



# City of Richmond

## Report to Committee

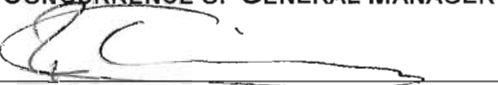


**To:** Public Works and Transportation Committee      **Date:** June 30, 2014  
**From:** John Irving, P.Eng. MPA      **File:** 10-6150-01/2014-Vol  
 Director, Engineering      01  
**Re:** **Fraser River Dredging and Environmental Considerations for Steveston  
 Harbour and Sturgeon Bank**

### Staff Recommendation

That the report titled "Fraser River Dredging and Environmental Considerations for Steveston Harbour and Sturgeon Bank," dated June 30, 2014, from the Director, Engineering, be received for information.

John Irving, P.Eng. MPA  
 Director, Engineering  
 (604-276-4140)

Att. 1

REPORT CONCURRENCE		
<b>ROUTED TO:</b>  Law	<b>CONCURRENCE</b>  <input checked="" type="checkbox"/>	<b>CONCURRENCE OF GENERAL MANAGER</b> 
<b>REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE</b>	<b>INITIALS:</b> 	<b>APPROVED BY CAO</b> 

## Staff Report

### Origin

Council referred:

1. on April 22, 2014, the article titled *Plan for deeper dredging in Fraser River could have high environmental price* (published April 22, 2014 in Business In Vancouver) to staff for analysis.
2. on February 17, 2014, that staff provide a historical background on the dredging of the Fraser River and report back to Council.
3. and on May 23, 2013, that the matter concerning the Dyke right-of-way at Steveston Harbour be referred to staff to provide information regarding the following:
  1. Ownership of the City owned property east of the rock berm at Steveston Island; and
  2. That Port Metro planning include the potential for a Dyke along the rock berm and Steveston Island.

### Background

Staff are actively engaged on several projects and issues around Steveston Harbour and Sturgeon Bank that are interrelated to varying degrees.

This report responds to the above referrals, discusses these issues, identifies significant initiatives in these areas and synergies between these initiatives and staff efforts to ensure the City's interests are addressed.

### Analysis

#### History of Dredging in the Fraser River Main and Secondary Channels

##### *Financial Responsibility for Dredging*

Fraser River dredging was initially assigned as a federal responsibility by the *British North America Act*. Maintenance dredging on the river began in the 1880's and Public Works and Government Services Canada (PWGSC) started regular maintenance dredging in 1901. In 1982 the responsibility for maintenance dredging was passed from PWGSC to the Canadian Coast Guard (CCG). The CCG continued maintenance dredging until the 1998 *Canada Marine Act* transferred responsibility for dredging to commercial users and the commercial ports. Subsequent to implementation of the Act, the Fraser River Port Authority chose to conduct maintenance dredging in the main channel of the Fraser River and received a one-time compensation of \$14.5 million from the Federal Government. The Vancouver Fraser Port Authority Historical Review of Lower Fraser River report (EBA, April 2013) indicates that "the

settlement does not obligate the Port to dredge, although they continue to do so. Secondary channels are not included in this framework unless the cost of dredging is fully recovered.”

#### *Local Channel Dredging and Ladner Steveston Local Channel Dredging Contribution Agreement*

The CCG dredged secondary channels that had significant commercial vessel utilization until the 1998 *Canada Marine Act* was implemented. There has not been any federal government funding for the secondary channels since 1998.

In 2008, the Fraser River Port Authority, the North Fraser Port Authority and the Vancouver Port Authority combined to become the Fraser River Port Authority which is known as Port Metro Vancouver (PMV). PMV launched the Local Channel Dredging Contribution Program in 2009. This program allocates \$7 million over 10 years for long-term community-based dredging plans. PMV has limited contributions to \$500,000 per local channel over a 10 year period.

In 2013, the Province, PMV, the Corporation of Delta and the City of Richmond entered into the Ladner Steveston Local Channel Dredging Contribution Agreement to provide one-time cost sharing and immediate dredging in Ladner and Steveston under PMV’s management.

Dredging of the western end of Steveston Harbour was completed in early 2014 at a cost of approximately \$1 million. The east end of the harbour still requires dredging. There is further Provincial and City funding available under the contribution agreement, however, PMV has exhausted its dredging funding for Steveston Harbour. Approximately \$4 million of PMV’s \$7 million allocated to secondary channel dredging has been spent or is committed to be spent by the end of 2014.

In February 2014, the Mayor sent a letter to the Provincial Attorney General and Minister of Justice explaining the situation and identifying Steveston Harbour as critical infrastructure. While a long term solution to dredging funding is required, there is a mechanism through PMV’s Habitat Enhancement Program to dredge the east end of Steveston Harbour in the near future.

Staff will continue to work with the Province and PMV to develop a long term funding strategy for dredging Steveston Harbour and other secondary channels.

#### *Main Channel Dredging Depth*

Over the last century shipping vessels have grown in size considerably and infrastructure that supports shipping has developed to accommodate larger vessels with deeper drafts. By 1960, PWGSC construction and dredging had developed a main channel profile that accommodated vessels with an 8.7 m draft. In the 1960’s, the depth of the channel was increased to a 9.1 m draft channel and by 1976 PWGSC was committed to maintaining a 10.7 m draft channel. Today, PMV maintains an 11.5 m draft channel.

With the announced the George Massey Tunnel Replacement Project, Fraser Surrey Docks has requested that depth of the Fraser River main channel be increased to accommodate 13.2 m draft ships once the tunnel is removed from service. If such a request were to be realized, other

significant infrastructure under the main channel, including Metro Vancouver water pipelines and Fortis gas pipelines, would require consideration. Additionally, further dredging would exacerbate long term erosion issues at Sturgeon Bank. Recognized Fraser River expert Dr. Michael Church's comments in an April 22, 2014, article in "Business in Vancouver" support the Dike Master Plan's finding regarding the impacts of dredging on Sturgeon Bank erosion and supports Staff's opinion that the proposed additional dredging will exacerbate this existing issue.

While the proposed additional dredging will not alter Fraser River water levels adjacent to Richmond, the erosion of Sturgeon Bank will impact the west dikes flood protection capacity in the long run. Any proposed work related to deeper dredging must be linked to the stabilization of Sturgeon Bank.

### PMV Habitat Enhancement Program

PMV has been creating and enhancing habitat in advance of port development projects since 1991. Their program aims to ensure the viability and sustainability of new and enhanced habitat to benefit fish and wildlife. These projects are intended to maintain a balance between the environment and future port development projects.

#### *Steveston Harbour*

As part of their Habitat Enhancement Program, PMV is proposing to build a tidal marsh at the east end of Shady Island as environmental compensation for future projects. PMV's proposal includes utilizing previously dredged material deposited on Shady Island and new material resulting from dredging the east end of Steveston Harbour to construct the tidal marsh habitat (Attachment 1). This plan will allow utilization of dry dredgeate material for marsh construction and replacement with fresh dredgeate resulting in no net loss of material on Shady Island. This proposal has the following benefits:

- facilitates one-time dredging of the east end of Steveston Harbour;
- has potential to reduce long term dredging costs by reducing sediment infill via marsh construction; and
- creates tidal marsh habitat, which is essential for juvenile salmon.

The City is working in cooperation with PMV, Small Craft Harbours and the Steveston Harbour Authority under a memorandum of understanding to ensure that any works performed in and around Steveston Harbour, including the proposed marsh, benefit all parties. In particular, reducing sediment deposition and required dredging is a key interest shared by all parties.

The City's Dike Master Plan – Phase 1 proposes to utilize Shady Island as the long-term diking solution for the Steveston area. The plan includes connecting Shady Island to Lulu Island with dikes at each end, maintaining water levels in Steveston Harbour that accommodate existing heritage buildings and harbour infrastructure. The planned dike will include sea gates that will allow water and vessels into the harbour most of the time and will be closed during periods of extreme high water levels. While the Dike Master Plan and the proposed marsh have some common elements, care must be taken to ensure the long-term diking plan is accommodated by any works developed in and around Steveston Harbour, including PMV's proposed marsh lands.

Staff have applied to the Province for access to Steveston Island to perform survey and geotechnical work as part of preliminary engineering work to develop Steveston Island as a dike.

The City owns all of the property on Lulu Island that borders the proposed marsh and has riparian rights associated with this ownership. One of the riparian rights protects the City's access to navigable waters from its upland property. Therefore, if the proposed marsh interferes with this right, the City's permission may be required prior to any development of the proposed marsh.

Staff will continue to work with PMV, Small Craft Harbours and the Steveston Harbour Commission to develop plans that improve Steveston Harbour.

### *Sturgeon Bank*

As identified in the City's Ecological Network Management Plan and the Dike Master Plan – Phase 1, both recently endorsed by Council, Sturgeon Bank is an environmental asset that also provides significant flood protection by dissipating wave energy in front of the west dike. Recent research indicates that the leading edge of the foreshore marsh habitat is receding rapidly (as much as 15 to 20 meters per year over the past 20 years). River training structures and channel dredging have greatly reduced the amount of sediment naturally deposited on Sturgeon Bank and play a large role in this erosion.

The City's Dike Master Plan – Phase 1 identifies potential flood protection issues associated with sea level rise with respect to the west dike. A primary concern is increased wave action on the dike facilitated by deeper water. The Master Plan identifies building barrier islands and strategically placing fill on sections of Sturgeon Bank as a potential long-term response to minimizing the impact of predicted sea level rise on the west dike.

In early 2014, City staff were invited by PMV to participate in a series of discussions to investigate potential habitat restoration works at Sturgeon Bank. The discussions have focused on establishing appropriate baseline reporting, goals, objectives, and next steps required to determine the feasibility of restoration at Sturgeon Bank. Preliminary restoration strategies have been discussed, including the deposit of dredge materials in the Sturgeon Bank tidal flats, with the intention to abate erosion of both the mudflats and the foreshore marsh leading edge (Attachment 1). This approach is congruent with the City's objectives regarding climate change adaptation for the foreshore habitats off of the West Dike as well as the City's Dike Master Plan – Phase 1.

In the late 1970's and again in the 1980's, the Fraser River Port Authority established a tidal marsh on the southern edge of Sturgeon Bank, on the north side of the Steveston Jetty at the mouth of the South Arm. This marsh was initially successful, however, storms caused significant damage to the marsh and it did not recover. PMV is proposing to re-establish and increase the footprint of this marsh with increased storm protection as part of the Sturgeon Bank restoration program (Attachment 1).

Staff will continue to participate in discussions with PMV and other stakeholders regarding the restoration of Sturgeon Bank.

**Financial Impact**

None at this time.

**Conclusion**

Funding for dredging operations in Steveston Harbour and other secondary channels has been problematic since 1998 when the Federal Government discontinued funding for dredging operations on the lower Fraser River. The western half of the harbour was dredged earlier this year through a three-way funding agreement between the Province, PMV and the City. PMV is proposing that the remainder of the harbour be dredged as part of a proposal to create marsh land at the east end of the harbour as part of PMV's Habitat Enhancement Program. This proposal has synergy with the City's Dike Master Plan – Phase 1 and could be constructed in a manner that supports both flood management and environmental objectives. PMV may require the City's permission to construct the marsh as the City has riparian rights associated with adjacent property.

Sturgeon Bank provides both environmental and flood protection benefits for the City. There is evidence that the habitat along the leading edge of the foreshore marsh is receding. These issues are influenced by river training structures and dredging that has reduced the transport and volume of sediment that would be naturally deposited on the bank. PMV is exploring habitat enhancement on Sturgeon Bank as part of their Habitat Enhancement Program. PMV has been receptive to staff's efforts to steering the process toward solutions that benefit both environmental and flood protection objectives.



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LD/LB:ld/lb

Att. 1: Map of Proposed Enhancement Projects, Sturgeon Bank and Fraser River South Arm

Attachment 1: Map of Proposed Enhancement Projects, Sturgeon Bank and Steveston Harbour

