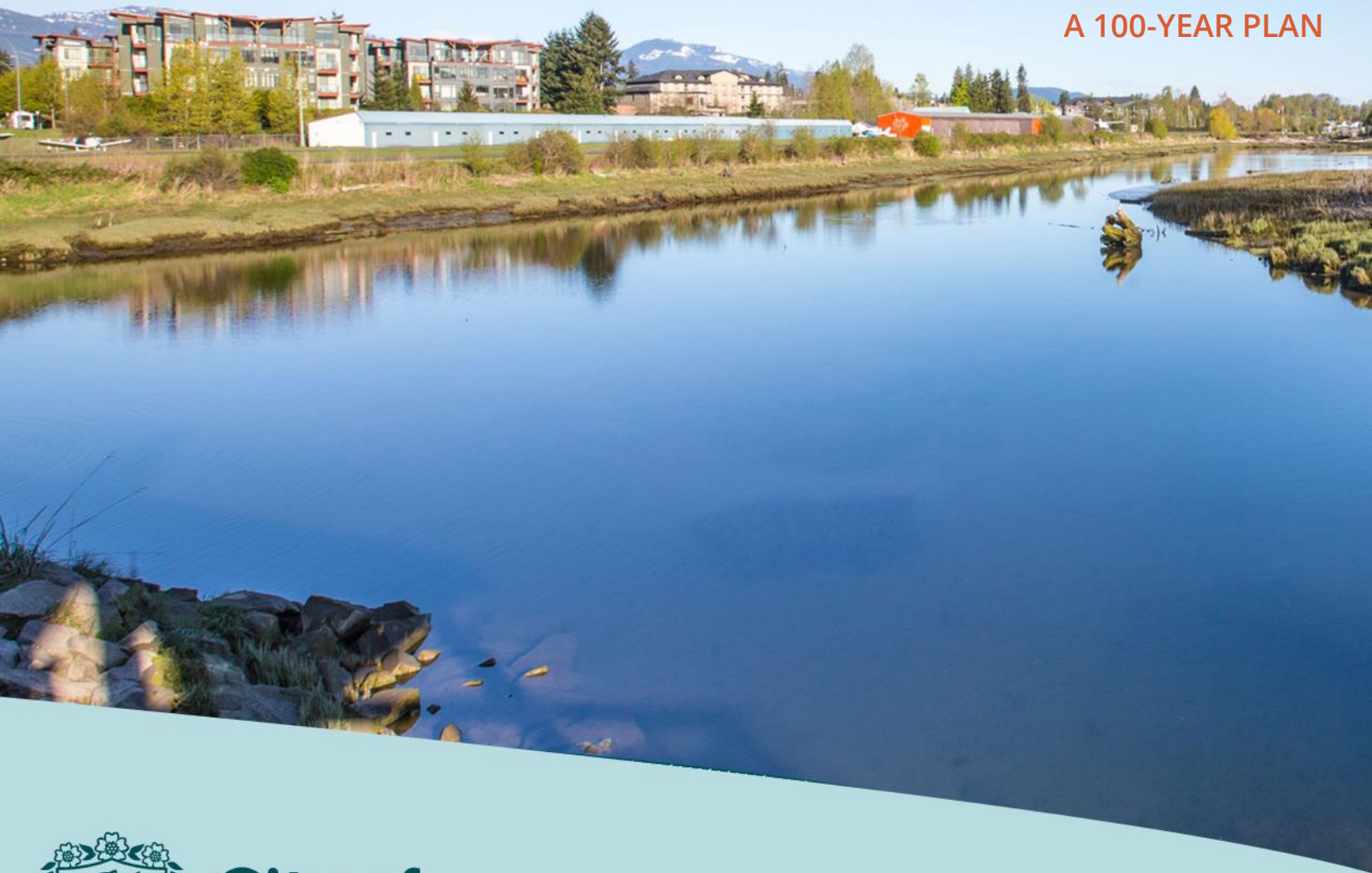
May 2024

Sustainable Infrastructure Investment Plan

"SIIP"

A 100-YEAR PLAN



City of Courtenay

Acknowledgment of Traditional Land

The City of Courtenay respectfully acknowledges that we are within the Unceded Traditional Territory of the K'ómoks First Nation, the traditional keepers of this land.

Thank you for taking the time to learn about the City of Courtenay's plan to replace its infrastructure in a sustainable way.

Contents

Acknowledgments

The Sustainable Infrastructure Investment Plan (SIIP) was prepared with significant input from key City departments. Specifically, the following staff and consultants provided essential data, information, feedback, and support:

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Introduction

The City of Courtenay (the City) is situated on the east coast of central Vancouver Island, within the traditional lands of the K'ómoks First Nation. Accessible by land, sea, or air, the City is a culturally diverse community offering supernatural beauty at its doorstep. The City has a population of 28,420 (2021) and is the urban and cultural hub of the Comox Valley.

The history of the City's infrastructure is unique. Starting as the small commercial hub of the Comox Valley, the City has grown into a desirable location for residents and businesses to call home. In the early 1960s, the City sold its municipal power utility to BC Hydro. It used the proceeds to install a sewer utility and sidewalk network in what was then a compact community at the confluence of the Puntledge, Tsolum and Courtenay Rivers. The City remained small until the late 1980s, when a combination of large developments and annexations expanded its borders, bringing statutory responsibilities to steward infrastructure management. At the time, the community had a good tax base to fund projects until the departure of two large industrial taxpayers (a sawmill and a milk processing facility) significantly reduced the City's revenue stream.

While the City has a significant amount of infrastructure for a community of its size, much of it was acquired through developer contributions, inheritance from annexations, or debt financing for community amenities built decades ago. The last several years has seen investments in valued infrastructure upgrades. Recently, the expansion of the bicycling network has made great strides in laying the groundwork for transportation mode shifts for many years to come. That being said, the City has a responsibility to balance future plans to improve the community with the stewardship of the core services residents and business have come to rely upon.

The time has come to responsibly consider the priorities for our infrastructure's maintenance, renewal, and growth.

Maintenance
The actions necessary to retain or restore an asset to functioning condition *(excluding rehabilitation or renewal).*
Maintenance may be preventative or corrective.

Executive Summary

Since its incorporation in 1915, the City has accumulated more than $1 Billion worth of infrastructure. While the City was established over a century ago, its infrastructure is, on average, relatively new. This is mainly due to the significant growth the City has experienced over the past 30 years. However, some of the infrastructure in the older areas of the City was installed well over 60 years ago. This infrastructure is reaching the end of its functional useful life and urgently needs replacing as failures are occurring more regularly. Approximately $82.2 million of the City's assets are considered beyond their functional useful lives, known as the infrastructure backlog, and with only $15.5 million set aside in infrastructure-related reserves the backlog could grow to $246 million in the next 20 years if we continue on the same path.

The City of Courtenay owns and operates a broad range of municipal infrastructure assets, including:

- **Wastewater System**
- **Stormwater System**
- **Water System**
- **Transportation System**
- **Parks and Recreation**
- **Facilities**
- **Fleet and Equipment**

While the City has made modest commitments over the years for infrastructure replacement, current funding levels for asset renewal are not sustainable to ensure long-term:

- service delivery,
- maintenance of assets, and
- replacement of assets.

Without taking steps to close the infrastructure funding gap now, the City will incur significant debt, resulting in financial hardships for future generations.

Functional Useful Life:
An asset's expected time to be in service before some form of intervention is required.

The Sustainable Infrastructure Investment Plan is a combination of an asset management plan (a spending plan) and a long-term financial plan (a funding plan). The average useful life of a municipal asset is 62 years; a renewal and funding plan needs to look beyond the 20- or 50-year horizon to forecast how decisions today will impact the City far into the future.

To address these concerns, the City has prepared this Sustainable Infrastructure Investment Plan (SIIP), a direct outcome of Council's Strategic Priorities, to focus on asset management for sustainable service delivery for the next 100 years. The purpose of this SIIP is to provide a background of the City's infrastructure renewal needs and financial projections and to provide recommendations to sustainably fund long-term capital renewal.

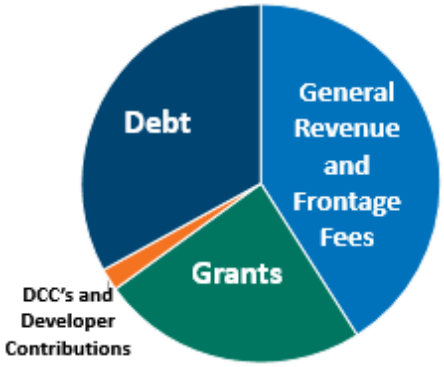
Based on recent financial assessments, this SIIP determines there is an **annual $8.9M sustainable funding shortfall**. In addition, as of 2022, there is an **infrastructure renewal backlog of $82.2M**, representing infrastructure beyond its service life. If underfunding continues, the backlog could grow to $246M over the next 20 years.

Using an asset renewal and funding forecast model to track infrastructure age, useful life, condition, and replacement cost, it is possible to determine the funding required for infrastructure renewal. Based on condition assessments and using a practical risk tolerance approach, the following infrastructure service lives and sustainable funding levels were determined:

Asset Class	Quantity	Replacement Cost	Useful Life	Annual Sustainable Funding*	Actual Annual Funding**	Annual Funding Gap
Stormwater	167km	$302M	84 years	$3.0M	$0.3M	$2.7M
Transportation	353 lane km	$178M	36 years	$3.4M	$2.5M	$900k
Facilities	22 Admin; 37 Rec & Culture	$63M	47 years	$1.3M	$0.6M	$700k
Fleet and Equipment	136 units	$15M	13 years	$1.1M	$0.6M	$500k
Parks and Recreation	35 parks; 37 km trails	$30M	45 years	$0.6M	$0.3M	$300k
Water	173km	$233M	81 years	$2.8M	$0.7M	$2.1M
Wastewater	160km	$265M	94 years	$2.6M	$0.9M	$1.7M
Total		**$1.08B**	**62 years**	**$14.8M**	**$5.9M**	**$8.9M**

* Source: Asset Management Investment Plan model
** Source: 2020 – 2026 Annual Financial Plans

Current capital spending for upgrades and renewal averages $15.8M per year, with one-third of that amount funded via debt. The 2021-2026 five-year financial plan forecasts that the City will borrow an average of $5.3M annually. If this continues, the debt will grow to $106M over the next 20 years, reaching a point where debt interest costs could be nearly equal to the principal payment. The average annual funding for capital projects from various sources is as outlined in the table below.

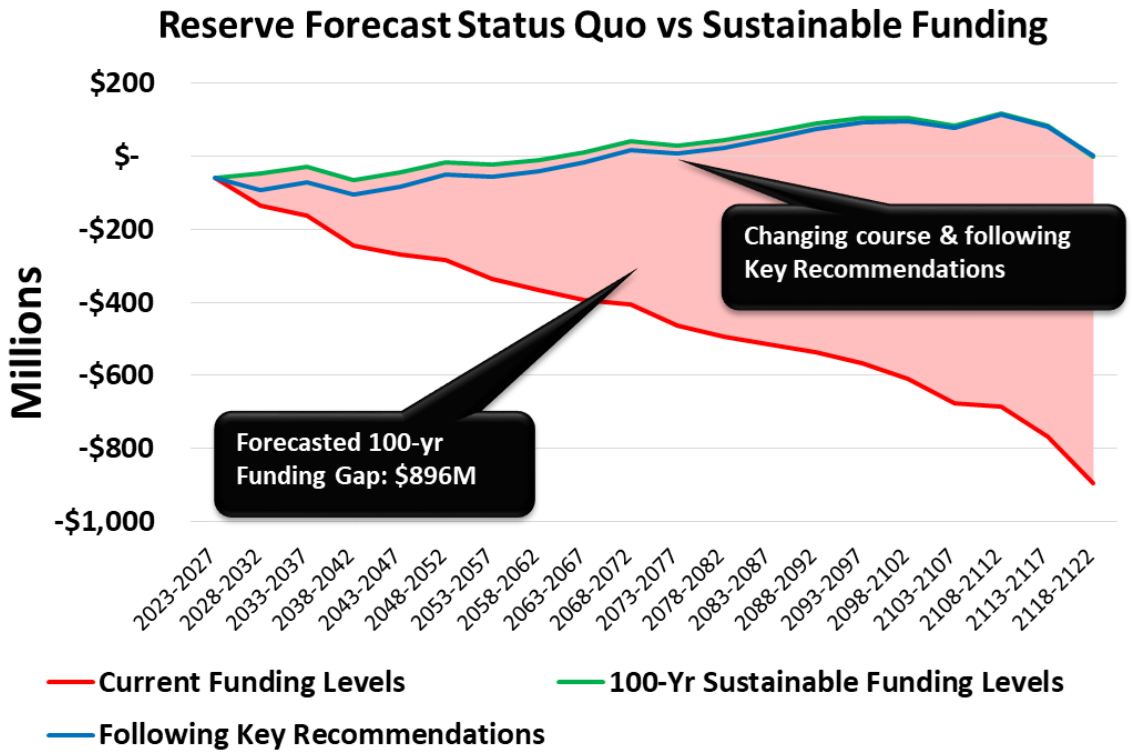


Funding Source	Average 2020 - 2026
General Revenue and Frontage Fees	41%
Grants	24%
DCC's and Developer Contributions	2%
Debt	33%

DCC:
Development Cost Change.

Considering this annual funding deficit for infrastructure renewal, limited grant availability, and the long-term costs of debt a decision needs to be made on new ways to fund the City's renewal obligations.

An illustrative example to forecast the funding gap is to model the 100-year spending versus funding provided during that timeframe. Modelling indicates that Infrastructure Replacement spending needs will exceed $1.4 Billion over the next 100 years (shown below). Current funding will provide $590M over the same timeframe ($5.9M per year for 100 years). This results in a 100-year funding gap of approximately $896M ($1,486M - $590M).



If we continue underfunding our infrastructure renewal in this way, projected revenue will be insufficient to cover anticipated expenses. Significant challenges include

- sustainably funding infrastructure renewal,
- risk-managing the current infrastructure backlog, and
- overcoming cash flow challenges over the next 20 years to fund the existing planned improvements.

Current funding levels for asset renewal are not sustainable in the long term.

By taking a multi-faceted approach to balancing costs and revenue, the City will be able to close the funding gap.

This Sustainable Infrastructure Investment Plan provides specific Key Recommendations, on page 15, for achieving these goals. Additionally, staff will continue to investigate various solutions for closing the sustainability gap and will assist the City in determining the affordability limits for its infrastructure systems.

By dedicating funds today towards future asset renewal, the City will be able to prepare itself for long-term sustainability. Taking a proactive approach will also be looked upon favorably by senior levels of government on infrastructure grant applications.

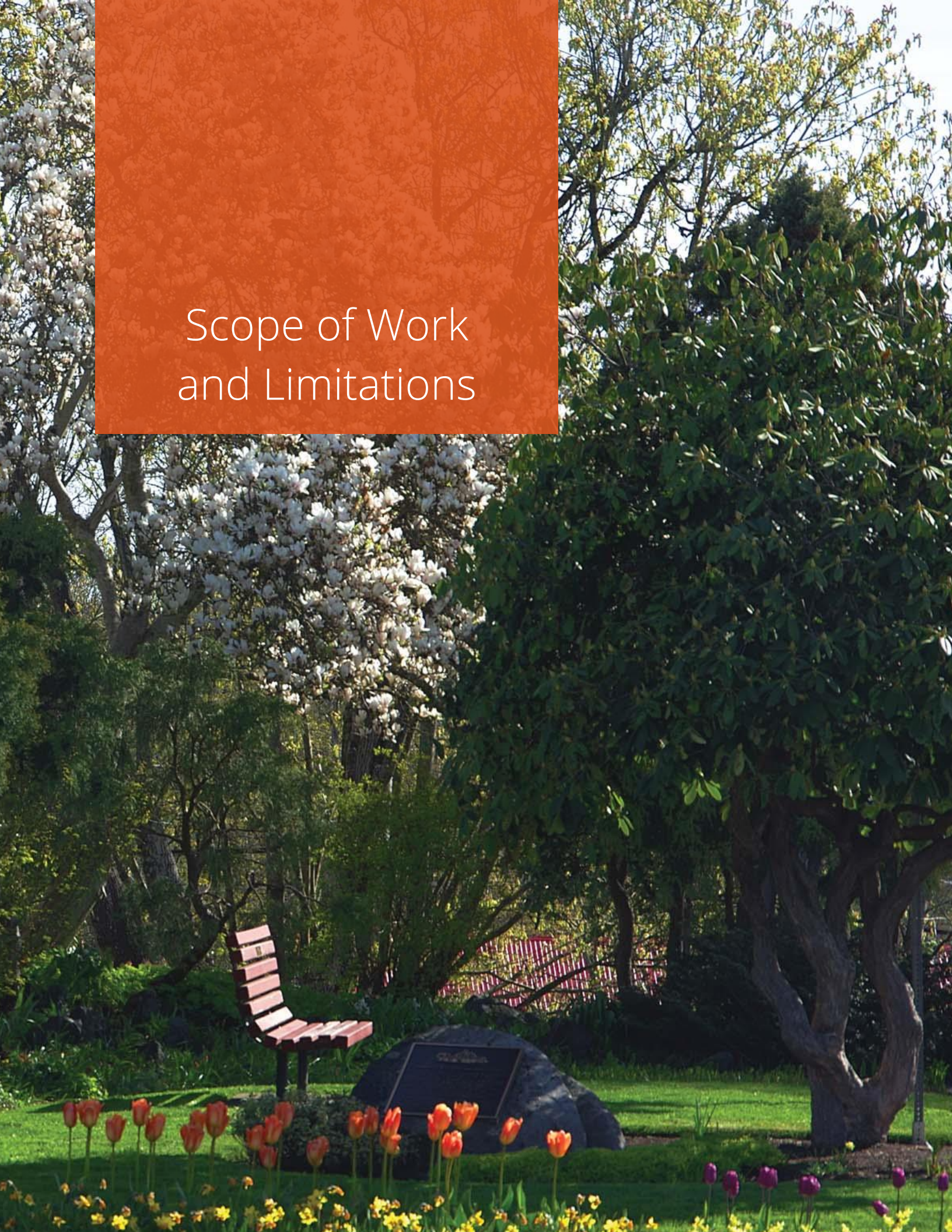
Asset:
Also known as a tangible capital asset, is a physical component of a system that has value, enables services to be provided, and has an economic life of greater than 12 months.

"Every Service we deliver depends upon the many millions of dollars in tangible capital assets owned by the City.

Led by Council, we have a statutory responsibility for the stewardship of those assets on behalf of all the present users, and on behalf of all those who will use them in the future."

October 2014 CAO Briefing Note to Council on
Asset Management Terms of Reference at the City of Courtenay

Scope of Work and Limitations



Objectives of the SIIP

1. Inventory of all the City's assets and estimate their useful life and replacement cost.
2. Using a 100-year timeframe, determine the required spending levels for infrastructure renewal.
3. Analyze and discuss levels of service.
4. Analyze future growth and infrastructure Master Plans for recommended funding levels.
5. Discuss risk in the context of asset renewal planning.
6. Discuss long-term funding needs for renewal.
7. Recommend tax and rate objectives to reach revenue goals.
8. Forecast reserve balances in the long-term.
9. Provide policy recommendations for sustainable capital service delivery.

Limitations of the SIIP

City-owned capital only: This SIIP examined capital owned solely by the City.

The analysis does not consider upgrading or replacing capital owned by other organizations, such as the Comox Valley Regional District. While the City contributes to capital funding for regional water, sewer projects, etc., the City is not an owner of the capital, and those assets will be captured in a separate asset management plan by the CVRD.

Projections: The revenue and cost projections are prepared in 2022 dollars. Adjustments for inflation have not been applied to the long-term projections. Regular updates to the asset management funding and revenue will be reported as costs change and the asset management program proceeds.

> The revenue and cost projections are prepared in 2022 dollars

Estimated accuracy: Forecasted costs for renewal or replacement of infrastructure are based on recent tenders or professional cost assessments for the Vancouver Island region.

Several factors can change forecasted values, including:

- Variation of the actual cost escalation experienced.
- Site conditions that impact useful life.
- Future risk tolerance and preferred service levels (to be discussed in other sections).
- Errors, omissions, or additions to the dataset.
- Changing economic events and conditions.
- New or changing regulations.
- Emergent conditions.
- Changing taxpayer and ratepayers' expectations.
- Rate of return on the City's investments.

Grant funding: Financial forecasts include modest estimates for potential conditional grants awarded by senior levels of government based on historical success rates. As senior level government grants are not typically awarded solely to replace existing infrastructure, forecasts primarily include ongoing funding agreements (i.e., Gas Tax grants).

> Senior level government grants are not typically awarded solely to replace existing infrastructure

Roadway assets: Estimates for the total cost to construct a road will typically include excavation and removal of road base and sub-base materials and the import of new base materials for construction. Road renewal cost estimates are based on the 'grind and pave' methodology: remove asphalt, repair spot defects, and repave. This is the City's current approach.

Building facility components: A condition assessment for all City owned facilities was completed in 2018. This included replacement costs and useful lives for all system components. Facilities assessed ranged from small seasonal recreation buildings to the Lewis Recreation Centre. For all buildings evaluated, the asset inventory and replacement schedule are based on the sum of the individual components rather than the total replacement cost of the entire facility.

Renewal standards: Cost estimates assume infrastructure will be replaced to the on a 'like for like' basis with the exception that new materials will be used, such as PVC pipe rather than Asbestos Cement or electric vehicles rather than traditional fleet vehicles (when feasible). The City's Subdivision and Servicing (SDS) bylaw is used for minimum pipe sizes for sewer and water distribution. To be pragmatic regarding replacement costs, the SDS bylaw is not used to estimate the cost of rebuilding entire roadways.

Climate change: Included is a discussion on the City's response to the effects of climate change on infrastructure. The Integrated Rainwater Management Plan is being completed concurrently with a Flood Management Strategy for the City. Further updates to the SIIP will integrate the recommendations for upgrades from these plans.

Natural Assets: This plan reviews the City's long-term engineered infrastructure renewal needs and financial funding. Further revisions of this plan may consider opportunities for integrating Natural Assets into the Asset Management Program.

Options for Council: Current and future Council decision-making concerning the level of risk, service levels, tax and rate revenue, and capital upgrade priorities have the most significant potential for impact on the financial modelling.

This SIIP should be considered a "living document" that will be updated and adjusted as new information becomes available. This will enable the SIIP to remain relevant and accurate going forward.

Subdivision and Servicing (SDS) Bylaw: Prescribes the minimum standards for works and services in the subdivision of land in the City. For roads this could include minimum width and depth, curbs and gutters, streetlights and all other associated assets for a new development

Key Findings and Recommendations

Key Findings

Asset Inventory
The City owns approximately $1.086 Billion in infrastructure (replacement cost in 2022 dollars).

$1.086B
Asset replacement cost

Infrastructure Backlog
Using pricing from capital projects along with considerable risk tolerance, the 2022 infrastructure backlog is $82M for all assets.

$82M
Infrastructure backlog cost

Annual Funding Gap
The current average funding for renewal is $5.9M, while the average annual contribution to renewal should be $14.8M, leaving a sustainability funding gap of $8.9M.

$8.9M
Sustainability Funding Gap

Future Growth
The City has recently completed Master Plans for Water and Sewer Utilities, Transportation, and Parks and Recreation. Carrying out commitments from these Master Plans will cost the City an estimated $64M in the future, based on a conservative estimate of the municipal portion of costs.

$64M
Future City Costs

Debt
According to the 2022 – 2026 Five Year Financial Plan, current debt is $11.6M. Funding renewal and Master Plan commitments through debt could see the City borrowing over $100M over the next 20 years.

$100M
Potential City Borrowing Costs

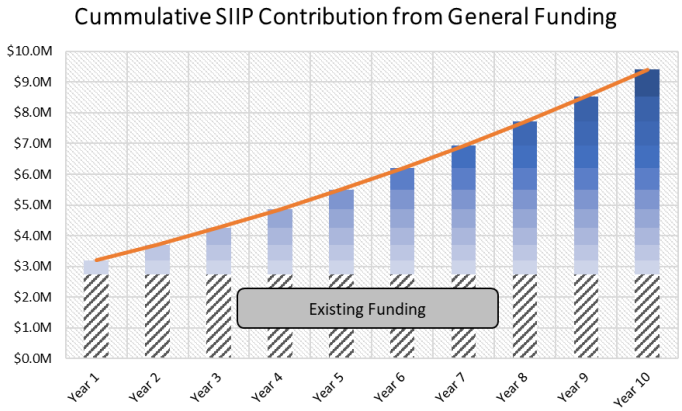
Cost of Climate Change
Municipalities will inevitably see increased costs for municipal infrastructure renewal in the face of climate change. This will result not only in added renewal requirements, such as larger drainage pipes, more substantial diking structures, or more robust pumps, but also in higher costs in materials and supply chain disruptions.

Unknown

Key Recommendations

Increase funding to sustainable levels.
There are several strategies for increasing infrastructure renewal funding. One such approach is implementing contributions to a Sustainable Infrastructure Investment Plan reserve, funded by tax and rate increases, to bring the City's infrastructure spending to sustainable levels. This approach will close the infrastructure gap. Different scenarios were considered for tax and rate increases, with the recommended cumulative increases shown in the table below. The various tax and rate increase options are outlined in Appendix C – Tax and Rate Options, with calculations for rate increases in Appendix D.

	Recommended Option	10-Year Average Contribution
Taxes	1.5% for ten years	$667,000



In addition to a dedicated renewal reserve, other options are available to the City to complement infrastructure funding. The following options would have minimal impact on current budgets:

Convert obsolete debt servicing budgets to infrastructure replacement reserve funding. Funds used to service debt payments for infrastructure projects would be paid into a capital reserve for future renewal.

Utilize Non-Market Change Revenue to increase the infrastructure replacement reserve funding until the annual funding gap is closed. Increased tax and rate revenue from City development growth would be paid to a capital renewal reserve for the replacement of development-contributed assets.

Integrate lifecycle costing in the City's decision-making in the following ways (as per the Asset Management Bylaw)[1]:

- A recent Purchasing Policy update has included a statement to focus on best value with consideration toward lifecycle costing when acquiring goods and services.
- Require a lifecycle costing analysis to be conducted when new capital expenditures are considered.
- Require a lifecycle costing analysis to be carried out for Council when considering rezoning, subdivisions, or other forms of development applications.

Aligning the City's investment portfolio with long-term cash flow projections will allow for the highest investment return

Align long-term cash flows with investment portfolio/horizon.

Aligning the City's investment portfolio with long-term cash flow projections will allow for the highest investment return. Investment returns can significantly reduce the City's need to raise taxes and utility fees to fund infrastructure replacement.

Update the DCC program

There has been significant growth in the City since the last DCC bylaw was written, and an update to the DCC program is needed.

Future Considerations:

Establish equitable infrastructure renewal contributions for each asset class.

Endeavour to fund infrastructure renewal for each asset category (Roads, Buildings, Parks) based on, for example, the relative overall value of the asset. An asset class renewal reserve could be used if more funding is required in a specific year for a particular project.

Strive for Efficient Capital Procurement and Delivery

It is paramount the City take every opportunity to look for efficiencies in the delivery of its capital works program with an updated four-year capital plan along with early conditional budget approvals to secure the best pricing and construction schedules.

Complete a strategic analysis of current service levels.

Increasing revenues can help, but there is a threshold of affordability for taxpayers. Therefore, a strategic analysis of current levels of service is required.

Develop a policy for borrowing versus pay-as-you-go

While borrowing can help address short-term cash flow challenges, developing a policy for borrowing versus pay-as-you-go should be considered. A renewal reserve can provide significant annual funds for infrastructure renewal, borrowing could be used for major capital projects requiring a one-time investment.

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[1] City of Courtenay Asset Management Bylaw No. 2981, 2019. (2019, December 2). Retrieved from https://www.courtenay.ca/assets/City~Hall/Bylaws/General~Regulatory/Bylaw-2981-Asset-Management-November-2019.pdf

Asset Management at the City of Courtenay

Asset Management for Sustainable Service Delivery

The SIIP's top priority is ensuring the long-term sustainability of services in the community. We need to be able to deliver these services in a socially, economically, and environmentally responsible manner. It is also essential that the decisions we make do not compromise the ability of future generations to meet their own needs. To this end, the City has invested for several years in staff training, developing asset inventories, condition assessments, and a Policy and Bylaw.

This SIIP integrates the work that has been accomplished in the Assess phase and addresses the Plan and Implement components of the Asset Management BC's Framework. This framework is a process developed by Asset Management BC to assist local governments in moving toward service, asset, and financial sustainability. It helps us to understand the City's current service delivery levels and financial state. It also allows us to strategize for sustainable service delivery for future generations.

Figure 1. Asset Management BC Framework for Sustainable Service

> The SIIP's top priority is ensuring the long-term sustainability of services in the community

Asset Management is a continuous quality improvement process to regularly improve practices toward sustainable service delivery. At the time of this report, significant work has already been completed in the three components of the process:

ASSESS

Starting in 2014, the City started a detailed inventory assessment of underground utilities including water, sanitary, and drainage using high accuracy GPS and GIS mapping software.

A full-scale pipe inspection program began in 2016 with nearly the entire network of sanitary and storm pipes completed by 2020.

In 2018, roadway, sidewalk, traffic signal, footbridge, drainage culvert, and building facility condition inspections were completed.

PLAN

In 2015 an Asset Management Policy was adopted, followed by the Asset Management Bylaw in 2019.

In 2019 Transportation, Cycling Network and Parks & Recreation Master Plans and the Urban Forest Management Strategy were completed.

In 2021 Water and Sewer Master Plans were completed.

In 2021, the Dike Replacement and Flood Management Strategy was completed.

In 2019, the Integrated Rainwater Management Plan was initiated, the final phase will be completed in 2023.

The Official Community Plan was updated in 2022

Significant work to complete the Sustainable Infrastructure Investment Plan began in 2022.

IMPLEMENT

Starting in 2014, Operationalizing Asset Management throughout the organization began, followed by a strategic corporate reorganization & implementation in 2017.

Asset Management Program Components

Annual Sidewalk Inspections (ongoing)	**Sustainable Infrastructure Investment Plan** (ongoing)	**Integrated Rainwater Management Plan** (2019-2022)
Flood Management Plan (2022)	**Water Master Plan** (2021)	**Sewer Master Plan** (2021)
Urban Forest Management Strategy (2019)	**Cycle Network Plan** (2019)	**Transportation Master Plan** (2019)
Parks, Recreation & Culture Master Plan (2019)	**Traffic Signal & Controller Assessment** (2018)	**Creek Crossing Condition Assessment** (2018)
Pavement Management Plan (2018)	**Facilities Condition Assessment** (2018)	**Sanitary & Storm Condition Assessments** (2016 - 2021)

City of Courtenay's Assets Overview

The City is responsible for operating and maintaining a wide variety of infrastructure, including:

- Water distribution utility
- Sanitary collection utility
- Stormwater system
- Transportation network
- Civic building facilities
- Parks and recreation facilities
- Fleet and equipment

Just over 14,000 parcels (residential homes, industry, and businesses) are currently served by this infrastructure, which not only delivers core needs (clean drinking water, sewer collection, effective drainage, etc.) but sustains the City's economic and social needs (safe and efficient travel, emergency routes, and recreational areas).

HIGHLIGHTS INCLUDE:

353 lane km of roadway	**160 km of sanitary sewer**	**86 City Parks, 179 ha of park**
15 km of bicycle lanes	**11 sanitary lift stations**	**3,700 managed trees**
173 km of sidewalks	**167 km of drainage pipe**	**23 playgrounds**
1,528 streetlights	**4,372 catch basins**	**10.8km of paved trails**
20 signalized intersections	**173 km of water main**	**26.5 km unpaved trails**
60+ building facilities	**805 fire hydrants**	**136 vehicles and equipment**

In this SIIP, we have broken down the City's assets into seven classes and have addressed each individually. The asset classes, their replacement costs, and their useful life can be found in Table 1 (next page).

Asset Class	Quantity	Replacement Cost	Useful Life
Stormwater	167km	$302M	84 years
Transportation	353 lane km	$178M	36 years
Facilities	22 Admin; 37 Rec & Culture	$63M	47 years
Fleet and Equipment	136 units	$15M	13 years
Parks and Recreation	35 parks; 37 km trails	$30M	45 years
Water	173km	$233M	81 years
Wastewater	160km	$265M	94 years
	Total	**$1.08B**	**62 years on Average**

Table 1. Asset Value by Class

Most of the City's asset value is made up of linear assets (water, wastewater, stormwater, and roadway infrastructure assets). Figure 2 illustrates the distribution of the City's linear and non-linear infrastructure.

Linear Asset:
Also known as a continuous asset, this infrastructure is maintained in segments, such as water mains, sanitary mains, storm mains, and roads.

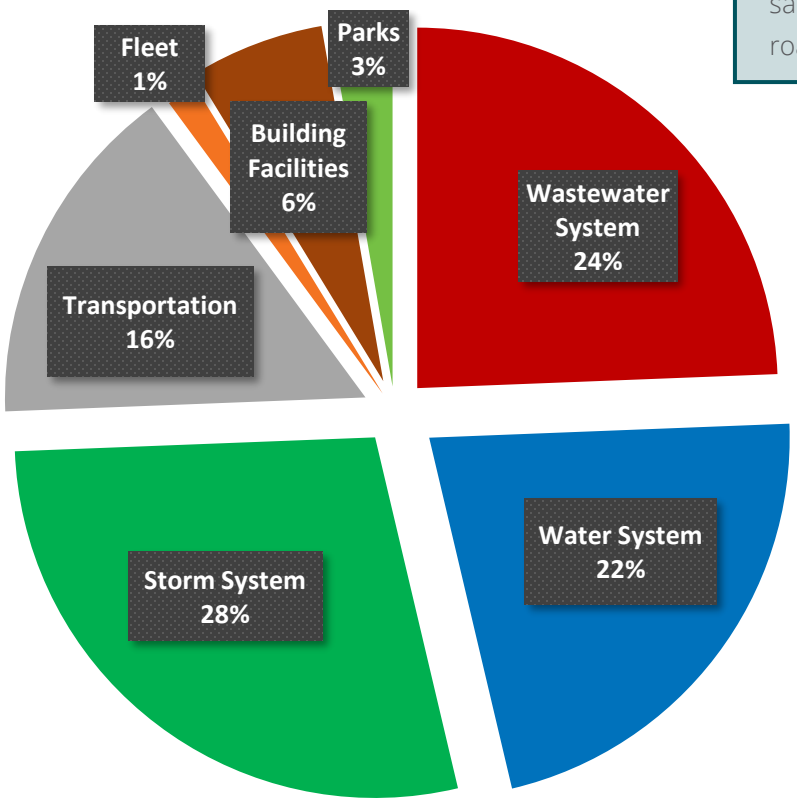


Figure 2. Distribution of Courtenay's Infrastructure

Figure 3 shows the amount of infrastructure consumed (in orange) versus the remaining life (in blue). Overall, 46% of the City's infrastructure has been consumed.

Remaining Life:
The anticipated time left that an asset would remain usable, based on its expected service life. This can be adjusted according to condition to reflect the unique conditions of each asset (e.g., usage, material, soil, quality of installation).

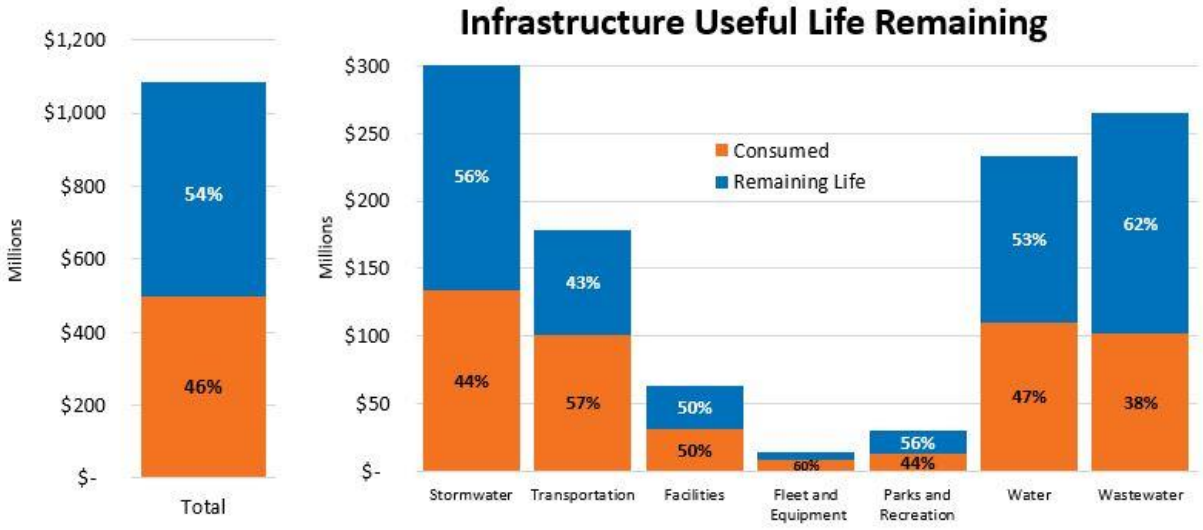


Figure 3. Assets Consumed in total and by asset

Spending, Reserve, and Debt

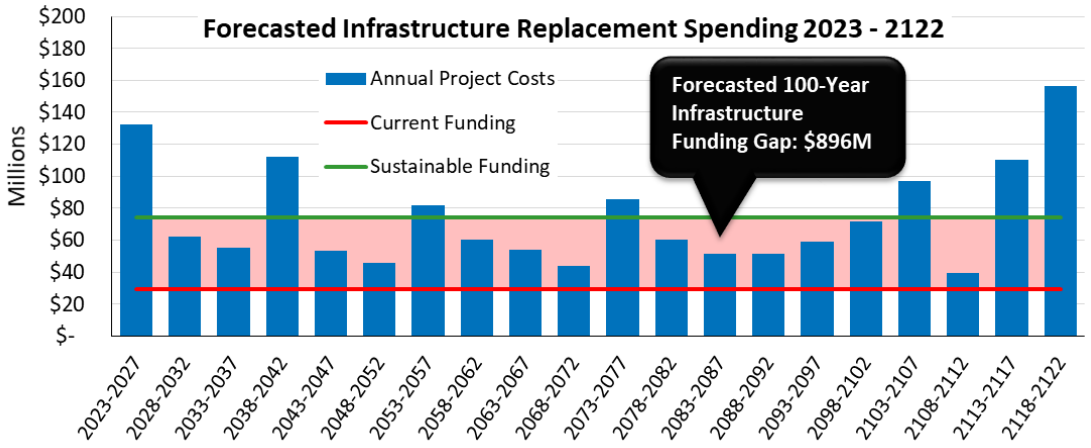


Figure 4. Courtenay's 100-year infrastructure renewal timing & Infrastructure

The City has seen significant growth in the last 30 years, and generally, the infrastructure condition is relatively good. However, over the next few years, a substantial amount of original infrastructure in the City will require an investment in renewal to maintain existing service levels.

While annual sustainable renewal funding from sustainable funding sources averages $5.9M per year, the annual capital program (including upgrades and renewal) averages $15.8M. One-third of that amount is funded through debt. The 2021-2026 five-year financial plan forecasts that the City will borrow an average of $5.3M per year. If this continues, the debt will grow to $106M in 20 years, reaching a point where debt interest costs begin to approach the principal payment.

Sustainable Funding Sources:
Taxes, Utility rates and transfers from other governments through agreements (e.g. 'Gas Tax').

Asset Class	Sustainable Annual Funding	Current Annual Funding	Annual Funding Gap
Stormwater	$3.0M	$0.3M	$2.7M
Transportation	$3.4M	$2.5M	$900k
Facilities	$1.3M	$0.6M	$700k
Fleet and Equipment	$1.1M	$0.6M	$500k
Parks & Recreation	$0.6M	$0.3M	$300k
Water	$2.8M	$0.7M	$2.1M
Wastewater	$2.6M	$0.9M	$1.7M
Total	**$14.8M**	**$5.9M**	**$8.9M**

Table 2. Current vs. Sustainable Funding by Asset Class

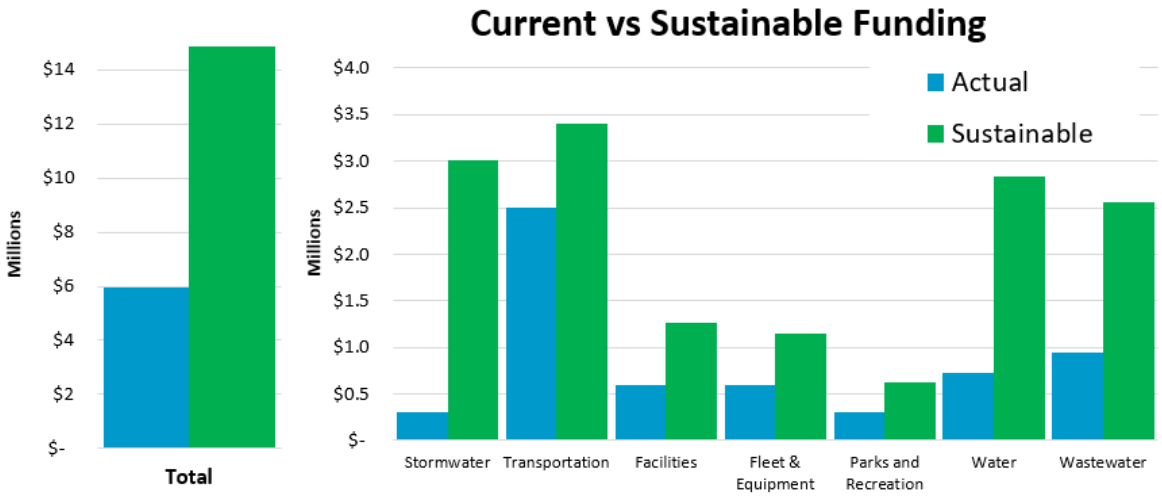


Figure 5. Current vs. Sustainable Funding

The average annual funding for capital projects from various sources is outlined in Table 3.

Funding Source	Average 2020 - 2026
General Revenue and Frontage Fees	41%
Grants (incl. CWF and application based)	24%
DCC's and Developer Contributions	2%
Debt	33%

Table 3. Average Funding Source Breakdown

Considering the annual funding deficit for infrastructure renewal, a decision needs to be made on how to fund the City's future renewal obligations. Grants are limited and out of the City's control, and debt brings a set of long-term costs borne by future residents. Therefore, a more sustainable funding model is recommended.

A review of the criteria for borrowing versus building reserves and adopting a pay-as-you-go form of infrastructure funding should be considered. Some projects could be candidates for borrowing (i.e., a fire hall), while other projects could be completed as funds are available.

When debt payments are completed on a long-term borrowing program, an option to help close the sustainability gap for infrastructure renewal is to continue to make those payments into a renewal reserve for that particular asset. This will reduce the amount of tax or rate increases necessary to close the funding gap and potentially have no impact on the annual budget requisition.

A decision needs to be made on how to fund the City's future renewal obligations

Growth, Master Plans and Future Demand

The City has recently completed Master Plans for different service areas. Figure 6 shows estimated spending is $64M over the next 20 years from these plans, with an average of $3.2M per year. As many projects are growth-driven, a conservative municipal contribution (50% on average) has been applied in place of a forthcoming DCC Bylaw update, which will more accurately calculate City obligations for funding these projects.

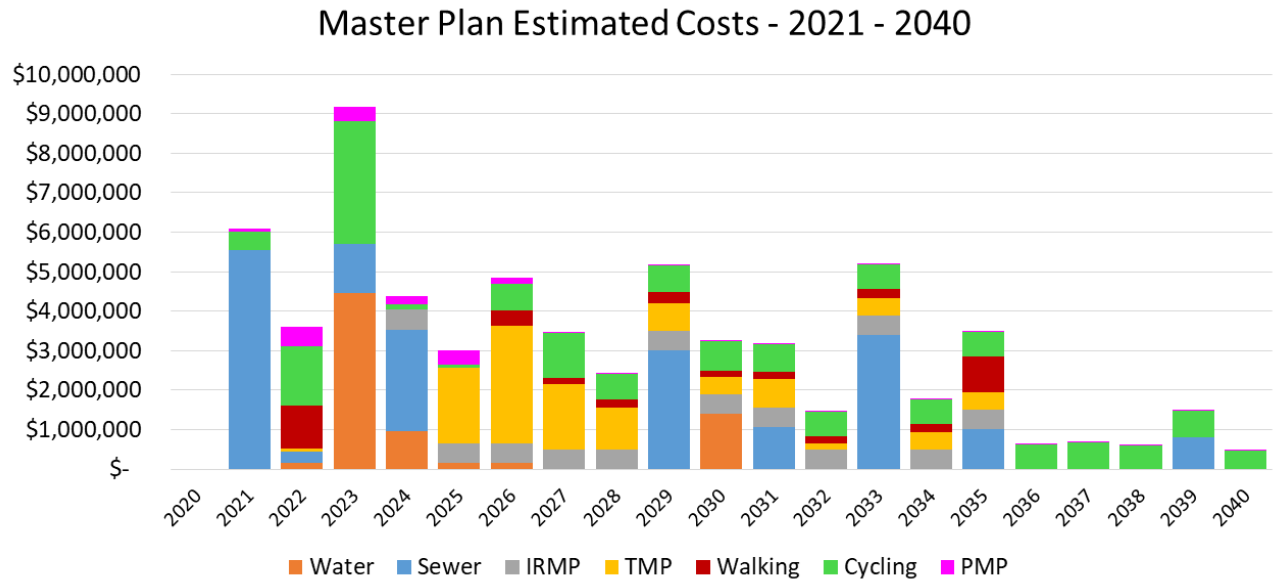


Figure 6. Estimated Improvement Costs from Master Plans

Costs will need to be formalized and detailed, and some plans will require further cost estimating. However, it is important to understand the financial impact of these plans in the next 20 years.

Infrastructure and Land Use Planning

Asset Management BC recommends that an assessment of lifecycle costs be conducted when land-use decisions are proposed. This is important for several reasons:

1. A municipality's tax rate may be unsustainable, and new development will compound financial pressures. While current tax and rate revenue may adequately fund the day-to-day operations, rarely do the rates cover the total lifecycle costs (including replacement) of infrastructure. While new properties will contribute additional revenue, the total lifecycle cost of new infrastructure will not be covered by the revenue eventually adding the additional infrastructure the accumulated Infrastructure Funding Gap.
2. Most of an asset's costs are incurred as operating and maintenance costs throughout its lifecycle. Initial construction costs are paid for by developers and given to the City as donated capital. However, the City will incur operating, maintenance, and replacement costs going forward.
3. New taxes from new developments initially exceed costs, but this is deceiving. Often the City will benefit from increased tax revenues when a property is initially subdivided. More revenue is earned when a property is developed, and new buildings are added. However, the capital maintenance, operating maintenance, and replacement costs all lag. Therefore, when the City uses new development taxation revenue to reduce the tax burden for current taxpayers, the true cost of development is not integrated into the tax rate.

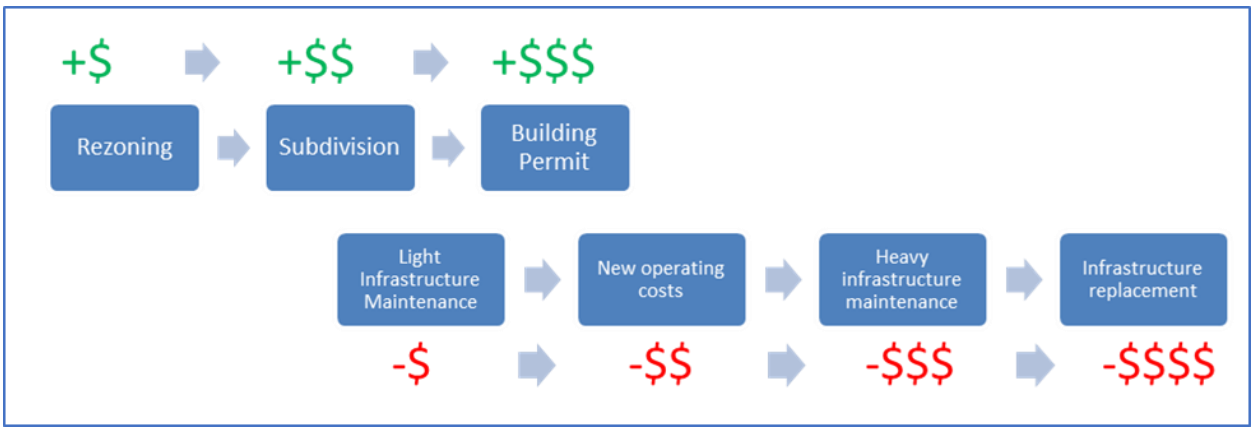


Figure 7. Lifecycle Costs of New Development

The following policies are recommended in respect to land use and asset management:

- Integrate lifecycle costing analysis into subdivision decision-making.
- Conduct lifecycle costing analysis for Council to consider when considering rezoning applications.
- Utilize Non-Market Change revenue to increase transfers to reserves for capital replacements.

There is a misconception that community growth will pay for the associated infrastructure required to service this growth through user fees and tax revenue. Using the Community Lifecycle Infrastructure Costing (CLIC) Tool from the BC Ministry of Municipal Affairs and Housing: (https://www2.gov.bc.ca/gov/content/governments/local-governments/planning-land-use/local-government-planning/community-lifecycle-infrastructure-costing), the City has modelled various growth scenarios to compare the effect on infrastructure lifecycle costs. The scenarios fall into three general categories:

- Infill redevelopment of underutilized properties near the urban core, including multi-family rentals and owned units.
- Single-family homes in or near the urban centre.
- Single-family homes outside the urban centre.

Using this model yields some notable results:

- Rental apartment units are not adequately charged frontage fees for water and sewer; one fee is charged rather than a fee per unit or a pro-rated amount to allow for lower-cost housing.
- Single-family homes in older parts of the community and near the urban centre are in some ways considered a more sustainable form of urban development. Still, they do not adequately cover the cost of City operations and capital renewal based on the taxes generated from the lower assessment values.
- High-value single-family homes farther from the community centre, considered the least sustainable form of development, generate the highest rate of revenue per unit of land area and subsidize the operation, maintenance, and renewal of City infrastructure.

The recently adopted Official Community Plan (Bylaw 3070, 2022) indicates the strategy for growth in Courtenay will be in Town Centre's and the Urban Corridor, Neighborhood Centre's and Multi-Residential, and Infill Areas*. Courtenay is in the early stages of the shift from nearly exclusive growth in single-family homes outside the City center to a more densified form of building near the core. Some developments are just recently completed. As such, it was challenging to obtain infrastructure costs for these new developments, as well as tax revenues, as some of the rental and multi-family units do not have a tax roll history yet. As the denser form of growth continues, the results from further analysis in a few years may yield different results.

Based on the analysis performed, the City may want to consider reviewing rates and taxes applied to various assessment classes to determine equity.

*Courtenay Official Community Plan Bylaw No. 3070, 2022. Part B 'Managing Growth'

> The City may want to consider reviewing rates and taxes

Climate Change Adaptation

The effects of climate change may significantly impact City assets and the services they provide. In the context of this SIIP, climate change can be considered as a future demand and risk.

At a minimum, the City will need to consider how to manage our existing assets, given the potential climate change impacts for our region.

Risks and opportunities identified to date are shown in Table 4.

> The effects of climate change may significantly impact City assets and the services they provide

Climate Change Description	Projected Change	Potential Impact on Assets and Services	Management
Increased rainfall intensity and duration	17% more rain by the 2050s (Climate Projections for Metro Vancouver (June 2016)	Greater intensity on built sewer systems;	Climate change intensities were built into capacity sizing for pipes in SMP / IRMP; RDI&I rates were increased by 17% in capacity sizing.
Increased summer droughts	Reduced lake reservoir levels	Enhanced water restrictions and potential for pressure for universal metering	Consideration in future budgets for the impact of a universal water metering program must be considered.
Low land flooding	1m to 2m sea level rise and a 15% to 30% increase in river flow	Increased flooding in low-lying areas impacts bridges, roads, lift stations, and private property.	Limit Building in the Floodplain; Coastal Flood Mapping Project; Flood Management Plan.
Rising temperature and City GHG Emission Reduction Targets	IPCC estimates 1.5°C increase between 2030 and 2052: Courtenay has committed to: 45% reduction in community-wide GHG emissions by 2030; Net-zero by 2050	Shifting fleet and equipment to other forms of energy consumption;	Include financial projections for shifting the fleet to electric vehicles;
		Civic Facility conversion to more energy efficiency;	Include cost projections for building energy efficiencies;
		More community-wide transportation options.	Implementation of the multi-modal transportation network will drive the capital renewal program for several years.

Table 4. Managing the Impact of Climate Change on Assets and Services

The impact of climate change on assets is a new and complex discussion, and further opportunities will be developed in future revisions of this SIIP.

The recently adopted Official Community Plan identifies Climate Action as one of four cardinal directions for achieving a 45% reduction in community-wide GHG emissions (from the 2016 level) by 2030 and net-zero emissions by 2050.

At the time of writing, the City is actively considering actions to reduce GHG emissions including the following:

- Electrification of the City fleet and equipment, where practicable.
- Automated Vehicle Location (AVL) tools to change driving behaviours have a track record of reducing fuel consumption significantly.
- Converting building systems to reduce GHG emissions, which can take the form of conversion to electrical heat, solar panels, improved insulation for reduced heat loss, building automation systems, or utilizing future technologies.

The modelling for the funding for the SIIP needs includes the fleet's electrification and some energy-efficient building renewal options. As the SIIP is a living document, further updates must be cognizant of emerging technologies incorporated into infrastructure renewal.

“

The City is actively considering actions to reduce GHG emissions

Levels of Service

Levels of Service define the outcomes and outputs customers can expect from asset-based services, which can be measured through defined performance measures and targets. These performance measures can be categorized into two groups:

- Operational and Maintenance Level of Service (what we do); and
- Renewal Level of Service (when we replace)

Key Performance Indicator:
A quantifiable measure to evaluate the success of an organization in meeting objectives for performance.

OPERATIONAL AND MAINTENANCE LEVEL OF SERVICE

Recently, with the help of the Finance and IT departments, a reorganization of public works cost-tracking was completed, allowing metrics to be defined for all operational work by each asset class.

Table 5 summarizes high-level Key Performance Indicators (KPIs) for various asset classes.

Asset Class	Annual Ops Costs (2021)	Asset Measure	KPI
Water Distribution	$1.335M	173.4 km	$7,700 / km
Sanitary Collection	$680,000	166.0 km	$4,095 / km
Storm Drainage	$0.572M	167.2 km	$3,419 / km
Transportation	$3.608M	353 lane km	$10,221 / lane km
Signalized Intersections	$158,000	21 count	$7,523 / intersection
Sidewalks / Walkways	$272,500	184.8 km	$1,475 / km
Parks			
Neighborhood Parks	277,700	10.01 ha	$27,742 / ha
Greenway Trails	$390,800	26.5 km	$14,747 / km

Table 5. Operational Service Cost KPIs from 2022 Financial Plan

The City will endeavor to compare its level of service KPIs to other local governments and to itself to evaluate performance annually. This report includes Operational Performance Indicators (OPIs) for current levels of service in the Inventory of Infrastructure Services section.

One tool the City has available is to change service levels to optimize the use of tax and rate revenue based on the community's needs. A recommendation is to consider a strategic analysis of the service levels across the organization to balance the services offered with the community's willingness to pay. Some analysis has started including optimizing snow and ice control on streets and sidewalks. A further analysis of service levels could also include a review of operational programs and services provided through public works to recreation and cultural services. There are a number of options available for shifting operational funds based on community need.

Asset Class	2022 Operating Budget
Public Works Services	$33,363,000*
Protective Services	$10,627,500
Recreation & Cultural Services	$7,497,000
General Government Services	$5,422,100
Development Services	$2,526,300
Engineering	$978,800
Cemetery	$400,100
Total	$60,814,800

*Includes General, Water, Sewer and Solid Waste funds
Source: 2022 Annual Financial Plan (Sched D,E,F,G)

Table 6. 2022 General Operating Budget by Department

RENEWAL LEVEL OF SERVICE

One fundamental way the City manages lifecycle costs for infrastructure is by assigning useful lives for infrastructure to determine affordability for renewal. The City has taken a pragmatic approach to assigning useful lives to maximize the infrastructure investments made in the past and accurately depict the City's current in-service infrastructure. For instance, recent CCTV camera inspections on the City's sanitary and storm pipes show that despite nearing the engineered useful life for asbestos cement pipe (70 years), the pipes show little deterioration and could have useful lives in the range of 120 years. To maximize infrastructure lives, the City has consciously decided to run infrastructure to near failure before planning for renewal. An evaluation of the useful lives and the related cost of infrastructure renewal under three scenarios is demonstrated in the Sensitivity Analysis section.

“

To maximize infrastructure lives, the City has consciously decided to run infrastructure to near failure

Risk Management

The City has chosen to extend useful lives as far as reasonably possible to reduce infrastructure renewal forecasts for the City. Extending these service lives is accepting a higher level of risk across the City and lowering service levels.

For a comparison, choosing industry-standard useful lives[1] rather than accepting a higher level of risk as currently modelled yields the following results:

Infrastructure Backlog increases from $82.0M to $178M

Annual Sustainable Infrastructure Funding grows from $14.8M to $20.3M

Annual Sustainability gap grows from $8.9M to $14.4M

RISK REGISTER

Part of the annual capital renewal obligations are capital projects to reduce the risk of failure for in-service assets through either risk mitigation measures or infrastructure renewal. One of the strengths of the City is the identification by staff of the numerous risk-related items and a prioritization of those risks by 'Operationalizing Asset Management' throughout the organization. A comprehensive Risk Register is under development with a sample list below.

Risk Mitigation:
Capital works to reduce risks associated with service provision.

Risk ID	Description	Risk	Resolution
112	First St Lift Station Replacement with upgraded capacity.	High	Currently at Options Analysis & Design stage.
7	South Courtenay – move water services from old water mains to new PVC main.	Medium	Planned for current year's operational budget.
188	Woods Ave storm drainage outfall replacement.	High	Continue to monitor and add renewal design to financial plan
251	Building Facility Roofs.	Medium	Assessments complete, prioritize with condition and annual budgets.
299	Riverway Trail – Replace Bridge in poor condition with vehicle accessible structure	Low	Scheduled for replacement in current capital year's budget.

Table 7. Sample Risk Register

[1] Industry Standard Useful Lives from IPWEA NAMS Practice Note 12 (Useful Life of Infrastructure) for underground utilities and roads as well as generally accepted useful live from various sources for facilities, fleet, and parks.

Much of the City's capital spending for renewal over the last several years has been on risk register items. However, through a comprehensive review of critical City operations (potable water delivery and wastewater collection, in particular), several risks have been managed through operational changes. Examples include establishing a:

- Uni-directional water flushing program.
- Hydrant servicing and replacement program.
- Water valve exercising and renewal program.
- Wastewater and drainage flushing using pre-inspection technology/methodology instead of bulk random area flushing (Sewer line rapid assessment tool), root clearing, and catch basin cleaning maintenance programs.

The City is also well on the way to delivering in-house inspection programs for sidewalks, walkways, park trails, playgrounds, culverts, and traffic signals.

Operations:
The actions necessary to keep an asset functioning and providing service (excluding maintenance, rehabilitation, or renewal), e.g., power, consumable materials, staff salaries, etc.

Financial Policy

INFRASTRUCTURE-RELATED FINANCIAL POLICIES

Asset management plans should also be considered as long-term financial plans. In the case of the SIIP, several economic policy recommendations have come from analyzing renewal needs and funding realities. Practical proposals for closing the sustainability gap and undertaking sound asset management are proposed below.

An Asset Management (AM) Policy is an important tool to support the City's vision for sustainable service delivery. The City has developed a formal AM Policy, Policy #1670.00.02. This Policy was adopted in June 2015.

Further to the City's AM Policy, a Bylaw was prepared and adopted in December 2019. An essential component of this Bylaw recognized the importance of Lifecycle Costing in decision-making as follows:

Lifecycle Costing

5. The Chief Administrative Officer will endeavor to provide or to coordinate the provision to Council of all available information and advice pertaining to Lifecycle Costs to facilitate decision-making related to the renewal, upgrade, and acquisition of Tangible Capital Assets.

6. Council will consider Lifecycle Costs in all decisions related to the renewal, upgrade, and acquisition of Tangible Capital Assets and in doing so will consider information provided to Council under Section 5.

Despite these Bylaw Provisions, **Lifecycle Costing concepts have not been integrated formally into other important policies and Bylaws**. It is therefore recommended that the integrations below take place. For every asset the City acquires through development, capital upgrades, or gifted from community organizations, there is a Lifecycle Cost implication for the long-term operation of the asset, that must be considered as part of sound financial management of infrastructure.

> “
>
> ...there is a lifecycle cost implication for the long-term operation of the asset

LIFE-CYCLE COSTING POLICY RECOMMENDATIONS

Policy Recommendation One:

Integrate Lifecycle Costing into the Purchasing Policy

Council should be provided with complete lifecycle information when making decisions related to City infrastructure.

Procurement decisions utilize evaluation scoring based on numerous factors. Often, financial considerations contribute between 30-60% to scoring. However, a more expensive option may be selected if a procurement decision only considers implementation or capital costs and fails to consider lifecycle costs.

A recent update to the City's Purchasing Policy has outlined award determinations will be evaluated on best value with consideration towards lifecycle cost amongst other factors.

Policy Recommendation Two:

Require Lifecycle Costing to be conducted for new capital expenditures

At first glance, capital transactions only seem to comprise a small proportion of the City's budget.

The City's 2022 Financial Plan includes provisions for $60.8M in operating expenses and $17.0M in Capital Expenditures and Debt Principles.

2022 Budget	Amount	Proportion
Operating Expenses	$60,814,800	78%
Capital Expenses & Debt Principal	$17,023,100	22%
Total	**$77,837,900**	**100.0%**

Table 8. Operating vs Capital Budgets

Considering what drives operating expenses in the budget, it's clear that most costs arise from infrastructure-driven services. Most operating costs are incurred to operate or maintain capital.

Expense	Amount
Operating expenses devoted to operating or maintaining capital (Ops & Cemetery)	$33.8M
Capital & principal payments	$17.0M
Total budget to provide capital services	$50.8M
Total 2022 budgeted expenses	$77.8M
Proportion of total budget	**65.2%**

Table 9. Costs of infrastructure-driven services

When capital expenditure decisions are made during budget deliberations, it is crucial Council consider the total lifecycle costs of the capital. This would include the initial capital outlay (construction and acquisition costs) and the lifetime operating and maintenance costs. Council should also consider what capital service level vision they have for the infrastructure. For instance, when a road is under construction, Council should decide the minimum pavement condition that staff are expected to maintain, determined through a condition assessment resulting in a Pavement Condition Index (PCI) score.

Policy Recommendation Three:
Establish Equitable Infrastructure Renewal Contributions

Should the City engage in a program to increase infrastructure renewal funding to sustainable levels, significant funds will be available for renewal. While several high-risk projects may need to be dealt with immediately, over time, there will need to be a system to equitably divide funding among all the asset classes, so no class or classes are underfunded. One option to consider is separating infrastructure renewal contributions based on overall asset class value.

Policy Recommendation Four:
Efficient Capital Procurement and Delivery

In the current market of material supply and labour shortages, it is important that the City take every opportunity to look for efficiencies in delivery of its capital program:

- A rolling four-year capital program would create clarity for staff to budget, fund, and deliver projects on an annual basis.
- Early conditional budget approval for capital projects would get the best pricing and schedule from proponents and allow the City to realistically accommodate risk.

It is important that the City take every opportunity to look for efficiencies in delivery of its capital program

INVESTMENT RECOMMENDATIONS

Investment Recommendation One:

Align long-term cash flows with a long-term investment portfolio horizon

Aligning the City's investment portfolio with long-term cash flow projections will allow the City to generate the highest investment return. Investment returns can significantly reduce the City's need to raise taxes and utility fees to fund infrastructure replacement.

To demonstrate how aligning the City's long-term cash flows with long-term investing, investment returns were modelled as follows:

Yield[1]	100-Year Investment Returns[2]
Current Plan assumption – 2.00%	$17.5M
Money Market Fund – 2.406%	$25.6M
Bond Fund – 3.72%	$189.5M
Mortgage Fund – 4.739%	$836.2M

Table 10. Investment Returns

1: Municipal Finance Authority Yields July 2022

2: For property taxation-funded infrastructure replacement, the 100-year Spending forecasted is $907M. Modelled annual reserve contributions of approx. $8.9M.

> Investment returns can significantly reduce the City's need to raise taxes and utility fees

Inventory of Infrastructure Services

Water System

The potable water distribution system includes 173km of water mains accounting for 21% of the City's Infrastructure. The average age of the system is 38 years, and with an overall useful life of 81 years, the system has 53% of its useful life remaining with a current backlog (assets beyond their useful life) of $8.6M. In place of a comprehensive condition assessment of all components, system age can be used to determine the overall condition of the water system is in the fair range. The water system is broken down into the following asset categories:

- **Water Mains:** Pipes delivering water to homes, business and for fire hydrants
- **Fire Hydrants:** Used for firefighting and flushing water mains for water quality
- **Booster Station:** Increases water pressure in one area of the City
- **Pressure Reducing Valves:** Reduces pressure due to topographic change in the system
- **System Valves:** For isolating water shut offs for breaks and water mains flushing
- **Air Valves:** Access points between sections of pipe
- **Blow Offs:** Type of flushing hydrant used for flushing dead end water mains
- **Water Meters:** Measures water consumption for ICI and Multi-Family properties
- **Service Connections:** Water connections to private property
- **Sampling Stations:** Used for taking water quality samples at various locations

SYSTEM HIGHLIGHTS

Much of the water system that was constructed in the 1950s and 1960s from asbestos cement pipe will be reaching the end of its useful life in the next 20 years, and the impact will be seen in the short term. Pipe materials installed in the ensuing years have a longer expected useful life, and the impact of replacement will be farther in the future.

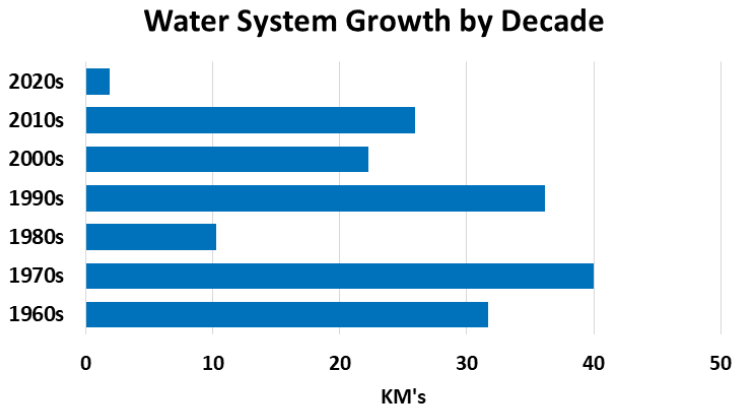


Figure 8. Water system growth by decade

WATER UTILITY SPENDING FORECASTS

Taking into account all pipes, hydrants, booster stations, PRVs, system valves, service connections, and other system components, the water system is determined to have a total replacement value of $234M.

This SIIP recommends increasing annual funding from $723,000 to $2.8M to achieve sustainable funding levels.

Replacement Value:
The cost (in current dollars) to upgrade, refurbish or replace existing facilities with facilities of equivalent capacity or performance capability.

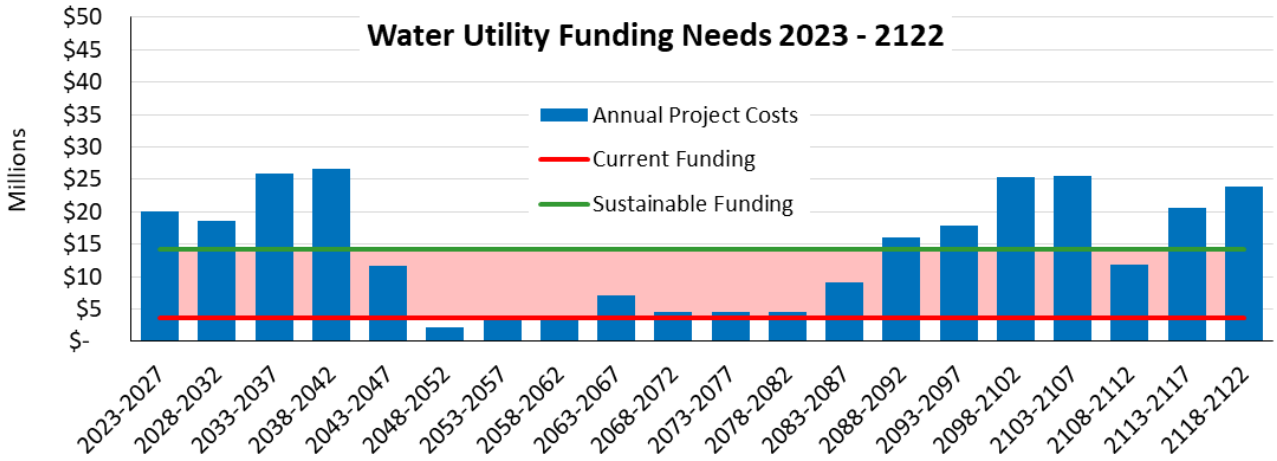


Figure 9. Water Renewal Funding Needs by Decade

OPERATING PERFORMANCE INDICATORS

Staffing Level: Six Full-time Employees

Total Operating Expenditure 2022 Budget: $1.85 Million

Water Distribution System	
Service (Cost Centre)	Operating Performance Indicators (OPI's)
Water Mains	• Annual uni-directional flushing program of 12% of distribution system
Water Service Connections	• 50 water service leak repairs each year on average
Water System Valves	• Exercise all system valves once per year • Replace 5 valves per year on average
Hydrant / Blow offs	• All hydrants inspected and serviced annually (B-level) • Deficient hydrants service (A-level) or replaced • Painting of approximately 20% of hydrants annually • All Blow offs inspected annually / 5 replaced annually
Water Meters	• All meters are read quarterly • An average of 34 meters are replaced annually
Pump Station & Facilities	• Maintenance & Operation (incl utility costs) of booster pump station • Quarterly maintenance of 7 PRV stations • Telemetry (SCADA) system operation • Bulk fill station licensing
Quality & Cross Connection Control	• Weekly water samples are taken to monitor for water quality (E. Coli & coliforms) • Quarterly water samples are taken for Haloacetic acids (HAA), Trihalomethanes (THM) and Total Metals
Water Conservation	• Leak Detection - Field surveys using 'data logger' equipment to determine if water mains and water services may have leaks are done on an annual basis

Wastewater System

The wastewater collection system includes 166km of gravity and force mains accounting for 24% of the City's Infrastructure. The average age of the system is 36 years with an overall useful life of 94 years. The system has 62% of its useful life remaining with a current backlog (assets beyond their useful life) of $6.2M. In lieu of a comprehensive condition assessment of all components, system age can be used to determine that the overall condition of the wastewater system is in the fair range. The wastewater system is broken down into the following asset categories:

- **Gravity Sewer Mains:** The majority of collection pipes
- **Pressurized Force Mains:** Used to convey flow from Lift Stations uphill to gravity mains
- **Lift Stations:** Sewer Pumping stations
- **Manholes:** Access points between sections of pipe
- **Service Connections:** Connections from private property to the collection system

SYSTEM HIGHLIGHTS

Much of the wastewater system that was constructed in the 1960s from asbestos cement pipe will be reaching the end of its useful life in the next 20 years, and the impact will be seen in the short term. Pipe materials installed in the ensuing years have a longer expected useful life, and the impact of replacement will be farther in the future.

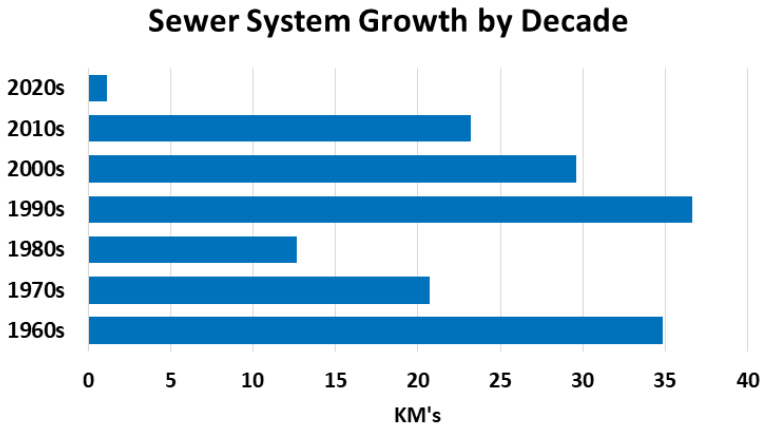


Figure 10. Wastewater system growth by decade

WASTEWATER UTILITY SPENDING FORECASTS

When looking at all pipes, lift stations, manholes, and service connections, the wastewater system is determined to have a total replacement value of $265M.

This SIIP recommends increasing annual funding from $943,000 to $2.6M to achieve sustainable funding levels.

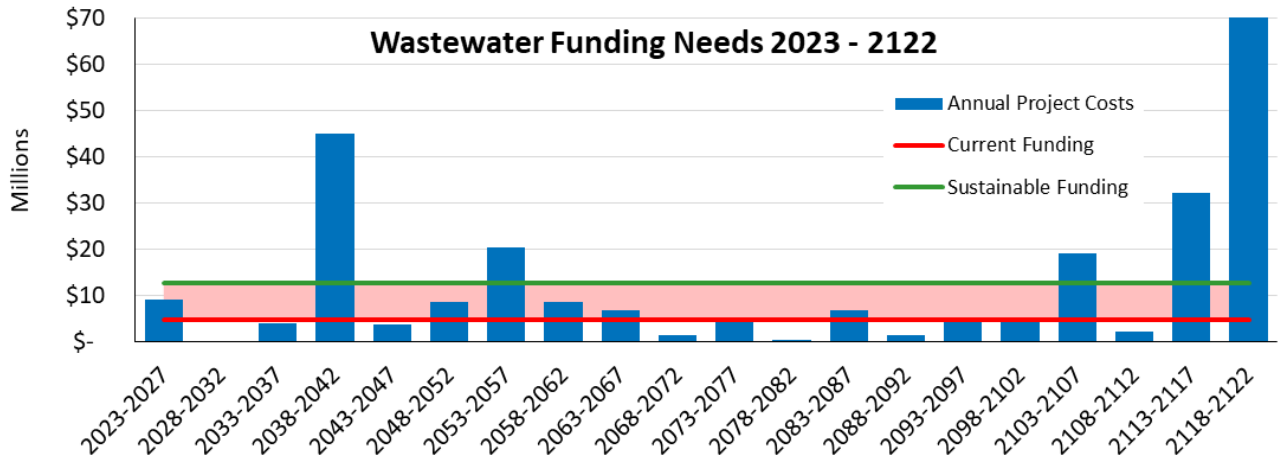


Figure 11. Wastewater Renewal Funding Needs by Decade

OPERATING PERFORMANCE INDICATORS

Staffing Level: Five Full-time Employees

Total Operating Expenditure 2022 Budget: $1.09 Million

Sanitary Collection System	
Service (Cost Centre)	Operating Performance Indicators (OPI's)
Sewer Main	• Flushing of approximately 15km of the 160km system annually • Regular 3 month and 6 month flushing of Hot Spots with a high and moderate risk of plugging • CCTV camera inspection of 10% of the mains on average
Sewer Service Connections	• 7 renewals completed each year on average
Sewer Manholes	• Inspection of 240 on average manholes per year
Sewer Valves	• Annual maintenance of sewer forcemain valves
Sewer Forcemains	• Annual maintenance or repair of forcemains
Sewer Lift Stations	• Maintenance & Operation (incl utility costs) of lift stations & pumping stations • Annual maintenance of forcemain Air Valves • Telemetry (SCADA) system operation
Sewer Inflow & Infiltration	• Repair of spot locations with infiltration issues identified

Stormwater System

The stormwater system includes 167km of gravity mains accounting for 28% of the City's Infrastructure. The average age of the system is 37 years with an overall useful life of 84 years. The system has 56% of its useful life remaining with a current backlog (assets beyond their useful life) of $15.9M. In lieu of a comprehensive condition assessment of all components, system age can be used to determine that the overall condition of the stormwater system is in the fair to poor range. The stormwater system is broken down into the following asset categories:

- **Gravity Mains:** The majority of drainage collection pipes
- **Culverts:** Comprised of large diameter creek crossings, as well as ditch crossing under roads, as well as driveway entrances
- **Manholes:** Access points between sections of pipe
- **Catch basins:** The drainage intake points for rainwater
- **Ponds:** For the detention and/or treatment of stormwater
- **Ditches:** Open structures for roadside drainage and conveying gravity flows
- **Control Structures:** On-site assets for flow control or stormwater treatment
- **Dikes:** Structures to protect against flooding
- **Outfalls:** Structures to control or deliver flows to creeks, rivers, or the ocean
- **Service Connections:** Connections from private property to the collection system
- **Creeks and Rivers:** Natural assets that receive rainwater flows and provide essential ecosystem functions

SYSTEM HIGHLIGHTS

Significant growth of the stormwater system occurred in the 1990s and onward from rapid growth on the east side of Courtenay. Before that time, materials used for construction had shorter useful lives than modern materials and will be due for renewal in the coming decades.

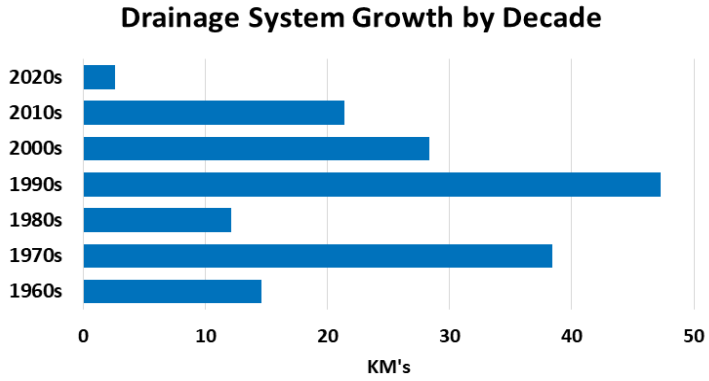


Figure 12. Stormwater system growth by decade

STORMWATER SPENDING FORECASTS

Considering all pipes, culverts, manholes, catch basins, dikes, service connections, and other drainage infrastructure, the stormwater system is determined to have a total replacement value of $300M.

This SIIP recommends increasing annual funding from $300,000 to $3M to achieve sustainable funding levels.

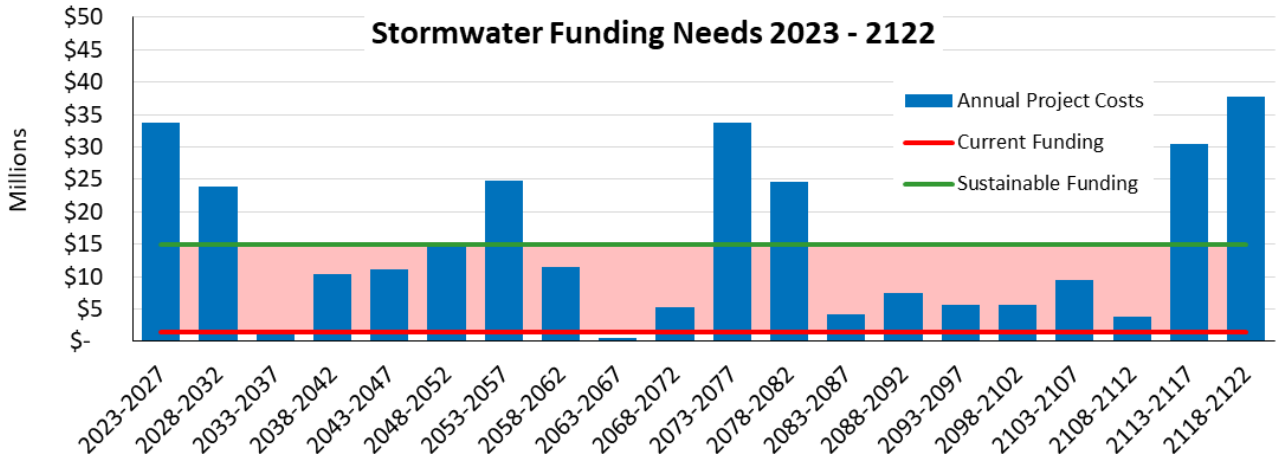


Figure 13. Stormwater Renewal Funding Needs by Decade

OPERATING PERFORMANCE INDICATORS

Staffing Level: Two Full-time Employees

Total Operating Expenditure 2022 Budget: $0.57 Million

Storm Drainage System	
Service (Cost Centre)	Operating Performance Indicators (OPI's)
Storm Main	• Flushing of approximately 4km of the 167km system annually • Annual root cutting and flushing of Hot Spots with a high and moderate risk of plugging • CCTV camera inspection of 5% of the mains on average
Storm Service Connections	• 3 renewals completed each year on average
Storm Manholes	• Inspection of 260 manholes per year on average
Storm Catch Basins	• Cleaning of 70% of catch basins per year • Inspection of 550 catch basins per year on average • 8 CB renewals completed each year on average
Storm Creek Crossings	• Regular inspection of large diameter culverts before storm events
Storm Detention Ponds	• Annual documented inspection of detention & retention ponds • Preventative maintenance work completed to increase service life of the ponds
Storm Flood Protection	• Annual deployment of portable dam flood protection system • Sandbag preparation for flood protection

Roadway System

The City of Courtenay has a road network of approximately 353 lane km, accounting for 16% of the City's infrastructure.

Roads are broken down into four major categories of road types:

- **Arterial:** High-capacity urban road
- **Collector:** A low-to-moderate-capacity road that serves to move traffic from local streets to arterial roads
- **Local Industrial/Commercial:** A street to or through property zoned industrial
- **Local Residential:** A local service street used primarily for access to abutting property

ROAD CONDITION ASSESSMENT

The average age of the system is 20 years, and it has an overall useful life of 36 years. The system has 43% of its useful life remaining with a current backlog (assets beyond their useful life) of $35.5M. In 2018, a comprehensive condition assessment of all road surfaces was conducted and projecting the results to 2022 showed the road network has an overall Pavement Condition Index (PCI) of 61/100. This score is considered 'Fair to Good'. However, we are seeing the Backlog (roads with a PCI < 40) grow from 7.6% to 17%. Generally, a very healthy agency will have less than 10% of its network in the backlog category with 12 - 15%. As soon as a City approaches and/or exceeds 20% backlog, the big-ticket work can spiral out of control as it piles up faster than the City can fund capital into the system. A forthcoming Road Condition Assessment will recalibrate the numbers and will provide updated PCI and backlog values.

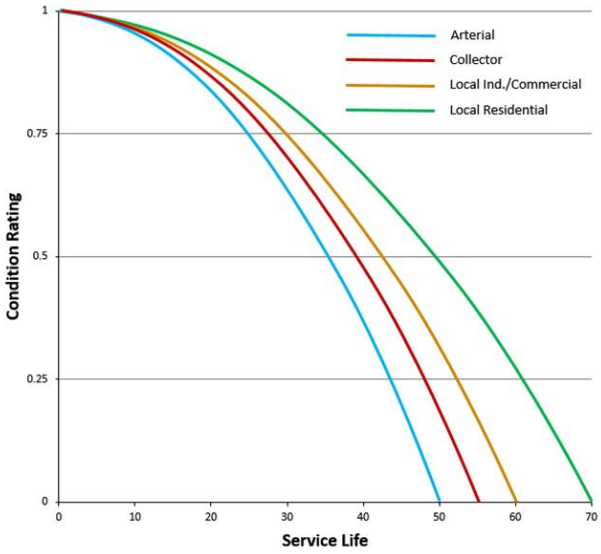


Figure 14. Road Condition Assessment

The City also owns and maintains an extensive network of sidewalks (173km), streetlights (1,528), bike lanes (15km), traffic signals (20), pedestrian-controlled crossings (30), road line markings, and traffic signs. Also included in the Roadway System are alleys, the 5th street bridge, retaining walls, and concrete barriers.

ROAD SPENDING FORECASTS

Considering all assets, the roadway system is determined to have a total replacement value of $178M.

This SIIP recommends increasing annual funding from $2.8M to $3.4M to achieve sustainable funding levels.

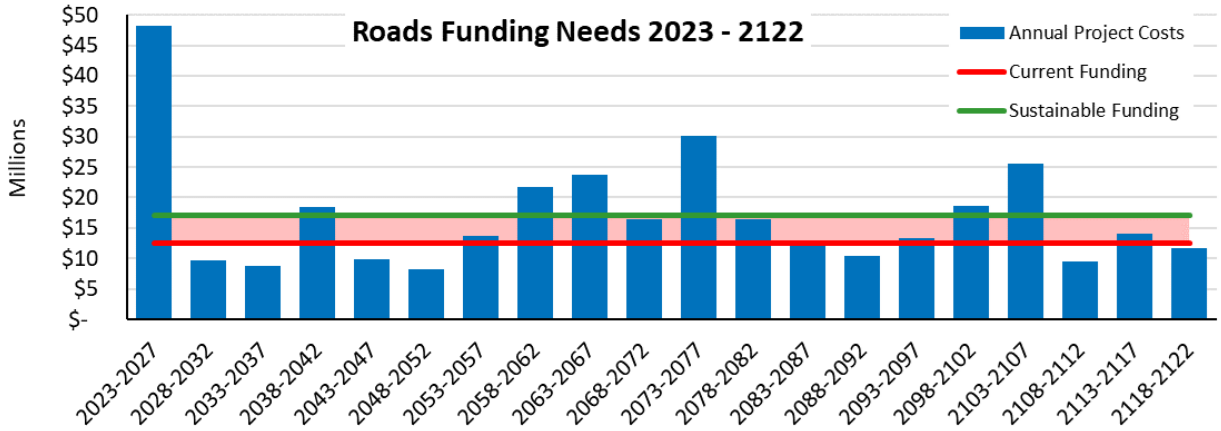


Figure 15. Roads Renewal Funding Needs by Decade

OPERATING PERFORMANCE INDICATORS

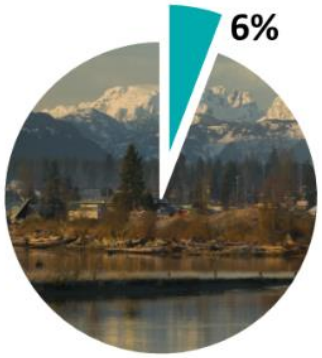
Staffing Level: 10 Full-time Employees

Total Operating Expenditure 2022 Budget: $3.6 Million

Transportation System	
Service (Cost Centre)	Operating Performance Indicators (OPI's)
Road Infrastructure	• Pedestrian, Cycling & Pavement Renewal Program • Road patching, utility cut repairs, potholes and overlays • Weed control on road and curbs, • Grading, material hauling, bank stabilization, road side barrier maintenance.
Sidewalk / Walkways	• Renewal, repairs of panels, including let downs.
Signs / Lines	• Roadway marking including lines and spot locations
Street Lights	• Renewal of streetlight luminaires with LED • Electricity for operation of BCH and City owned lights
Traffic Signals	• Regular inspection and maintenance of lights and controllers
Ditch / Culverts	• Annual ditch cleaning and renewal of driveway culverts.
Brush Cutting	• Roadside mowing and cutting / pruning of ditches
Parking Lot Maintenance	• Pavement surface maintenance and parking lot lights
Street Sweeping	• 10 routes including weekly and bi-monthly roads, • Cleaning of debris after snow events and City road construction
Snow and Ice Control	• Annual snow and ice control on streets, sidewalks and City owned parking lots and facilities
Contract Services	• Crack sealing, Paving and Railway Crossing Signal maintenance
Garbage Collection	• Weekly and bi-weekly collection from public trash cans • Includes dog stations and needle boxes
Street Decorations	• Seasonal decoration of City Centre with banners and Christmas lights
Urban Issues	• Remediation of sites due to encampments or other urban issues.

Building Facilities

The building facilities portfolio includes over 50 buildings accounting for 6% of the City's Infrastructure. The average age of the buildings is 23 years with an overall useful life of 47 years. The buildings have 50% of their useful life remaining with a current backlog (assets beyond their useful life) of $8.2M. In lieu of a comprehensive condition assessment of all the components, system age can be used to determine that the overall condition of the building facilities is in the fair to poor range. The building facilities are broken down into the following building types:



- **Administrative Buildings:** City Hall, Public Works, and other facilities used for the administration of the City's operations
- **Recreation and Cultural Buildings:** Lewis Centre, Filberg Centre, Library, Museum, and other facilities for the enjoyment of the public

BUILDING CONDITION ASSESSMENT

In 2018, a Building Condition Assessment of all facilities was conducted addressing building components, including the structure, roofs, HVAC systems, electrical, fire suppression, inside finishes, and outside facilities. Following the 2018 assessment, a more detailed roof replacement assessment and estimated replacement costs were completed. Costs for these assessments are included in the long-term spending forecasts.

BUILDING FACILITIES SPENDING FORECASTS

Considering all components of City building facilities, the replacement costs for all components are estimated at $64.5M.

Th SIIP recommends increasing annual funding from $600,000 to $1.3M to achieve sustainable funding levels.

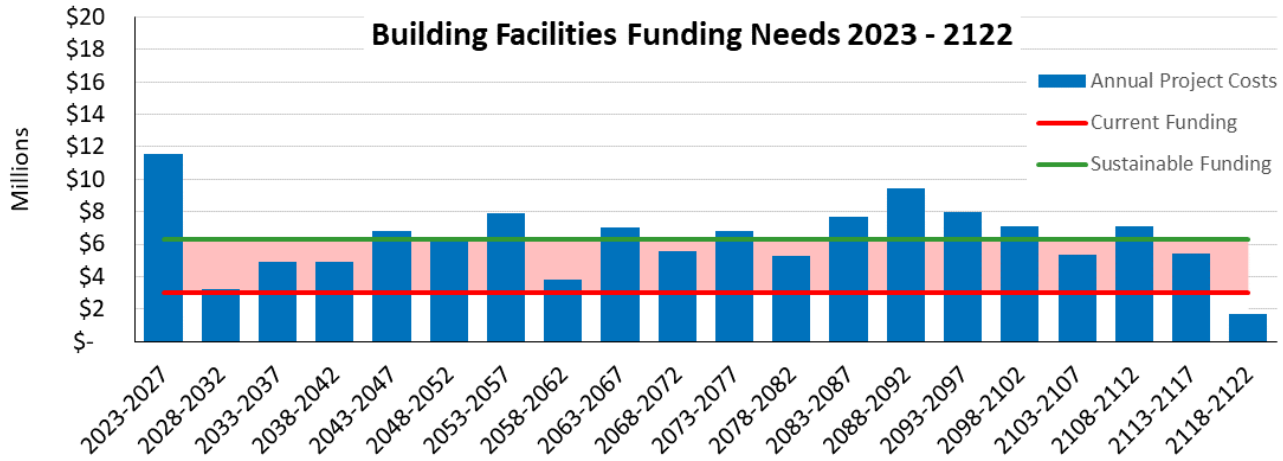


Figure 16. Building Facilities Renewal Funding Needs by Decade

OPERATING PERFORMANCE INDICATORS

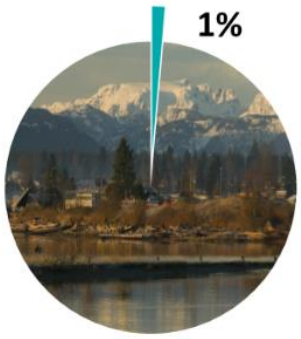
Staffing Level: Five Full-time Employees

Total Operating Expenditure 2022 Budget: $1.45 Million

Civic Properties Maintenance	
Service (Cost Centre)	Operating Performance Indicators (OPI's)
General Repair & Maintenance	• Reactive and preventative maintenance to City facilities • Planned renovations to facilities
Security Services	• Security patrols and off-site alarm monitoring
Utilities	• Electrical, natural gas utility payments
Fire Safety	• Fire Inspections
HVAC	• Heating and cooling contracted maintenance services
Electrical	• Electrical contracted maintenance services
Plumbing	• Plumbing and gas fitting contracted maintenance services
Painting	• Internal and external painting of facilities
Power Washing	• Contracted power washing services
Elevator Inspections	• Regulatory elevator inspections
Asbestos Inspection & Sampling	• Regulatory asbestos surveys and sampling
Roofing	• Roofing inspection, repair or replacement services
Janitorial	• Janitorial cleaning contract services for select buildings
Urbaloo	• Downtown public washroom O & M
Building Rental	• Rental of temporary trailers for staff
Graffiti & Vandalism	• Removal or cleaning of vandalism

Fleet

The City's fleet includes over 100 vehicles and pieces of equipment, accounting for 1% of the City's Infrastructure but taking a critical role in the operation of the City. The average age of the system is eight years with an overall useful life of 13 years. The system has 40% of its useful life remaining with a current backlog (assets beyond their useful life) of $4.2M. In lieu of a comprehensive condition assessment of all assets, fleet age can be used to determine that the overall condition of the fleet is in the fair to poor range. The Fleet is broken down into the following vehicle groups:



- **Light Trucks:** Pickups and other light vehicles used for public works, recreation, and facility maintenance
- **Heavy Trucks:** Dump trucks and heavier vehicles used for construction and snow & ice operations
- **Light equipment:** compactors, forklift, chipper, and other equipment
- **Heavy Equipment:** Backhoes, graders, and loaders
- **Trailers:** used for various purposes
- **Parks Equipment:** Mowers, turf equipment, tractors, skid steers, and other equipment
- **Fire Department:** Equipment and Apparatus
- **Cars / SUVs:** Light vehicles

FLEET SPENDING FORECASTS

Considering all vehicles, accessories and pieces of equipment, the replacement costs for all components are estimated at $14.6M.

This SIIP recommends increasing annual funding from $300,000 to $1.1M to achieve sustainable funding levels.

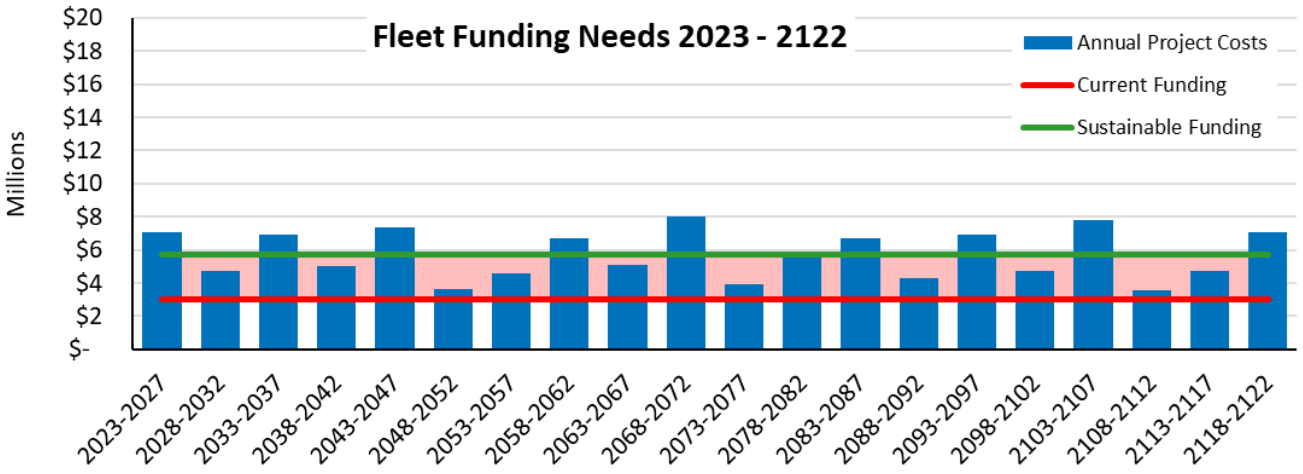


Figure 17. Fleet Renewal Funding Needs by Decade

OPERATING PERFORMANCE INDICATORS

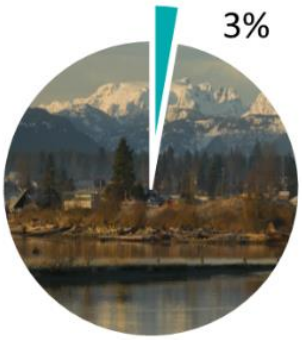
Staffing Level: Two Full-time Employees

Total Operating Expenditure 2022 Budget: $700,000

Fleet Services	
Service (Cost Centre)	Operating Performance Indicators (OPI's)
General Repair & Maintenance - Reactive	• Reactive maintenance to City fleet and equipment • Includes maintenance to generators, trailers and accessories
General Repair & Maintenance - Preventative	• Preventative maintenance to City fleet and equipment
Attachments	• Maintenance, replacement of vehicle and equipment attachments
Insurance & Licensing	• Vehicle insurance and other regulatory requirements
Fuel	• Automobile and Equipment fuel and oil
Inspections & Testing	• Inspections and testing for regulatory requirements

Parks and Recreation

Parks and recreation include over 70 parks accounting for 3% of the City's Infrastructure. The average age of the system is 20 years with an overall useful life of 45 years. The system has 56% of its useful life remaining with a current backlog (assets beyond their useful life) of $1.6M. In lieu of a comprehensive condition assessment of all components, age can be used to determine that the overall condition of the parks and recreation system is in the fair to poor range. Parks and recreation are broken down into the following groups:



- **Park Amenities:** Benches, tables, fences, courts, garbage cans or any other similar feature
- **Landscape Areas:** Display beds, mulch, turf, hedges, hardscape, or other landscaping
- **Paved areas:** Asphalt paved areas, concrete walks, or curbing
- **Trees:** Street trees and park plantings
- **Cemetery:** Various features in the civic cemetery
- **Playgrounds:** Various parks around the City
- **Footbridges:** Made from wood, metal, and a combination thereof, built to variable standards
- **Sports fields:** Various types for single-season and all-weather use
- **Trails:** Unpaved walking trails in parks and connecting areas
- **Irrigation systems:** Various types built over several eras with different technologies
- **Stadium Lighting:** Two parks with sports fields with adequate lighting for evening events

PARKS AND RECREATION SPENDING FORECASTS

The replacement value for all park's infrastructure is estimated at $30M.

This SIIP recommends increasing funding from $300,000 to $600,000 to achieve sustainable funding levels.

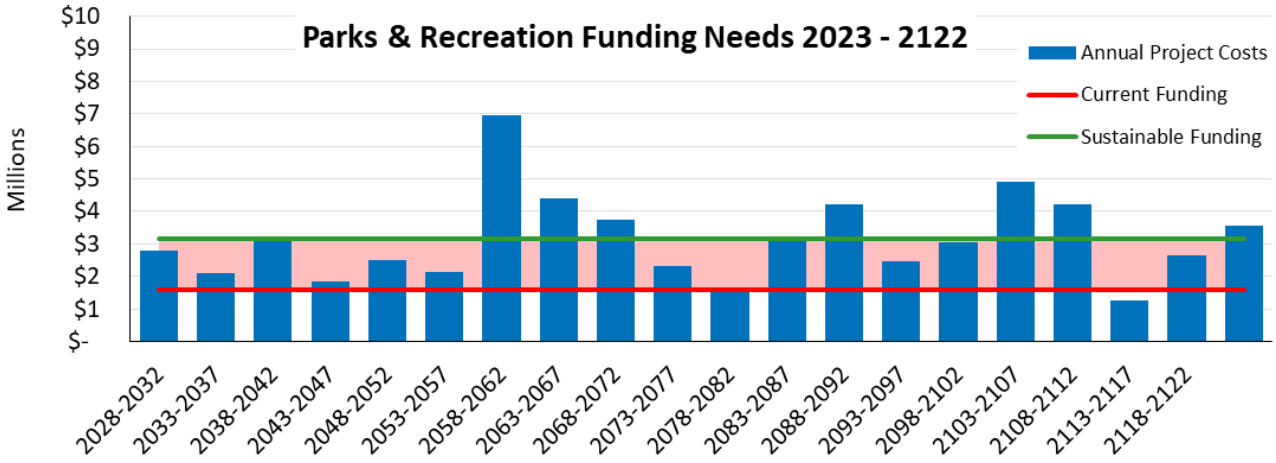


Figure 18. Parks & Rec Renewal Funding Needs by Decade

OPERATING PERFORMANCE INDICATORS

Staffing Level: 13 Full-time Employees

Total Operating Expenditure 2022 Budget: $2.9 Million

Parks, Trails and Cemetery	
Service (Cost Centre)	Operating Performance Indicators (OPI's)
Community Parks	• Reactive and preventative maintenance of destination parks that serve residents from the entire city and beyond.
Neighbourhood Parks	• Reactive and preventative maintenance of parks that generally serve the catchment area similar to that of a school.
Nature Parks	• Reactive and preventative maintenance of parks dominated by natural features such as forests and watercourses, often including environmentally sensitive areas
Maintained Greenspace	• Reactive and preventative maintenance of parks that consist of small grassed and treed areas that does not support a significant amount of use.
Greenspace Buffer	• Reactive and preventative maintenance of undeveloped greenspaces with the primary purpose of separating residential areas from commercial space
Greenway Trails	• Reactive and preventative maintenance of narrow corridors for the purpose of supporting a trail, may have amenities such as benches, signs and plantings
City Boulevards	• Maintenance of road side boulevards with a park or horticultural feature.
Tree Program	• Planned and Reactive tree inspections
Parks Water Usage	• Metered water usage tracking
Cemetery Maintenance	• Materials, Equipment and wages to maintenance the Civic Cemetery
Recreation Facilities – Grounds Maintenance	• Grounds maintenance in and around Recreation Facilities: Lewis Centre, Linc Youth, Filberg, Native Sons, Museum
Cultural Facilities – Grounds Maintenance	• Grounds maintenance in and around Cultural Facilities: Sid Williams, Arts Centre, Library

Summary

The City of Courtenay began its Asset Management journey in earnest several years ago, and this report is the culmination of years of data collection, analysis, staff training and collaboration toward the goal of sustainable service delivery. The adoption of the Asset Management Bylaw in 2019 defined the need for work to begin on this Sustainable Infrastructure Investment Plan.

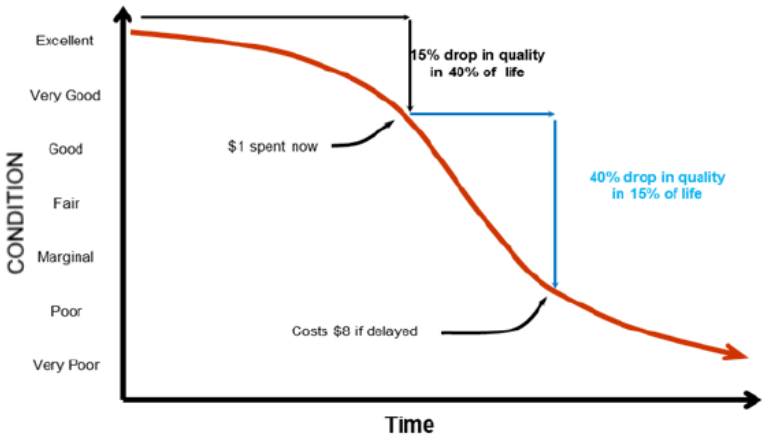
The City owns over $1 billion in infrastructure in 2022 dollars, and there is an $82 million infrastructure backlog consisting of assets considered beyond their useful lives. With approximately $15 million in infrastructure related reserves and an increasing amount of infrastructure reaching the end of its useful life, the backlog could grow to $246 million in the next 20 years.

After completing a review of the City's infrastructure installation dates and useful lives, the long-term renewal spending needs were understood. The financial review of the annual available funding determined that there is an infrastructure funding gap of approximately $8.9 million per year, which will grow to an estimated $896 million over the next hundred years. No combination of borrowing or grants will meaningfully close the funding gap. Policy changes and an enhanced revenue strategy will be needed to position Courtenay on the path to long-term financial sustainability. Some changes have already been made, and others will need to be actively discussed. While the problem won't be solved in a year or two, the changes we make today will have a significant impact on the future generations of residents and business in the City of Courtenay.

Appendices

Appendix A:
Basis for Asset Rating

It's unrealistic to complete a comprehensive condition assessment of every infrastructure class, so a combination of asset age, overall asset class consumption, sustainable funding, and condition assessments are used to create the asset class ratings outlined below. These asset class ratings are meant to be subjective. This process intends to act as a starting point for asset-class sustainability. The accuracy of the ratings will be further improved as more condition assessments are completed, and updated results are incorporated into the knowledge base of each asset class.



Rating	Description
	Danger is the most serious of the ratings. It tells us the overall weighted assets class service life is over half consumed and has reached a point where the remaining life is less than half of the expected useful life. This means the asset is nearing the point where the existing renewal is underfunded, and deterioration is accelerating to the point where a gradual increase in funding will not be sufficient to overcome the decline in condition.
	Investment in renewal could be increased at the Warning point to bring funding to sustainable levels and avoid condition decline outpacing renewal. As more condition assessments and analysis is completed, asset classes (or components of asset classes) may be moved to the next rating class.
	At the Proceed with Caution point, funding for renewal is at a sustainable level, shown through long-term funding analysis or comprehensive condition assessments. However, caution should be exercised, and condition assessments should continue to monitor the overall state of the systems to ensure current funding is adequate and to avoid extreme increases in funding needs.

Appendix B: Sensitivity Analysis

A sensitivity analysis has been conducted to demonstrate how sensitive the findings are to changing assumptions. Changing the assumptions used in preparing this SIIP could significantly change its conclusions.

The City created three scenarios to measure the effect of useful life on Infrastructure Backlog, the 100-year funding gap, and the annual sustainable funding gap:

Scenario 1: Run-to-failure, useful life is equal to an asset's physical life.

Scenario 2: The City's current risk-based approach to infrastructure management.

Scenario 3: Industry Standard (NAMS) approach to useful lives and road renewal.

	Scenario 1	Scenario 2	Scenario 3
	Run to Failure Approach	Risk-Based Approach	Industry Standard
Infrastructure Backlog	$64M	$82M	$178M
100-Year Funding Gap	$1.275B	$1.48B	$2.03B
Annual Sustainable Funding Gap	$6.85	$8.9M	$14.4M

Appendix C: Tax and Rate Options

Modeling indicates the City will needs to increase annual funding levels in order to close the sustainable funding gap. Deferring tax and utility frontage rate increases, or underfunding the increases, will result in the infrastructure backlog increasing combined with higher borrowing costs for longer periods as the City is forced to borrow to renew infrastructure. This plan has developed various tax and frontage rate increase options with the intention of recommending the most reasonable option for tax and rate payers, the results are below.

General Funding (Taxes)

Sustainable funding for all assets that fall under the general fund is $9.4M annually and current funding from sustainable reserves is $2.7M. To increase funding to sustainable levels the City would have to increase taxes approximately 17%, which would be above and beyond any regular tax increases for operations or capital upgrade programs.

Due to the significant infrastructure backlog ($82M), significant debt will have to be taken on in the model, in reality the City may choose to risk manage the assets to end of physical life.

Tax Increase Option [1]	Tax Revenue 2023 - 2122	Debt Interest Paid 2023 - 2122	Investment Returns 2023 - 2122	Net Cost to Taxpayer 2023 - 2122	
A: 1 yr x 17%	$944,861,000	$70,808,000	$(3,841,000)	$1,011,828,000	
B: 5 yrs x 3%	$944,858,000	$89,402,000	$(3,278,000)	$1,030,982,000	
C: 10 yrs x 1.5%	$944,861,000	$112,528,000	$(2,841,000)	$1,054,548,000	} Recommended

Table 11: General Taxation Increase Options

[1] Does not include additional tax increases for tax funded operating expenses or growth

The plan recommends the City implement Option C: A 1.5% cumulative Infrastructure Levy for 10 years.

Water Utility

While borrowing early in the long-term plan is necessary for the water utility, investment returns over the term of the plan significantly reduce the net cost to the ratepayer. Recommended changes will be subject to a further detailed analysis in the water and sewer rate review.

Rate Increase Option [1]	Frontage Rate Revenue 2023 - 2122	Debt Interest Paid 2023 - 2122	Investment Returns 2023 - 2122	Net Cost to Ratepayer 2023 - 2122	
A: 1 yr x 24%	$283,145,000	$25,821,000	$(26,782,000)	$282,184,000	
B: 5 yrs x 4%	**$283,145,000**	**$30,864,000**	**$(25,118,000)**	**$283,891,000**	} Recommended
C: 10 yrs x 1.9%	$283,144,000	$37,131,000	$(23,027,000)	$297,248,000	

Table 12: Water Utility Fronrage Rate Options

The plan recommends the City implement Option B: A 4.0% cumulative Infrastructure Levy for 5 years.

Sewer Utility

Rate Increase Option [1]	Frontage Rate Revenue 2023 - 2122	Debt Interest Paid 2023 - 2122	Investment Returns 2023 - 2122	Net Cost to Ratepayer 2023 - 2122	
A: 1 yr x 19%	$256,097,000	$1,910,000	$(60,097,000)	$197,910,000	
B: 5 yrs x 2.9%	**$256,097,000**	**$3,539,000**	**$(57,406,000)**	**$202,230,000**	} Recommended
C: 10 yrs x 1.3%	$256,097,000	$6,541,000	$(54,529,000)	$208,109,000	

Table 13: Sewer Utility Rate Options

The plan recommends the City implement Option B: A 2.9% cumulative Infrastructure Levy for 5 years.

Appendix D – Calculations

Calculations for the 1.5% recommended cumulative tax increase are shown below:

Current base funding for General Fund capital renewal from sustainable reserves: $2.7M

- 2024 Contribution to the SIIP renewal reserve (1.5%): $468,000
- 2025 Contribution to the SIIP renewal reserve (1.5%): $508,000 + $468,000 from 2024.
    - The cumulative nature of the contribution adds an additional $40,000
- 2026 Contribution to the SIIP renewal reserve (1.5%): $551,000 + $508,000 (2025) + $468,000 (2024).

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Base Funding	$2.7M	$2.7M	$2.7M	$2.7M	$2.7M	$2.7M	$2.7M	$2.7M	$2.7M	$2.7M
Year 1	$468k	$468k	$468k	$468k	$468k	$468k	$468k	$468k	$468k	$468k
Year 2		$508k	$508k	$508k	$508k	$508k	$508k	$508k	$508k	$508k
Year 3			$551k	$551k	$551k	$551k	$551k	$551k	$551k	$551k
Year 4				$598k	$598k	$598k	$598k	$598k	$598k	$598k
Year 5					$648k	$648k	$648k	$648k	$648k	$648k
Year 6						$690k	$690k	$690k	$690k	$690k
Year 7							$735k	$735k	$735k	$735k
Year 8								$780k	$780k	$780k
Year 9									$825k	$825k
Year 10										$870k
Total Funding	$3.2M	$3.7M	$4.3M	$4.9M	$5.5M	$6.2M	$6.9M	$7.7M	$8.5M	**$9.4M**

Glossary of Terms

The following commonly used terms and definitions have been described as they relate to the City of Courtenay's Asset Management Program and in the context of this report:

SIIP Model	the model created in Microsoft Excel to analyze parallel cost and funding pressures and evaluate the annual and long-term infrastructure cash flow.
Asset	also known as a tangible capital asset, is a physical component of a system that has value, enables services to be provided, and has an economic life of greater than 12 months.
DCC	development cost charge
Infrastructure Backlog (deficit)	the replacement value of all assets which are in service beyond their expected service life. Infrastructure backlogs may result in public complaints, e.g. roads are visibly full of potholes, sewer pipes are prone to backup due to root intrusion and groundwater infiltration, and regular water main breaks or leaks resulting in lost revenue.
Infrastructure Funding Gap	the difference in funding between current and sustainable funding levels. Also known as the funding shortfall, and is also related to the annual funding gap – the annual gap between current and annual sustainable funding.
Infrastructure Renewal Backlog	in-service assets considered beyond the useful lives used in the practical risk-based model to generate the results of this report.
Key Performance Indicator	A quantifiable measure to evaluate the success of an organization in meeting objectives for performance.
Level of Service Increase	capital works to improve the provision of a particular service. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability, and cost.
Linear Asset	which is also known as a continuous asset, is infrastructure that is maintained in segments, such as water mains, sanitary mains, storm mains, and roads.
Maintenance	the actions necessary to retain or restore an asset to functioning condition (excluding rehabilitation or renewal). Maintenance may be preventative or corrective.
Operations	the actions necessary to keep an asset functioning and providing service (excluding maintenance, rehabilitation, or renewal), for example power, consumable materials, staff salaries, etc.

Physical Life	the actual time that an asset is in service without interruption before failure. Often longer than useful life as physical life requires accepting a risk of in-service failure to see the full life of an asset.
Remaining Life	the anticipated time left that an asset would remain usable, based on its expected service life. This can be adjusted according to condition to reflect the unique conditions of each asset (e.g., usage, material, soil, quality of installation).
Renewal	The replacement, restoration, rebuilding or refurbishment of infrastructure with a similarly functioning asset. Often combined with, but different from, an upgrade
Replacement Value	the cost (in current dollars) to upgrade, refurbish or replace existing facilities with facilities of equivalent capacity or performance capability.
Risk Mitigation	capital works to reduce risks associated with service provision.
Sustainability Gap	also known and the funding gap in this report, this is the difference between the funding for asset renewal that is available and the long-term funding required for sustainable infrastructure replacement.
Sustainable Funding	the decision to fund infrastructure renewal at the rate that assets are consumed over the long-term. Similar to Annual Sustainable Funding, which is the annual contribution to fund a sustainable renewal program.
Sustainable Funding Sources	Taxes, Utility rates, and transfers from Other governments through agreement (e.g. Community Works Funding, 'Gas Tax'). Borrowing, application-based grants, or funding from reserve without replenishing is considered unsustainable funding.
TCA	tangible capital asset
The Plan	the Sustainable Infrastructure Investment Plan, which sets out a strategy for closing the gap between the City's current funding level and the level required to replace assets at the end of their service life.
Upgrade	See Level of Service Increase
Useful Life (Functional)	the typical life expectancy commonly used for asset time in-service. Could also be considered an asset's expected time to be in service before some form of intervention is required. This is typically used for TCA reporting (as opposed to for asset management purposes) and is based on limiting the level of risk by intervening prior to some sort of failure or interruption.

List of Figures & Tables