Lower Fraser River Channel Dredging Proposal

September 12, 2023

Prepared by the Ladner Sediment Group
https://ladnersedimentgroup.ca

EXECUTIVE SUMMARY

This proposal was prepared by the Ladner Sediment Group September 2023

The Ladner Sediment Group is comprised of Industrial, Commercial, Residential and Recreational property owners on the Fraser River Secondary Navigation Channels.

Six navigation channels branch from the South Arm of the Fraser below the Massey Tunnel and service the Ladner, Canoe Pass and Westham Island areas then connect back to the South Arm of the Fraser River further downriver via the Sea Reach channel.

Navigability of these channels is monitored by Public Works Canada and the Coast Guard. Annual channel depths are measured using "soundings" and positioned using GPS.

The Coast Guard publishes the annual soundings to aid in real time marine navigation.

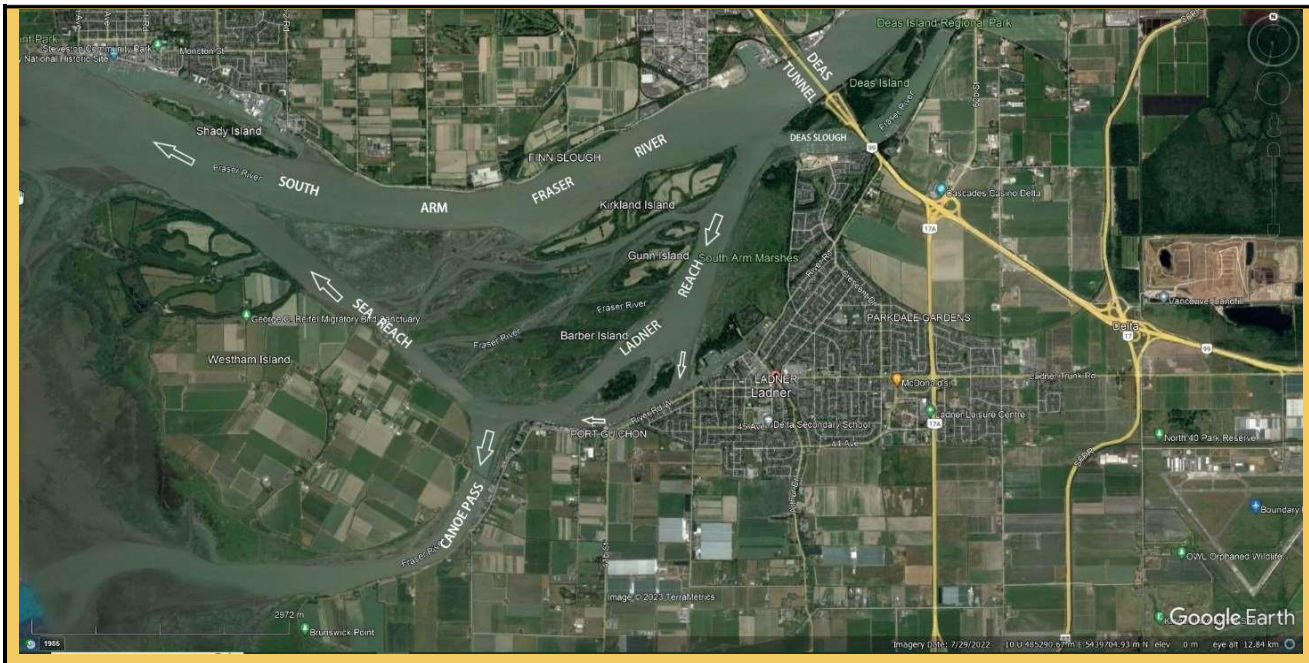
The channels have not been dredged since 2015 and silt deposited by the Fraser River has settled in the channels making them unfit for navigation. The sedimentation severely limits, access to the Ladner Federal Harbour, fish processing plants, marinas, boat moorage, float home communities and all other commerce relying on these segments of the Fraser River.

Based upon 2022 Coast Guard soundings, design channel widths and design channel depths the Ladner Sediment Group has estimated the quantity of material to be dredged from each of the six channels as follows:

The cost per cubic metre of $20 plus a $0.50 government disposal fee has been applied to the dredging quantities to determine the following costs.

Ladner Harbour & Channel	138,235 cubic metres to -3.6m depth below low water	$2.83M
Part of Canoe Pass	25,838 cubic metres to -3.6m depth below low water	$0.53M
Ladner Feeder	54,325 cubic metres to -3.6m depth below low water	$1.12M
Deas Slough	102,380 cubic metres to -3.6m depth below low water	$2.10M
Ladner Reach	21,370 cubic metres to -3.6m depth below low water	$0.44M
Sea Reach	44,100 cubic metres to -4.5m depth below low water	$0.91M

TOTAL QUANTITY +/- 387,000 cubic metres at a total estimated cost of $7.93 Million



Ladner Harbour Channel, Canoe Pass, Ladner Feeder Channel, and Deas Slough are in desperate need of dredging. It will take 4 years of concentrated dredging to bring these channels back to navigable depth.

Completing the dredging program over 4 years would require a budget of $2 Million per year. Maintenance dredging would continue on an as needed basis once the channel depths have been restored.

The Port of Vancouver currently manages dredging contracts for the South Arm of the Fraser River and is the agency most appropriate to manage restoration of the secondary channels. The Ladner Sediment Group is requesting the Federal Government to increase funding to the Port of Vancouver accordingly.

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1. Introduction

The objective of this report is to establish a dredging program by the Port of Vancouver for the navigation channels at Ladner BC. The dredging estimates in this report indicate 2 million dollars per year over a four-year period would restore the channels to a navigable state.

Periodic dredging would follow to maintain the channels as needed.

2. The Mighty Fraser River

The Fraser River is the largest river by discharge flowing into the Pacific seaboard of Canada. The river spans the province travelling 1,370 kms from headwaters in the Rocky Mountains to eventually fan out through the Fraser River Delta into the Salish Sea.

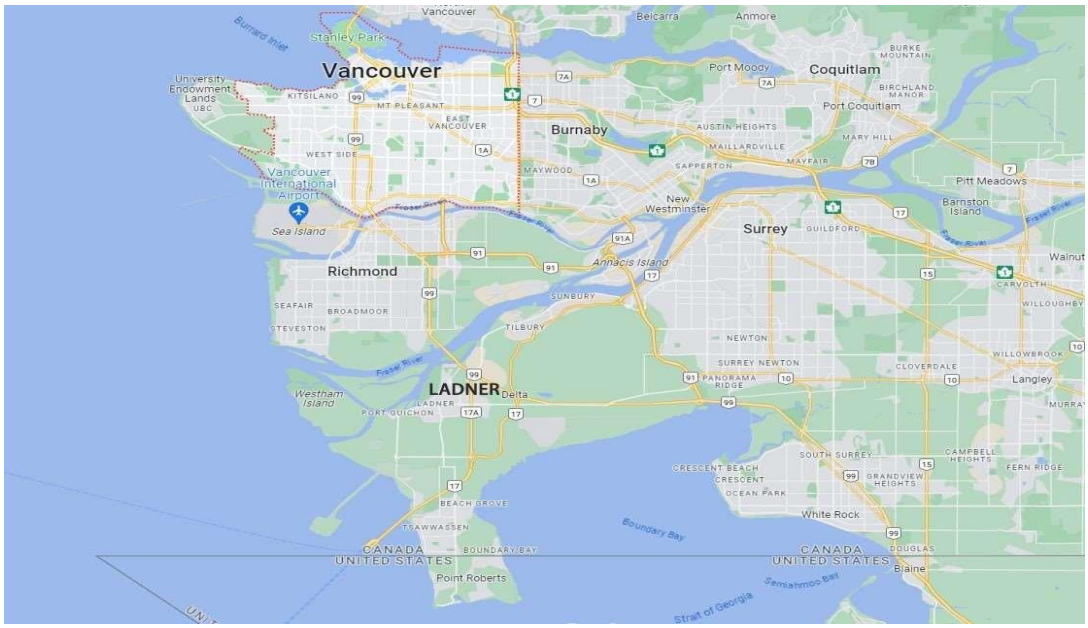
> **20 million tons of sediment flow down the Fraser River each year. Most of the sediment flows out of the main shipping channel between Delta (Ladner) and Richmond.**

To maximize flow in the main channel and reduce sedimentation, training walls have been installed to direct water away from the secondary channels and feeder sloughs have been capped. The river is a key transportation route for goods and services delivered to the region.

The Port of Vancouver have a continuous dredging program on the South Arm to keep the channel navigable.

MURAT YÜKSELIR/THE GLOBE AND MAIL

3. Ladner on the River



Ladner is situated on the south side of the South Arm of the Fraser River. It is one of the oldest communities in British Columbia established in 1868 by the Ladner brothers. Ladner quickly developed into a centre for fishing and farming. Port Guichon on the Ladner Channel was the terminus for the railway delivering BC lumber to schooners bound for England. In the 1800's the salmon fishery and canneries were a thriving industry on these channels situated between the South Arm of the Fraser River and the Strait of Georgia.

Today Ladner is a growing multicultural community established along the Lower Fraser River Estuary. Ladner is home to fishing fleets, fish processing plants, Ladner Federal Harbour, multiple Marinas, waterfront industries and approximately 150 Float homes.

Due to siltation the harbour, marinas, and navigation channels are crippled.
Float home communities, struggling with massive sediment accumulations are seeing homes grounded on the mud benches almost daily. Grounding of float homes leads to structural damage of the float homes, docks, wharves and infrastructure.

4. Cutting off Flow to Ladner Channels

The Ladner Ferry operated from 1913 to 1959 as the only South Arm crossing between Ladner and Richmond. Construction of the Ladner Ferry Landing blocked off a portion the channel feeding the top of Ladner Reach redirecting water flow.

To replace the ferry in 1956 the Deas Tunnel (George Massey Tunnel) was constructed under the South Arm of the Fraser River just upstream of the branches to Ladner. Tunnel installation resulted in the capping off Deas Channel and turned it into a slough eliminating all flow and supply to the top of Ladner Channels.

Dredge spoils from the tunnel excavation were dumped in the Ladner Channel immediately adjacent to Port Guichon. Between 1968 and 1980 dredge spoils from the creation of Ladner Harbour by the Department of Fisheries were added to the tunnel dredge spoils narrowing the channel significantly below the Harbour thereby constricting flow further.

The dredge spoil sites are now uninhabited islands with mature trees pictured in the background below and identified as habitat sites. These Islands have added to the diversion of water velocity and increased the sediment load in the water column.

The tunnel construction was accompanied by installation of "training" walls on the South Arm to direct river flow away from Ladner's Secondary Channels into the main channel. This further added to the loss of flow through Ladner's four main channels.

Loss of flow increased the sediment load added to the channels. The result of reduced flow and compressed channel width by the dredge spoils has resulted in critical sedimentation of the four Ladner Channels and Harbour Entrance.

FISHERMAN TRYING TO DISLODGE BOAT GROUNDED DUE TO NEGLECTED CHANNEL MAINTENANCE
WATER DEPTH AT THE ENTRANCE TO LADNER FEDERAL HARBOUR IS NOW 0.7m AT LOW TIDE. CHANNEL DESIGN DEPTH IS 3.6m

4.1 Climate Change Compounding Sediment Accumulation

Sediment accumulation has been exacerbated in recent years by additional loads from forest fire denuding hillside vegetation bounding the Fraser River.

Recent floods and landslides of November 2022 when the Coquihalla Highway, the Highway 8 from Merritt to Spences Bridge, the flooding of the Bonaparte River at Cache creek and the landslide at Jackass Mountain resulted in major amounts of sediment into the Fraser River which greatly added to the sediment loads in Ladner's four channels.

Ladner's Channels were last maintained in 2015 and have since been neglected resulting is dangerous navigation for commercial and private vessels with low water depths of < 1m at low tide.

Boats are running aground daily causing damage to running gear and stranding those on board.

Float homes are grounding out potentially suffering structural damage to the floats, docks and supporting infrastructure.

Resultant economic impacts are compromising the community.

5. Economic Analysis

A 2012 report on the economic output from Ladner Harbour and its secondary channels was provided to the City of Delta[1]. The focus of the report was to determine the impact of leaving the channels to fill with sediment or re-instate a regular dredging maintenance program. The estimates in Table B are adjusted from 2012 estimates to align with a 25% cost of living increase between 2012 and 2022 derived from Statistics Canada.

[1] (Inc, 2012)

Table B: Estimated economic output from Ladner Harbour and Ladner Secondary Channels

Type of Impact	Employment (Jobs)	Employment (Full Time Equivalent)	Wages $ Millions	GDP $Millions	Economic Output ($ Millions)
Direct	356	294	10	18	64
Indirect	265	219	8	20	28
Induced	186	154	6	11	28
Total Contribution	808	666	24	49	120

It should be noted that Navigation Channels are Provincial and Federal Transportation corridors and maintenance programs are beyond Municipal Government capabilities.

To quote a well-known local:

“You wouldn’t ask the Town of Merritt to maintain the Coquihalla Highway.”

6. Environmental Impact

The 2012 InterVistas Report titled “Dredging Ladner Harbour & Related River Channels”, researched Dredging and the Economic and Environmental impacts is still relevant today.

‘There are environmental impacts to dredging and not dredging the lower Fraser River. Dredging can be perceived as an unnatural cause that will harm water and land habitats. However, strategic dredging for specific areas of the river channel or estuary can help restore water and land habitats. The Fraser River estuary is a rich wildlife habitat with over 300 species of bird, and 80 species of shellfish and fish. Most relevant to Ladner Harbour and its channels, the cessation of dredging activity increases the risk of two environmental concerns. The first environmental concern relates to flood risk because of increased sedimentation and a rise in sea level due to climate change. The second contributes to further loss of Fraser sockeye salmon habitat.’

6.1 Fish Habitat

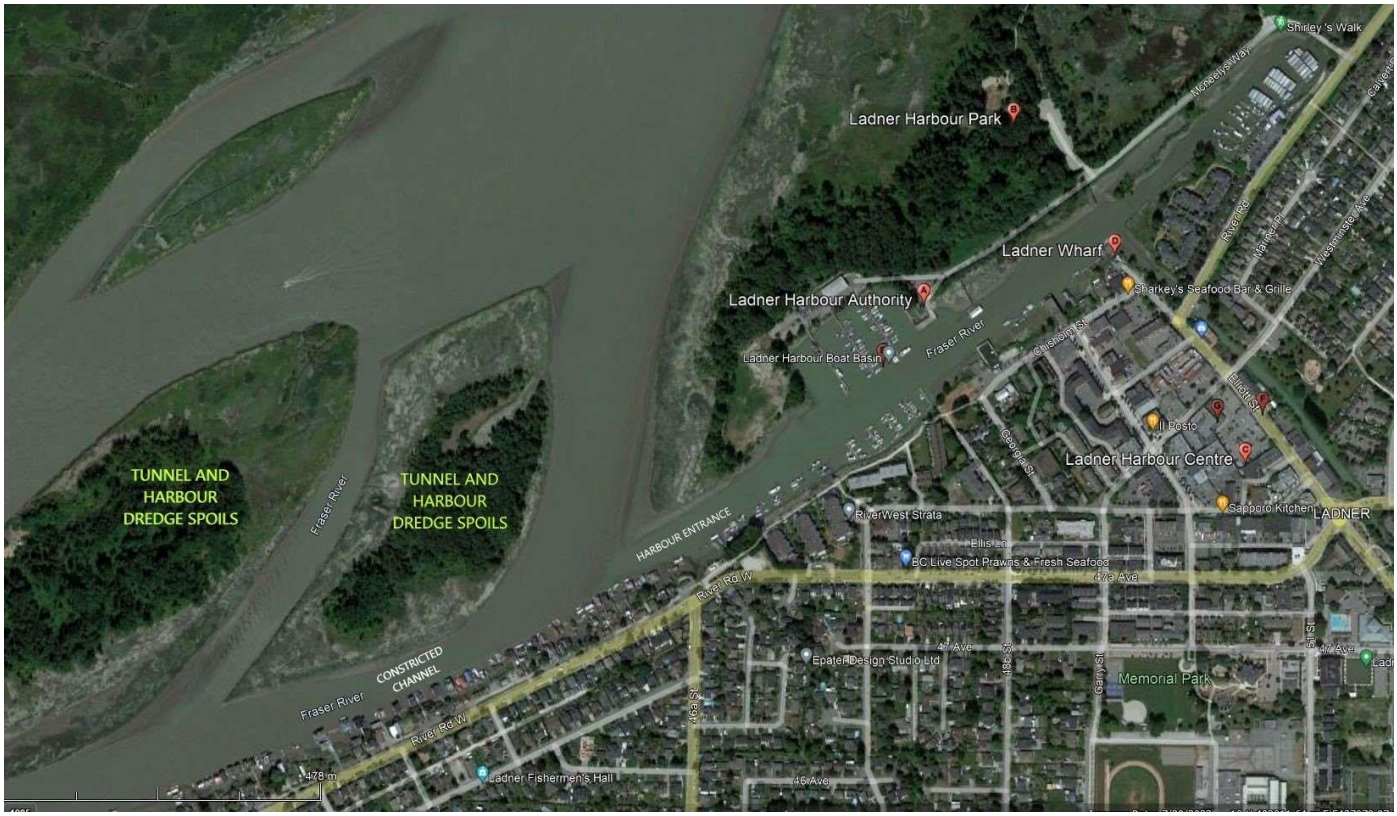
The Strait of Georgia and the lower Fraser River are used by juvenile and adult salmon as key habitats and migratory corridors to and from the North Pacific. Various levels of human activity including changes in population, land use, development and waste disposal have affected the natural physical water characteristics and habitat for salmon and other fish species. A study completed by the Cohen Commission into the decline of sockeye salmon in 2011 revealed that management of waterways such as dredging is successful in reducing the effects and risks of loss to the sockeye salmon habitat in the Fraser River from human activity. Dredging is one solution that could mitigate loss of natural habitat for fish species such as salmon. As the Channels and water lots around Ladner choke with sediment, the seabed is no longer a suitable habitat.

6.2 Flood Risk

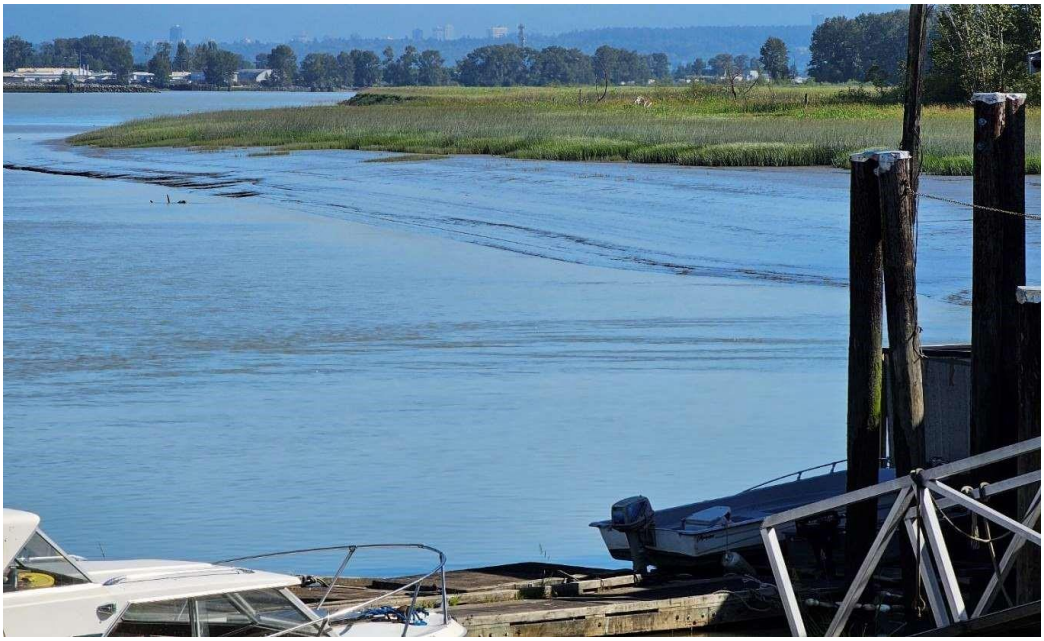
Delta is below sea level and relies on dikes, flood boxes and pump stations to mitigate against flooding. The stoppage of dredging activity has decreased the depth of the riverbed. Consequently, increasing the risk of flooding around Ladner Harbour and surrounding channels from high spring freshet river flow or storm surges during extreme high tides. In 1948, Delta experienced a flooding event which Environment Canada estimated cost $20 million in 1948 dollars. A similar flood event today would cost $1.8 billion to the Fraser Valley. More recently, a strong storm surge in 2006 recorded about a metre rise in sea level and waves close to six metres above the mean sea level.

7. Images

Dredge Spoils blocking flow to Ladner Channel



Silt at Ladner Harbour Entrance August 5, 2023



Silt Accumulation within Ladner Harbour

2 Acre Sandbar blocking shore access – Canoe Pass, Ladner

8. Sediment Measurements – Coast Guard 2022

Six secondary navigation channels branch from the South Arm of the Fraser below the Massey Tunnel and service the Ladner, Canoe Pass and Westham Island areas then connect back to the South Arm of the Fraser River further downriver via the Sea Reach channel.

Navigability of these channels is monitored by Public Works Canada and the Coast Guard.

The Ladner channels have not been dredged since 2015.

The coast guard publishes the results of the annual soundings to aid in real time marine navigation.

The latest soundings were published for 2022 and have been used by the Ladner Sediment Group to calculate dredge quantities and estimate the cost for channel restoration. Table A: Dredge Material and cost estimate

Channel	Quantity to be Dredged to reach. Design Channel Depth	Cost Estimate at $20.50 per cubic metre dredged
Ladner Harbour and Channel to Canoe Pass	138,235 cubic metres	$2.83M
Canoe Pass Channel Only does not reach shorelines	25,838 cubic metres	$0.53M
Ladner Feeder	54,325 cubic metres	$1.12M
Deas Slough	102,380 cubic metres	$2.10M
Ladner Reach	21,370 cubic metres	$0.44M
*Sea Reach	44,100 cubic metres to -4.5m depth	$0.91M

The Ladner Sediment Group contracted a Drone company in August 2023 to record aerial images of the sediment accumulations in the area.

Drone Images can be viewed on the website. https://ladnersedimentgroup.ca

9. Dredging Program Sequence

The Ladner Sediment Group respectfully proposes the following sequence to restore the Lower Fraser River channels to navigability.

Table B: Dredging Sequence

Year 1 and Part of Year 2	Ladner Harbour and Channel to Canoe Pass
Remainder of Year 2	Canoe Pass
Year 3	Ladner Feeder Channel – from Ladner Reach to Ladner Harbour Channel
Year 4	Deas Slough

The highest priority are the populated portions of the secondary channels.

Dredging should begin in the Ladner Federal Harbour and proceed down the Ladner Channel to the Canoe Pass Junction.

Second should be the first segment of the Canoe Pass Channel.

* Please note that the Canoe Pass channel does not touch either shoreline.

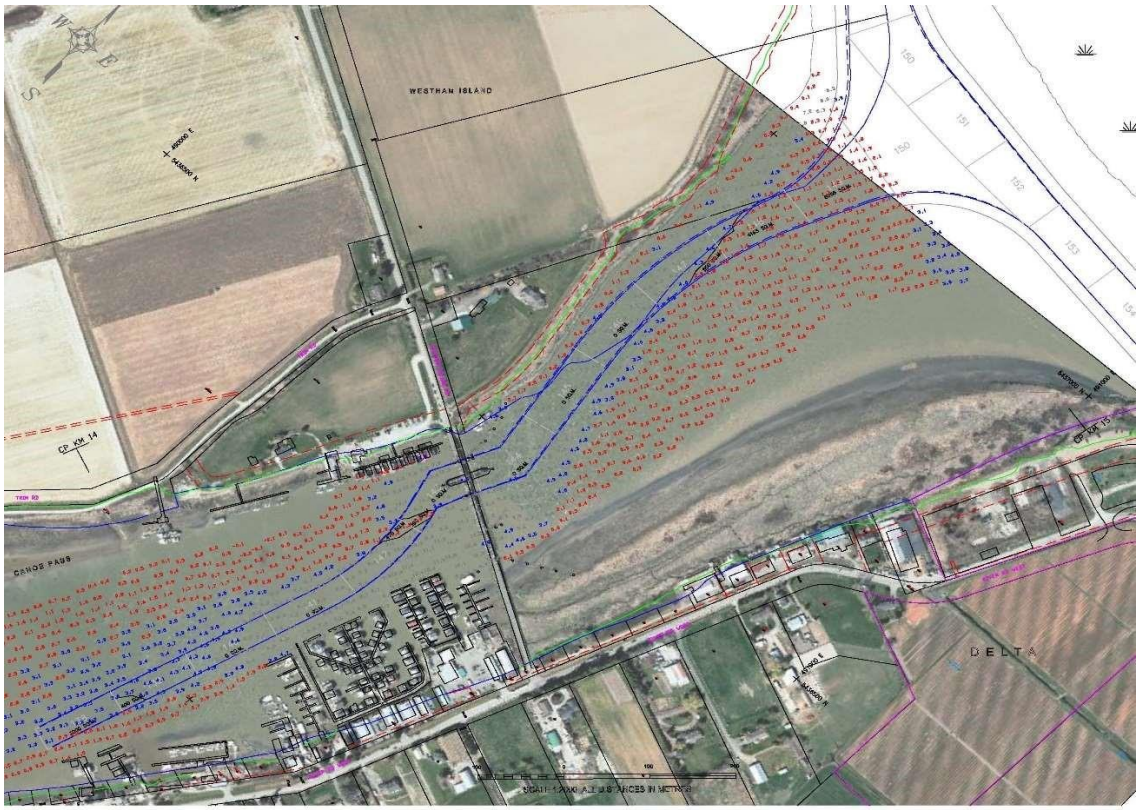
Connective dredging will have to be performed to reach the float home communities and marinas on shore.

The connective dredging program has not been included in this channel dredging proposal.

Sea Reach and Ladner Reach require relatively little dredging to meet design channel depths and can follow the above as maintenance dredging.

a. LADNER HARBOUR

b. LADNER CHANNEL



c. CANOE PASS CHANNEL

d. DEAS SLOUGH

10. Allocating Funds to Vancouver Port

From the Port of Vancouver website:

“Because of the high volume of sediment left in the river, the port authority must dredge the south arm of the river every year to carefully remove and dispose sediment that can clog the waterway, create navigation hazards, and impact marine-related trade.”

To increase the main channel flow the Ladner secondary channels have been intentionally compromised.

On December 31, 2014, two Fraser River head leases held by the Vancouver Fraser Port Authority expired.

The Port abandoned dredging the secondary channels within a year of the leases expiring.

The dangerous levels of sediment accumulation since 2015 increase the risk of flooding, dwindling fish habitats, compromised navigation, vessel damage and the safety of those who live in Float Homes.

Based upon Public Works and Coast Guard measurements we have quantified the dredging and projected a budget of $2 Million per year for a period of 4 years to restore the channels with an as needed maintenance program to follow.

The Ladner Sediment Group respectfully request a Federally funded Channel Maintenance program to be implemented and managed by the Port of Vancouver.

The Ladner Sediment Group offers our full support to Delta Mayor George Harvie in his request for a Secondary Channel maintenance program, federally funded and managed by the Port of Vancouver.

Members of the sediment group have been in business on the channels well over 50 years, fishing families have lived on the river for over one hundred years. Group members have accumulated hundreds of reports relating to the river, the environment and potential global warming effects.

It has been a continuous constant struggle for decades to communicate with Government.

It is easy for the government to drop programs and extraordinarily difficult to restore that relationship. Please consider reinstating your maintenance program. Thank you,

11. Assisting Water Lease Holders

The Provincial Government through the Ministry of Forests, manage the allocation of Water Lot Leases for commercial and residential purposes. Due to neglect of the Secondary Channels by the Provincial Government, the adjoining water lots have accumulated significant amounts of sediment causing dangerous conditions, damaged homes, docks, and infrastructure. Leaseholders are left to cover the entire cost of environmental testing, permits and restoration dredging for sediment accumulation they cannot prevent.

The cost of restoration dredging an individual 15m wide water lot is estimated to be $50K to $75K.

The traditional method for flushing the sediment back into the channel is through “Propeller Washing” or “Wheel washing”.

The 1994 360-Page report by the Department of Fisheries and Oceans Canada, Small Craft Harbours – Pacific Region stated that “Prop Washing” or “Wheel Washing” to maintain the depth of water in water lots was a cost effective, efficient, and environmentally safe method.

Despite this report Prop Washing has been deemed a criminal offence under the Fisheries Act.

To support restoration of the water lot depths the Ladner Sediment Group propose an exception to the Act to de-criminalization Propeller Washing and establish a simplified permit process through Fisheries and Oceans Canada.

Appendix A. Ladner Channel and Ladner Federal Harbour

Ladner Sediment Group

Coast Guard Channel Soundings Aug 2022

Design Channel Depth 3.6m

9/20/2023

WB

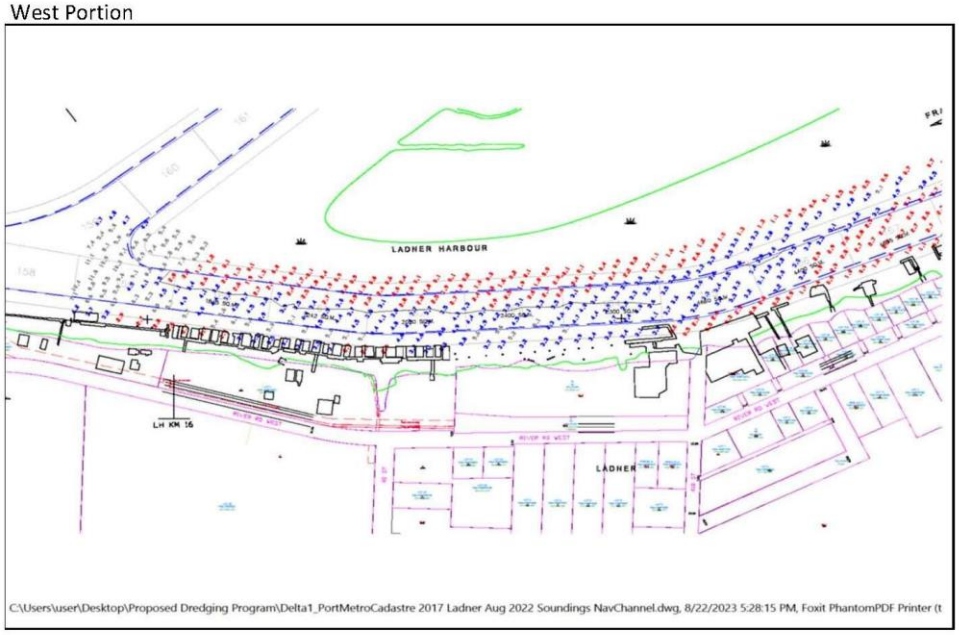
LADNER HARBOUR 2.5Km (100m Segments)	Cubic Metres of Dredging
Start at SM Products 3827 River Rd W.	
West Entrance Segment 159	0
160	1,634
161	1,797
162	1,615
163	1,750
164	816
165	1,334
166	3,572
167	5,175
168	3,982
169	2,019
170	4,083
171	2,980
172	3,050
173	4,960
174	9,100
175	12,589
176	9,776
177	6,083
178	4,844
179	5,640
180	3,412
181	4,793
182	6,995
183	10,060
Ends at 4955 River RD W Shorewalk Apts.	
TOTAL Ladner Harbour Channel	**112,059**
Additional 300m Channel to Ladner Yacht Club	26,175
TOTAL	138,235

Ladner Channel

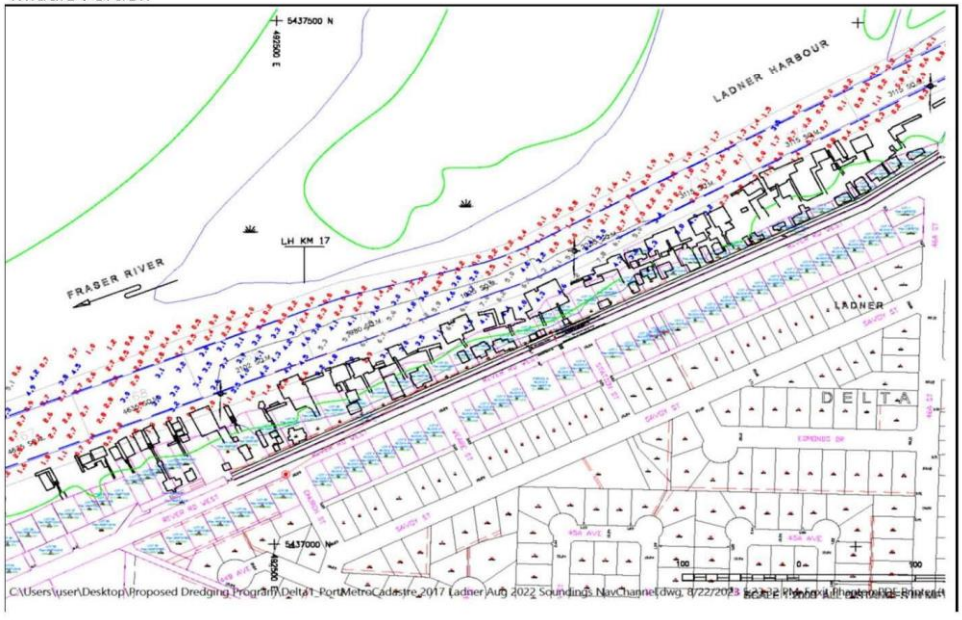
Ladner Sediment Group
Coast Guard Channel Soundings Aug 2022
Design Channel Depth 3.6m

9/20/2023
WB

West Portion



Middle Portion

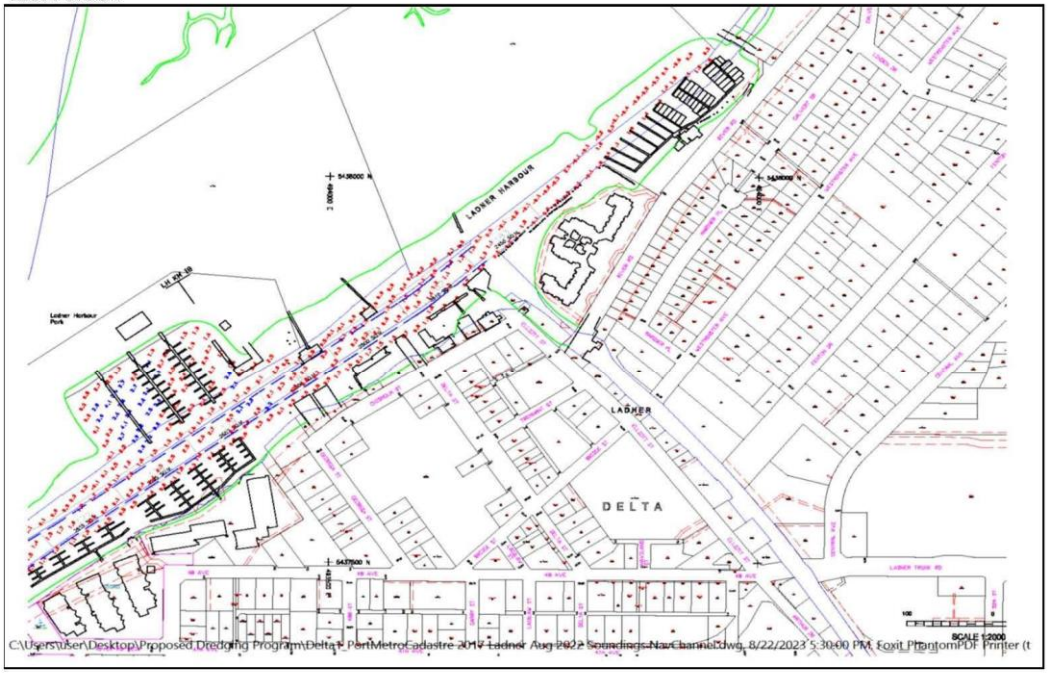


Ladner Federal Harbour

Ladner Sediment Group
Coast Guard Channel Soundings Aug 2022
Design Channel Depth 3.6m

9/20/2023
WB

East Portion



Appendix B. Canoe Pass

Ladner Sediment Group

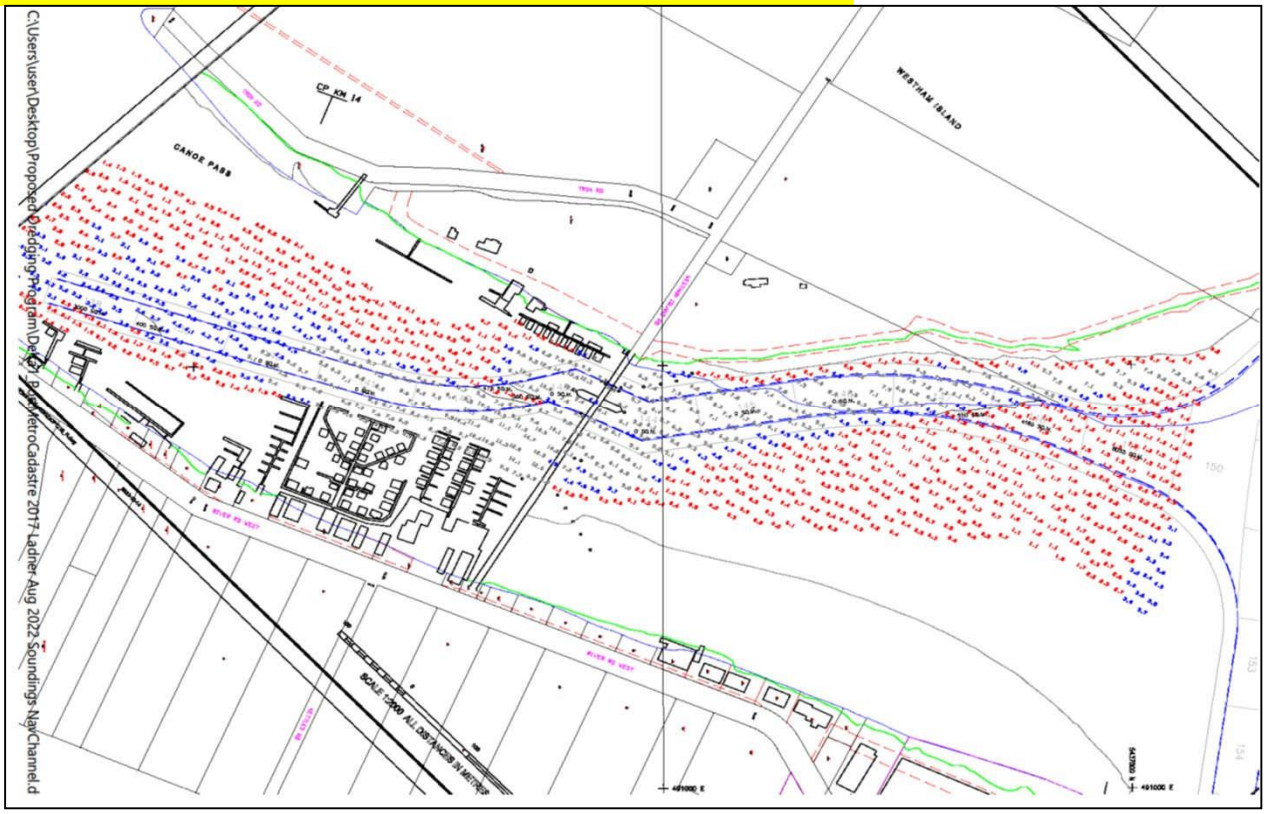
8/29/2023

WB

Coast Guard Channel Soundings Aug 2022

Design Channel Depth 3.6m

Canoe Pass Sheet 1of 3 (100m Segments)	Cubic Metres of Dredging
North Segment 149	16,788
148	6,665
147	450
146	0
145	0
144	0
Bridge 143	190
142	315
141	0
140	0
139	64
South Segment 138	1,366
TOTAL CANOE PASS	**25,838**



Appendix C. Ladner Feeder Soundings

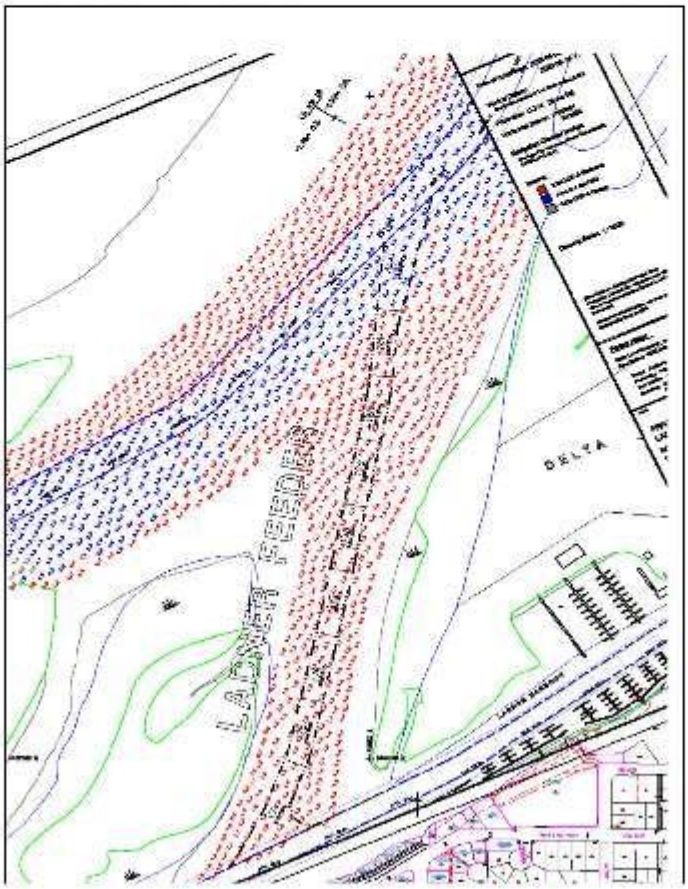
Ladner Sediment Group

Coast Guard Channel Soundings Aug 2022

Design Channel Depth 3.6m

9/3/2023
WB

Ladner Feeder 1 sheet (+/-100m Segments)	Cubic Metres of Dredging
Meet Ladner Harbour 174	12,125
Connecting north to Ladner Reach 175	6,185
176	6,460
177	6,310
178	6,195
179	6,250
180	4,510
181	3,090
182	3,200
TOTAL DREDGING ESTIMATE	54,325



Appendix D. Deas Slough

DEAS SLOUGH (100 m Segments)

Ladner Sediment Group

11/4/2023

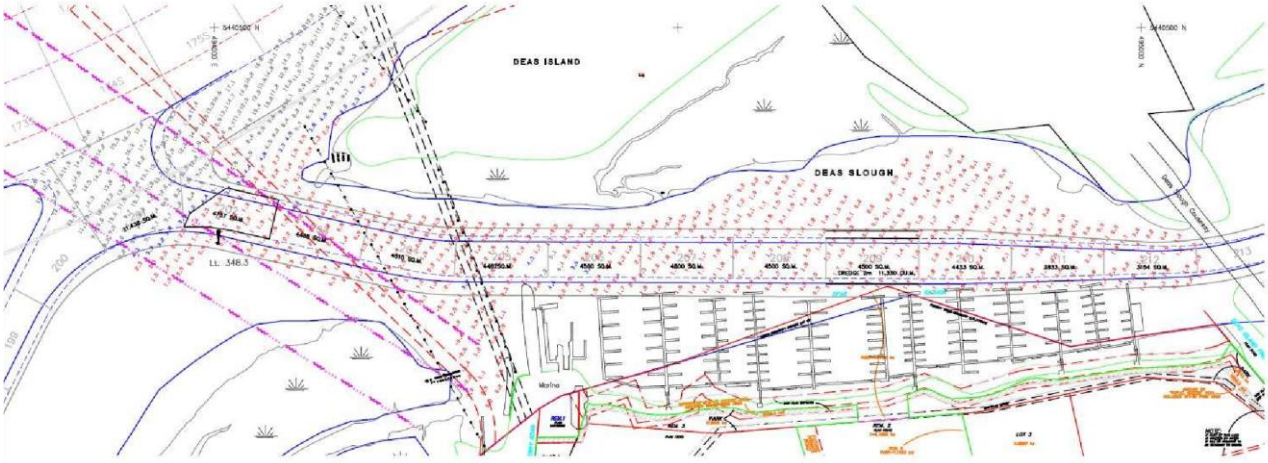
Coast Guard Channel Soundings Aug 2022 Design

WB

Channel Depth 3.6m

Cubic Metres of Dredging

West Entrance Segment	201	0
	202	6,448
	203	11,273
	204	11,874
	205	6,009
	206	10,990
	207	9,520
	208	10,045
	209	11,425
	210	9,786
	211	7,880
Ends at Tunnel Bridge	212	7,130
TOTAL DEAS SLOUGH		102,380



Appendix E. Sea Reach Soundings

Ladner Sediment Group
Coast Guard Channel Soundings Aug 2022
Design Channel Depth 3.6m

8/31/2023
WB

Sea Reach 5 sheets (+/-100m Segments)	Cubic Metres of Dredging
West Segment Fraser River South Arm 108	0
Travelling east to Wellington Point 109	0
110	540
111	6,400
112	5,917
113	4,702
114	3,248
115	1,866
116	2,712
117	611
118	1,415
119	1,388
120	1,266
121	1,163
122	2,707
123	1,081
124	115
125	539
126	50
127	20
128	0
129	0
130	0
131	0
132	0
133	0
134	0
135	0
136	0
137	0
138	76
139	76
140	0
141	0
142	0
143	200
144	53
145	0
146	0
147	0
148	0

Appendix F. Ladner Reach Soundings

Ladner Sediment Group 8/31/2023
Coast Guard Channel Soundings Aug 2022 WB
Design Channel Depth 3.6m

Ladner Reach 4 sheets (100m Segments)		Cubic Metres of Dredging
South Segment (SM PRODUCTS)	157	0
Travelling north to Fraser Main Channel	158	0
	159	0
	160	0
	161	0
	162	0
	163	0
	164	0
	165	0
	166	0
	167	0
	168	0
	169	0
	170	0
	171	0
	172	0
	173	1,358
	174	2,677
	175	2,422
Branch Channel to Ladner Harbour	176	2,970
	177	3,568
	178	2,900
	179	2,377
	180	1,268
	181	0
	182	0
	183	0
	184	0
	185	0
	186	0
	187	0
	188	0
	189	450
	190	930
	191	450
	192	0
	193	0
	194	0
	195	0
	196	0
	197	0

Works Cited

Canada, DFO (1994). Propeller Washing Study Fraser River B.C.

InterVISTAS, I. C. (2012). Dredging Ladner Harbour & Related River Channels. Vancouver, B.C.