

### Capital Repair and Remediation Cost of 2017 Flooding of Waterfront Parks

Date: July 6, 2018

To: Executive Committee

From: General Manager, Parks, Forestry and Recreation

Wards: 6, 11, 13, 14, 19, 20, 28, 30, 32, 36, 43, 44

#### SUMMARY

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This report responds to directions from City Council to report to the Executive Committee in 2018 with a comprehensive inventory of all capital costs associated with the spring flooding of 2017, and for the General Manager, Parks, Forestry and Recreation to submit outstanding short-term capital repair and mitigation projects and longer term capital projects, arising from high lake levels, for priority consideration in the 2019 Capital Budget process. In addition, this report also outlines the cost of subsequent damage to the shoreline as a result of the windstorm experienced on April 14 and 15, 2018.

The combined total cost of repairing damage across the waterfront due to these two extreme weather events is \$28.267 million. A total of \$24.706 million is unfunded and cannot be accommodated within the debt targets assigned to Parks, Forestry and Recreation for the 2019-2028 Capital Budget and Plan.

#### RECOMMENDATIONS

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The General Manager, Parks, Forestry and Recreation recommends that:

1. The Executive Committee receive this report for information.

#### FINANCIAL IMPACT

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There are no financial implications from adopting the recommendation in this report.

The combined total cost of repairing damage across the waterfront due to these two extreme weather events is \$28.267 million. \$3.561 million is included in the Parks, Forestry and Recreation Approved 2018-2027 Capital Budget and Plan and a total of

\$24.706 million is unfunded and cannot be accommodated within the debt targets assigned to Parks, Forestry and Recreation for the 2019-2028 Capital Budget and Plan. Parks, Forestry and Recreation will include this capital work as a below the line request for consideration.

**Table 1: Approved Capital Funded Projects**

<b>Capital Work Required</b>	<b>Total Project Costs (000's)</b>
<b>High Lake Effect Impacts</b>	
Erosion Control	\$2,201
Trails, Pathways and Boardwalks	\$150
Asset Infrastructure	\$760
Toronto Islands Flood Study	\$150
<b>Subtotal</b>	<b>\$3,261</b>
<b>Windstorm Impacts</b>	
Erosion control	\$300
<b>Total</b>	<b>\$3,561</b>

All of the approved capital funded projects are expected to be completed in 2018.

**Table 2: Proposed Capital Unfunded Projects<sup>1</sup>**

<b>Capital Work Required</b>	<b>Estimated Total Project Cost (\$000's)</b>			
	<b>Immediate (2019)</b>	<b>Short term (2020)</b>	<b>Medium term (2021-2022)</b>	<b>Total</b>
<b>High Lake Effect Impacts</b>				
Erosion Control	\$1,122	\$3,600	-	\$4,722
Shoreline Infrastructure	\$780	-	-	\$780

<sup>1</sup> The years in the table indicate the proposed start of the Capital work.

Capital Work Required	Estimated Total Project Cost (\$000's)			
	Immediate (2019)	Short term (2020)	Medium term (2021-2022)	Total
Trails, Pathways and Boardwalks	\$2,036	\$420	\$10	\$2,466
Asset Infrastructure	\$330	\$2,550	\$1,500	\$4,380
<b>Subtotal</b>	<b>\$4,268</b>	<b>\$6,570</b>	<b>\$1,510</b>	<b>\$12,348</b>
<b>Windstorm Impacts</b>				
Erosion Control	\$7,300	\$350	-	\$7,650
Shoreline Infrastructure	\$1,350	\$2,000	-	\$3,350
Trails, Pathways and Boardwalks	\$600	\$200	-	\$800
<b>Subtotal</b>	<b>\$9,250</b>	<b>\$2,550</b>	<b>-</b>	<b>\$11,800</b>
Senior Project Coordinator				\$558
<b>Total</b>	<b>\$13,518</b>	<b>\$9,120</b>	<b>\$1,510</b>	<b>\$24,706</b>

To assist in the delivery of these projects resulting from the two storm events, one temporary Senior Project Coordinator will also be required at a cost of \$0.558 million over four years.

These projects have been prioritized to address health and safety issues, protect hard assets such as buildings and bridges, stabilize the shoreline, and ensure safe access to the beaches across the city. In some cases, work has been scheduled across multiple years to balance urgency with a desire to ensure ongoing access to parkland. Work should be completed as quickly as possible in order to mitigate future escalating costs and safety concerns. With the expected impacts of climate change-related storms being more severe, if shoreline structures are not repaired expediently, much more damage will be experienced in future storm events.

Detailed infrastructure timing and funding will need to be prioritized against funded and unfunded City-wide capital projects and operating impacts, with consideration also being given to the City's financial and resource capacity to deliver additional infrastructure works. These considerations will inform and guide future Capital Budget and Operating Budget processes.

The Interim Chief Financial Officer has reviewed this report and agrees with the financial impact information.

## **DECISION HISTORY**

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City Council, at its meeting of July 4, 5, 6 and 7, 2017, directed the General Manager, Parks, Forestry and Recreation to report to the Executive Committee in the third quarter of 2018 with a comprehensive inventory of all capital costs associated with the Spring flooding of 2017, including repair of existing infrastructure and mitigation strategies.  
<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.CC31.4>

At its meeting of January 31 and February 1, 2018, City Council directed the General Manager, Parks, Forestry and Recreation to submit outstanding short term Capital repair and mitigation projects and longer term capital projects, arising from high lake levels, for priority consideration in the 2019 Capital Budget process.  
<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.EX30.7>

City Council, at its meeting of February 12, 2018, adopted the 2018 Capital Budget for Parks, Forestry and Recreation through item EX31.2 (20 a.i.) and a total project cost and 2018 cash flow of \$2.000 million for the Waterfront High Lake Effect Flooding Rehab sub-project.  
<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.EX31.2>

## **COMMENTS**

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### **2017 Flooding and High Lake Effect**

In the spring of 2017, Lake Ontario saw an unprecedented rise in water level, as snowmelt and an exceptionally rainy spring season increased water supply to the basin. On May 27, 2017, lake levels reached their peak height of 75.93 metres above sea level. This was 0.91 metres above normal averages and was the highest water level ever recorded in over 100 years of tracking levels of Lake Ontario.

The effect of this flooding was felt along the entire length of Toronto's waterfront and at Toronto Island Park. An unprecedented 70 landslides were recorded along the Scarborough Bluffs. Debris flowing down the Humber River inundated the beaches in the west end of the city on a daily basis.

Staff from both the City of Toronto and the Toronto and Region Conservation Authority (TRCA) worked to prevent damage and the loss of property and assets through emergency flood mitigation efforts. Despite these efforts, across the whole of the waterfront, 41 instances of damage were recorded which need capital investment to repair and to mitigate against future high water damage.

After the spring thaw in April 2018, TRCA and coastal engineering specialists as well as Parks, Forestry and Recreation (PF&R) Capital Project planners have inspected all

known damage associated with the 2017 and early 2018 high water levels, to detail repair work and associated costs. All work has been prioritized and a projected plan by year has been prepared based on the capability and capacity of the TRCA, contractors and City staff, assuming additional staffing resources are provided as part of the proposed budget to undertake the work volume and associated contract oversight.

### **Further Damage - Windstorm April 14-15, 2018**

With lake levels still above average this spring, the windstorm of April 14-15, 2018 exacerbated shoreline damage across the waterfront and resulted in major damage. The waves measured during this storm were the highest ever measured in Lake Ontario. This was determined through a 45+ year wave hindcasting project by Shoreplan Engineering whereby recorded wind data was used to model the wave conditions expected to have occurred due to those winds. The major storm event that occurred in April 2018 produced higher wave heights than any other storm during that 45+ year hindcast. The damage sustained during this 24 hour period is of the same magnitude of the entirety of the flood event from 2017. Estimates on the cost of repairing the shoreline are approximately an additional \$11.800 million.

The most significant damage was to the south headland at Bluffer's Park. The shoreline protection was washed away and significantly weakened, resulting in the shoreline being exposed to wave action. This results in ongoing and active erosion to this headland, not just during severe storm events but through routine coastal processes. The erosion has already reached the heavily used path that skirts the headland and is putting public safety at risk. If there is no action to repair shoreline protection to this area in the immediate future, further land loss is anticipated and large portions of the headland may need to be reinstated or abandoned.

### **Approved Capital Funded Projects**

In the fall of 2017 and spring of 2018, staff inspected damage along the waterfront and identified \$3.261 million in work that was urgently required and was approved in the 2018 PF&R Capital Budget. Following the April 2018 windstorm, an additional \$0.300 million is required to complete urgent repairs to the Bluffer's Park headland. Of the total \$3.561 million, \$2.000 million is funded through the Waterfront High Lake Effect Flooding Rehab sub-project, in the Special Facilities project. The remaining \$1.561 million will be funded from the Parks Rehabilitation sub-projects, the CAMP State of Good Repair Special Facilities Building and Structures sub-project, and other emergency sources that are being re-allocated from other projects to address the emergency needs.

**Table 3: Approved Capital Funded projects**

<b>Category of Repair</b>	<b>Cost (\$000's)</b>	<b>Location</b>
<b>High Lake Effect Impacts</b>		
Erosion Control	\$2,201	Bluffer's Park Scarlett Woods golf course
Trails, Pathways and Boardwalks	\$150	Balmy Beach Park
Asset Infrastructure	\$760	Eastern Beaches (Leuty Boathouse) Toronto Island Park Sumps and Pumps Centre Island Park washroom
Flood Study	\$150	Toronto Island Park
<b>Subtotal</b>	<b>\$3,261</b>	
<b>Windstorm Impacts</b>		
Erosion Control	\$300	Bluffer's Park headland
<b>Total Cost</b>	<b>\$3,561</b>	

## Proposed Capital Unfunded Projects

### Immediate projects (2019)<sup>2</sup>

Through the inspections undertaken this spring, the following work has been identified as immediate projects to address damage as a result of high water levels and the windstorm:

**Table 4: Immediate projects (2019)**

Category of Repair	Cost (\$000's)	Location
Erosion control	8,422	Cherry Beach Sunnyside Park Bluffer's Park Humber Bay Park East Humber Bay Park West
Shoreline Infrastructure	\$2,130	Tommy Thompson Park Humber Bay Shores Ward's Island Humber Bay Park East Humber Bay Park West Humber Bay Shores (Palace Pier)
Trails, Pathways and Boardwalks	\$2,636	Martin Goodman Trail Marie Curtis Park Sunnyside Park Sir Casimir Gzowski Park Lenford Park Toronto Island Park Humber Bay Park East
Asset Infrastructure	\$330	Humber Bay Park West Humber Bay Arch Bridge
<b>Total Cost</b>	<b>\$13,518</b>	

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<sup>2</sup> 2 Year indicates proposed start of the Capital Work.

### Short term projects (2020)<sup>3</sup>

Through the inspections that were undertaken this spring, the following work has been identified as short term projects as a result of high water levels and the windstorm:

**Table 5: Short term projects (2020)**

Category of Repair	Cost (\$000's)	Location
Erosion control	\$3,950	Centreville Cherry Beach Colonel Sam Smith Park Ashbridges Bay Park Humber Bay Park West
Shoreline Infrastructure	\$2,000	Humber Bay Park West
Trails, Pathways and Boardwalks	\$620	Sir Casimir Gzowski Park Tommy Thomson Park
Asset Infrastructure	\$2,550	Marie Curtis Park Toronto Island Park Silverbirch Boathouse
<b>Total Cost</b>	<b>\$9,120</b>	

### Medium term projects (2021-2022)<sup>3</sup>

Through the inspections that were undertaken this spring, the following work has been identified as medium term projects as a result of high water levels and the windstorm:

**Table 6: Medium term projects (2021-2022)**

Category of Repair	Cost (\$000's)	Location
Trails, Pathways and Boardwalks	\$10	Budapest Beach
Asset Infrastructure	\$1,500	Toronto Island Park
<b>Total Cost</b>	<b>\$1,510</b>	

All of the projects listed above are unfunded and will be submitted for consideration in the 2019 Parks, Forestry and Recreation Capital Budget submission process.

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<sup>3</sup> Year indicates proposed start of the Capital Work.



Additionally, a Senior Project Coordinator is required to assist in the delivery of these projects at an estimated cost of \$0.558 million over four years. This brings the unfunded total to \$24.706 million.

## **Categories of repairs**

The damage and required repair and remediation work along the waterfront has been summarized into four categories. Attachment A illustrates the categories of waterfront damage with some pictures.

### **Erosion control**

Erosion control is required where the wind and wave action has resulted in the loss of land along the shoreline. In some instances, this type of loss of land also undermined trails, embankments and has created beach scours.

### **Shoreline Infrastructure**

Damage occurred to shoreline infrastructure such as beach curbs and berms, which are in place to protect shorelines from erosion. Compromised infrastructure requires restoration and repair to avoid future shoreline erosion.

### **Trails, Pathways and Boardwalks**

Trails, pathways and boardwalks across the length of the waterfront were compromised by high water levels and storm related wave action. Considerable repairs are required and in some cases, complete lengths of paths, trails or boardwalks need to be replaced. In other places, the repairs consist of asphalt or concrete segment work.

### **Asset Infrastructure**

Infrastructure damage to waterfront buildings, bridges, and other structures occurred and have caused structural concerns which are in need of repair. This includes damage to footings, floors and concrete slabs and boat launches.

## **Conclusion**

Impacts from the 2017 Flooding and HLE and 2018 Windstorm are estimated to cost \$28.267 million. Of that amount, only \$3.561 million is funded through various sources in the 2018 PF&R Capital Budget. Another \$24.706 million is unfunded and will be submitted through the Parks, Forestry and Recreation 2019 Capital Budget submission as a below the line request.

The impacts of severe storms are no longer infrequent events occurring only once or twice a decade. Modeling shows that the storms and impacts related to climate change and urbanization will only continue to accelerate both in frequency and severity. Long-term planning and coordination is required to ensure Toronto's shoreline and waterfront parks are stewarded for future generations. Staff will continue to work with the TRCA and the Chief Resiliency Officer to determine long-term repair and resiliency work that is required in the context of ongoing high water levels and severe weather events.

## CONTACT

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## SIGNATURE

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General Manager, Parks, Forestry and Recreation,

## ATTACHMENTS

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Attachment A: Four Categories of Waterfront Damage

## Attachment A – Four Categories of Waterfront Damage

Figure 1: Example of Erosion Damage

### Bluffer's Park – Ward 36

May 25, 2017



July 20, 2017



Figure 2: Example of Damage to Shoreline Infrastructure

### Sunnyside Park, Breakwall by Gus Ryder Pool – Ward 13

September 1, 2017



**Figure 3: Example of Damage to Trails, Pathways and Boardwalks**

**Port Union Waterfront Park Pathway – Ward 44**

April 24, 2017

May 31, 2017

July 26, 2017



**Figure 4: Example of Damage to Asset Infrastructure**

**Centre Island Park Washroom & Bathing Station – Ward 28**

July 25, 2017

