COST ANALYSIS

SEWER SEPARATION with stormwater pollution source control

through intensified street sweeping and catchbasin cleaning

Area	Capital costs			Estimated Annual operation and maintenance costs	TOTAL COST as Present Value
	New sewers	Equipment costs	Total		based on 50-year service life
DOWNTOWN CORE					
Brock St to Bay St	$9.4 M	$0.4 M	$9.4 M	$40,000	**$10.4 M**
NORTH OF CORE					
Bay Street to River St	$9.1 M	$0.6 M	$9.7 M	$70,000	**$11.5 M**
KING STREET WEST					
Sir John A to Collingwood St	$6.3 M	$1.1 M	$7.4 M	$80,000	**$9.4 M**
TOTAL					
	$24.8 M	$2.1 M	$26.5 M	$190,000	**$31.4 M**

SEWER SEPARATION with stormwater treatment

	Capital costs				Estimated annual operation and maintenance costs	TOTAL COST as Present Value
	New sewers	Stormwater treatment		Total		based on 50-year service life
		Treatment method	*Capital cost*			
DOWNTOWN CORE						
Brock St to Bay St	$9.4 M	Distributed oil/grit chambers	$2.1 M	$11.5 M	$100,000	**$14.1 M**
NORTH OF CORE						
Bay Street to River St	$9.1 M	Distributed oil/grit chambers	$2.0 M	$11.1 M	$130,000	**$14.4 M**
KING STREET WEST						
Sir John A to Collingwood St	$6.3 M	End-of-pipe tank	$7.2 M	$13.5 M	$50,000	**$14.8 M**
TOTAL						
	$24.8 M		$11.3 M	$36.1 M	$280,000	**$43.3 M**

INTERCEPT AND TREAT OVERFLOWS

Option	Capital cost				Estimated Annual Operational and Maintenance Cost	Downstream Costs		Present Value of TOTAL COST
	Storage Tank(s)	Interceptor Sewer	Satellite treatment	Total Capital Cost		Upgrades at Pumping Stations and at Ravensview STP	Estimated Annual O&M costs at Downstream Facilities	based on 50 year life cycle
BROCK STREET TO RIVER STREET								
New Interceptor Sewer with Centralized Storage Tank, with pump out and treatment at Ravensview Sewage Plant	$4.9 M	$2.6 M		**$7.5 M**	$75,000	$ 5.7 M	$13,000	**$15.5 M**
New Interceptor Sewer with Centralized Storage and Satellite Treatment	$4.9 M	$2.6 M	$1.13 M	**$8.6 M**	$180,000			**$13.3 M**
Multiple Storage Tanks with Pump-out to Existing HTS, treatment at Ravensview Sewage Plant	$8.0 M			**$8.0 M**	$96,000	$ 5.7 M	$13,000	**$16.5 M**
Multiple Storage Tanks with Satellite Treatment	$8.0 M	$0.0 M	$1.40 M	**$9.4 M**	$370,000			**$18.9 M**
Deep Tunnel Storage with pump out to River St PS				**$14.0 M**	$88,000	$ 5.7 M	$13,000	**$22.3 M**
KING STREET WEST CSO								
Storage tank with Pump Out to existing HTS, treatment at Ravensview Sewage Plant	$2.1 M			**$2.1 M**	$36,000	$ 2.8 M	$14,000	**$6.2 M**
Storage tank with Satellite Treatment	$2.1 M		$0.58 M	**$2.7 M**	$140,000			**$6.3 M**
TOTAL								
with centralized treatment at Ravensview WPCP								**$21.7 to $28.5 M**
with satellite treatment facilities								**$19.6 to $25.2 M**

SEWER OVERFLOW CONTROL: ALTERNATIVES ANALYSIS
COST versus ENVIRONMENTAL BENEFIT

Environmental benefit has been quantified in terms of the **volume** of stormwater or combined-sewer overflow, and amount of **suspended solids (SS)** and **bacteria** (*E.coli*) discharged to the waterfront from the project area. Many pollutants of concern (bacteria, nutrients such as phosphorus, metals and other urban wash-off pollutants) are carried by or are associated with SS, making it a useful indicator of the overall pollutant load.

Results below are for a representative April-October period (515 mm rainfall)

Alternative Solution	TOTAL COST As Present Value	ESTIMATED VOLUME OF DISCHARGE (m^3)	ESTIMATED POLLUTANT LOAD DISCHARGED TO WATERFRONT from the combined-sewer area	
			SS (kg)	Indicator bacteria (billions)
EXISTING		83,000 m^3	32,000 kg	600,000
INTERCEPT AND TREAT OVERFLOWS				
▪ With centralized treatment at Ravensview WPCP	$22 to $28 million	21,000 m^3	8,000 kg	150,000
▪ With satellite treatment facilities	$ 20 to $ 25 million			
SEWER SEPARATION				
• with no stormwater treatment or source control intensification	$25 million		81,000 kg	135,000
• with INTENSIFIED STORMWATER POLLUTION SOURCE CONTROL	$ 31 million	330,000 m^3	49,000 kg	108,000
• with STORMWATER TREATMENT FACILITIES	$ 43 million		31,000 kg	70,000

OTHER CRITERIA

CRITERIA	INTERCEPT AND TREAT OVERFLOWS		SEWER SEPARATION with stormwater pollution source control or treatment
	With centralized treatment at Ravensview Sewage Plant	With satellite treatment facilities	
Infrastructure Integration	Uses existing pumping and treatment capacity. Will hasten need for future upgrade of existing pumping station and treatment plant. New interceptor sewer may provide for additional sewage collection capacity within City core area.	Avoids use of existing pumping and treatment infrastructure, but substantially increases number of treatment facilities to operate.	Requires construction of substantial additional infrastructure (new sewers and stormwater treatment facilities)
Technical and Operational Complexity	Relatively low. Tank pump-out operation can be integrated with current operations at River St Sewage Pumping Station.	Relatively high. Satellite facilities will require high technical capability and significant operational commitment.	Moderate. Maintenance and operation of new stormwater treatment facilities will require new technical capability and operational commitment.
Adaptability	Most readily adaptable to improvements in treatment technology since treatment is centralized.	Less adaptable to new technology since treatment is at a number of smaller-scale facilities	Less adaptable or retrofit to new technology, since stormwater treatment would take place at a number of small-scale facilities
Socio-Economic Impacts, including disruption during construction	Moderate to high impact, depending on selected alignment for new interceptor sewer in downtown area and method of construction.	Likely the least disruptive, since most construction limited to individual sites of storage/treatment facilities	Most disruptive because of need to construct extensive sewer network within City core area; and intensified source control may be disruptive in residential areas
Environmental Risks associated with exposure of subsurface contamination	High potential depending on route of new interceptor and storage tank locations	Likely has least potential, since works limited to sites of storage/treatment facilities	Moderate to high potential because of need to construct extensive sewer network within City core area
Waterfront Areas and Natural Features	Relatively low. Proposed underground storage tanks can be designed to preserve existing waterfront parkland.	Potentially higher impact along waterfront due to need for multiple facilities.	New pipe outfalls will have an impact along the shoreline. High impact if treatment provided in ponds built in waterfront areas; lower if underground tanks; little impact if treatment provided by oil/grit removal chambers within sewer network
Local Heritage Resources	High potential for impact depending on route and depth selected for new interceptor sewer in core area and northward alongside Inner Harbour.	Moderate impact potential, depending on specific sites chosen for storage/treatment facilities	Moderate to high impact potential, given need for extensive construction of new sewers

OUTCOME of ANALYSIS

1. INTERCEPTING AND TREATING OVERFLOWS has a substantially more favourable ratio of cost to environmental benefit than alternatives that involve SEWER SEPARATION.

2. INTERCEPTING AND TREATING OVERFLOWS is substantially less costly than options involving SEWER SEPARATION.

3. INTERCEPTING OVERFLOWS AND TREATING CENTRALLY AT RAVENSVIEW is least costly and is favourable in terms of its ability to integrate with other infrastructure and to adapt in future to improvements in sewage treatment technology.

4. INTERCEPTING OVERFLOWS AND TREATING CENTRALLY AT RAVENSVIEW by constructing a new interceptor sewer in the central core area poses highest potential for impacts on local heritage/archaeological resources, and poses relatively high risk of exposing subsurface contamination. However, these risks are present to some degree for all alternatives. It is expected that these impacts can be addressed through analysis of various interceptor alignment options and design/construction options as the Class EA advances.

Based on the above, **THE PREFERRED ALTERNATIVE for SEWER OVERFLOW CONTROL** is

BROCK ST to RIVER ST:

INTERCEPT OVERFLOWS with a NEW INTERCEPTOR SEWER, store the flow in a centralized tank and then pump to Ravensview Sewage Plant for treatment.

KING STREET WEST (COLLINGWOOD STREET OVERFLOW):

INTERCEPT OVERFLOW in an underground tank along the waterfront near Collingwood Street, pump out to the existing trunk sewer to send the flow to Ravensview Sewage Plant for treatment.