City of Port Moody
Report/Recommendation to Council

Date: October 7, 2020
Submitted by: Engineering and Operations Department – Project Delivery Services Division
Subject: Funding Request – Shoreline Trail Sanitary Sewer Project

Purpose
The purpose of this report is to seek funding for the recommended options for the rehabilitation of the shoreline trail sanitary sewers and pathway.

Recommended Resolution(s)

THAT $5.21M be allocated from the Sanitary Sewer Reserve and $4.1M be allocated from Density Bonusing Reserve to construct the recommended upgrades (Option 1 for Sewer and Option 1 for Pathway) to the two sanitary sewer mains under Shoreline Trail and existing Shoreline Trail paved pathway as recommended in the report dated October 7, 2020 from the Engineering and Operations Department – Project Delivery Services Division regarding Funding Request – Shoreline Trail Sanitary Sewer Project.

Executive Summary
This report presents the options explored for the replacement or rehabilitation of two sewers that are located underneath the paved shoreline trail from Murray Street to Old Orchard Park. The report also presents options to upgrade the existing paved pathway given that it is in disrepair and have many issues such as tripping hazards and drainage problems. The main objectives of this project are:

1. The replacement or rehabilitation of 1.5km of 600mm diameter low-pressure sanitary sewer main;
2. The replacement or rehabilitation of 1.6km of 400mm diameter gravity sanitary sewer main;
3. The replacement of the existing 3.0m wide paved pathway; and
4. The installation of additional pathway features such as signage, storytelling boards, and benches.

Multiple options were explored for each asset. The explored options and associated costs can be seen on Table 1 below:

Table 1: List of Options considered for the project

Options	Cost
Gravity Main	
Option 1 – Trenchless	$2.1M
Low Pressure Sewer Main	
Option 1 – 100% Trenchless	$8.0M
Option 2 – 100% Open-Cut	$6.0M
Option 3 – Re-alignment onto Ioco Road	$10.8M
Option 4 A – Hybrid (75% trenchless + 25% open-cut)	$7.8M
Option 4 B – Hybrid (60% trenchless + 40% open-cut)	$7.3M
Option 4 C – Hybrid (40% trenchless + 60% open-cut)	$6.9M
Pathway	
Option 1 – 3.3m wide full depth rehab	$3.5M
Option 2 – 4.3m wide full depth rehab	$4.7M
Option 3 – surface rehab only	$1.9M
Other upgrades including signage, benches, etc.	$0.6M

In addition to technical merits, each option was evaluated against environmental and archaeological constraints. Additionally, each option was also weighed against the survey feedback received after a public engagement event conducted in August, 2020. The survey feedback indicated that the environment is an important factor to the public when determining a rehabilitation approach.

The gravity main rehabilitation options were limited to a trenchless approach and have a low impact on the environment.

The low-pressure sewer rehab option 3 is the highest cost option and will have significant traffic and environmental impacts. Therefore, this option was eliminated at the 30% design stage.

The lowest cost low-pressure sewer option is option 2 – open cut replacement. While this option is low in cost, it has significant environmental impacts including the removal of approximately 200 trees. Therefore, this option is also not recommended.

A number of hybrid options were also considered where the trenchless approach was steadily decreased from 100% to 40% while increasing the open cut approach. While this decreased overall costs, the approach increases the environmental impact proportionally.

The recommended option for the low-pressure sanitary sewer rehabilitation is the 100% trenchless approach or option 1. This has the lowest environmental impact but one of the higher costs. The recommended option for the gravity main will also be a trenchless approach and construction costs at tender for both sewers are expected to be lower than the estimated amounts given efficiency achieved with using the same approach for both sewers.

The pathway options consisted of widening the trail where feasible and providing a safe surface for pedestrians and cyclists. The recommended approach for the pathway upgrade is option 1 – 3.3m wide full-depth restoration. This approach will have minimal impacts to the environment as the pathway will be built up from the existing grade and provide a consistent width with proper drainage for safe usage.

The sewers have a current budget of $8.52M allocated from the sewer reserve. However, for the recommended option, an additional budget of $1.58M is requested which would increase the 2021 capital budget request from $3.63M to $5.21M.

The pathway upgrade was earmarked in the approved 2020-2024 capital budget with a value of $400,000 in 2021, but without an approved funding source. Therefore, staff are requesting a budget of $4.1M to construct the recommended option, which includes upgrades to the pathway such as drainage, signage, storytelling boards, and accessible benches.

Background

The City's sanitary sewer network contains two sewer mains, which are located underneath the Shoreline Trail paved pathway on the north shore of the Burrard Inlet. The mains generally run parallel to the pathway and are considered critical sewer infrastructure in the network. The subject mains – a gravity and a low-pressure siphon – were built in 1970 and 1988 respectively and serve a large portion of the north shore areas of the City, including neighbourhoods such as Ioco, April Road, Pleasantside, Twin Creeks, and Heritage Mountain.

The 600mm thin-walled DR41 PVC low-pressure main collects approximately 250 L/s flow in peak wet weather and discharges directly to Metro Vancouver's Coquitlam Interceptor at Dewdney Truck Road.

The main does not have any bypass ports or diversions which would allow for isolation of the main in the event of a rupture. Given that the main is located in a highly environmentally sensitive area, the consequence of a break is great.

The parallel 400mm AC gravity main collects approximately 24 L/s flow in peak wet weather and discharges to the Metro Vancouver-owned Port Moody Pump Station at Murray Street. A map of the project area is shown in Figure 1.

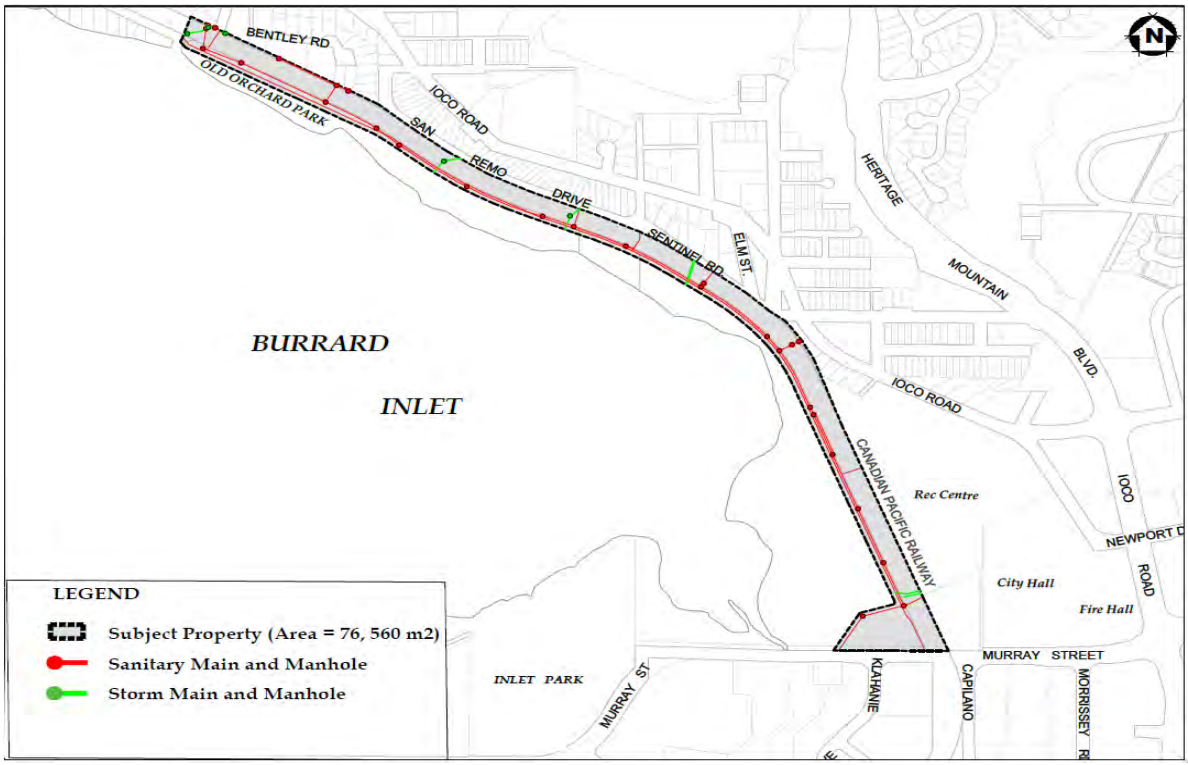

Figure 1: Map of project area

The two mains have two specific purposes. The gravity main collects sanitary sewer from the houses located south of Ioco Road, while the low-pressure main collects a much larger catchment on the north shore and is considered a “trunk” main. The gravity main cannot be eliminated as services from houses cannot directly be connected to a pressure main due to hydraulics.

To date, a number of studies have been completed to assess the capacity, condition, feasibility of operation, and construction of the sewer mains. These studies have concluded that the low-pressure main and the gravity main should be replaced in the 2020-2021 timeframe. Since the sewers are located underneath the paved bike and pedestrian pathway, staff also plan to upgrade the path to accommodate multi-use with a wider trail where feasible based on physical and environmental constraints. The pathway is currently in disrepair and contains many tripping hazards and drainage issues. It is also important to note that there is an efficiency to making the pathway improvements at the same time as the sanitary sewer upgrades to minimize public impacts and streamline the environmental review and approval process rather than carrying out two separate projects.

It is important to note that the pathway and sewers are located within an environmentally and archeologically sensitive area and in close proximity to CP rail right-of-way. The Environmentally Sensitive Area (ESA) contains aquatic, riparian, and urban forest habitats. The existing sewer and path crosses ten streams and runs adjacent to multiple low-lying wetlands. Three of the streams have recent documented fish occurrences (Suterbrook, Noons, and Turner Creeks). A Pacific Great Blue Heron Colony has established in a stand of cottonwood trees above a wetland adjacent to the path and sewer. The forest habitat in the area comprises mixed stands of cottonwood, western red cedar, red alder, and big leaf maple with a

herbaceous understory of shrub species. These features support important habitat and act as a corridor for many species of fish, amphibians, bats, birds, and large mammals. The area also has regional significance as a biodiversity hub.

Careful planning around these features is required to avoid, reduce, and mitigate impacts and ensure compliance with senior legislation (i.e. *Fisheries Act*, *Species at Risk Act*, *Water Sustainability Act*, *Wildlife Act, Migratory Birds Conventions Act*).

The City retained Kerr Wood Liedal Associates (KWL) in January 2020 to complete an options analysis and detailed design to replace or rehabilitate the sewers and the path.

KWL along with City staff explored multiple options and conducted an options analysis, taking environmental and archaeological constraints into account. This report provides Council information on the explored options, associated costs, and environmental impacts of each option, as well as construction timelines. Staff are seeking endorsement of additional funding for the recommended options.

Discussion

Preliminary Investigations

Prior to exploring any options, multiple preliminary investigations were conducted to gather information on site conditions. These investigations included:

- Engineering Survey;
- Tree Inventory;
- Biophysical Inventory;
- Geotechnical Investigations;
- Archaeological Investigations; and
- Great Blue Heron Management Plan for Construction.

A total of seven (7) options were explored for the replacement or rehabilitation of the sewers, while three (3) options were explored for the rehabilitation of the pathway. Each sewer option was considered with a set of design criteria, including but not limited to:

- A capacity analysis which considered future OCP sewer loading, including an assumption in the case of potential new development in Anmore;
- Resilience, including seismic, geotechnical, and climate and weather events;
- Environmental impacts, including any potential tree removals;
- Archaeological considerations;
- Flow bypass during construction and construction access; and
- Impacts on public and park users.

All options presented will result in environmental impacts, including vegetation removal, ground disturbance, changes to the plant community, and changes to soil drainage. Areas impacted will be restored at a 2:1 ratio as per City policy, presenting opportunities to enhance areas that are currently dominated by invasive species. A summary of each option considered can be found below.

Gravity Sewer

Option 1 – Trenchless In-Situ Cured-In-Place Pipe CIPP Lining

The Gravity Sewer main is a 400mm Asbestos Cement (AC) main constructed in 1970. A Closed Circuit Television (CCTV) assessment conducted in 2016 found that this main is in fairly good condition with a few areas that needs repair. These include breaks, some holes, and spalling on the walls of the pipe. Accordingly, the recommended repair for the gravity mains is a trenchless CIPP re-lining where a liner will be placed inside the pipe and cured in place at an estimated cost of $2.1M. The design life after construction is expected to be approximately 50 years. This option is the recommended approach as it is the most cost effective solution, and this capital cost is within the capital budget as planned by staff in 2020.

Low-Pressure Sewer

The Low-Pressure Sewer main is a 600mm SD-41 PVC main constructed in 1988. The main extends from the Ioco Cleansing Pump Station near 1st Avenue through to the Coquitlam Interceptor at Dewdney Trunk road. Along the length of the pipe, it receives flows from three pump stations and four pressure sewers. A 2016 study identified that the material of the sewer pipe combined with its shallow depths could contribute to a rupture as it ages. Given that this sewer does not currently have any bypass ports or manholes, there would not be any way to isolate the main for a repair in the event of a break, and flows will be discharged into the surrounding highly sensitive environment until a repair can be completed. Thus, the study recommended that the City either replace the sewer or insert bypass ports into the main to ensure that flows can be managed with minimum negative impacts to the surrounding environment in the event of a break.

Apart from the hydraulic differences, a key difference between the low-pressure sewer and the gravity sewer is the access points into the sewer. The gravity sewer is designed with manholes that can be accessed from the surface, thus repairs can be easily completed. The low-pressure sewer is not easily accessible and requires the addition of access points which is reflected in the cost estimates discussed in the following sections. Pressure sewers are not typically equipped with manholes as flows will breach manhole covers and discharge to the surface. Bypass ports or valves, however, are typically designed in modern pressure sewers to ensure easy access and isolation in the event of a break. This key difference between the subject mains is illustrated in Figures 2 and 3 below.

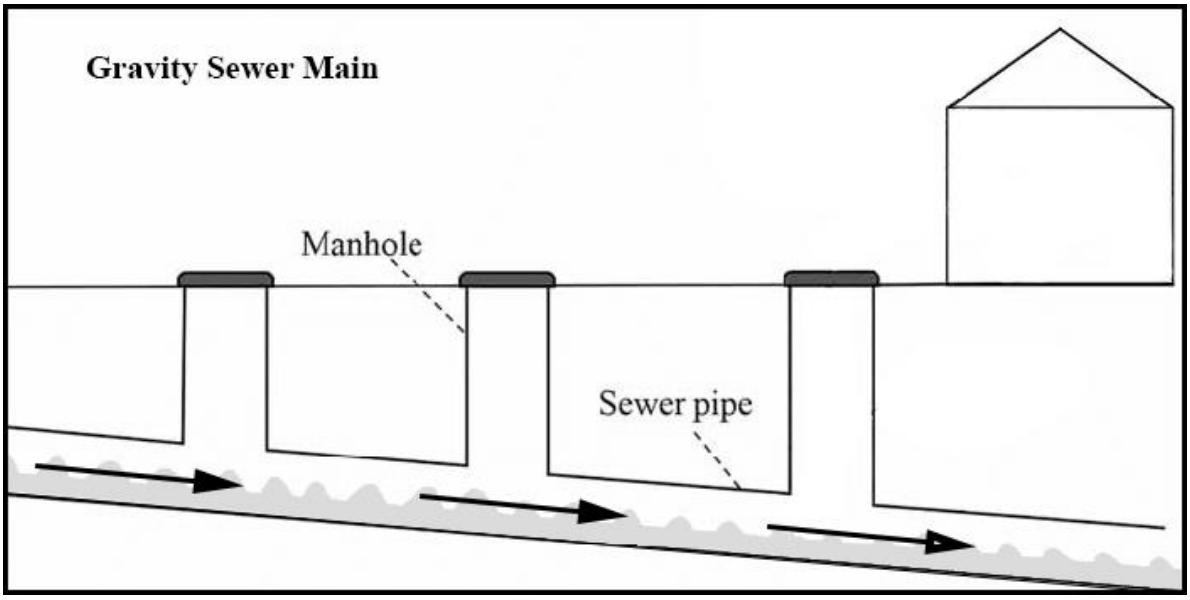

Figure 2: Illustration of a Gravity Sewer Main

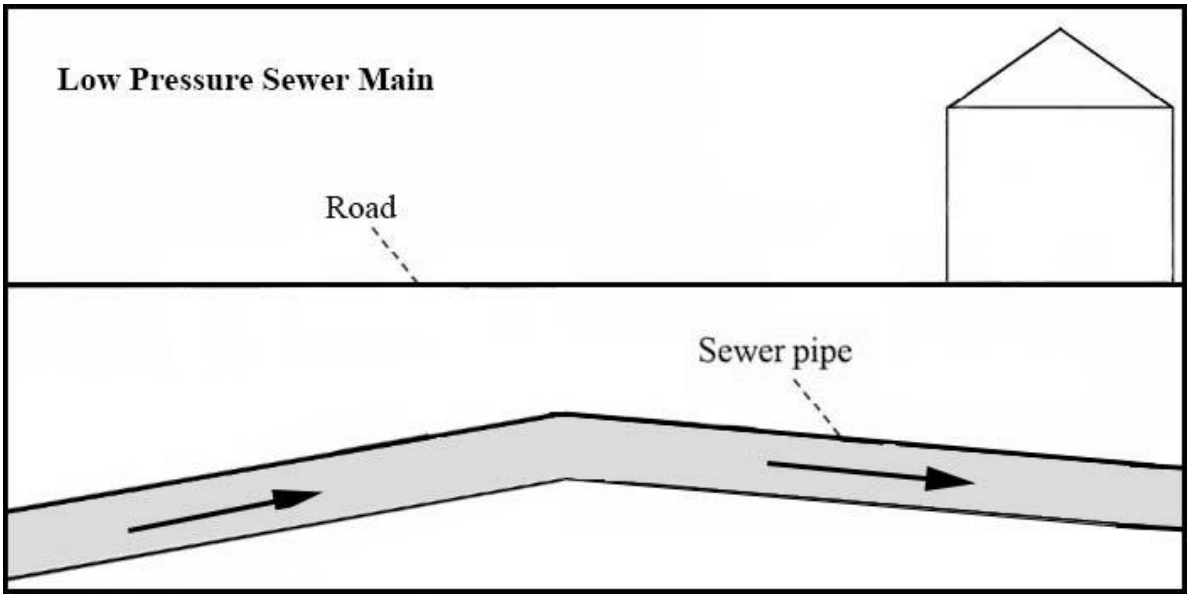

Figure 3: Illustration of a Low Pressure Sewer Main

Several options were considered for the replacement or rehabilitation of the low-pressure sewer main:

Option 1 –100% Trenchless In-Situ CIPP Lining – Existing Alignment
This option involves rehabilitating the low-pressure sewer with a cured-in-place (CIPP) liner, which would require excavation of approximately 15 entry/exit pits each approximately 6m long and 3m wide. The number of pits are dictated by the length limit for liners and installation machinery and equipment. Potential environmental impacts are limited to the ground and vegetation disturbance at the entry/exit pits, and will likely require the removal of approximately seven trees. This option will prolong the life of the sewer by an additional 50 years and has an estimated cost of $8.0M.

Option 2 – 100% Open Cut – Existing Alignment
This option involves replacing the existing sewer in the same alignment (in Shoreline Park) adjacent to the existing sewer with a brand new pipe. This approach has the largest potential of environmental impacts, as vegetation clearing along much of the 1.7m length of the trail is required, resulting in the removal of approximately 176-200 trees and understory vegetation. This amount of vegetation removal could potentially have long-term impacts on canopy cover, stream, and wildlife, and would significantly change the park characteristic for users with a notable clear-cut corridor. This option will, however, give the City a brand new pipe complete with bypass ports and seismic resiliency with a design life of 80 years at an estimated cost of $6.0M. This is the lowest cost option. This option's capital cost is within the capital budget as planned by staff in 2020.

Option 3 – Re-route the sewer on to Ioco Road – Eliminated
This option involves constructing a brand new sewer underneath Ioco Road. The sewer will be tied in at Old Orchard Park and constructed along San Remo Drive, Ioco Road, and Murray Street before tying in at the Works Yard at Murray Street. This approach is anticipated to have the greatest potential impact on aquatic habitat of all the options, due to the construction of a pipe bridge at Noons Creek and disturbance to Suterbrook Creek. While this option would remove the low-pressure sewer out of the park, the gravity sewer main would remain due to hydraulic reasons. This option also carries the highest cost at $10.8M. Given the high impacts to the environment and public inconvenience of construction on a major route, this option was eliminated early on in the options analysis.

Option 4 – Hybrid Approach – Trenchless In-Situ CIPP Lining – Existing Alignment
This option involves rehabilitating the low-pressure sewer through trenchless methodology for a portion of the length and installing a new adjacent main for the remaining portion of the length. This approach avoids some of the environmental impacts associated with open cut methods, and allows for strategic placement of the open cut sections to avoid sensitive habitat around streams and the Great Blue Heron colony. This approach increases the life of the main from 50 years towards 80 years. Within this hybrid approach, three options were developed which explored percent rehabilitation through trenchless methodology from 75%, 60%, and 40%. Approximate tree loss for the 75%, 60%, 40% trenchless approaches vary at 25, 45, 75 trees respectively.

Pathway
A total of three (3) options were considered for the upgrade of the trail. Design considerations such as width, drainage, environmental impacts, modal and directional separation, as well as safety and accessibility were incorporated in to the evaluation of the options. The explored options are as follows:

Option 1 – 3.3m wide trail, full-depth restoration
This option includes constructing a 3.3 m wide pathway from Murray Street to Old Orchard Park. The alignment will follow the existing pathway but provide a consistent width all the way through except at locations such as existing bridges and a segment with steep slopes. The path will be built on top of the existing pathway, which will minimize environment impacts; however, some tree and vegetation removal will be required. The estimated cost for this option is $3.5M.

Option 2 – 4.8m wide trail, full-depth restoration
This option includes constructing a 4.8m wide pathway from Murray Street to Old Orchard Park. This approach will allow for separation between cyclist and pedestrian modes, but has the largest potential for environmental impacts due to the permanent loss of vegetation and habitat. The estimated cost for this option is $4.7M. Stakeholder engagements with the Transportation Committee and Parks and Recreation Committee indicated that the path is mainly used for recreational purposes, so a full 4.8m wide standard multi-use path is not desired as the environmental impacts will be great. Therefore this option was eliminated at the 30% design stage.

Option 3 – Surface rehab only
This option includes only re-surfacing the pathway and will have a short design life and could require rehabilitation within the following five years. This approach has the lowest potential for environmental impact at a lower cost of $1.9M, but will not fully address the existing drainage issues. Given that construction of the sewers will be disturbing the area already, a higher design life is desired for the pathway. Therefore this option is not recommended.

A full summary of the proposed options and associated environmental impacts and cost estimates can be found in **Attachment 1** – Options Analysis.

Construction Schedule and Traffic Management
Construction is expected to take one full year; however, due to the nature of the works and the location, construction could take up to two years. In addition to weather and soil conditions, construction is restricted by environmental regulations such as the fisheries window, bird nesting window, heron buffer, etc. The trail will have a rolling closure as works progress. Pedestrians and cyclists will be detoured up to San Remo Drive and Ioco Road as construction progresses. Details of these detours are not available at this time and will be finalized closer to construction. Every effort will be made to ensure safety and convenience of the public.

Construction is expected to begin in Spring of 2021. A tentative and high-level construction timeline is shown on Figure 4 below.

Figure 4 – Tentative Construction timeline

In summary, the recommended options for the project and their associated costs are shown below in Table 2.

Table 2: Summary of the recommended options and associated costs

Asset	Option	Estimated Cost
Gravity Sewer Main	Option 1 - Trenchless CIPP Lining	$2.1M
Low Pressure Sewer Main	Option 1 - 100% Trenchless CIPP Lining	$8.0M
Trail	Option 1 - 3.3m wide, full-depth rehab	$3.5M
	Upgrades such as new furniture, signage, etc.	$0.6M

The sewer portion of the project is currently funded through the 2020-2024 5-year capital plan as follows:

Current funding approved through the 2020-2024 five-year capital plan		Required additional funding	Requested Funding through 2021 capital plan
2020	$4.89M		
2021	$3.63M	$1.58M	**$5.21M**
Total	$8.52M		

However, estimated costs indicate that the sewer portion would cost $1.58M higher than the projected plan of $3.63M to be allocated in 2021. Therefore, staff request that the 2021 planned budget of $3.63M be increased to $5.21M. Based on staff's allocation of sanitary sewer projects in the 2021 five-year capital plan, the sanitary sewer reserve can accommodate this additional expenditure.

The pathway portion of the project is currently unfunded. However, given that the sanitary sewer project will be disturbing the area, staff would like to capitalize on the opportunity and complete upgrades to the pathway. Should Council support upgrades to the pathway, it is recommended that the pathway works be funded from the Density Bonusing reserve.

Alternate options have been presented to Council for their consideration to reduce capital expenditure or to phase the project so that there is a more moderate cash flow profile as reserves can replenish over time.

Other Option(s)

1. THAT $5.21M be allocated from the Sanitary Sewer Reserve and $4.1M be allocated from Density Bonusing Reserve to construct alternate options scenario 1 (Option 4A for Sewer and Option 1 for Pathway).

2. THAT $5.01M be allocated from the Sanitary Sewer Reserve and $4.1M be allocated from Density Bonusing Reserve to construct alternate options scenario 2 (Option 4B for Sewer and Option 1 for Pathway).

3. THAT $4.51M be allocated from the Sanitary Sewer Reserve and $4.1M be allocated from Density Bonusing Reserve to construct alternate options scenario 2 (Option 4C for Sewer and Option 1 for Pathway).

4. THAT $4.11M be allocated from the Sanitary Sewer Reserve and $4.1M be allocated from Density Bonusing Reserve to construct alternate options scenario 2 (Option 2 for Sewer and Option 1 for Pathway).

5. THAT construction be phased over multiple years and $2.45M be allocated from the Sanitary Sewer Reserve for Phase 2, Option 1 Sewer construction and $2.16M be allocated from Density Bonusing Reserve for Phase 1 and $2.23M be allocated from Density Bonusing Reserve for Phase 2 to construct recommended option for the pathway

A full list of options and their impacts including estimated costs can be found in **Attachment 1** – Options Analysis and **Attachment 2** – Estimated Project Costs. It is important to note that phasing the project will have an adverse impact on both the public with repeated construction interruptions as well as cost, as costs are likely to increase over the next four years.

Financial Implications

There are significant financial implications associated with this project. A summary of each option and its associated costs are shown in Table 2. The recommended options are highlighted in orange.

Table 2: Financial impact of each project

Asset	Option	Estimated Cost	Estimated Project Cost for Recommended Options
Gravity Sewer Main	Option 1 - Trenchless CIPP Lining	$2.1M	$2.1M
Low Pressure Sewer Main	Option 1 - 100% Trenchless CIPP Lining	$8.0M	$8.0M
	Option 2 - 100% Open Cut	$6.0M	
	Option 3A - 100% Open Cut and re-align to Ioco Road	$9.3M	
	Option 3B - 100% Open Cut and re-align to Ioco Road	$10.8M	
	Option 4A - Hybrid existing alignment (75% trenchless +25% open-cut)	$7.8M	
	Option 4B - Hybrid existing alignment (60% trenchless + 40% open-cut)	$7.3M	
	Option 4C - Hybrid existing alignment (40% trenchless +60% open-cut)	$6.9M	
Trail	Option 1 - 3.3m wide, full depth rehab	$3.5M	$3.5M
	Option 2 - 4.3m wide, full depth rehab	$4.7M	
	Option 3 - Surface rehab only	$1.9M	
	Upgrades such as new furniture, signage, etc.	$0.6M	$0.6M
TOTAL			**$14.2M**
**Includes 20% contingency amount to account for unknown risks **			
	Recommended Options		

Currently, $8.52M has been budgeted for the sanitary sewer (both gravity and low-pressure) mains to be replaced or rehabilitated in the 2020 and 2021 budgets. However, an additional budget of $1.58M is required to complete the sewers as recommended above. Therefore, staff request that the 2021 budget be increased to $5.21M from the sanitary sewer reserve to cover the additional budget required for the completion of the sanitary sewer portion of the project.

The pathway upgrade was earmarked in the approved 2020-2024 capital budget with a value of $400,000 in 2021, but without an approved funding source. Therefore, an additional budget of $4.1M will be required to complete the works on the path. The additional budget is proposed to be allocated from Density Bonusing reserve. It should be noted that staff are in the process of actively searching and applying for grants for the pathway portion of the project.

Communications and Civic Engagement Initiatives

KWL, along with City staff, conducted multiple stakeholder engagements and a public engagement event to inform and gather feedback on the upgrades planned for the pathway. The following stakeholders were directly engaged:

- Parks and Recreation Committee;
- Environmental Protection Committee;
- Senior Focus Committee;
- Transportation Committee;
- HUB –Tri-Cities Group;
- Environmental Stewardship Groups; and
- Canadian Pacific Railway.

In addition, a public engagement pop-up event was held on August 28 and 29, 2020 at Old Orchard Park. A survey was also used to gather feedback on the proposed upgrades for the pathway. A total of 137 survey responses were received. There was general agreement with the following statements:

- The proposed features are appropriate for the trail and would improve the experience of the trail for many users;
- The proposed features support the community's use of the trail for recreation and play;
- The proposed features would improve the accessibility of the trail for people with disabilities and older adults;
- The proposed features support goals of ecological and public health;
- The introduction of storytelling to the trail would enrich the user's experience of the trail; and
- It is important for the trail storytelling component to recognize the indigenous connection to the land.

In addition, the survey requested that the public rate the proposed features from the most important to the least important. A summary of this feedback can be found below in Figure 5 and a full record of the public feedback is included in **Attachment 3** – Summary of Public Engagement Event.

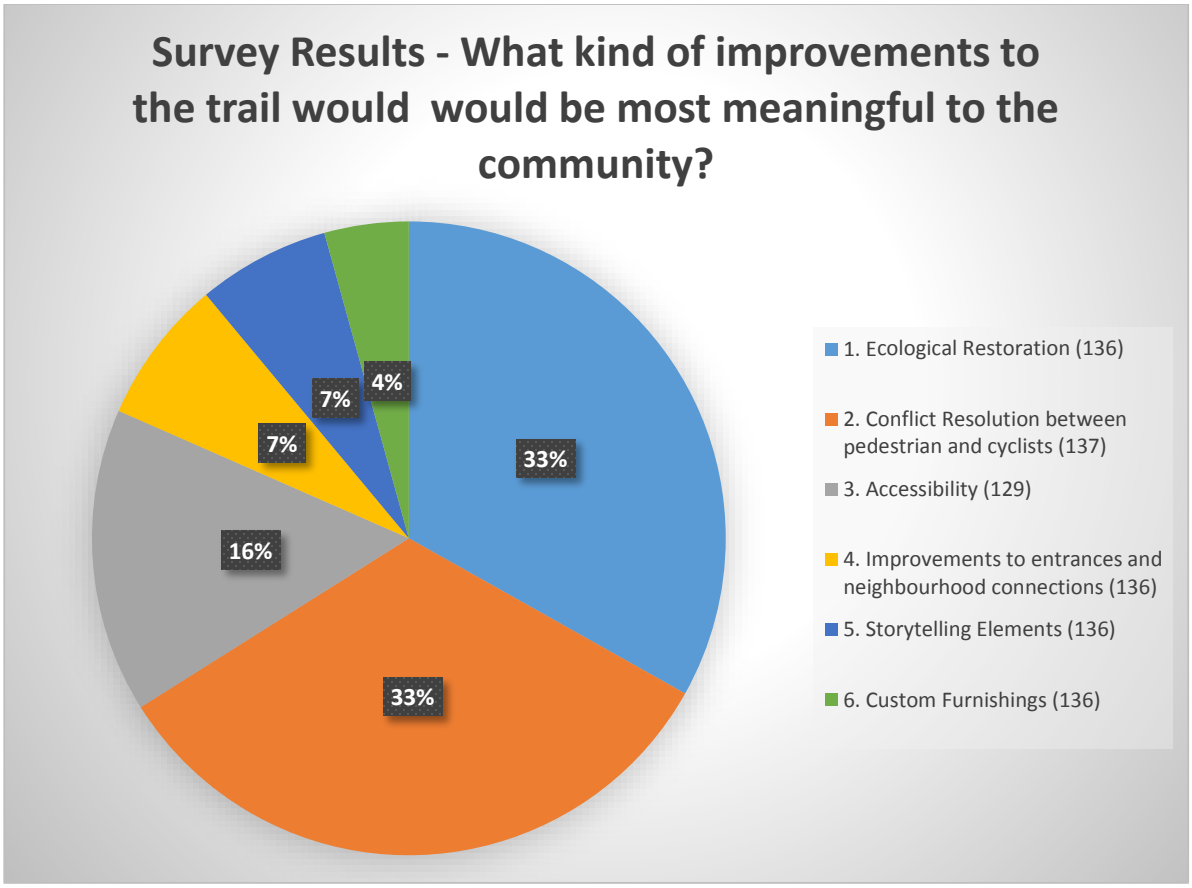

Figure 5: Survey feedback on what is most important to the public for the pathway upgrade

Council Strategic Plan Objectives

This project aligns with Council's Strategic Plan priorities of Service Excellence and Healthy City.

Attachment(s)

1. Options Analysis.
2. Estimated Project Costs.
3. Summary of Public Engagement Event.

Report Author

Shashi Bandara, P.Eng.
Project Engineer

Report Approval Details

Document Title:	Funding Request – Shoreline Trail Sanitary Sewer Project.docx
Attachments:	- Attachment 1 - Options Analysis.pdf - Attachment 2 - Estimated Project Costs.pdf - Attachment 3 - Summary of Public Engagement Event.pdf
Final Approval Date:	Oct 28, 2020

This report and all of its attachments were approved and signed as outlined below:

Kim Law, Manager of Project Delivery Service - Oct 23, 2020 - 3:21 PM

Jeff Moi, General Manager of Engineering and Operations - Oct 23, 2020 - 3:22 PM

Dorothy Shermer, Corporate Officer - Oct 26, 2020 - 12:05 PM

Rosemary Lodge, Manager of Communication and Engagements - Oct 26, 2020 - 2:57 PM

Ron Higo, General Manager, Community Services - Oct 26, 2020 - 3:54 PM

Paul Rockwood, General Manager of Finance and Technology - Oct 26, 2020 - 4:01 PM

Tim Savoie, City Manager - Oct 28, 2020 - 11:21 AM

Asset	Option	Total Tree Imapcts	Tree Impacts - Retention Value			Relative Potential Environmtenal Impacts			Estimated Cost	Remarks	Decision/Rationale
			Low	Moderate	High	Terrestiral Habitat	Aquatic Habitat	Widlife			
Gravity Sewer Main	Option 1 - Trenchless CIPP Lining	0	N/A	N/A	N/A	N/A	N/A	N/A	$2.1M	Bypass Required	Recommended
Low Pressure Sewer Main	Option 1 - 100% Trenchless CIPP Lining	9	2	7	-	low	low	low	$8.0M	Bypass Required	Recommended
	Option 2 - 100% Open Cut	176-200	N/A	N/A	N/A	high	high	high	$6.0M	No Bypass	
	Option 3A - 100% Open Cut and re-align to Ioco Road	N/A	N/A	N/A	N/A	moderate	high	high	$9.3M	Traffic Management Required- Eliminated	Eliminated due to high costs and high impacts
	Option 3B - 100% Open Cut and re-align to Ioco Road	N/A	N/A	N/A	N/A	moderate	high	high	$10.8M	Traffic Management Required- Eliminated	Eliminated due to high costs and high impacts
	Option 4A - Hybrid existing alignment (75% trenchless +25% open-cut)	25	8	16	-	moderate	low	low	$7.8M	Bypass Required	
	Option 4B - Hybrid existing alignment (60% trenchless + 40% open-cut)	45	9	36	-	moderate	low	moderate	$7.3M	Bypass Required	
	Option 4C - Hybrid existing alignment (40% trenchless +60% open-cut)	75	21	24	-	high	low	moderate	$6.9M	Bypass Required	
Trail	Option 1 - 3.3m wide, full depth rehab	8	2	2	-	moderate	low	low	$3.5M		Recommended
	Option 2 - 4.3m wide, full depth rehab	N/A	N/A	N/A	N/A	high	high	high	$4.7M	Eliminated	Eliminated due to high impacts and public input on keeping the pathway recreational
	Option 3 - Surface rehab only	0	N/A	N/A	N/A	low	low	low	$1.9M	Short service life	
	Upgrades such as new furniture, signage, etc.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	$0.6M	optional	

largest DBH = 610
smallest DBH = 30

Asset	Option	Estimated Cost	Estimated Project Cost for Recommended Options
Gravity Sewer Main	Option 1 - Trenchless CIPP Lining	$2.1M	$2.1M
Low Pressure Sewer Main	Option 1 - 100% Trenchless CIPP Lining	$8.0M	$8.0M
	Option 2 - 100% Open Cut	$6.0M	
	Option 3A - 100% Open Cut and re-align to Ioco Road	$9.3M	
	Option 3B - 100% Open Cut and re-align to Ioco Road	$10.8M	
	Option 4A - Hybrid existing alignment (75% trenchless +25% open-cut)	$7.8M	
	Option 4B - Hybrid existing alignment (60% trenchless + 40% open-cut)	$7.3M	
	Option 4C - Hybrid existing alignment (40% trenchless +60% open-cut)	$6.9M	
Trail	Option 1 - 3.3m wide, full depth rehab	$3.5M	$3.5M
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	Option 3 - Surface rehab only	$1.9M	
	Upgrades such as new furniture, signage, etc.	$0.6M	$0.6M
TOTAL			**$14.2M**

**Includes 20% contingency amount to account for unknown risks **

Recommended Options

Shoreline Trail Sanitary Sewer Project – Public Engagement Event Briefing

Public Engagement Event

The public engagement event was held on August 28-29th on site at Old Orchard Park with representatives from the City of Port Moody, KWL and Hapa Collaborative. Hapa prepared boards with information about the sewer upgrades project and then presented opportunities along the trail including design goals and principles, various features, and diagrams that illustrated possible changes and additions to the trail. The intention was to encourage the public to get involved by asking “As the City has the opportunity to rehabilitate and improve the shoreline trail, what should our priorities be?”

In preparation for the event, there was a general layout developed to ensure there was adequate spacing to promote social distancing. There was more feedback and conversations from the public on Saturday morning as compared to the turnout on Friday. At the event, the public was encouraged to provide their feedback on the shoreline trail and the proposed features through the online survey.

Online Survey

The survey made available on the City of Port Moody website received 137 responses. These are the general results from the survey, see the attached survey data for more information and the compiled comments.

Question 1-4 were intended to provide relevant background information about the respondents. Generally, the respondents lived in Port Moody, were within the 25-54 age range, and use the Shoreline Trail multiple times a week. In responding to how they use the trail, 95% chose with “For recreation: walking, running, cycling” with 31% also including “With Children”, “To experience nature” was also a popular response with 73%.

Question 5-10 were a series of statements about the proposed features presented on the boards. Respondents could choose between Strongly Agree, Agree, Disagree, Strongly Disagree, and No Opinion. If there was no response, it was counted as No Opinion. There was a general agreement for the following statements:

- The proposed features are appropriate for the trail and would improve the experience of the trail for many users.
- The proposed features support the community's use of the trail for recreation and play.
- The proposed features would improve the accessibility of the trail for people with disabilities and older adults.
- The proposed features support goals of ecological and public health.
- The introduction of storytelling to the trail would enrich the user's experience of the trail.
- It is important for the trail storytelling component to recognize the indigenous connection to the land.

For statements 5-9, “Agree” received the largest percentage of the responses while “It is important for the trail storytelling component to recognize the indigenous connection to the land” received the largest percentage of “Strongly Agree” responses.

Question 11 asked respondents to rank six proposed features in terms of importance for the trail. The intention of the question was to have respondents rank each feature in relation to the rest; however, 54% of the collected survey either ranked one or more features as the same importance or had incomplete answers. To account for this, the data was processed in two methods: one method accounted for all entered responses, and the other method only accounted for the correctly ranked answers. Both ended with the same ranking of importance for the following six proposed features:

1. Ecological restoration
2. Conflict reduction between pedestrians and cyclists
3. Accessibility improvements
4. Improvements to entrances and neighbourhood connections
5. Storytelling elements
6. Custom furnishings

Table 1: Survey Results

Importance	% of 1 (Most Important)	% of 2	% of 3	% of 4	% of 5	% of 6 (Least Important)	No Answer
1. Ecological Restoration (136)	40%	30%	16%	10%	2%	1%	2
2. Conflict Resolution between pedestrian and cyclists (137)	39%	23%	18%	8%	9%	3%	1
3. Accessibility (129)	19%	22%	26%	18%	9%	7%	8
4. Improvements to entrances and neighbourhood connections (136)	9%	17%	27%	13%	17%	16%	2
5. Storytelling Elements (136)	8%	19%	11%	20%	19%	22%	2
6. Custom Furnishings (136)	5%	5%	15%	18%	22%	34%	2