City of Richmond

Report to Committee

To:	General Purposes Committee	**Date:**	February 8, 2023
From:	Milton Chan, P.Eng Director, Engineering	**File:**	10-6060-01/2023-Vol 01
Re:	**Steveston Island Dike Preliminary Design – Public and Stakeholder Engagement**		

Staff Recommendation

That, as outlined in the staff report titled "Steveston Island Dike Preliminary Design – Public and Stakeholder Engagement," dated February 8, 2023, from the Director, Engineering, the preliminary design for the Steveston Island Dike project be endorsed for the public and stakeholder engagement.

Milton Chan, P.Eng
Director, Engineering
(604-276-4377)

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Real Estate Services	☑	
Parks Services	☑	
Roads & Construction	☑	
Sustainability & District Energy	☑	
Intergovernmental Relations	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

The Council endorsed Dike Master Plan—Phase 1 report assessed and recommended flood protection measures for the west dike south of Williams Road and the south dike from Garry Point Park to No. 2 Road. Recognizing the disruptions to residents, businesses, and heritage sites posed by upgrading the dike along its existing alignment between London Farm and Gary Point Park, Phase 1 proposed a new dike on Steveston Island with floodwalls and gates to enclose Steveston Harbour as the recommended long-term solution for flood protection in the Steveston area.

Subsequently, the City pursued the recommendations from Phase 1 to develop the Steveston Island dike concept further and was awarded $1.2 million through the National Disaster Mitigation Program to complete the Steveston Island Flood Risk Investigation. The findings of this investigation, including the conceptual design, geotechnical investigations, and the sea gate concept, were presented at the Public Works and Transportation Committee Meeting on June 19, 2019, in a staff report titled "Steveston Island Flood Protection Update," dated May 17, 2019, from the Acting Director, Engineering.

Following the work plan outlined in the Dike Master Plan - Phase 1, staff have progressed this project forward by completing further technical assessments and initial stakeholder engagement to inform the preliminary design of the Steveston Island dike. This report presents the findings of the Steveston Island Preliminary Dike Design project and seeks Council endorsement to engage the public and key stakeholders for feedback on the proposed concepts.

This report supports Council's Strategic Plan 2018-2022 Strategy #1 A Safe and Resilient City:

> *Enhance and protect the safety and well-being of Richmond.*
>
> *1.2 Future-proof and maintain city infrastructure to keep the community safe.*
>
> *1.3 Ensure Richmond is prepared for emergencies, both human-made and natural disasters.*

This report supports Council's Strategic Plan 2018-2022 Strategy #2 A Sustainable and Environmentally Conscious City:

> *Environmentally conscious decision-making that demonstrates leadership in implementing innovative, sustainable practices and supports the City's unique biodiversity and island ecology.*
>
> *2.1 Continued leadership in addressing climate change and promoting circular economic principles.*

Analysis

Project Location – Steveston

Located in the southwest corner of Richmond, Steveston is home to a vibrant community with historical buildings, diverse cultural history, and an operating harbour with over 500 commercial fishing vessels. Harbour facilities are located at two different sites – the Gulf site and the Paramount site – managed by the Steveston Harbour Authority. Steveston is protected from flooding by a perimeter dike surrounding Lulu Island.

The assessment completed for the Dike Master Plan Phase 1 identified that raising the dike in its current alignment will majorly impact the existing properties, businesses, and infrastructure in the Steveston area. Additionally, it would leave many new and historic buildings like the Britannia Shipyards and the Gulf of Georgia Cannery outside of it unprotected.

The Steveston Island Dike project proposes to change the existing Steveston breakwater into the City's primary flood defense between London Landing and Garry Point Park as an alternative to raising the existing dike. The proposed dike would provide a standard of flood protection that meets provincial guidelines, working in tandem with the existing dike, with a navigable gate at the harbour entrance that would close under high water conditions that risk overtopping the existing dike. The foreshore area along the existing dike alignment will be raised over the years through development or as opportunities arise. Council endorsed this alignment presented in the staff report titled "Dike Master Plan – Phase 1 Report, at the April 22, 2013, Regular Council Meeting.

Figure 1. Steveston Island Dike Layout

Figure 1 above shows the proposed layout of the Steveston Island dike. The planned work area is primarily contained on Steveston Island and the Fraser River riverbed. This alignment ties into the existing dike at the eastern edge of Garry Point Park and at Dyke Road at the London Landing area. The section of dike east of this project will be raised in the upcoming years as a part of an active Capital project.

Technical and Environmental Site Assessments

With an average land elevation of 1.0 metre above sea level, Richmond is located wholly within the floodplain of the Fraser River and is susceptible to flood risks posed by climate change-induced sea level rise, spring freshets and storm surges. For this project, sea level rise was specified as 1.0 metre by the year 2100, as accepted by the province, and a land subsidence allowance of 0.2 metres was established for the same period.

This project completed hydraulic and seismic assessments, and wave impact analysis to inform the preliminary dike design. Additionally, preliminary environmental investigations were completed to better understand the existing habitat at this location. In addition, an Archeological Overview Assessment was also conducted for this project by the Musqueam Archeology Department; no archaeological sites or areas of archaeological potential were identified during the survey.

Preliminary Dike Design

The preliminary dike design outlined in Figure 2 is proposed to protect the harbour and the adjacent community from flood hazards and enhance the adjacent habitat. The concept involves enclosing the harbour with a dike on Steveston Island and floodwalls with gates at the east and west ends that can be closed during high water levels.

The dike will span the 3.3 kilometres length of Steveston Harbour from London Landing in the east to Garry Point Park in the west. From east to west, this includes the following:

- An earth-fill dike connection to the existing dike along Dyke Road at the London Landing parking area;
- A flood wall across the east entrance to the park;
- An earth fill dike along Steveston Island;
- A flood wall along part of the existing breakwater west of Steveston Island; and
- A flood wall along the river bed and harbour entrance to a connection at Garry Point.

Figure 2. Rendering of the Steveston Island Dike

Earth-Fill Dike: The earth-fill portion of the dike will have a crest width of ten metres to permit future raising without future widening of the base and a 4 metres maintenance access road atop the dike. The crest elevation will vary between 4.7 metres and 5.5 metres. Due to the varying width of the island along its length, the dike slopes will vary depending on available space. Where space permits, a 30 m riparian setback is proposed to avoid disturbing habitat and removing trees along the bank.

Flood Walls: The two proposed flood walls will consist of two rows of circular pile walls, at a width of 4 metres apart, topped with a minimum 4 metres maintenance access road with handrails. The flood walls will be designed at the second stage of preliminary design.

East Gate: The East Gate design, as shown in Figures 3 and 4, consists of a large concrete open box culvert with an access bridge above it and stop log slots to close off the gate during high tidal water levels. The access bridge design will be further refined in the second stage of the preliminary design. This gate will provide water access between the Fraser River and the Steveston Harbour for recreational use, including canoers, kayakers and paddle boarders.

Figure 3. Rendering of East Gate Concept (Looking East)

Figure 4. Bird's Eye View of the East Gate (Looking East)

Navigation Gate: The proposed type of gate for the Navigation Sea Gate is a horizontal axis sector gate. Figure 5 shows the closed Navigation Gate with an upper gate elevation of 5.5 metres to accommodate the anticipated sea level rise beyond 2100. The navigation gate design

will be completed at the second stage of preliminary design. No changes have been made since the concept design stage.

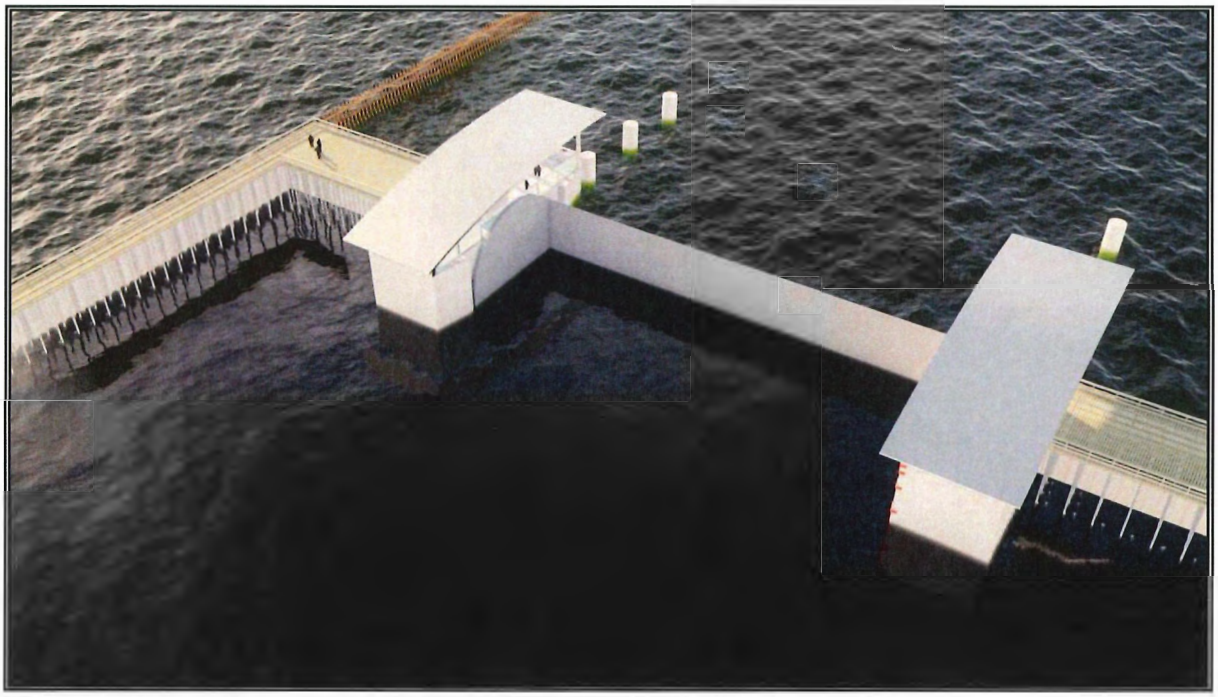

Figure 5. Closed Horizontal Axis Sector Gate (Looking West) Rendering

Breakwater: There are three proposed breakwater structures. The two rip rap breakwater structures are intended to reduce erosion from river flow and waves to protect habitat enhancement areas behind them. The third runs west of the navigation gate, as shown in Figure 2 above, and is intended to minimize wave action approaching and entering the gate. This will also be designed at a second stage of preliminary design.

Ecological Enhancement and Environmental Permitting

The proposed concept includes enhancing the existing habitat east of the East Gate (Figure 6). Enhancement works can be supported by constructing a rock berm and wood retaining walls that will be filled with river sediments to promote the development of intertidal marsh habitat at this location. Sediments will be contoured and planted, creating a diversity of elevations and habitat types, including intertidal marsh, tidal channels, and riparian floodplain. The proposed work, including enhancement, will be subject to provincial and federal environmental permitting requirements including the federal *Fisheries Act*, which is administered by the Department of Fisheries and Oceans Canada.

Council endorsed the pursuit of a formal agreement with the Department of Fisheries and Oceans Canada to establish a fish habitat bank in 2021. Staff continue the work to develop a formal, city-wide agreement for Richmond, which may take several more years to be operational. The ecological enhancements proposed for this project consider future permitting requirements to offset the modification of fish habitat that a final design may propose.

Figure 6. Proposed Intertidal Marsh Complex

Project Costs

Since the last update to Council, the project costs have continued to evolve as the project advanced and a substantial escalation in construction costs is anticipated. As the project decisions around the structural elements, land rights, environmental offsetting and public access are finalized, staff can estimate the project costs more accurately. The cost of this project will be comparable to the estimated cost to raise the dike in Steveston along the existing alignment through the village. However, the latter would significantly disrupt existing properties, underground utilities, commercial and heritage buildings, and infrastructure in Steveston, as well as impact the character of the existing waterfront area.

More refined project estimates will be prepared as the design progresses and will continue to be revised to suit the evolving market conditions. Additionally, staff will continue to develop and bring forward funding and resourcing strategies for the overall flood protection program in the coming years.

Opportunities and Considerations

Past community and stakeholder engagement generally supported creating a new dike alignment on Steveston Island based on the potential to minimize community disruption and maximize opportunities for long-term dike upgrades. The City proactively engaged key internal and

external stakeholders to inform the preliminary dike design. These discussions brought to light several opportunities and challenges associated with the project.

The proposed design and location of the Steveston Island dike presents the opportunity to integrate solutions to maximize habitat value, implement on-site habitat compensation requirements, and support a future habitat banking agreement. The proposed exploration of using dredged material for the construction of the dike aligns with circular economy objectives.

There are also opportunities to explore public access on Steveston Island by constructing trails and viewpoints along the dike and incorporating user amenities to enhance the experience. In addition, concepts to create a potential pedestrian and cyclist friendly loop connecting the London Landing to Garry Point across the stretch of Steveston Island Dike could be presented as a part of the public and stakeholder consultation to gauge public interest. This concept can be explored and developed further and incorporated into the design in future stages of the project, if supported. Additionally, staff will seek to secure senior government funding through grants and cost-share opportunities to support the development and construction of this project.

Some challenges identified for consideration include acquiring land use rights and regulatory environmental permits, a potentially extensive environmental assessment process, large project costs, and waterfront view obstructions at Steveston village. These challenges will be addressed during future stages of the project.

Proposed Public and Stakeholder Engagement

Staff recommend engagement with key external stakeholders and the public on the Steveston Island dike preliminary design. Key stakeholders include:

- Adjacent residences, businesses and the general public;
- Steveston non-profit associations and societies;
- Local First Nations;
- Richmond Advisory Committee on the Environment;
- Small Craft Harbours;
- Steveston Harbour Authority;
- Port of Vancouver;
- Department of Fishers and Oceans, Fish and Fish Habitat;
- BC Ministry of Forests;
- BC Ministry of Water, Land and Resource Stewardship;
- BC Inspector of Dikes;
- Transport Canada;
- Canadian Coast Guard;
- Urban Development Institute (UDI);
- Ducks Unlimited; and
- The City of Delta.

Public engagement events will aim to increase awareness of climate change impacts, including sea level rise and the associated flood risks. The engagement will identify public interests and opportunities relating to this project, build community support and gather stakeholder feedback.

Key external stakeholder groups will be engaged through leveraging the City's social media tools, such as Let's Talk Richmond, Facebook, Instagram, and a dedicated project webpage. In addition, staff will hold community workshops, focus group events and open houses targeting key external stakeholders either virtually or in person. The City will also engage the local indigenous communities to inform them of the proposed project and the community enhancement opportunities, and collect their feedback. The results of external stakeholder engagement and any updates to the Steveston Island dike preliminary design will be presented to Council in the future.

Next Steps

Moving forward, staff will undertake the following:

- Completing the second phase of the preliminary design, which will constitute the designs for the structural components, including the flood wall, navigation gate, breakwater, and wharf;
- Initiating conversations with the province to negotiate land tenure on Steveston Island to facilitate the dike construction;
- Establishing requirements for the environmental assessment;
- Working with key stakeholders to establish strategic partnerships that can be leveraged to reduce construction costs; and
- Seeking funding from the senior levels of government.

The Steveston Island dike project is a long-term initiative with a multi-decade implementation timeline. Planning and proactive engagement of stakeholders allow the City to strategically implement this upgrade through grants and partnerships and accelerate the construction schedule should funding opportunities or changes in climate change science arise.

Financial Impact

None.

Conclusion

Staff have completed the preliminary design for the Steveston Island Dike proposed between Garry Point Park to the west and London Landing to the east. This dike alignment protects Steveston from flood hazards without disrupting the residents, businesses and historical sites located on the foreshore. The completed preliminary design project aims to address the more significant design decisions, provides preliminary design drawings, formalizes stakeholder support, and prepares the City for public engagement.

The Steveston Island Dike project is a unique large-scale project which, in addition to strengthening flood protection infrastructure and safeguarding the Steveston community, also

presents many opportunities for the City to explore and benefit from. Staff will continue to advance the project and update Council as required.

Eric Sparolin, P.Eng.
Manager, Engineering Planning
(604)-247-4915

Ridhi Dalla, EIT
Project Manager, Engineering Planning
(604)-204-8521

City of Richmond

Report to Committee

To:	General Purposes Committee	**Date:**	March 2, 2023
From:	Claudia Jesson Director, City Clerk's Office	**File:**	12-8125-80-01/Vol 01
Re:	**2022 General Local and School Election: Summary of Highlights**		

Staff Recommendation

That the staff report titled "2022 General Local and School Election: Summary of Highlights", dated March 2, 2023 be received for information.

Claudia Jesson
Director, City Clerk's Office
(604-276-4006)

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Finance	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:** CJ	**APPROVED BY CAO**

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