contingency - 20% = 35%

Total per m = Pipe cost per metre + \$246.00 + \$106.50 + \$14.98 + 40%



APPENDIX B

Service Life Estimates

The service life of an asset such as a pipe depends on many factors such as the materials it is constructed from, the properties of the soils that it is buried in, how it was installed and many, many other factors. For this reason, lifespan estimates are generally based on "rule of thumb" values. Most rule of thumb lifespans applied by engineers are conservative (on the safe side). In reality many assets could actually last much longer (50% longer or possibly more) than these estimates. The following tables summarize the "rule of thumb" values utilized in the AMIP.

The unit costs and service life estimates for the WWTP have been provided under separate cover. Unit costs for solid waste and other assets not included above will be based on historical cost (from invoices or TCA spreadsheets) and increased to 2017 dollars using the Engineering News record (ENR) cost increase factors.

Sanitary Sewer System	
Pipe Material	Life Expectancy (years)
AC	70
CONC	70
VCT	70
STEEL	70
PVC/HDPE	100
Component	
Pump Stations – Short lived	25
Pump Stations – Long Lived	80

Water Distribution System	
Pipe Material	Life Expectancy (years)
AC	80
CI	80
DI	60
COPPER	60
GALV	40
STEEL	60
Polyethylene	80
HDPE	80
PVC	100
Component	
Wells/Pumps/Treatment	25
Reservoirs	80
Flow Meters	30
Appurtenances	20

