

Summary of Stormwater Design Alternatives in Keating Channel Precinct

Evaluation Criteria	Alternative 1 All land uses (development blocks, open space/parks and roads) have individual systems for treating stormwater including Total Suspended Solid (TSS) removal and disinfection.	Alternative 2 All land uses have individual site systems for TSS removal but there is a common facility used for disinfection.	Alternative 3A All land uses share a common facility for all stormwater treatment (i.e., TSS removal and disinfection), but the facilities are only designed to service Keating Channel Precinct. Facilities are optimized to meet the required water quality targets.	Alternative 3B All land uses share a common facility for all stormwater treatment (i.e., TSS removal and disinfection), but the facilities are only designed to service Keating Channel Precinct. Facilities are sized based on available space.	Alternative 4A All land uses share common TSS removal and disinfection systems and the facilities are designed to be integrated with facilities for adjacent neighbourhoods (i.e., EBF and WDL). Facilities are optimized to meet the required water quality targets.	Alternative 4B All land uses share common TSS removal and disinfection systems and the facilities are designed to be integrated with facilities in adjacent neighbourhoods. The facilities are optimized to meet the required water quality targets. Facilities are sized based on available space.
Natural Environment ▪ Don Mouth Naturalization ▪ New Natural Area – (Wetlands)	No difference to Don Mouth Naturalization because Keating Channel Precinct (i.e., proposed improvements) are north of Villiers/Commissioners Street					
Social Environment ▪ Vibrant, mixed use community ▪ Access to water	- The most amount of land is lost within each land use, to provide individual systems.	- Some land is lost within each land use to provide individual systems for TSS removal.	Is a viable option for Keating Channel Precinct but requires more land in “larger picture” of adjacent neighbourhoods, – creates some redundancy and limits total space available for mixed use, vibrant communities. + Good water quality targets	Is a viable option for Keating Channel Precinct but requires more land in “larger picture” of adjacent neighbourhoods, – creates some redundancy and limits total space available for mixed use, vibrant communities. - Water quality targets are lower.	+ This alternative maximizes use of space and provides good water quality targets - Keating Channel Precinct stormwater functioning is dependent on work of others in adjacent studies.	+ This alternative ensures that Keating Channel Precinct stormwater is dealt with appropriately, regardless of outcome of adjacent studies and supports mixed use, vibrant community.
Economic Environment ▪ Economically viable blocks ▪ Cost-effective to build	- Least cost-effective to build multiple systems for each land use for TSS removal and disinfection.	- Not cost-effective to build multiple systems for each land use for TSS removal.	Is acceptable for Keating Channel Precinct but not most cost-effective way to manage stormwater (i.e., each neighbourhood has their own system).	Is acceptable for Keating Channel Precinct but not most cost-effective way to manage stormwater (i.e., each neighbourhood has their own system).	Is most cost-effective to build but has a higher level of risk when Keating Channel stormwater approvals are dependant on outcome of adjacent studies.	+ This alternative is cost-effective to build because it is integrated with stormwater treatment in adjacent neighbourhoods, includes natural processes and confirms appropriate water quality targets, independent of adjacent studies.
Cultural Environment ▪ Aboriginal people ▪ Heritage structures ▪ Archaeology	No difference between alternatives to cultural environment – no impacts.					
Sustainability ▪ WT Sustainability Framework ▪ City sustainability standards ▪ Impervious surfaces ▪ Water Quality Improvement	Will meet partial sustainability targets by improving water quality, reducing impervious surfaces and addressing both City and WT sustainability standards and framework. - Will not achieve technical sustainability and other engineering aspects due to having separate UV treatment facilities for disinfection.	Will meet partial sustainability targets by improving water quality, reducing impervious surfaces and addressing both City and WT sustainability standards and framework. Will achieve partial technical sustainability and other engineering aspects with common facility for UV treatment.	Will meet sustainability targets by improving water quality, reducing impervious surfaces and addressing both City and WT sustainability standards and framework. Will achieve partial technical sustainability and other engineering aspects with common facility for UV treatment.	Will meet sustainability targets by improving water quality, reducing impervious surfaces and addressing both City and WT sustainability standards and framework. Will achieve partial technical sustainability and other engineering aspects with common facility for UV treatment.	Will meet sustainability targets by improving water quality, reducing impervious surfaces and addressing both City and WT sustainability standards and framework. + Will achieve technical sustainability and other engineering aspects with common facility for UV treatment.	Will meet sustainability targets by improving water quality, reducing impervious surfaces and addressing both City and WT sustainability standards and framework. + Will achieve technical sustainability and other engineering aspects with common facility for UV treatment.
Land Use and Property ▪ New land uses ▪ Public realm goals ▪ Property	- Has the greatest property impacts within each land use.	- Has property impacts within each land use.	Has minor property impacts.	Has minor property impacts.	Has minor property impacts.	Has minor property impacts.
Transportation ▪ Walkability ▪ Transit priority ▪ Zero-growth traffic ▪ Parking	N/A					
Municipal Services Utilities	No difference - All alternatives are capable of servicing the Keating Channel Precinct adequately and all utility impacts can be mitigated					
Summary	NOT PREFERRED	NOT PREFERRED	NOT PREFERRED	NOT PREFERRED	NOT PREFERRED	PREFERRED

Alternative 4B is the Preferred Stormwater Design because it maximizes efficiencies with adjacent stormwater treatment facilities and land uses, is most compatible with the City of Toronto's goals for stormwater management in the waterfront area, it uses less land in each separate neighborhood because integrated facilities' are used. The Preferred Stormwater Design includes:

- Tying into the proposed tank in East Bayfront EA to service lands west of Cherry Street;
- Locating LDL tanks adjacent to the West Don Lands tanks (at the rail berm north of Lake Shore Boulevard), to service lands east of Cherry Street (north of the Keating Channel); and sharing pumping and UV treatment facilities; and
- Using either a new tank (permanently) to service lands north of Villiers Street (south of Keating Channel) or servicing this part of Keating North (temporarily) with oil grit separators until designs are confirmed for lands south of Villiers Street, in the Lower Don Lands study area. The decision to build something permanent or temporary for lands on the north side of Villiers Street (in Keating Channel Precinct) will be made through discussions with the City prior to implementation.

STORMWATER MANAGEMENT BMP SELECTION MATRIX FOR LOWER DON LANDS CLASS EA - OPPORTUNITIES AND CONSTRAINTS

UPSTREAM

DOWNSTREAM

Source Controls

Conveyance Controls

End of Pipe Controls

Sedimentation

Pre-Disinfection Filtration

Disinfection

	Source Controls			Conveyance Controls			Sedimentation			Pre-Disinfection Filtration			Disinfection		
	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint
Development Blocks (Privately Controlled)	Retention - Green Roof	Green		Swales (grassed, bio-filtration)	Green		Oil Grit Separators	Green	Feasible for block areas less than 5.0 ha	Provisional Filtration Systems for Optimizing Operation of UV Treatment Facility	Red	Individually operated disinfection systems not desirable from cost/ quality control perspective	Disinfection: a) UV Treatment	Red	Individually operated disinfection systems not desirable from cost/ quality control perspective
	Rainwater Harvesting for Toilet Flushing Demands	Green		Catchbasin Filters	Green		Infiltration Basins	Red	Infiltration not feasible given soil contamination issues						
	Rainwater Harvesting for Street Tree Irrigation Needs	Green		Pervious Catchbasins	Red	Infiltration not feasible given soil contamination issues	Dry Ponds	Red	Land area requirements unacceptable						
	Control of Fertilizers	Green		Pervious Pipes	Yellow	Liner required to prevent infiltration to contaminated soil conditions	Wet Ponds	Red	Land area requirements unacceptable						
	Retention - Absorbent Landscaping (rain gardens, bio filters)	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Storm Sewers	Green		Constructed Wetlands	Red	Land area requirements unacceptable						
	Filter Strips	Green		Sand Filters (use roadway fill materials as filter medium for water quality treatment)	Yellow	Liner required to prevent infiltration to contaminated soil conditions	Screening Facilities	Red	Source of conveyance controls provide this function						
	Sand Filtration Systems	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Street Trees (Silva Cells)	Green	Roof water could be routed through these systems prior to discharge to the street tree silva cells	In-line or Off-line Shallow Underground Tanks	Red	End of pipe integrated solution with EBF and WDL provides this function						
	Soak Away Pits	Red	Infiltration not feasible given soil contamination issues	OGS - Oil Grit Separator	Red	Considered end of pipe solution for this application	In-line or Off-line Deep Underground Tanks/Tunnels	Red	End of pipe integrated solution with EBF and WDL provides this function						
	Pervious Pavements	Yellow					High Rate Treatment Devices/Storage in Receiving Waters by Displacement	Red	No specific need for this application identified						
	Retention for Site Irrigation	Green					Real Time Monitoring	Red	No specific need for this application identified						
Development Blocks (WATERFRONToronto)	Retention - Green Roof	Green		Swales (grassed, bio-filtration)	Green		Oil Grit Separators	Green	Feasible for block areas less than 5.0 ha	Provisional Filtration Systems for Optimizing Operation of UV Treatment Facility	Red	Individually operated disinfection systems not desirable from cost/ quality control perspective	Disinfection: a) UV Treatment	Red	Individually operated disinfection systems not desirable from cost/ quality control perspective
	Rainwater Harvesting for Toilet Flushing Demands	Green		Catchbasin Filters	Green		Infiltration Basins	Red	Infiltration not feasible given soil contamination issues						
	Rainwater Harvesting for Street Tree Irrigation Needs	Green		Pervious Catchbasins	Red	Infiltration not feasible given soil contamination issues	Dry Ponds	Red	Land area requirements unacceptable						
	Control of Fertilizers	Green		Pervious Pipes	Yellow	Liner required to prevent infiltration to contaminated soil conditions	Wet Ponds	Red	Land area requirements unacceptable						
	Retention - Absorbent Landscaping (rain gardens, bio filters)	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Storm Sewers	Green		Constructed Wetlands	Red	Land area requirements unacceptable						
	Filter Strips	Green		Sand Filters (use roadway fill materials as filter medium for water quality treatment)	Yellow	Liner required to prevent infiltration to contaminated soil conditions	Screening Facilities	Red	Source of conveyance controls provide this function						
	Sand Filtration Systems	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Street Trees (Silva Cells)	Green	Roof water could be routed through these systems prior to discharge to the street tree silva cells	In-line or Off-line Shallow Underground Tanks	Red	End of pipe integrated solution with EBF and WDL provides this function						
	Soak Away Pits	Red	Infiltration not feasible given soil contamination issues	OGS - Oil Grit Separator	Red	Considered end of pipe solution for this application	In-line or Off-line Deep Underground Tanks/Tunnels	Red	End of pipe integrated solution with EBF and WDL provides this function						
	Pervious Pavements	Yellow					High Rate Treatment Devices/Storage in Receiving Waters by Displacement	Red	No specific need for this application identified						
	Retention for Site Irrigation	Green					Real Time Monitoring	Red	No specific need for this application identified						

Public Park Land and Open Space	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	
	Retention - Green Roof	Green		Swales (grassed, bio-filtration)	Green		Oil Grit Separators	Yellow	Generally other bmps would be more cost effective. Maybe considered for spill control	Provisional Filtration Systems for Optimizing Operation of UV Treatment Facility	Yellow	Designs should provide ability to implement if UV treatment is proposed	Disinfection: a) UV Treatment	Green		
	Rainwater Harvesting for Toilet Flushing Demands	Green		Catchbasin Filters	Green		Infiltration Basins	Yellow	My be feasible for areas next to lake or river if engineered soils imported							
	Rainwater Harvesting for Street Tree Irrigation Needs	Green		Pervious Catchbasins	Red	Infiltration not feasible given soil contamination issues	Dry Ponds	Green								
	Control of Fertilizers	Green		Pervious Pipes	Yellow	Liner required to prevent infiltration to contaminated soil conditions	Wet Ponds	Green								
	Retention - Absorbent Landscaping (rain gardens, bio filters)	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Storm Sewers	Green		Constructed Wetlands	Green						Disinfection: b) Sand Filtration	Yellow	May be feasible for management of surfaces draining to lake/ river
	Filter Strips	Green		Sand Filters (use roadway fill materials as filter medium for water quality treatment)	Red	Cost benefit questionable given opportunities to achieve drainage objectives with other bmps	Screening Facilities	Red	Source of conveyance controls provide this function							
	Sand Filtration Systems	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Street Trees (Silva Cells)	Green		In-line or Off-line Shallow Underground Tanks	Red	End of pipe integrated solution with EBF and WDL provides this function							
	Soak Away Pits	Red	Infiltration not feasible given soil contamination issues	OGS - Oil Grit Separator	Red	Considered end of pipe solution for this application	In-line or Off-line Deep Underground Tanks/Tunnels	Red	End of pipe integrated solution with EBF and WDL provides this function							
	Pervious Pavements	Yellow					High Rate Treatment Devices/Storage in Receiving Waters by Displacement	Red	No specific need for this application identified							
Retention for Site Irrigation	Green					Real Time Monitoring	Yellow	Consider need if disinfection systems are warranted								

Public Road	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint			
	Retention - Green Roof	Red	Not Generally Applicable	Swales (grassed, bio-filtration)	Yellow	Structural measure may be required to limit width and impact on Road Allowance width	GO TO END OF PIPE CONTROLS FOR STORMWATER MANAGEMENT FACILITY											
	Rainwater Harvesting for Toilet Flushing Demands	Red	Not Generally Applicable	Catchbasin Filters	Red	Infiltration not feasible given soil contamination issues												
	Rainwater Harvesting for Street Tree Irrigation Needs	Red	Roadway runoff quality not deemed suitable for irrigation	Pervious Catchbasins	Red	Infiltration not feasible given soil contamination issues												
	Control of Fertilizers	Green		Pervious Pipes	Yellow	Liner required to prevent infiltration to contaminated soil conditions												
	Retention - Absorbent Landscaping (rain gardens, bio filters)	Yellow	Structural measures may be required to limit width and impact on Road Allowance width	Storm Sewers	Green													
	Filter Strips	Yellow	Application will increase the width of the Road Allowance	Sand Filters (use roadway fill materials as filter medium for water quality treatment)	Yellow	Liner required to prevent infiltration to contaminated soil conditions												
	Sand Filtration Systems	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Street Trees (Silva Cells)	Green	Located in boulevard but receives irrigation supply from roof areas from adjacent developments												
	Soak Away Pits	Red	Infiltration not feasible given soil contamination issues	OGS - Oil Grit Separator	Green	Locate such that contributing drainage are is less than 5.0 ha												
	Pervious Pavements	Yellow																
Retention for Site Irrigation	Red	Roadway runoff quality not deemed suitable for irrigation																

Stormwater Management Facility	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	BMP	Potential	Opportunity / Constraint	
	Retention - Green Roof	Green		Swales (grassed, bio-filtration)	Green		Oil Grit Separators	Red	End of pipe contributing areas are greater than 5.0 ha. OGS considered o	Provisional Filtration Systems for Optimizing Operation of UV Treatment Facility	Green		Disinfection: a) UV Treatment	Green		
	Rainwater Harvesting for Toilet Flushing Demands	Green		Catchbasin Filters	Green		Infiltration Basins	Red	Infiltration not feasible given soil contamination issues							
	Rainwater Harvesting for Street Tree Irrigation Needs	Green		Pervious Catchbasins	Red	Infiltration not feasible given soil contamination issues	Dry Ponds	Red	Land area requirements unacceptable							
	Control of Fertilizers	Green		Pervious Pipes	Yellow	Liner required to prevent infiltration to contaminated soil conditions	Wet Ponds	Red	Land area requirements unacceptable							
	Retention - Absorbent Landscaping (rain gardens, bio filters)	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Storm Sewers	Green		Constructed Wetlands	Red	Land area requirements unacceptable					Disinfection: b) Sand Filtration	Yellow	
	Filter Strips	Green		Sand Filters (use roadway fill materials as filter medium for water quality treatment)	Red	Cost benefit questionable given opportunities to achieve drainage objectives with other bmps	Screening Facilities	Yellow	Consider for design of major storm inlets and storm pumping station							
	Sand Filtration Systems	Yellow	Liners may be required to mitigate potential impacts on infiltration to contaminated soils	Street Trees (Silva Cells)	Green		In-line or Off-line Shallow Underground Tanks	Green								
	Soak Away Pits	Red	Infiltration not feasible given soil contamination issues	OGS - Oil Grit Separator	Red	Considered end of pipe solution for this application	In-line or Off-line Deep Underground Tanks/Tunnels	Green								
	Pervious Pavements	Yellow					High Rate Treatment Devices/Storage in Receiving Waters by Displacement	Green								
Retention for Site Irrigation	Green					Real Time Monitoring	Green									

Legend

- Potential component of SWM treatment train
- Conditional component of SWM treatment train process
- No potential as component of SWM treatment train process

