

CITY OF BURNABY

ENVIRONMENT AND WASTE MANAGEMENT COMMITTEE

HIS WORSHIP, THE MAYOR  
AND COUNCILLORS

Re: Summary of Consultants Report, Evaluating The Environmental Impacts of Dredging  
Burnaby Lake

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RECOMMENDATIONS:

1. **THAT** Council receive this report for information purposes.
2. **THAT** a copy of this report be forwarded to the Parks and Recreation Commission for information purposes.

REPORT

The Environment and Waste Management Committee, at its meeting held on 1997 October 14, adopted the *attached* report summarizing the key findings in the consultant's report and outlining the next steps in addressing this issue within the process of developing the Burnaby Lake Regional Nature Park Management Plan. The Committee advised that the consultant's report provides information which indicates that dredging at Burnaby Lake is technically feasible and associated with a number of potential environmental benefits and impacts. The Committee further advised that the draft Management Plan with different scenarios associated with lake rejuvenation will be the subject of a public review tentatively planned for late November of this year.

Respectfully submitted,

Councillor L. Rankin  
Chair

Councillor D. Johnston  
Member

Councillor D. Lawson  
Member

: COPY - CITY MANAGER  
- DIRECTOR ENGINEERING  
- DIRECTOR FINANCE  
- DIR. PLNG. & BLDG.  
- A/DIR. REC. & CULT. SERV.

TO: ENVIRONMENT AND WASTE MANAGEMENT COMMITTEE

FROM: DIRECTOR PLANNING AND BUILDING

SUBJECT: **Summary of Consultant's Report,  
*Evaluating the Environmental Impacts of Dredging Burnaby Lake***

**Purpose:** To provide the Committee with a summary of the report by Enkon Environmental Ltd., *Evaluating the Environmental Impacts of Dredging Burnaby Lake* for information and outline how this issue will be addressed within the Burnaby Lake Regional Nature Park Management Plan process currently underway.

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#### RECOMMENDATIONS:

THAT a copy of this report be forwarded to Council and the Parks and Recreation Commission for information purposes.

### REPORT

#### 1.0 BACKGROUND

As the Committee is aware, the City has been working in partnership with GVRD Parks to develop a contemporary management plan for Burnaby Lake Regional Nature Park. Staff are currently meeting with GVRD representatives in regular working sessions towards development of a draft management plan and expect to gain feedback from members of the public and stakeholders at an open house potentially in late November of this year. Completion of the management plan is targeted for early 1998.

A significant issue to be addressed within the management plan is that of the environmental quality of the lake. Being centrally located within the broad central valley of the Brunette watershed, Burnaby Lake serves as a natural sink pond in the system and is characteristically shallow with a significant sediment build-up and high nutrient loadings associated with eutrophication (natural progression of lakes towards filling in due to high productivity) of the lake. Sedimentation inputs into the lake are estimated at 2,000 m<sup>3</sup> per year. Relatively intense urbanization in the area over the last century and the discharge of pollutants such as hydrocarbons, metals and nutrients (i.e. fertilizers) from urban runoff into the watershed has expedited the filling in and eutrophication of Burnaby Lake. This has resulted in the loss of significant open water area, a decrease in water-based recreation opportunities specifically rowing and canoeing and a proliferation of native and non-native vegetation and algae.

Given the ecological significance of the park within the municipality and the region and the overall purpose of the park being associated with that of a nature and wildlife sanctuary, it is appropriate within the contemporary management plan to look at the issue of potential lake rejuvenation.

Late in 1996, the City in partnership with GVRD Parks and Environment Canada, (Fraser River Action Plan, FRAP) jointly commissioned a study to review lake rejuvenation, specifically through various dredging techniques and scenarios, disposal options and assess potential associated environmental impacts. General costs associated with various dredging options were also requested within the scope of the study. The purpose of the study was to gain valuable background information for assessing lake rejuvenation within the Burnaby Lake Regional Nature Park Management Plan. The study does not infer dredging will take place. It identifies various dredging technologies which could have application to rejuvenating Burnaby Lake and the potential associated environmental impacts.

The purpose of this report is to provide the Committee with a summary of the key findings of the report, *Evaluating the Environmental Impacts of Dredging Burnaby Lake* by Enkon Environmental Ltd. and outline the next steps in addressing this issue within the process of developing the Burnaby Lake Regional Nature Park Management Plan.

## 2.0 KEY CONCLUSIONS OF CONSULTANT'S REPORT

Copies of the consultant's report are available in the Planning Department. Key conclusions of the report are as follows:

- Dredging Burnaby Lake is feasible from a technical perspective. The report identifies a range of dredging scenarios from small scale dredging for improved canoe access and improved fish habitat (1000 m<sup>3</sup> solids removed) to full scale restoration of the rowing course with additional areas (157,000 m<sup>3</sup>) to accommodate future incoming sediments based on an estimated rate of infill of 2,000 m<sup>3</sup> / year. These are shown in Table 7-2 of the consultant's report, **attached**.
- On-site disposal and de-watering options were preferred due to the expense and limited available opportunities associated with off-site disposal as well as the potential environmental impacts of transferring dredgeate off-site (i.e. sedimentation, spillage). Landfilling and ocean dumping are, however, off-site disposal options which could be further explored although it is likely that landfills will only accept de-watered dredgeate. Preferred on-site disposal options involve transferring dredgeate through a 10" -12" pipeline to a de-watering site located a maximum of 1 km away, followed by revegetation and habitat enhancement works. Several habitat zones in the park were assessed to be potential deposition areas for dredgeate because they minimized environmental impacts and were associated with potential habitat enhancements. These included the mixed forest between the south side of the lake and the highway, the area beneath the Hydro wires south of the lake (subject to Hydro's requirements and approval) and the purple loosestrife zone on the south side of the lake although the effects of depositing dredgeate on purple loosestrife to eradicate it are not well resolved. Wet dredgeate is estimated to be 4 times the volume of actual solids removed. Therefore, de-watering facilities would need to accommodate large volumes and occupy large land areas temporarily.

- Preliminary cost estimates for the preferred hydraulic type dredging range from approximately \$6/m<sup>3</sup> - \$20/m<sup>3</sup> dredged solids. A number of hypothetical dredging scenarios have been identified by the consultants to show magnitude of scale comparative cost estimates. Costs are in the range of approximately \$30,000 - \$40,000 for removal of 1,000 m<sup>3</sup> solids (to improve canoe access and fish refuge areas) to \$950,000 - \$1.1 million for dredging which could fully restore the rowing course and significantly increase open water areas (removal of 140,000 m<sup>3</sup> solids) assuming on-site disposal as shown in Table 7-2 *attached*. These estimates do not include potential additional costs associated with de-watering if water quality treatment, monitoring, etc. is required. The costs of restitution planting are also not included in these estimates. Off site disposal options are more expensive and estimated in the range of \$1.68 - \$1.98 million (for landfilling and ocean dumping comparatively) for dredging of an average of 60,000 m<sup>3</sup> solids.
- If on-site disposal options are to be pursued, further sediment sampling and analysis will be required to more comprehensively characterize sediments as a few of the existing sediment samples exhibited exceedances (i.e. lead, copper, zinc) beyond the *Park/ Residential* standard, but were within the *Industrial/ Commercial* level under the BC Contaminated Sites Regulations (CSR, 1996).
- The potential environmental impacts associated with dredging are difficult to quantify. However, temporary changes in water quality including increased suspended solids, potential resuspension of contaminants, reduced oxygen, and increased acidity which could affect fish and other aquatic organisms as well as terrestrial and aquatic habitat loss would result and relate directly to the scale of area being dredged and size of de-watering/ deposition facilities. A number of mitigation strategies are identified in the report to minimize environmental impacts and maintain water quality within approved standards for aquatic life. These include timing dredging between August and November to avoid sensitive breeding or winter foraging periods for wildlife and fish, implementing state-of-the-art siltation control measures at dredging and de-watering sites, monitoring and adapting activities to ensure water quality standards are maintained, depositing dredgeate in the least environmentally sensitive areas and revegetating to enhance habitat. Approval by appropriate environmental bodies would be required to proceed with a dredging program of any scale. Preliminary contact with DFO has indicated that they are willing to provide feedback on the consultant's proposals and that any proposed works would be subject to DFO, MOELP's approval process.
- The report recommends considering development and implementation of a pilot scale dredge program involving the removal of 2,500 m<sup>3</sup> of solids at the mouth of Still Creek or other potential management sites such as the mouths of creeks to adequately characterize sediments, work through the necessary regulatory approvals, test appropriate dredging techniques and identify and mitigate potential environmental impacts. The recommended pilot program involves on-site disposal with a de-watering facility capable of accommodating 10,000 m<sup>3</sup> of wet dredgeate. The cost of this pilot program is estimated between \$175,000. - \$200,000. as shown in Table 7-2.

### 3.0 ENVIRONMENTAL BENEFITS

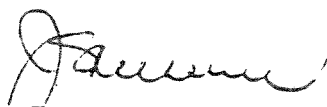
The potential environmental and recreational benefits of a dredging program for lake rejuvenation as identified in the report include the following:

- Potentially improving water and substrate quality of the lake by removing contaminated sediments and silt from Burnaby Lake which have been introduced as a result of urbanization and deleterious discharges into the Still Creek system;
- Slowing the process of lake infilling and eutrophication which has been expedited due to urbanization and reverting it to an earlier successional state (depending on the volume dredged);
- Creating more open water habitat for wildlife and for passive boating recreational activities;
- Deepening areas of the lake thereby improving water temperature and habitat for fish;
- Enhancing aquatic and terrestrial habitat by removing invasive or undesirable vegetation and replanting desired native species in areas affected by dredging facilities.

### 4.0 NEXT STEPS

The consultant's report provides information which indicates that dredging at Burnaby Lake is technically feasible and associated with a number of potential environmental benefits and impacts.

It is the intention of staff in working with the GVRD, to incorporate the consultant's findings into the Management Plan process. The issue of lake rejuvenation will therefore be considered in the context of other issues affecting the Management Plan. The draft Management Plan with different scenarios associated with lake rejuvenation will be subject of the public's review tentatively planned for late November of this year. In addition, staff will consult with appropriate technical/ regulatory bodies including MOELP and DFO to gain feedback on the dredging options identified by the consultant. Staff will provide the Committee with additional information once the details of the open house have been finalized.

  
D.G. Stenson, Director  
PLANNING AND BUILDING

SH/ma  
Attachment

cc: City Manager  
Director Engineering  
Director Recreation and Cultural Services  
Director Finance  
Chief Environmental Health Officer

**Table 7-2  
Cost Summary of Dredging Scenarios**

Scenario	Pipeline Transfer and On-site Disposal	Dredge Type	Total Estimated Costs	Potential Environmental Impacts
Dredging to Provide Increased Canoe Access (1,000 m <sup>3</sup> , deposit to Zone 3A or Zone 3D)	x	Pumping Bucket	\$30K to \$40K (includes mobilization)	high runoff potential; moderate impact to upland vegetation and wildlife; low everything else
Dredging Basin Areas (up to 20,000 m <sup>3</sup> , deposit in various zones)	x	Pumping Bucket	\$200K to \$400K (will depend on how many sites are selected, and how many disposal sites are selected)	high runoff potential; moderate impact to upland vegetation and wildlife.
Dredging to Create 30% Open Water (up to 50,000 m <sup>3</sup> , deposit to Zones 3A, 3D, and possibly 4)	x	cutter suction or auger dredge	\$350K to \$400K	high runoff potential; moderate turbidity caused by ancillary equipment, moderate impact to upland vegetation and wildlife.
Dredging a Modified Area of the Rowing Course (up to 60,000 m <sup>3</sup> , deposit to Zones 3A, 3D, and 4)	x	cutter suction or auger dredge	\$330K to \$450K	high runoff potential; moderate turbidity caused by ancillary equipment, moderate impact to upland vegetation and wildlife.
Restore the Full Rowing Course (up to 140,000 m <sup>3</sup> , deposit to Zones 3A, 3D, and 4)	x	cutter suction or auger dredge	\$950K to \$1.1 million	high runoff potential; moderate turbidity caused by ancillary equipment, moderate impact to upland vegetation and wildlife.
Pilot Program (2,500 m <sup>3</sup> ) (includes \$25,000 for sampling program, \$7,000 for preparation of tender specifications by an engineer, \$120,000 for a lined detention pond, up to \$25,000 for dredging and engineering, \$10,000 for dredge mobilization, up to \$15,000 for environmental monitoring and testing during dredging.)	x	cutter suction or auger dredge	\$175K to \$200K (Does not include decommissioning the pond)	high runoff potential; moderate turbidity caused by ancillary equipment, moderate impact to upland vegetation and wildlife.