



City of Richmond

Report to Committee

To: Public Works and Transportation Committee

Date: September 13, 2010

From: John Irving, P.Eng. MPA
Director, Engineering

File: 10-6045-09-01/2010-
Vol 01

Re: Sea Dike Provincial Guidelines

Staff Recommendation

That a letter be sent to the Provincial Minister of Environment, copied to local MLA's, requesting dedicated funding to allow the City to proceed with a dike raising program should the Province adopt the draft Sea Dike Guidelines.

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

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ROUTED TO:	CONCURRENCE		CONCURRENCE OF GENERAL MANAGER		
Roads & Dikes	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>	
Policy Planning	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>	
Parks	Y	<input checked="" type="checkbox"/>	N	<input type="checkbox"/>	
REVIEWED BY TAG	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	REVIEWED BY CAO
					DEPUTY
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Staff Report

Origin

In June 2010, the Province invited select local communities to review three draft climate change adaptation guideline documents related to Sea Dikes and Coastal Flood Hazard Land Use.

- Guidelines for Management of Coastal Flood Hazard Land Use
- Sea Dike Guidelines
- Policy Discussion Paper

The Province continues to develop these documents and it is anticipated that they will be finalized near the end of 2010.

The purpose of this report is to provide Council a broad summary of the Sea Dike Guidelines and the associated impacts to the City. A similar future report to Council is planned for the Guidelines for Management of Coastal Flood Hazard Land Use and Draft Policy Discussion Paper.

Analysis

The City's flood protection system is extensive and consists of underground pipe, ditches/sloughs/canals, pump stations and approximately 49 km of dikes. The West Dike protects the City from flooding from the sea while the North and South Dikes protect the City from flooding from the Fraser River. The City's dikes are required to protect the City from flooding from the sea and from the Fraser River during high tide events.

The City's dikes were primarily constructed to their current condition starting in the late 1960's. Dike heights at that time were established by the Province based upon the highest ever recorded sea level as measured at Point Atkinson in the 1940's and the Fraser River flood of record in 1898, plus a freeboard allowance of approximately 0.6 metre. The City proactively operates and maintains the dike system and generally completes capital upgrades on an annual basis as funded through the Drainage and Dike Utility and/or grant funding programs.

In 2008 Council adopted the Flood Plain Designation and Protection Bylaw 8204 and the 2008 – 2031 Richmond Flood Protection Strategy. A full assessment of flood risk management was the foundation for preparing these documents and resulted in numerous tangible flood protection action items. The City's existing dike infrastructure has successfully mitigated flood risks for many decades, however significant upgrades are necessary to meet future challenges.

For new dike construction projects, the City has proactively exceeded the Provincial requirement by including as a minimum an additional 0.5-metre allowance for sea level rise to be responsive to this flooding threat. The current Provincial dike height requirement is to meet the 1:200 year event with no allowance for sea level rise or wave run-up.

In 2005 the City created a Dike Utility as a means for dedicated funding to complete dike upgrades. The City has been able to proceed with a regular dike raising program through a combination of this utility funding and Provincial/Federal grants. It is partly through these initiatives that homeowners now have access to flood protection related insurance where they didn't in the past.

In June 2010, the City was invited by the Province to review and comment on their draft Sea Dike Guidelines. The proposed guidelines contain significant proposed changes to the current methodology of determining dike heights.

The Province's proposed Sea Dike Guideline has been developed to now specifically allow for sea level rise, a 1:500 return period and also provides for a level of service similar to the Netherlands whereby wave run-up and flow over the dike is also a height determining condition.

An increase in dike height is proposed by the Province in the draft Sea Dike Guideline as a result of sea level rise projections to Year 2100 and a level of service increase to a 1:500 return period. This would require the City's sea dikes to be increased from their current approximate height of 3.5 metres. With wave run-up included as a consideration, the dike height would increase further, the height of which would be subject to the level of service desired. There are also technical solutions to address wave run-up that do not require increases in dike height.

There are considerable practical and aesthetic issues associated with providing a level of service that considers sea level rise and wave run-up. Staff are continuing to work with Ministry staff on ensuring that all issues are considered when establishing dike height criteria.

Funding

Funding to complete dike crest height increases is derived from either the City's Drainage and Dikes Utility and any Federal/Provincial grant programs that may be available. The City regularly applies for dike related grants. Over the period 2008 to 2010, the City applied for approximately \$100 million dike related project value grant funding, and was awarded approximately \$8.6 million to date. While these awards were valuable and appreciated, they do not address the need for long term, sustained funding.

Through past Council adopted staff reports, the Mayor has sent the Province letters emphasizing the City's need for dike upgrade related funding following transfer of dike ownership from the Province to the City beginning in 2003. The transfer of dike infrastructure was completed without associated funding. The Province's July 30, 2009 response to the Mayor's letter dated May 22, 2009 discussed the City's opportunity to acquire funding in a competition with all other applicants through the grant application process.

An order of magnitude cost to raise the City's approximately 49 km of dikes to meet sea level rise projections to Year 2100 and a 1:500 level of service would be in the order of \$100 Million. Construction of the dikes to this increased height would be challenging and may require alternative strategies and realignment in some areas. While the City has proactively initiated dike upgrade projects in various locations such as the north Middle Arm, No. 7 to No. 8 Road along the south side and more, commitment from senior government is necessary. It is

recommended that a letter be sent to the Province requesting dedicated funding to allow the City to proceed with a dike raising program.

Financial Impact

There is no financial impact at this time.

Conclusion

The Province has prepared draft climate change adaptation guideline documents related to Sea Dikes and Coastal Flood Hazard Land Use. The draft Sea Dike Guideline proposes an increased level of service as compared to the current Provincial requirements. The proposed guidelines would require considerable financial resources to implement and would be challenging to construct, particularly if wave run-up is included as a dike height requirement. Staff will continue to work with the Province to develop appropriate Sea Dike design criteria.

A handwritten signature in black ink, appearing to read 'J. Young', is positioned above the typed name and title.

Jim V. Young, P. Eng.
Manager, Engineering Design and Construction
(604-247-4610)

JVY:jvy