As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific Representations as Scientific Representation Representation

Municipal Address: 2380 4th Line, 30-046-64

GIS Coordinates: 44°15'0" N Constructed: Latitude:

Part 1: General Information Valleyview Municipal Pond ID LSRCA Pond ID Certificate of Approval: Facility Type Dry pond **Facility Function** NVCA Watershed Innisfil Creek **Receiving Waters**

	Longitude:	79°36'33" W	Retrofitted:	-		Re	ceiver Type	•	
		1							
	Assessment		Design Value (CofA and/or Design		Min.	Max.	Criteria	Notes	MOE
Checklist	Value	Units	Report)	Units	Design	Design	Check		Page
Part 2: Catchment Information									
Contributing Drainage Area	7.16	ha	-	ha	5.0		ок	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha	4-80
Catchment Predominate Landuse	-		-					Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness % Fisheries Protection Level	50 Basic	% Level	- Basic	% Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment	
Part 3a: Pond Design Parameters - Main Pond	Basic	Levei	Basic	Levei	Basic		Falled	Dry ponos cannot achieve nigner than basic treatment	
· ·								Standards for fencing vary from municipality to municipality, thorny vegetative	4.00
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	barriers very effective	4-60
Interpretive & Warning signage			_				FALSE	Should describe the pond's function and warn of water level fluctuations, thin ice and other specific hazards	4-60
Total SWM Pond Surface Area	814	yes/no m²	-	yes/no m ²	yes		FALSE	Measured at PP level or through mid section of the pond	
Pond Block Area / Pond Area (top surface) ratio	6.8	PBA/PA	-	PBA/PA	1.5		ок	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	22.2	m	-	m				Measured at top of berm	
Overall Pond Width	10.9	m	-	m				Bu6	4.50
Length / Width Ratio	2.0	I/w	-	I/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Depth of Extended Detention Storage	0	m	-	m		3	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
Existing Extended Detention Storage									3-10
	0	m ³	-	m³	966		Failed	Actual volume must equal or exceed the design volume	
Extended Detention Storage Drawdown Time Active Storage Depth (total storage @ spillway Elev.)	N/A 1.27	hours m	-	hours m	24 1	3	OK OK	Based on Equation 4.11 Total active storage including quantity control	4-58 4-81
Maximum Pond Side Slopes	3.9	:1 (h/v)	-	:1 (h/v)	4	3	Failed	Maximum pond side slopes 4:1 or flatter	4-61
Part 3b: Pond Design Parameters - Forebay	0.0	(,		(, .,	•		, and		
Total Forebay Surface Area	-	m²	-	m ²		271	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet	no	yes/no	-	yes/no		_		If multiple inlets	4-80
Max Depth of Forebay: F1 F2	-	m m	-	m m	1 1	3		Minimum forebay depth is 1 m Minimum forebay depth is 1 m	4-80 4-80
Provided Length to Width Ratio: F1	-	I/w	-	I/w	2	3	ок	Minimum forebay length to width ratio is 2:1 if single inlet	4-80
F2	-	l/w	-	l/w	2		ОК		4-80
Forebay Berm: F1	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-80
F2 Part 3c: Pond Design Parameters - Inlet	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-80
Number of pond inlets	1	1	-			1	ОК		4-81
Inlet 1		J							
Inlet Pipe Diameter_1	520	mm	-	mm	450		OK	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_1	10.7	%	-	%	1		OK	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_1 Submerged Inlet 1	65.6 No	m ves/no	-	m ves/no	no		ок	A submerged inlet is not preferred	4-81
Submerged Pipe Grade 1	-	yes/110 %	-	%	1		OK	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_1	Yes	yes/no	-	yes/no	yes		ОК	Only portions of forebay required to be hardened	4-81
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet Outlet located in embankment	Voc	1	_				01/	Outlet structure should be located in embankment for maintenance purposes	4-82
Outlet Pipe Diameter	Yes 380	yes/no mm	-	yes/no mm	yes 450		OK Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-62
Outlet Pipe Slope	2.3	%	-	%	1		OK	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79
Reverse Sloped Pipe Diameter, if provided								Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-79, 4-
Orifice Diameter	-	mm mm	-	mm mm	150 75	100	OK OK	slope pipe should have a minimum diameter of 150 mm Smallest acceptable diameter is 75 mm	83 4-82
Part 3e: Pond Design Parameters - Major Flow	Outlet	111111	-	11111	75	100	OK	Smallest acceptable diameter is 75 min	4-02
Top of Berm Elevation	275.2	m	-	m				Data input	
Top of Emergency Spillway Elevation	275.05	m	-	m				Data input	
Provided Freeboard (@ spill elev.)	0.15	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment Annual sediment loading	11	m³/year	_	m³/year					6-14
Estimated sediment volume	195.39	m ³	-	m ³					0-14
Number of years before clean-out required	#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage	0	m ³ /ha	-		135				
Treatment Level	>3		-						
END OF CHECKLIST									

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific MacDonald

Municipal Address: 2304 Meadowland St., 2-256-22 GIS Coordinates: Latitude: 44°15'22" N Constructed: 1990

Part 1: General Information Coralwoods 4-2 Municipal Pond ID No Data LSRCA Pond ID 3-1520-89-006 Certificate of Approval: Facility Type Dry pond Water quantity control **Facility Function** NVCA Watershed Innisfil Creek Receiving Waters

	Longitude:	79°36'28" W	Retrofitted:	0		Re	ceiver Type	-	
		1							
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information		1	Г	l		1			
Contributing Drainage Area	18.41	ha	_	ha	5.0		ок	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha	4-80
Catchment Predominate Landuse	-		-					Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	45	%	-	%					
Fisheries Protection Level Part 3a: Pond Design Parameters - Main Pond	Basic	Level	Basic	Level	Basic	1	Failed	Dry ponds cannot achieve higher than basic treatment	
•								Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	barriers very effective	4-60
Interpretive & Warning signage								Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
Total SWM Pond Surface Area	3827	yes/no m²	4100	yes/no m ²	yes		FALSE	and other specific hazards Measured at PP level or through mid section of the pond	
Pond Block Area / Pond Area (top surface) ratio	1.4	PBA/PA	-	PBA/PA	1.5		Failed	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	88.9	m	-	m				Measured at top of berm	
Overall Pond Width	16	m	-	m	_			5 () () ()	
Length / Width Ratio	5.6	I/w	-	I/w	3		OK	Preferred is 4:1 to 5:1	4-59
Depth of Extended Detention Storage	0	m	_	m		3	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
		-							
Existing Extended Detention Storage				_					3-10
	0	m ³	-	m ³	2210		Failed	Actual volume must equal or exceed the design volume	
Extended Detention Storage Drawdown Time	0	hours	-	hours	24 1	3	OK	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.) Maximum Pond Side Slopes	2.73 3.1	m :1 (h/v)	-	m :1 (h/v)	4	3	OK Failed	Total active storage including quantity control Maximum pond side slopes 4:1 or flatter	4-81 4-79
Part 3b: Pond Design Parameters - Forebay	0.1	()		(, .,	-	1	Tanca	maximum porta dide diepos in di maxis.	
Total Forebay Surface Area	-	m²	-	m ²		1276	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet Max Depth of Forebay: F1	no	yes/no	-	yes/no				If multiple inlets	4-80 4-80
Max Depth of Forebay: F1 F2	-	m m	-	m m	1	3		Minimum forebay depth is 1 m Minimum forebay depth is 1 m	4-80
Provided Length to Width Ratio: F1	-	I/w	-	I/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	4-80
F2	-	l/w	-	I/w	2				4-80
Forebay Berm: F1 F2	-	yes/no yes/no	-	yes/no yes/no	yes yes			Submerged preferred for safety reasons Submerged preferred for safety reasons	4-80 4-80
Part 3c: Pond Design Parameters - Inlet		yes/iio	_	yes/iio	yes			Cubinerged preferred for Salety reasons	4-00
Number of pond inlets	2		-			1		More than one inlet may require increases in effective storage volumes	4-81
Inlet 1	825				450	1	OK	Minimum inlet nine diameter of 450mm	4-81
Inlet Pipe Diameter_1 Inlet Pipe Slope 1	4.46	mm %	-	mm %	1		OK OK	Minimum inlet pipe diameter of 450mm Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_1	23.3	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	A submerged inlet is not preferred	4-81
Submerged Pipe Grade_1 Energy dissipation provided to prevent scour_1	Yes	% yes/no	-	% yes/no	1 yes		OK OK	Submerged pipe slope should be a minimum of 1 % Only portions of forebay required to be hardened	4-81 4-81
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Inlet 2					·				
Inlet Pipe Diameter_2	Swale	mm	-	mm	450		OK	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_2 Inlet Pipe Length 2	-	% m	-	% m	1		OK	Inlet pipe slope preferred > 1%	4-81
Submerged Inlet 2	No	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_2	-	%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2	Yes	yes/no	-	yes/no	yes		OK	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_2 Inlet Headwalls and Wingwalls_2	No No	yes/no yes/no	-	yes/no yes/no	yes	0	Failed Failed	An exposed pilot channel is not preferred Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet		, , 00,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,00	1	T dillod	Sieces milear et actual de mignify proteined	
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		OK	Outlet structure should be located in embankment for maintenance purposes	4-82
Outlet Pipe Diameter Outlet Pipe Slope	500	mm %	-	mm %	450 1		OK Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement) Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79 4-79
· · ·	0.53	76	-	70			railed	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-79 4-79, 4-
Reverse Sloped Pipe Diameter, if provided	-	mm	-	mm	150		ок	slope pipe should have a minimum diameter of 150 mm	83
Orifice Diameter	-	mm	-	mm	75	100	ОК	Smallest acceptable diameter is 75 mm	4-82
Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation	Outlet 271.25	m	_	m				Data input	
Top of Emergency Spillway Elevation	271.25	m m	-	m m				Data input	
Provided Freeboard (@ spill elev.)	0.25	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment		3,		1 3,		1			
Annual sediment loading Estimated sediment volume	23 1147.82	m ³ /year m ³	-	m³/year m³					6-14
Number of years before clean-out required	#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage	0	m³/ha	-	,	120				
Treatment Level	>3		-						
END OF CHECKLIST									

By: Hatch Mott MacDonald Series

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1



Part 1: General Information

Previn Court

Receiving Waters Receiver Type	
Receiver Type	

Pond Name	Fleviii Coult
Municipal Pond ID	6-1a
LSRCA Pond ID	I-S70
Certificate of Approval:	2124-4L5REZ
Facility Type	Wet pond
Facility Function	Water quality and quantity control
Watershed	Innisfil Creeks
Receiving Waters	Banks Creek
Receiver Type	-

Municipal Address:	GIS Coordinate	es:	Year:				Watershed	Innisfil Creeks	
1006 Quarry Dr., 023-005-02	Latitude:		Constructed:	#N/A		Recei	ving Waters	Banks Creek	
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		70.000/50// W		0				_	
	Longitude:	19 32 36 W	Retrofitted:	U		Re	ceiver Type	•	
						1			
	Assessment		Design Value (CofA and/or Design		Min.	Max.	Criteria	Notes	MO
Checklist	Value	Units	Report)	Units	Design	Design	Check		Pag
Part 2: Catchment Information		1		1		1			
Contributing Drainage Area	79.7	ho	107.0	ho	5.0		OV	Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha	4-52
Contributing Drainage Area Catchment Predominate Landuse	73.7	ha	107.8	ha	5.0		OK	Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	22	%	-	%				2000/100 707 to out a gattor of altern by closin pro-dominant	
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		ОК	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond		_				1			
Pond Fenced (vegetative barrier or fence)	W							Standards for fencing vary from municipality to municipality, thorny vegetative	4-60
	Yes	yes/no	-	yes/no	no		OK	barriers very effective Should describe the pond's function and warn of water level fluctuations, thin ice	
Interpretive & Warning signage	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	24080	m²	-	m ²	•			Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio	1.3	PBA/PA	-	PBA/PA	1.5		Failed	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	314	m	-	m				Measured at PP level or through mid section of the pond	
Overall Pond Width	84	m	-	m				Duftered's 444 554	4.5
Length / Width Ratio Average Permanent Pool depth	3.7 1.2	I/w m	- 1	l/w m	3 1	2	OK OK	Preferred is 4:1 to 5:1 Average permanent pool depth should be between 1 - 2 m	4-59 4-60
Max Depth Permanent Pool	1.7	m		m	1	3	OK	Maximum permanent pool depth should be less than 3 m	4-60
Permanent Pool Volume Unit	75	m³/ha	38	m ³ /ha	•		O.C	As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	5503	m ³	4115	m ³	4631		ок	Compare Unit rate volume to actual design	3-10
								Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
Depth of Extended Detention Storage	1.2	m	-	m		1.5	ОК	Active storage deptir for water quality/erosion control - 1.0 in preferred maximum	4-60
								Actual volume must equal or exceed the design volume / Design extended	4.52
Existing Extended Detention Storage				_				detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	3-10
	14569	m ³	-	m³	2,947		ОК	storm runoff volume (~ 40m3/ha used as a minimum criteria)	
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.) Maximum Grade at Permanent Pool	1.0	m	-	m	_	2	OK	Total active storage including quantity control	4-60
Maximum Pond Side Slopes	5 3.4	:1 (h/v) :1 (h/v)	3:1	:1 (h/v) :1 (h/v)	5	7	OK OK	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum Maximum pond side slopes 3:1 or flatter	4-61 4-61
Part 3b: Pond Design Parameters - Forebay	3.4	(II/V)	3.1	. 1 (11/V)		, ,	OK	Maximum pond side slopes 5.1 or natter	4-0
Total Forebay Surface Area	-	m²	-	m ²		8026.53	Failed	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet	no	yes/no	-	ves/no				If multiple inlets	4-56
Max Depth of Forebay: F1	-	m	-	m	1	3		Minimum forebay depth is 1 m	4-55
F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	
Provided Length to Width Ratio: F1	-	I/w	-	I/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	
F2	-	I/w	-	I/w	2			Cub managed managed for another managed	4.50
Submerged Forebay Berm: F1 F2	-	yes/no yes/no	-	yes/no yes/no	yes yes			Submerged preferred for safety reasons Submerged preferred for safety reasons	4-58 4-58
Part 3c: Pond Design Parameters - Inlet		yes/110	_	yes/iio	yes	1		Cubinorgea protetrea for salety reasons	4-30
Number of pond inlets	1		-			1	ОК		4-62
Inlet 1									
Inlet Pipe Diameter_1	900 x 1800	mm	-	mm	450		ок	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	0.45	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1	18	m	-	m				A submerged inlet is not preferred	4-63
Submerged Inlet_1 Submerged Pipe Grade_1	-	yes/no %	-	yes/no %	no 1		ок	Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel 1	No	yes/no	-	yes/no	yes	0	Failed	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes	-	ОК	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Part 3d: Pond Design Parameters - Outlet				1		1			
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		OK .	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet Outlet Pipe Diameter	No	yes/no	200	yes/no	yes 450		Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-1 ⁻ 4-9
Outlet Pipe Diameter Outlet Pipe Slope	0.3	mm %	200	mm %	450 1		Failed Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement) Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9 4-9
, ,	0.3	70	•	/6			ralled	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-66;
Reverse Sloped Pipe Diameter, if provided	-	mm	-	mm	150		ок	slope pipe should have a minimum diameter of 150 mm	69
Orifice Diameter	-	mm	155	mm	75	100	ОК	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used								Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	4-6
	-	mm	200	mm	50		OK	plate diameter should be greater than 50 mm in diameter	
Design Modifications for Cold Climates: alpha	15	4						Coefficient of ice growth	4-8
Df	7500							Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie	4-8
h	753.3 412	mm		mm	MOE Equ	lation 4 1		lce thickness	4-8
Submerged outlet depth	-	m		m	562		ок	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Part 3e: Pond Design Parameters - Major Flov									
Top of Berm Elevation	226	m	200	m				Data input	
Top of Emergency Spillway Elevation	225	m		m				Data input	
Provided Freeboard (@ spill elev.)	1.00	m	#VALUE!	m	0.300		OK	Minimum freeboard above maximum design water level should be 0.3 m	4-6
Part 4: Sediment	44.0	3,	Not defined	3,		1			0.1
Annual sediment loading Estimated sediment volume	44.2 997.18	m³/year m³	Not defined Not defined	m³/year m³					6-1
	997.18 57	yrs	Not defined	yrs			ОК		
Number of years before Pond clean-out required			Not defined	yıs	87		OK	Target efficiency required storage	
Number of years before Pond clean-out required Adjusted water quality storage	115	m ⁻ /ha							
Number of years before Pond clean-out required Adjusted water quality storage Treatment Level	115 TBD	m ³ /ha	Not defined		01		OK	raiget emolency required storage	

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific Asserted Regione & Asserted

Municipal Address:
East of 930 Booth Ave., 023-238-92 GIS Coordinates: 44°18'6" N 2005 Latitude: Constructed:

Part 1: General Information Tepco North 6-2 Municipal Pond ID I-S72 LSRCA Pond ID 2416-6HZKC3 Certificate of Approval: Wet pond Facility Type Water quality and quantity control **Facility Function** Innisfil Creeks Watershed Ditch north side of Seventh Line / Banks Creek **Receiving Waters**

	Longitude:	79°32'40" W	Retrofitted:	2008		Re	ceiver Type	•	
		1							
	Assessment		Design Value (CofA and/or Design		Min.	Max.	Criteria	Notes	MOE
Checklist	Value Units Report) Units Design Design Check		110.00	Page					
Part 2: Catchment Information						1			
Contributing Drainage Area	8.50	ha	9.7	ha	5.0		ок	Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha	4-52
Catchment Predominate Landuse	-	IIa	9.7	IIa	5.0		OK	Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	35	%	-	%				γ γ γ	
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		OK	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond		1				1		Standards for fancing vary from municipality to municipality, thereby variety is	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	_	yes/no	no		ок	Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective	4-60
Interpretive & Warning signage		,		•				Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
	-	yes/no	-	yes/no	yes			and other specific hazards	4 00
Total SWM Pond Surface Area Pond Block Area / Pond Area (top surface) ratio	2991 1.8	m² PBA/PA	-	m ² PBA/PA	1.5		ок	Measured at top of berm Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	72.2	m	-	m	1.0		O.K	Measured at PP level or through mid section of the pond	
Overall Pond Width	31.1	m	-	m					
Length / Width Ratio Average Permanent Pool depth	2.3 0.54	l/w m	-	I/w m	3 1	2	Failed Failed	Preferred is 4:1 to 5:1 Average permanent pool depth should be between 1 - 2 m	4-59 4-60
Max Depth Permanent Pool	0.57	m	-	m	i	3	Failed	Maximum permanent pool depth should be less than 3 m	4-60
Permanent Pool Volume Unit	74	m³/ha	57	m³/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	630	m ³	549	m³	850		Failed	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage	0.51	m	-	m		1.5	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
						1.0		Actual volume must equal or exceed the design volume / Design extended	
Existing Extended Detention Storage								detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52; 3-10
	1030	m ³	1204	m ³	340		OK	storm runoff volume (~ 40m3/ha used as a minimum criteria)	
Extended Detention Storage Drawdown Time Active Storage Depth (total storage @ spillway Elev.)	NA 1.2	hours m	-	hours	24	48 2	Failed OK	Based on Equation 4.11 Total active storage including quantity control	4-58 4-60
Maximum Grade at Permanent Pool	3.33	:1 (h/v)	-	m :1 (h/v)	5	7	Failed	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-60
Maximum Pond Side Slopes	3.33	:1 (h/v)	-	:1 (h/v)		3	ОК	Maximum pond side slopes 3:1 or flatter	4-61
Pond shape optimized for shading/open water shaded	-	yes/no	-	yes/no		#3/ALLIE		Length to width ratio maximized	4-10
Outlet channel is shaded /designed to mitigate temp. Part 3b: Pond Design Parameters - Forebay	-	yes/no	-	yes/no		#VALUE!		Temperature mitigation measures recommended	H-8
Total Forebay Surface Area	380	m ²	-	m ²		997.01	ОК	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet	Yes	yes/no	no	yes/no		_		If multiple inlets	4-56
Max Depth of Forebay: F1 F2	1.01	m m	-	m m	1	3	OK	Minimum forebay depth is 1 m Minimum forebay depth is 1 m	4-55
Provided Length to Width Ratio: F1	0.95	I/w	-	I/w	2	"	Failed	Minimum forebay length to width ratio is 2:1 if single inlet	
F2	-	I/w	-	l/w	2			, ,	
Submerged Forebay Berm: F1 F2	No	yes/no	-	yes/no	yes		Failed	Submerged preferred for safety reasons	4-58 4-58
Part 3c: Pond Design Parameters - Inlet	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-36
Number of pond inlets	1		1			1	ОК		4-62
Inlet 1		1	500		450	1		Witness teletation discrete of 450 cm	4.0
Inlet Pipe Diameter_1 Inlet Pipe Slope 1	0.90	mm %	600	mm %	450 1		OK Failed	Minimum inlet pipe diameter of 450mm Inlet pipe slope preferred > 1%	4-9 4-9
Inlet Pipe Length_1	6.7	m	-	m	•		Tanca	micropie diepo protenda y 170	4.0
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1 Energy dissipation provided to prevent scour 1	- No	% yes/no	yes	% yes/no	1		OK Failed	Submerged pipe slope should be a minimum of 1 % Only portions of forebay required to be hardened	4-63 4-63
Exposed Pilot Channel 1	No	yes/no	yes -	yes/no	yes	0	Failed	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		ОК	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1 Part 3d: Pond Design Parameters - Outlet	-	m	-	m	1.0	3.0		Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Outlet located in embankment	Yes	yes/no	_	yes/no	yes		ок	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet	No	yes/no	-	yes/no	yes		Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-11
Outlet Pipe Diameter	375	mm	450	mm	450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	0.57	%	-	%	1		Failed	Outlet pipe slope preferred > 1% (Cold climate min. requirement) Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-9 4-66; 4-
Reverse Sloped Pipe Diameter, if provided	-	mm	250	mm	150		ок	slope pipe should have a minimum diameter of 150 mm	69
Orifice Diameter	-	mm	80	mm	75	100	ОК	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used					50		01/	Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice plate diameter should be greater than 50 mm in diameter	4-67
Design Modifications for Cold Climates: alpha	15	mm	-	mm	50		OK	Coefficient of ice growth	4-8
Df								Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	4-8
	753.3					·		2000 - City of Barrie	
h Submerged outlet depth	412	mm m		mm m	MOE Equ 562	lation 4.1	ок	Ice thickness Submerged outlets obvert to be set 150 mm lower than ice cover	4-8 4-9
Part 3e: Pond Design Parameters - Major Flow							J.K	222	. 3
Top of Berm Elevation	225.7	m	-	m				Data input	
Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.)	225.48 0.22	m m	-	m m	0.300		Failed	Data input Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment	0.22		-	111	0.300		ralled	wiiiningin neebbard above maximum design water iever stiddid be 0.3 fff	4-60
Annual sediment loading	5.1	m³/year	-	m³/year					6-14
Estimated sediment volume	55	m ³	-	m ³					
Number of years before Forebay A clean-out required Number of years before Pond clean-out required	0	yrs	Not defined	yrs			Failed		
Adjusted water quality storage	114	m³/ha	-	,,,,	115		Failed	Target efficiency required storage	
Treatment Level	2		-						
END OF CHECKLIST									

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific Asserted Regione & Asserted

Municipal Address: West of 965, Nantyr Dr., 023-238-32 GIS Coordinates: Latitude: 44 °17'49" N 2005

Part 1: General Information Tepco South 6-3 Municipal Pond ID I-S71 LSRCA Pond ID 2416-6HZKC3 Certificate of Approval: Wet pond Facility Type Water quality and quantity control **Facility Function** Innisfil Creeks Watershed Ditch north side of Nantyr Drive east of St. John's Road / Belle Aire Ck Receiving Waters

West of 965, Nameyr Dr., 025-256-52	Latitude:	44 17 49 N	Constructed:	2005		Receiv	ing Waters	Ditch florth side of Nantyr Drive east of St. John's Road / Belle A	alle CK
	Longitude:	79°32'35" W	Retrofitted:	2009		Red	ceiver Type	•	
					•				
			Design Value (CofA		Min	Mov	Cuitouio		MOI
Checklist	Assessment Value	Units	and/or Design	Unite	Min.	Max. Design	Criteria Check	Notes	Pag
Part 2: Catchment Information	value	Units	Report)	Units	Design	Design	Check		. 3
Fait 2. Catchinent information								Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	
Contributing Drainage Area	5.86	ha	5.5	ha	5.0		ок	area is >10 ha	4-52
Catchment Predominate Landuse	•		-					Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	42.5	. %		%					
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		OK	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond				l				Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	No	yes/no	_	yes/no	no		Failed	barriers very effective	4-60
Interception 0 Magazine signature		,		,				Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
Interpretive & Warning signage	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	2806	m ²	-	m ²				Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio Overall Pond Length	1.5 24.6	PBA/PA	-	PBA/PA m	1.5		OK	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5 Measured at PP level or through mid section of the pond	
Overall Pond Width	30.3	m m	-	m				weasured at FF level of through this section of the pond	
Length / Width Ratio	0.8	I/w	-	I/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	1.04	m	-	m	1	2	ок	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool	1.14	m	-	m	1	3	ок	Maximum permanent pool depth should be less than 3 m	4-60
Permanent Pool Volume Unit	221	m³/ha	-	m³/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	1298	m³	453	m³	703		OK	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage	0.16	m	_	m		1.5	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
	0.10						•	Actual volume must equal or exceed the design volume / Design extended	
Existing Extended Detention Storage								detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52;
	284	m ³	619	m³	234		ок	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	0.9	m	-	m		2	OK	Total active storage including quantity control	4-60
Maximum Grade at Permanent Pool	5.625	:1 (h/v)	-	:1 (h/v)	5	7	OK	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-61
Maximum Pond Side Slopes Part 3b: Pond Design Parameters - Forebay	5.625	:1 (h/v)	-	:1 (h/v)		3	OK	Maximum pond side slopes 3:1 or flatter	4-61
Total Forebay Surface Area	-	m ²	_	m ²		935.49	Failed	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet	no	yes/no	no	yes/no		000110		If multiple inlets	4-56
Max Depth of Forebay: F1	·	m	-	m	1	3		Minimum forebay depth is 1 m	4-55
F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	
Provided Length to Width Ratio: F1	-	I/w	-	I/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	
F2	•	I/w	-	I/w	2			Cultimargad professed for aniaty reasons	4.50
Submerged Forebay Berm: F1 F2	-	yes/no yes/no	-	yes/no yes/no	yes yes			Submerged preferred for safety reasons Submerged preferred for safety reasons	4-58 4-58
Part 3c: Pond Design Parameters - Inlet		yesine		yconio	yes			Submisiged prevented for ealerly readens	. 00
Number of pond inlets	2		1			1		More than one inlet may require increases in effective storage volumes	4-62
Inlet 1									
Inlet Pipe Diameter_1	600	mm	600	mm	450		OK	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	0.6	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1 Submerged Inlet_1	18.9 No	m yes/no	-	m yes/no	no		ок	A submerged inlet is not preferred	4-63
Submerged linet_1	-	%	-	%	1		OK	Submerged niner is not presented Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1	No	yes/no	yes	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel_1	No	yes/no	•	yes/no	-	0	Failed	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet 2 Inlet Pipe Diameter 2	Swale	mm	_	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope 2	- Swale	mm %	-	mm %	1		OK	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length 2	-	m	-	m					
Submerged Inlet_2	No	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_2	-	%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2	No	yes/no	-	yes/no	yes	_	Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_2 Inlet Headwalls and Wingwalls 2	No No	yes/no yes/no	-	yes/no yes/no	Voc	0	Failed	An exposed pilot channel is not preferred Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet	INO .	yes/110		yes/iio				biotechnical sudctures highly preferred	4-01
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		ок	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet	No	yes/no	-	yes/no	yes		Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-11
Outlet Pipe Diameter	450	mm	450	mm	450		ОК	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	0.901639344	%	-	%	1		Failed	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9
Reverse Sloped Pipe Diameter, if provided	450	mm	450	mm	150		OK	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse slope pipe should have a minimum diameter of 150 mm	4-66; 69
Orifice Diameter	450 -	mm mm	75	mm mm	150 75	100	OK OK	Smallest acceptable diameter is 75 mm	4-58
	-		7.5		73	100	OK .	Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm		mm	50		ок	plate diameter should be greater than 50 mm in diameter	4-67
Design Modifications for Cold Climates: alpha	15							Coefficient of ice growth	4-8
Df	750.0							Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	4-8
 L	753.3 412	ma m-			MOE Equ	ation 4.1		2000 - City of Barrie Ice thickness	4-8
Submerged outlet depth	0.57	mm m		mm m	562	4.1	Failed	Submerged outlets obvert to be set 150 mm lower than ice cover	4-8 4-9
Part 3e: Pond Design Parameters - Major Flow								ger track track to the form to the first to	
Top of Berm Elevation	225.9	m	-	m				Data input	
Top of Emergency Spillway Elevation	225.18	m	-	m				Data input	
Provided Freeboard (@ spill elev.)	1	m	-	m	0.300		OK	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment	6.4	ma3/	Not defined	3/					C 11
Annual sediment loading Estimated sediment volume	6.4	m³/year m³	Not defined Not defined	m³/year m³					6-14
Estimated sediment volume Number of years before Forebay A clean-out required	-1547.66		Not delined	""			Failed		
Number of years before Pond clean-out required	162	yrs	Not defined	yrs			. uncu		
Adjusted water quality storage	270	m³/ha	-	,	129		ок	Target efficiency required storage	
				,					
Treatment Level END OF CHECKLIST	1		Not defined						

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1



Part 1: General Information

Municipal Pond ID LSRCA Pond ID Certificate of Approval:

Facility Type

Facility Function

Royal Alcona No Data

0.0 Wet Pond

0.0 Innisfil Creeks

By: Hatch Mott MacDonald State of Lance				
Municipal Address:	GIS Coordinates:		Year:	
971 Garden Ave., 24-214-05	Latitude:	44°18'22" N	Constructed:	2007
	Longitude:	79°32'43" W	Retrofitted:	0

971 Garden Ave., 24-214-05	Latitude:	44°18'22" N	Constructed:	2007		Recei	iving Waters	Lake Simcoe Tributary / Banks Creek Watershed	
	Longitude:	79°32'43" W	Retrofitted:	0		Re	eceiver Type	0	
						1			_
	Assessment		Design Value (CofA and/or Design		Min.	Max.	Criteria	Notes	MOE
Checklist	Value	Units	Report)	Units	Design	Design	Check		Page
Part 2: Catchment Information						1		Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	
Contributing Drainage Area	40.37	ha	-	ha	5.0		ок	area is >10 ha	4-52
Catchment Predominate Landuse Catchment Imperviousness %	47.75	%	-	%				Describe % / Is curb & gutter or ditch system pre-dominant	
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		ок	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond						1			
Pond Fenced (vegetative barrier or fence)	No	yes/no	_	yes/no	no		Failed	Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective	4-60
Interpretive & Warning signage		youmo		youmo			. alloa	Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
Total SWM Pond Surface Area	6610	yes/no m²	-	yes/no m²	yes		FALSE	and other specific hazards Measured at top of berm	4 00
Pond Block Area / Pond Area (top surface) ratio	4.1	PBA/PA	-	PBA/PA	1.5		ок	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	171.63	m	-	m				Measured at PP level or through mid section of the pond	
Overall Pond Width Length / Width Ratio	14.93 11.5	m I/w	-	m I/w	3		ок	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	0.20	m	-	m	1	2	Failed	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool Permanent Pool Volume Unit	0.25 6	m m³/ha	-	m m³/ha	1	3	Failed	Maximum permanent pool depth should be less than 3 m As per Table 3.2 (MOE)	4-60 3-10
Existing Permanent Pool Volume	238	m ³	-	m ³	5349		Failed	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage	0.40					4.5		Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
	0.19	m	-	m		1.5	OK	Actual volume must equal or exceed the design volume / Design extended	
Existing Extended Detention Storage								detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52;
	410	m ³	-	m ³	1,615		Failed	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA 1.0	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.) Maximum Grade at Permanent Pool	1.8 4.2	m :1 (h/v)	-	m :1 (h/v)	5	2 7	OK Failed	Total active storage including quantity control Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-60 4-61
Maximum Pond Side Slopes		:1 (h/v)		:1 (h/v)		3	ОК	Maximum pond side slopes 3:1 or flatter	4-61
Part 3b: Pond Design Parameters - Forebay Total Forebay Surface Area	512.62	m²	-	m²		2203.23	ОК	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet	No	yes/no	-	yes/no		2203.23	OK	If multiple inlets	4-56
Max Depth of Forebay: F1	0.78	m	-	m	1	3	Failed	Minimum forebay depth is 1 m	4-55
F2 Provided Length to Width Ratio: F1	0.38 1.2	m I/w	-	m I/w	1 2	3	Failed Failed	Minimum forebay depth is 1 m Minimum forebay length to width ratio is 2:1 if single inlet	
F2	2.0	I/w	-	I/w	2		OK	Willimidin forebay length to width ratio is 2.1 if single filler	
Submerged Forebay Berm: F1	No	yes/no	-	yes/no	yes		Failed	Submerged preferred for safety reasons	4-58
F2 Part 3c: Pond Design Parameters - Inlet	No	yes/no	-	yes/no	yes	1	Failed	Submerged preferred for safety reasons	4-58
Number of pond inlets	3		-			1		More than one inlet may require increases in effective storage volumes	4-62
Inlet 1 Inlet Pipe Diameter 1	825	mm	_	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	2.1	%	-	%	1		ОК	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1	15.6	m	-	m				A subsequent distriction of source	4.00
Submerged Inlet_1 Submerged Pipe Grade 1	-	yes/no %	-	yes/no %	no 1		FALSE OK	A submerged inlet is not preferred Submerged pipe slope should be a minimum of 1 %	4-63 4-63
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel_1 Inlet Headwalls and Wingwalls 1	No Yes	yes/no	-	yes/no	1/00	0	Failed	An exposed pilot channel is not preferred Biotechnical structures highly preferred	4-62 4-65
Inlet Area Depth 1	-	yes/no m	-	yes/no m	yes 1.0	3.0	OK Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet 2	1000 1000					1			
Inlet Pipe Diameter_2 Inlet Pipe Slope_2	1220 x 1930 0.64	mm %	-	mm %	450 1		OK Failed	Minimum inlet pipe diameter of 450mm Inlet pipe slope preferred > 1%	4-81 4-81
Inlet Pipe Length_2	52.2	m	-	m	•		, and		
Submerged Inlet_2 Submerged Pipe Grade 2	No	yes/no %	-	yes/no %	no 1		ок	A submerged inlet is not preferred Submerged pipe slope should be a minimum of 1 %	4-81 4-81
Energy dissipation provided to prevent scour_2	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_2	No	yes/no	-	yes/no		0	Failed	An exposed pilot channel is not preferred	
Inlet Headwalls and Wingwalls_2 Inlet 3	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Inlet Pipe Diameter_3	900	mm	-	mm	450		ок	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_3 Inlet Pipe Length 3	4.00	%	-	%	1		OK	Inlet pipe slope preferred > 1%	4-81
Submerged Inlet_3	41.7 No	m yes/no	-	m yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_3	-	%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_3 Exposed Pilot Channel 3	No No	yes/no yes/no	-	yes/no yes/no	yes	0	Failed Failed	Only portions of forebay required to be hardened An exposed pilot channel is not preferred	4-81
Inlet Headwalls and Wingwalls_3	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet Outlet located in embankment	Voc	Voc/ro	_	Vec/re	V00		ОК	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet	Yes No	yes/no yes/no	-	yes/no yes/no	yes yes		OK Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-65 4-11
Outlet Pipe Diameter	400	mm	-	mm	450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	3.3	%	-	%	1		OK	Outlet pipe slope preferred > 1% (Cold climate min. requirement) Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-9 4-66; 4-
Reverse Sloped Pipe Diameter, if provided	-	mm	-	mm	150		ок	slope pipe should have a minimum diameter of 150 mm	69
Orifice Diameter	-	mm	-	mm	75	100	ок	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	_	mm	50		ок	Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice plate diameter should be greater than 50 mm in diameter	4-67
Design Modifications for Cold Climates: alpha	15	,		-				Coefficient of ice growth	4-8
Df	753.3							Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie	4-8
h	412	mm		mm	MOE Equ	ation 4.1		Ice thickness	4-8
Submerged outlet depth	- Outlet	m		m	562		ОК	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation	222.6	m	-	m				Data input	
Top of Emergency Spillway Elevation	222.6	m	-	m				Data input	
Provided Freeboard (@ spill elev.) Part 4: Sediment	0	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Annual sediment loading	57.7	m³/year	Not defined	m³/year					6-14
Estimated sediment volume	615.52	m ³	Not defined	m ³					
Number of years before Forebay A clean-out required Number of years before Pond clean-out required	0	yrs	Not defined	yrs			Failed		
Adjusted water quality storage	16	m³/ha	-	yıs	137.75		Failed	Target efficiency required storage	
Treatment Level	<3	-	Not defined				-	<u> </u>	
END OF CHECKLIST									

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific MacDonald

Municipal Address: 1896 Webster Blvd., 23-636-10 GIS Coordinates: Latitude: 44°18'9" N Constructed: #N/A

Part 1: General Information Wallace Mills Municipal Pond ID I-S68 LSRCA Pond ID 3-1808-98-996 Certificate of Approval: Facility Type Wet pond **Facility Function** Innisfil Creeks Watershed Banks Creek **Receiving Waters**

	Longitude:	79°33'37" W	Retrofitted:	2002		Re	ceiver Type	-	
			Danissa Value (Onto	1					
Checklist	Assessment	Units	Design Value (CofA and/or Design	Unito	Min.	Max.	Criteria	Notes	MOE Page
Part 2: Catchment Information	Value	Units	Report)	Units	Design	Design	Check		
								Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	4-52
Contributing Drainage Area Catchment Predominate Landuse	28.12	ha	-	ha	5.0		OK	area is >10 ha Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	40	%	-	%				2000/120 /0/ 10 data a galler of allow bydelim pro definition	
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		OK	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond				1				Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	barriers very effective	4-60
Interpretive & Warning signage	_	yes/no	_	yes/no	yes		FALSE	Should describe the pond's function and warn of water level fluctuations, thin ice and other specific hazards	4-60
Total SWM Pond Surface Area	3992	m²	-	m ²	-			Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio Overall Pond Length	1.7 55.35	PBA/PA m	-	PBA/PA m	1.5		OK	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5 Measured at PP level or through mid section of the pond	
Overall Pond Length Overall Pond Width	79.32	m	-	m				weasured at FF level of through this section of the pond	
Length / Width Ratio	0.7	I/w	-	I/w	3	_	Failed	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth Max Depth Permanent Pool	1.87 1.87	m m	-	m m	1 1	2	ok ok	Average permanent pool depth should be between 1 - 2 m Maximum permanent pool depth should be less than 3 m	4-60 4-60
Permanent Pool Volume Unit	57	m³/ha	-	m³/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	1604	m ³	-	m³	3164		Failed	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage	0.94	m	-	m		1.5	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
Eviating Extended Detention Storage								Actual volume must equal or exceed the design volume / Design extended detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52;
Existing Extended Detention Storage	2620	m³	_	m³	1,125		ок	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.) Maximum Grade at Permanent Pool	0.8 2.2	m :1 (h/v)	-	m :1 (h/v)	5	2 7	OK Failed	Total active storage including quantity control Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-60 4-61
Maximum Pond Side Slopes	3	:1 (ll/v) :1 (h/v)		:1 (h/v)	J	3	OK	Maximum pond side slopes 3:1 or flatter	4-61
Part 3b: Pond Design Parameters - Forebay		2		12		1000 71	E-D-1	Forshow area should be less than 1/2 of pand auritors area	4 EG
Total Forebay Surface Area Forebay provided at each inlet	no	m² yes/no	-	m ² yes/no		1330.71	Failed	Forebay area should be less than 1/3 of pond surface area If multiple inlets	4-56 4-56
Max Depth of Forebay: F1	-	m	-	m	1	3		Minimum forebay depth is 1 m	4-55
F2 Provided Length to Width Ratio: F1	-	m I/w	-	m I/w	1 2	3		Minimum forebay depth is 1 m Minimum forebay length to width ratio is 2:1 if single inlet	
F2	-	I/w	-	I/w	2				
Submerged Forebay Berm: F1 F2	-	yes/no yes/no	-	yes/no yes/no	yes yes			Submerged preferred for safety reasons Submerged preferred for safety reasons	4-58 4-58
Part 3c: Pond Design Parameters - Inlet	_	yes/110	-	yes/110	yes	1		Submerged preferred for safety reasons	4-36
Number of pond inlets	3		-			1		More than one inlet may require increases in effective storage volumes	4-62
Inlet 1 Inlet Pipe Diameter 1	1200	mm	-	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	1.1	%	-	%	1		ОК	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1 Submerged Inlet 1	91.0	m yes/no	-	m yes/no	no		FALSE	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1	-	%	-	%	1		OK	Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1 Exposed Pilot Channel 1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-63 4-62
Inlet Headwalls and Wingwalls_1	No Yes	yes/no yes/no	-	yes/no yes/no	yes	0	Failed OK	An exposed pilot channel is not preferred Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet 2 Inlet Pipe Diameter 2	300	mm	-	mm	450	1	Failed	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_2	1.05	%	-	%	1		ОК	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_2 Submerged Inlet 2	21.1 No	m yes/no	-	m yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_2	-	% %	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2 Exposed Pilot Channel 2	No	yes/no	-	yes/no	yes	0	Failed	Only portions of forebay required to be hardened An exposed pilot channel is not preferred	4-81
Inlet Headwalls and Wingwalls_2	No Yes	yes/no yes/no	-	yes/no yes/no	yes	0	Failed OK	Biotechnical structures highly preferred	4-81
Inlet 3	500			1	450	1		Michael Market Manager (150 mg	4.04
Inlet Pipe Diameter_3 Inlet Pipe Slope 3	530 1.00	mm %	-	mm %	450 1		OK OK	Minimum inlet pipe diameter of 450mm Inlet pipe slope preferred > 1%	4-81 4-81
Inlet Pipe Length_3	22.2	m	-	m	·		0		
Submerged Inlet_3 Submerged Pipe Grade 3	No -	yes/no %	-	yes/no %	no 1		ок	A submerged inlet is not preferred Submerged pipe slope should be a minimum of 1 %	4-81 4-81
Energy dissipation provided to prevent scour_3	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_3	No	yes/no	-	yes/no		0	Failed	An exposed pilot channel is not preferred	4.04
Inlet Headwalls and Wingwalls_3 Part 3d: Pond Design Parameters - Outlet	Yes	yes/no	-	yes/no	yes	1	OK	Biotechnical structures highly preferred	4-81
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		ОК	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet Outlet Pipe Diameter	No 220	yes/no mm	-	yes/no mm	yes 450		Failed Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-11 4-9
Outlet Pipe Slope	0.5	%	-	%	1		Failed	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9
Reverse Sloped Pipe Diameter, if provided	300	mm		mm	150		ОК	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse slope pipe should have a minimum diameter of 150 mm	4-66; 4- 69
Orifice Diameter	-	mm	-	mm	75	100	OK OK	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used					F0		01/	Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	
Design Modifications for Cold Climates: alpha	15	mm	-	mm	50		OK	plate diameter should be greater than 50 mm in diameter Coefficient of ice growth	4-8
Df		1		1				Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	4-8
h	753.3 412	mm		mm	MOE Equ	ation 4.1		2000 - City of Barrie Ice thickness	4-8
Submerged outlet depth	-	m		m	562		ок	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation	Outlet 239	m	-	m				Data input	
Top of Emergency Spillway Elevation	238.74	m m	-	m				Data input	
Provided Freeboard (@ spill elev.)	0	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment Annual sediment loading	26.0	m³/year	Not defined	m³/year					6-14
Estimated sediment volume	590.1	m ³	Not defined	m ³					
Number of years before Forebay A clean-out required Number of years before Pond clean-out required	36	yrs	Not defined	yrs			Failed		
Adjusted water quality storage	97	m³/ha	-	,	124		Failed	Target efficiency required storage	
Treatment Level END OF CHECKLIST	2		Not defined						
LIND OF CHECKEIST									

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific MacDonald

Municipal Address: 1891 Forest Valley Dr., 019-033-28 GIS Coordinates: Latitude: 44°16'37" N Constructed: 1998

Part 1: General Information Forest Valley Municipal Pond ID No Data LSRCA Pond ID Certificate of Approval: Facility Type Dry pond **Facility Function Lovers Creek** Watershed Upper Lovers Creek Receiving Waters

	Longitude:	79°40'10" W	Retrofitted:	0		Re	ceiver Type		
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information	74.40	00	Поролу	Office	Doolgii	Doolgii	Oncon		
								Malana dalam and dalam Electrica dalam dalam and dalam a	4.00
Contributing Drainage Area	9.86	ha	-	ha	5.0		ОК	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha	4-80
Catchment Predominate Landuse								Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	16	%	•	%					
Fisheries Protection Level	Basic	Level	-	Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment	
Part 3a: Pond Design Parameters - Main Pond									
Pond Fenced (vegetative barrier or fence)								Standards for fencing vary from municipality to municipality, thorny vegetative	4-60
Total Fericea (vegetative barrier of ferice)	Yes	yes/no	-	yes/no	no		ок	barriers very effective	4-00
Interpretive & Warning signage								Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	. 00
Total SWM Pond Surface Area	743	m ²	-	m ²				Measured at PP level or through mid section of the pond	
Pond Block Area / Pond Area (top surface) ratio	2.6	PBA/PA	•	PBA/PA	1.5		OK	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	24	m	-	m				Measured at top of berm	
Overall Pond Width	18	m	-	m				Dufamath 44 to 54	4.50
Length / Width Ratio	1.3	I/w	-	l/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Depth of Extended Detention Storage								Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
, ,	-	m	•	m		3	Failed		
Existing Extended Detention Storage		2		2					3-10
	0	m ³	-	m ³	406		Failed	Actual volume must equal or exceed the design volume	
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24		ок	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.49	m	-	m	1	3	OK	Total active storage including quantity control	4-81
Maximum Pond Side Slopes	3.4	:1 (h/v)	•	:1 (h/v)	4		Failed	Maximum pond side slopes 4:1 or flatter	4-79
Part 3b: Pond Design Parameters - Forebay		2		2				For the control of the last the state of the	4.00
Total Forebay Surface Area	-	m ²	-	m ²		247.70	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet	no	yes/no	-	yes/no				If multiple inlets	4-80
Max Depth of Forebay: F1 F2	-	m	-	m	1 1	3		Minimum forebay depth is 1 m	4-80
Provided Length to Width Ratio: F1	-	m	-	m I/w	2	3		Minimum forebay depth is 1 m Minimum forebay length to width ratio is 2:1 if single inlet	4-80 4-80
F1 F2	-	l/w l/w	-	I/W	2			William to repay tength to width ratio is 2.1 it single intel	4-80
Forebay Berm: F1	-	yes/no	-	ves/no	yes			Submerged preferred for safety reasons	4-80
F2	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-80
Part 3c: Pond Design Parameters - Inlet		ycanio		yconio	yes	1		Cabinety Caronica for Salety Teasons	7 00
Number of pond inlets	1		_			1	ОК		4-81
Inlet 1									
Inlet Pipe Diameter 1	600	mm	-	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope 1	1.65	%		%	1		ок	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_1	13.3	m		m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		ок	A submerged inlet is not preferred	4-81
Submerged Pipe Grade_1	-	%	-	%	1		ОК	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_1	Yes	yes/no	-	yes/no	yes		ОК	Only portions of forebay required to be hardened	4-81
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		ок	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet						1			
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		OK	Outlet structure should be located in embankment for maintenance purposes	4-82
Outlet Pipe Diameter	300	mm	•	mm	450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-79
Outlet Pipe Slope	-	%	•	%	1		OK	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79
Reverse Sloped Pipe Diameter, if provided								Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-79, 4-
	-	mm	•	mm	150	400	OK	slope pipe should have a minimum diameter of 150 mm	83
Orifice Diameter Part 3e: Pond Design Parameters - Major Flow	200 Outlet	mm	-	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-82
				m				Data inavit	
Top of Berm Elevation Top of Emergency Spillway Elevation	283.6 283.6	m m		m m				Data input Data input	
Provided Freeboard (@ spill elev.)	0.00	m	#VALUE!	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment	0.00		#VALUE:		0.500		i alieu	willimian needoard above maximum design water level should be 0.3 m	4-00
Annual sediment loading	6	m³/year		m³/year		1			6-14
Estimated sediment volume	239.17	m ³		m ³					5 17
Number of years before clean-out required	#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage	0	m³/ha	-	,	41.1				
Treatment Level	<3	,	Not defined	'					
END OF CHECKLIST									

Pond Block Area / Pond Area (top surface) ratio Overall Pond Length

Overall Pond Width Length / Width Ratio

Average Permanent Pool depth Max Depth Permanent Pool Permanent Pool Volume Unit

Existing Permanent Pool Volume

Depth of Extended Detention Storage

Existing Extended Detention Storage

Maximum Pond Side Slopes

Total Forebay Surface Area Forebay provided at each inlet

Provided Length to Width Ratio:

Submerged Forebay Berm:

Max Depth of Forebay:

Extended Detention Storage Drawdown Time

Active Storage Depth (total storage @ spillway Elev.)
Maximum Grade at Permanent Pool

Part 3b: Pond Design Parameters - Forebay

Number of years before Forebay A clean-out required Number of years before Pond clean-out required

Adjusted water quality storage

END OF CHECKLIST

Hatch Mott

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1

MXCG



Part 1: General Information

Innisbrook Estates (IH) Municipal Pond ID LSRCA Pond ID

0693-5PAQ7A Certificate of Approval:

> Infiltration Pond Water quality and quantity control

Facility Function Lovers Creek Watershed

Upper Lovers Creek

Measured at top of berm

Target efficiency required storage

Facility Type

Receiving Waters Receiver Type

Max.

Design

Criteria

Check

ок

ОК

Min.

Design

5.0

Enhanced

no

yes

1.5

2234

948 24

5

yes yes

1.5

48

7

1317.69

PBA/PA

m

m I/w

m m m³/ha m³

m

 m^3

hours

m (h/v)

1 (h/v)

m²

yes/no

m

l/w

I/w yes/no

yes/no

400

no

Municipal Address:	GIS Coordinate	s:	Year:		
East of 1949, Innisbrooke St., 020-025-73	Latitude:	44°17'2" N	Constructed:	2003	
	Longitude:	79°39'28" W	Retrofitted:	•	
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	
Part 2: Catchment Information		,	T		
Contributing Drainage Area Catchment Predominate Landuse	23.70	ha	23.6	ha	
Catchment Imperviousness %	32.75	%	-	%	
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	
Part 3a: Pond Design Parameters - Main Pond					
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	
Interpretive & Warning signage	_	ves/no	_	ves/no	
Total SWM Pond Surface Area	3953	m ²	-	m ²	

3.2 127.78

26.9 4.8 0.58 0.63

24 557

0.22

517

NA 0.5

433

yes 0.74

0.8

No

F2 F1

F2 F1

F2

PBA/PA

m

m I/w

m m m³/ha m³

m

 m^3

hours

m (h/v)

(h/v)

m²

yes/no

m

m I/w

l/w yes/no

yes/no

yrs m³/ha

Not defined

Not defined

yrs

111

Notes	MOE Page
Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha	4-52
Describe % / Is curb & gutter or ditch system pre-dominant	
All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective	4-60
Should describe the pond's function and warn of water level fluctuations, thin ice and other specific hazards	4-60

ок	Preferred is 4:1 to 5:1	4-59
Failed	Average permanent pool depth should be between 1 - 2 m	4-60
Failed	Maximum permanent pool depth should be less than 3 m	4-60
	As per Table 3.2 (MOE)	3-10
Failed	Compare Unit rate volume to actual design	3-10
ОК	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
	Actual volume must equal or exceed the design volume / Design extended	4.52;
	detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	3-10
Failed	storm runoff volume (~ 40m3/ha used as a minimum criteria)	0.0
Failed	Based on Equation 4.11	4-58
OK	Total active storage including quantity control	4-60
ок	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-61
OK	Maximum pond side slopes 3:1 or flatter	4-61
OK	Forebay area should be less than 1/3 of pond surface area	4-56
	If multiple inlets	4-56
Failed	Minimum forebay depth is 1 m	4-55
	Minimum forebay depth is 1 m	
Failed	Minimum forebay length to width ratio is 2:1 if single inlet	
Failed	Submerged preferred for safety reasons	4-58
	Submerged preferred for safety reasons	4-58

Check for retrofit feasibility - pond expansion not feasible if ratio <1.5 Measured at PP level or through mid section of the pond

Part 3c: Pond Design Parameters - Inlet									/
Number of pond inlets	2		-			1		More than one inlet may require increases in effective storage volumes	4-62
Inlet 1									
Inlet Pipe Diameter_1	600	mm	-	mm	450		OK	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	1.3	%	-	%	1		ок	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1	13.3	m	-	m					,
Submerged Inlet_1	No	yes/no	-	yes/no	no		ок	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1	-	%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel_1	-	yes/no	-	yes/no		0	FALSE	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	No	yes/no	-	yes/no	yes		Failed	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet 2									
Inlet Pipe Diameter_2	375	mm	-	mm	450		Failed	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_2	0.32	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_2	52.2	m	-	m					,
Submerged Inlet_2	Yes	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_2	0.32	%	-	%	1		Failed	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_2	No	yes/no	-	yes/no		0	Failed	An exposed pilot channel is not preferred	ŀ
Inlet Headwalls and Wingwalls_2	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet				_					
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		OK	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet	No	yes/no	-	yes/no	yes		Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-11
Outlet Pipe Diameter	450	mm	-	mm	450		OK	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	2.6	%	-	%	1		OK	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9
Reverse Sloped Pipe Diameter, if provided								Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-66; 4-
' ' '	-	mm	-	mm	150		OK	slope pipe should have a minimum diameter of 150 mm	69
Orifice Diameter	-	mm	108	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used								Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	4-67
, , , ,	-	mm	150	mm	50		OK	plate diameter should be greater than 50 mm in diameter	
Design Modifications for Cold Climates: alpha	15							Coefficient of ice growth	4-8
Df								Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	4-8
DI	753.3							2000 - City of Barrie	4-0
h	412	mm		mm	MOE Equ	ation 4.1		Ice thickness	4-8
Submerged outlet depth	-	m		m	562		OK	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Part 3e: Pond Design Parameters - Major Flow	Outlet	,							
Top of Berm Elevation	261.1	m	150	m				Data input	ļ
Top of Emergency Spillway Elevation	260.82	m	-	m				Data input	l
Provided Freeboard (@ spill elev.)	0	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment		1 2		٦ ,					
Annual sediment loading	14.2	m³/year	Not defined	m³/year					6-14
Estimated sediment volume	763.3	m ³	Not defined	m ³					,
Number of veers before Earsboy A clean out required	1	1					Falled		

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific Asserted Regione & Asserted

Municipal Address: 1295 Gina St., 023-057-32 GIS Coordinates: 44°18'43" N #N/A Latitude: Constructed:

Part 1: General Information Innisbrook Developments 7-6 (BMP 4Q1) Municipal Pond ID I-S64 LSRCA Pond ID 6045-5J2TP3 Certificate of Approval: Wet pond Facility Type Water quality control **Facility Function** Innisfil Creeks Watershed Bon Secuors Creek (Ck #4) **Receiving Waters**

	Longitude:	79°33'21" W	Retrofitted:	-		Red	ceiver Type	-	
		1		1					
	Assessment		Design Value (CofA		Min.	Max.	Criteria	Notes	MOE
Checklist	Value	Units	and/or Design Report)	Units	Design	Design	Check	Notes	Page
Part 2: Catchment Information			. ,			,			
		_		_				Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	4-52
Contributing Drainage Area	5.96	ha	5.56	ha	5.0		OK	area is >10 ha Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Predominate Landuse Catchment Imperviousness %	50	%	-	%				Describe % / is curb & gutter or alich system pre-adminant	
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		ок	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond				,					
Pond Fenced (vegetative barrier or fence)	Na						F-11-4	Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective	4-60
	No	yes/no	-	yes/no	no		Failed	Should describe the pond's function and warn of water level fluctuations, thin ice	
Interpretive & Warning signage	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	1784	m ²	-	m ²				Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio Overall Pond Length	7.5 56.7	PBA/PA m	-	PBA/PA m	1.5		OK	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5 Measured at PP level or through mid section of the pond	
Overall Pond Width	19.4	m	-	m				weasured at 11 level of throught this section of the pond	
Length / Width Ratio	2.9	l/w	-	I/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	0.76	m	-	m	1	2	Failed	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool Permanent Pool Volume Unit	1.04 38	m m³/ha	63	m m³/ha	1	3	OK	Maximum permanent pool depth should be less than 3 m As per Table 3.2 (MOE)	4-60 3-10
Existing Permanent Pool Volume	227	m ³	353	m ³	819		Failed	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage								Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
o	0.4	m	-	m		1.5	OK		, 50
Existing Extended Detention Storage								Actual volume must equal or exceed the design volume / Design extended detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52;
Existing Extended Determion Storage	393	m³	818	m³	238		ок	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.6	m	-	m		2	OK	Total active storage including quantity control	4-60
Maximum Grade at Permanent Pool	6.9	:1 (h/v)	-	:1 (h/v)	5	7	OK	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-61
Maximum Pond Side Slopes Part 3b: Pond Design Parameters - Forebay	6.9	:1 (h/v)	-	:1 (h/v)		3	OK	Maximum pond side slopes 3:1 or flatter	4-61
Total Forebay Surface Area	-	m²	-	m ²		594.54	Failed	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet	no	yes/no	no	yes/no				If multiple inlets	4-56
Max Depth of Forebay: F1 F2	-	m m	-	m m	1	3		Minimum forebay depth is 1 m	4-55
Provided Length to Width Ratio: F1	-	I/w	-	I/w	2	3		Minimum forebay depth is 1 m Minimum forebay length to width ratio is 2:1 if single inlet	
F2	-	l/w	-	l/w	2				
Submerged Forebay Berm: F1	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-58
F2 Part 3c: Pond Design Parameters - Inlet	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-58
Number of pond inlets	1		-			1	ОК		4-62
Inlet 1		,		,					
Inlet Pipe Diameter_1	900	mm	-	mm o/	450 1		OK	Minimum inlet pipe diameter of 450mm Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Slope_1 Inlet Pipe Length_1	3.49 8.89	% m	-	% m	'		OK	met pipe slope preferred > 1%	4-9
Submerged Inlet_1	No	yes/no	-	yes/no	no		ок	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1	-	%	-	%	1		OK	Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1 Exposed Pilot Channel 1	yes	yes/no	-	yes/no	yes	0	OK Failed	Only portions of forebay required to be hardened An exposed pilot channel is not preferred	4-63 4-62
Inlet Headwalls and Wingwalls_1	No No	yes/no yes/no	-	yes/no yes/no	yes	U	Failed	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	0.8	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Part 3d: Pond Design Parameters - Outlet		1						Ordet about a should be leasted in early directly for the second	4.05
Outlet located in embankment Bottom Draw Outlet	Yes No	yes/no yes/no	-	yes/no yes/no	yes yes		OK Failed	Outlet structure should be located in embankment for maintenance purposes Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-65 4-11
Outlet Pipe Diameter	300	mm	-	mm	450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	6.53	%	-	%	1		ОК	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9
Reverse Sloped Pipe Diameter, if provided	200				450			Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-66; 4-
Orifice Diameter	300	mm mm	-	mm mm	150 75	100	OK OK	slope pipe should have a minimum diameter of 150 mm Smallest acceptable diameter is 75 mm	69 4-58
					70	100	O.K	Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		ОК	plate diameter should be greater than 50 mm in diameter	
Design Modifications for Cold Climates: alpha	15							Coefficient of ice growth Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	4-8
Df	753.3							2000 - City of Barrie	4-8
h	412	mm		mm	MOE Equ	ation 4.1		Ice thickness	4-8
Submerged outlet depth	0.25	m		m	0.56		Failed	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation	Outlet 239.7	m		m				Data input	
Top of Emergency Spillway Elevation	239.7	m	-	m				Data input	
Provided Freeboard (@ spill elev.)	0	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment		1 3,		1 3,		1			
Annual sediment loading Estimated sediment volume	9.4 238.6	m³/year m³	-	m ³ /year m ³					6-14
Number of years before Pond clean-out required	0	yrs	Not defined	yrs			Failed		
Adjusted water quality storage	78	m³/ha	-	,	141		Failed	Target efficiency required storage	
Treatment Level	3		Not defined						
END OF CHECKLIST									

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1



Part 1: General Information

Municipal Pond ID LSRCA Pond ID Certificate of Approval: Orsi/Bayshore Estates I-S67

4163-4P6GPY

nd quantity control

Facility Type	Wet pond
Facility Function	Water quality and quar
Watershed	Innisfil Creeks
Receiving Waters	Banks Creek (Ck #5)

By: Hatch Mott MacDonald MacDonald				
Municipal Address:	GIS Coordinate	s:	Year:	
W of 1097, Anna Maria Ave., 023-015-57	Latitude:	44°18'5" N	Constructed:	1999

W 01 1097, Allifa Maria Ave., 023-015-57	Latitude:	44-185 N	Constructed:	1999		Recei	ving Waters	Danks Creek (Ck #5)	4
	Longitude:	79°33'8" W	Retrofitted:	0		Re	ceiver Type	•	
			Design Value (CofA						MOE
o	Assessment		and/or Design		Min.	Max.	Criteria	Notes	Page
Checklist	Value	Units	Report)	Units	Design	Design	Check		. ugo
Part 2: Catchment Information		1		1				Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	
Contributing Drainage Area	32.50	ha	45	ha	5.0		ок	area is >10 ha	4-52
Catchment Predominate Landuse	-		-		0.0		O.K	Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	11	%	-	%					
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		ок	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond				,					
Pond Fenced (vegetative barrier or fence)								Standards for fencing vary from municipality to municipality, thorny vegetative	4-60
Total office (regulative same) of folios,	Yes	yes/no	-	yes/no	no		ок	barriers very effective	. 00
Interpretive & Warning signage		voo/no		vaa/na			FALSE	Should describe the pond's function and warn of water level fluctuations, thin ice and other specific hazards	4-60
Total SWM Pond Surface Area	12242	yes/no m²	-	yes/no m ²	yes		FALSE	Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio	3.3	PBA/PA	-	PBA/PA	1.5		ок	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	136.14	m	-	m			O.C	Measured at PP level or through mid section of the pond	
Overall Pond Width	31.46	m	-	m					
Length / Width Ratio	4.3	l/w	-	I/w	3		ок	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	1.25	m	-	m	1	2	OK	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool	1.40	m m³/ha	-	m m³/ha	1	3	OK	Maximum permanent pool depth should be less than 3 m	4-60
Permanent Pool Volume Unit Existing Permanent Pool Volume	68 2219	m /na m³	6800	m /na m³	1021		ок	As per Table 3.2 (MOE) Compare Unit rate volume to actual design	3-10 3-10
*	2219	• •••	0000		1021		OK .		
Depth of Extended Detention Storage	0.56	m	-	m		1.5	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
								Actual volume must equal or exceed the design volume / Design extended	4.50
Existing Extended Detention Storage								detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52;
	2794	m³	-	m³	1,300		ок	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.6	m	-	m		2	ОК	Total active storage including quantity control	4-60
Maximum Grade at Permanent Pool	5	:1 (h/v)	-	:1 (h/v)	5	7	OK	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-61
Maximum Pond Side Slopes	2.6	:1 (h/v)	-	:1 (h/v)		3	Failed	Maximum pond side slopes 3:1 or flatter	4-61
Part 3b: Pond Design Parameters - Forebay		2		2		4000 50	F-11-1	Farehau and about the last the 1/0 of and author are	4.50
Total Forebay Surface Area Forebay provided at each inlet	-	m ²	-	m²		4080.59	Failed	Forebay area should be less than 1/3 of pond surface area If multiple inlets	4-56 4-56
Max Depth of Forebay: F1	no -	yes/no m	-	yes/no m	1	3		Minimum forebay depth is 1 m	4-55
F2		m	-	m	1	3		Minimum forebay depth is 1 m	4 00
Provided Length to Width Ratio: F1	-	l/w	-	I/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	
F2	-	l/w	-	I/w	2				
Submerged Forebay Berm: F1		yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-58
F2	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-58
Part 3c: Pond Design Parameters - Inlet	_	1		1				Mary the annual in late and a second in a first the attention of the second in the sec	4.00
Number of pond inlets	2		-			1		More than one inlet may require increases in effective storage volumes	4-62
Inlet 1 Inlet Pipe Diameter 1	1350	mm		mm	450	I	ОК	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope 1	0.6	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1	24.0	m	-	m	•		ranca	miles pipe diopo protetrou y 170	. 0
Submerged Inlet 1	-	yes/no	-	yes/no	no		FALSE	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1		%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel_1	No	yes/no	-	yes/no		0	Failed	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet 2 Inlet Pipe Diameter 2	Swale	mm	-	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope 2	- Swale	%	-	mm %	1		OK	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length 2		m		m	•		OK .	mict pipe diope proteried > 176	701
Submerged Inlet_2	No	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_2	-	%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_2	No	yes/no	-	yes/no		0	Failed	An exposed pilot channel is not preferred	
Inlet Headwalls and Wingwalls_2	No	yes/no	-	yes/no	yes		Failed	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet	V					1	01/	Outlet structure chould be leasted in embantment for maintaining	4.05
Outlet located in embankment Bottom Draw Outlet	Yes Yes	yes/no yes/no	-	yes/no yes/no	yes yes		OK OK	Outlet structure should be located in embankment for maintenance purposes Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-65 4-11
Outlet Pipe Diameter	250	yes/no mm	250	yes/no mm	yes 450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-11 4-9
Outlet Pipe Slope	4.5	%	-	%	1		OK	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9 4-9
		1		1				Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-66; 4
Reverse Sloped Pipe Diameter, if provided	300	mm	-	mm	150		ок	slope pipe should have a minimum diameter of 150 mm	69
Orifice Diameter		mm	128	mm	75	100	ОК	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used								Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	4-67
	-	mm	200	mm	50		OK	plate diameter should be greater than 50 mm in diameter	
Design Modifications for Cold Climates: alpha	15	-						Coefficient of ice growth	4-8
Df	750 0							Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie	4-8
h	753.3 412	mm		mm	MOE Equ	ation 4 1		lce thickness	4-8
Submerged outlet depth	412	m		m	562		ок	Submerged outlets obvert to be set 150 mm lower than ice cover	4-6 4-9
Part 3e: Pond Design Parameters - Major Flow					50 <u>2</u>	1	JK		, ,
Top of Berm Elevation	230	m	200	m				Data input	
Top of Emergency Spillway Elevation	228.9	m	-	m				Data input	
Provided Freeboard (@ spill elev.)	1.1	m	-	m	0.300		OK	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment		3.		3.		1			
Annual sediment loading	19.5	m³/year	Not defined	m³/year					6-14
Estimated sediment volume	3721.28	m³ yrs	Not defined Not defined	m³					
			INDI DETIDED	yrs					
Number of years before Pond clean-out required	189 108		-	,	63.6		OK	Target efficiency required storage	
	189 108 1	m³/ha	-	,	63.6		ок	Target efficiency required storage	
Number of years before Pond clean-out required Adjusted water quality storage	108		- Not defined	,,,,	63.6		OK	Target efficiency required storage	

As per Stormwater Management Planning and Design Manual (March 2003)



Year:

Constructed:

1991

Part 1: General Information

Crossroads Municipal Pond ID LSRCA Pond ID

Facility Type

Facility Function

Receiver Type

8844-7PZJAS Certificate of Approval:

Wet pond Water quality and quantity control

Innisfil Creeks

Watershed Leonard's Ck (Ck #3) & Bon Secuors Creek (Ck #4) **Receiving Waters**

STORMWATER MANAGEMENT MASTER PLAN - PART 1

GIS Coordinates:

Latitude:

44°18'53 N

79°33'30" W

yes/no yes/no

mm %

mm

mm

mm

m

m

m m

m³/year

yrs m³/ha

600

1.0

15

753.3

412

240.1

31.3 454.26

47

221

alpha

Submerged outlet depth

Part 3e: Pond Design Parameters - Major Flow Outlet
Top of Berm Elevation 240.3

Hatch Mott MXCG

2163 Jans Blvd, 23-184-00

Municipal Address:

Bottom Draw Outlet

Outlet Pipe Diameter

Reverse Sloped Pipe Diameter, if provided

Design Modifications for Cold Climates:

Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.)

Number of years before Pond clean-out required

Part 4: Sediment

eatment Level

nnual sediment loading

Estimated sediment volume

Adjusted water quality storage

Perforated Riser Orifice Plate Dia., if riser pipe used

Outlet Pipe Slope

Orifice Diameter

Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information		_							
		_						Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	4-52
Contributing Drainage Area	20.54	ha	34.05	ha	5.0		OK	area is >10 ha	. 02
Catchment Predominate Landuse	49.25	%	-	%				Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness % Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		ок	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond	Lillanceu	Level	Lillianceu	Level	Lillanceu	1	OK.	All streams within INVOA and ESHOA require Emilanced Protection (Level 1)	
•				Ì				Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	_	yes/no	no		ок	barriers very effective	4-60
		,00,0		,				Should describe the pond's function and warn of water level fluctuations, thin ice	
Interpretive & Warning signage	-	yes/no		yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	6651	m ²	-	m ²				Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio	4.1	PBA/PA	-	PBA/PA	1.5		ок	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	40	m	•	m				Measured at PP level or through mid section of the pond	
Overall Pond Width	50	m	-	m				Bu 6 and 6 44 6 54	4.50
Length / Width Ratio	0.8	I/w	•	I/w	3	•	Failed	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth Max Depth Permanent Pool	1.83 2.13	m m	-	m m	1	2	OK OK	Average permanent pool depth should be between 1 - 2 m Maximum permanent pool depth should be less than 3 m	4-60 4-60
Permanent Pool Volume Unit	181	m³/ha	-	m³/ha	•	•	OK	As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	3708	m ³	3303	m ³	2773		ок	Compare Unit rate volume to actual design	3-10
•	0.00						0		
Depth of Extended Detention Storage	0.04	m	-	m		1.5	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
								Actual volume must equal or exceed the design volume / Design extended	4.50
Existing Extended Detention Storage								detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52; 3-10
	342	m³	2622	m ³	822		Failed	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	•	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	2.2	m	-	m		2	Failed	Total active storage including quantity control	4-60
Maximum Grade at Permanent Pool	6.7	:1 (h/v)	7:1	:1 (h/v)	5	7	ок	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-61
Maximum Pond Side Slopes	6.7	:1 (h/v)	-	:1 (h/v)		3	OK	Maximum pond side slopes 3:1 or flatter	4-61
Part 3b: Pond Design Parameters - Forebay		2		12		0047.00		Front Control of the Lorentz All Control of	4.50
Total Forebay Surface Area Forebay provided at each inlet	-	m ²	-	m²		2217.00	Failed	Forebay area should be less than 1/3 of pond surface area If multiple inlets	4-56 4-56
Max Depth of Forebay: F1	no	yes/no m	yes -	yes/no m	1	3		Minimum forebay depth is 1 m	4-56 4-55
F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	4-55
Provided Length to Width Ratio: F1	-	I/w		I/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	
F2	-	l/w	-	I/w	2				
Submerged Forebay Berm: F1	-	yes/no	yes	yes/no	yes			Submerged preferred for safety reasons	4-58
F2	-	yes/no	yes	yes/no	yes			Submerged preferred for safety reasons	4-58
Part 3c: Pond Design Parameters - Inlet		_	-						
Number of pond inlets	3		2			1		More than one inlet may require increases in effective storage volumes	4-62
Inlet 1	4050	1	0110 D 4050 (N	1	450	1		Minimum inlatain a dispersary of 450 mm	4.0
Inlet Pipe Diameter_1 Inlet Pipe Slope_1	1350	mm o/	(WQual), 1350 (Wo		450 1		OK	Minimum inlet pipe diameter of 450mm	4-9 4-9
Inlet Pipe Slope_1	1.5 14.4	% m	-	% m	•		OK	Inlet pipe slope preferred > 1%	4-9
Submerged Inlet 1	No No	yes/no	-	yes/no	no		ок	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1	-	% %		%	1		ОК	Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour 1	Yes	yes/no	yes	ves/no	yes		ок	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel_1	No	yes/no		yes/no	,	0	Failed	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	yes	yes/no	yes		ок	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet 2		_		1					
Inlet Pipe Diameter_2	300	mm	•	mm	450		Failed	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_2	1.84	%	•	%	1		OK	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_2	21.1	m	-	m				A subsequent into the most area formed	4-81
Submerged Inlet_2 Submerged Pipe Grade 2	No -	yes/no %	-	yes/no %	no 1		ок	A submerged inlet is not preferred Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2	No	ves/no	-	ves/no	ves		Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel 2	No	yes/no		yes/no	yes	0	Failed	An exposed pilot channel is not preferred	
Inlet Headwalls and Wingwalls 2	Yes	yes/no	-	yes/no	yes		ОК	Biotechnical structures highly preferred	4-81
Inlet 3		,			, , , , , , , , , , , , , , , , , , , ,			<u>, , , , , , , , , , , , , , , , , , , </u>	
Inlet Pipe Diameter_3	0	mm	-	mm	450		Failed	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_3	0.00	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_3	0.0	m	-	m					
Submerged Inlet_3	0	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_3	0	%	-	%	1		Failed	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_3	0	yes/no	-	yes/no	yes		FALSE	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_3 Inlet Headwalls and Wingwalls 3	0	yes/no	-	yes/no	was	0	FALSE	An exposed pilot channel is not preferred Biotechnical structures highly preferred	A 01
Part 3d: Pond Design Parameters - Outlet	0	yes/no	•	yes/no	yes		FALSE	ыотволитові зтистите в підтіў ртететей	4-81
Outlet located in embankment	Yes	ves/no		ves/no	ves		ОК	Outlet structure should be located in embankment for maintenance purposes	4-65
Outot located iii ellipalikillell	162	ves/IIO		ves/IIO	ves		UK	- Conc. on acture cricaia de rocatea in embankinent lui maintenance buidoses	T-00

yes/no

yes/no

mm %

mm

mm

mm

m

m

m m

m³/year

0 (minor), 600 (maj

300 0 (minor), 200 (maj

Not defined

Not defined Not defined

Not defined

yes yes 450

150

75

50

0.300

140

MOE Equation 4.1 562

100

2000 - City of Barrie

Target efficiency required storage

Ice thickness

Data input

OK Failed

ок ок

ок

Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)

Outlet pipe slope preferred > 1% (Cold climate min. requirement) Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse

Submerged outlets obvert to be set 150 mm lower than ice cover

Data input
Minimum freeboard above maximum design water level should be 0.3 m

slope pipe should have a minimum diameter of 150 mm Smallest acceptable diameter is 75 mm

Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation

Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice plate diameter should be greater than 50 mm in diameter

Coefficient of ice growth
Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-

4-11

4-9

4-66; 4

69 4-58

4-67

4-8 4-8

4-8

4-9

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific Asserted Regione & Asserted

Municipal Address: 1041 Corrie St, 23-176-00 GIS Coordinates: 44°19'5" N Constructed: 1993 Latitude:

79°33'23" W

Part 1: General Information Crossroads #2 Municipal Pond ID I-N2 LSRCA Pond ID 3-0825-91-006 Certificate of Approval: Facility Type Wet pond Water quality and quantity control **Facility Function** Innisfil Creeks Watershed Leonard's Ck (Ck #3) Receiving Waters

	Longitude:	79°33°23″ W	Retrofitted:	0		Re	ceiver Type	0	
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information		1						Minimum during a grant of the first and the	
Contributing Drainage Area	19.87	ha	10.2	ha	5.0		ок	Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha	4-52
Catchment Predominate Landuse	-		-		0.0		•	Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	47.5	%	-	%					
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		OK	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond		1						Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	barriers very effective	4-60
Interpretive & Warning signage				•				Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
, , , , ,	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-00
Total SWM Pond Surface Area Pond Block Area / Pond Area (top surface) ratio	7513 5	m ² PBA/PA	-	m² PBA/PA	1.5		ок	Measured at top of berm Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	187.08	m	-	m	1.5		OK .	Measured at PP level or through mid section of the pond	
Overall Pond Width	100.76	m	-	m				•	
Length / Width Ratio	1.9	I/w	-	l/w	3	_	Failed	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth Max Depth Permanent Pool	0.89 1.11	m m	-	m m	1	2	Failed OK	Average permanent pool depth should be between 1 - 2 m Maximum permanent pool depth should be less than 3 m	4-60 4-60
Permanent Pool Volume Unit	73	m³/ha	-	m³/ha	•	3	OK	As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	1450	m ³	-	m ³	2633		Failed	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage								Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
Doput of Extended Botomion Clorage	0.11	m	-	m		1.5	OK		. 00
Existing Extended Detention Storage								Actual volume must equal or exceed the design volume / Design extended	4.52;
Existing Extended Detention Storage	422	m ³	1275	m³	795		Failed	detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.4	m	-	m		2	ОК	Total active storage including quantity control	4-60
Maximum Grade at Permanent Pool	5.4	:1 (h/v)		:1 (h/v)	5	7	OK	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-61
Maximum Pond Side Slopes	3.3	:1 (h/v)	-	:1 (h/v)		3	OK	Maximum pond side slopes 3:1 or flatter	4-61
Part 3b: Pond Design Parameters - Forebay Total Forebay Surface Area	_	m ²	-	m²		2504.29	Failed	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet	Yes	yes/no	-	yes/no				If multiple inlets	4-56
Max Depth of Forebay: F1	1.11	m	-	m	1	3	OK	Minimum forebay depth is 1 m	4-55
F2 Provided Length to Width Ratio: F1	4.50	m I/m	-	m	1	3	014	Minimum forebay depth is 1 m	
Provided Length to Width Ratio: F1 F2	4.50	I/w I/w	-	I/w I/w	2		OK	Minimum forebay length to width ratio is 2:1 if single inlet	
Submerged Forebay Berm: F1	Yes	yes/no	-	yes/no	yes		ок	Submerged preferred for safety reasons	4-58
F2	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-58
Part 3c: Pond Design Parameters - Inlet	_	1	_				014		4-62
Number of pond inlets Inlet 1	1		-			1	OK		4-62
Inlet Pipe Diameter_1	1000	mm	-	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	0.61	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1 Submerged Inlet 1	57.2	m voo/no	-	m voo/no			OV	A submarged inlat is not professed	4-63
Submerged Pipe Grade 1	No -	yes/no %	-	yes/no %	no 1		ok ok	A submerged inlet is not preferred Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1	Yes	yes/no	-	yes/no	yes		ОК	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel_1	No	yes/no	-	yes/no		no	OK	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1 Inlet Area Depth 1	Yes 0.78	yes/no		yes/no	yes 1.0	3.0	OK Failed	Biotechnical structures highly preferred Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65 4-65
Part 3d: Pond Design Parameters - Outlet	0.76	m	-	m	1.0	3.0	railed	Depth at the lines pipe should be a minimum of 1 m (Flunge poor)	4-65
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		ОК	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet	No	yes/no	-	yes/no	yes		Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-11
Outlet Pipe Diameter Outlet Pipe Slope	850 1.71	mm %	300	mm %	450 1		OK	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement) Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9 4-9
	1.71	70	-	70	'		OK	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-66: 4-
Reverse Sloped Pipe Diameter, if provided	-	mm	-	mm	150		ОК	slope pipe should have a minimum diameter of 150 mm	69
Orifice Diameter	-	mm	130	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used			200	m. m.	50		OV	Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	4-67
Design Modifications for Cold Climates: alpha	15	mm	300	mm	50		OK	plate diameter should be greater than 50 mm in diameter Coefficient of ice growth	4-8
								Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	4-8
Df	753.3							2000 - City of Barrie	
h Submerged outlet depth	412	mm		mm m	MOE Equ 562	ation 4.1	ок	Ice thickness Submerged outlets obvert to be set 150 mm lower than ice cover	4-8 4-9
Part 3e: Pond Design Parameters - Major Flow	Outlet	m		111	302		UK	Submerged outlets obvert to be set 150 mill lower trial rice cover	4-9
Top of Berm Elevation	237	m	300	m				Data input	
Top of Emergency Spillway Elevation	237	m	-	m	0.000			Data input	,
Provided Freeboard (@ spill elev.) Part 4: Sediment	0.00	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Annual sediment loading	28.1	m³/year	-	m³/year					6-14
Estimated sediment volume	986.75	m ³	-	m ³					
Number of years before Forebay A clean-out required									
Number of years before Pond clean-out required	0	yrs	-	yrs	400		Failed	Torget officionaly required storage	
Adjusted water quality storage Treatment Level	113 3	m³/ha %	-		138		Failed	Target efficiency required storage	
END OF CHECKLIST		/0	-			1			

					Part 1: Ge	neral Info	rmation		
Wet Pond Criteria Check					Pond Name			Crossroads #2	
As per Stormwater Management Planning and Des	sign Manual (March	2003)				Munici	pal Pond ID	8-4	
		·					CA Pond ID	I-N2	1
STORMWATER MANAGEMENT MAST	ED DI AN - DAD	Т 1			,		of Approval:	3-0825-91-006	-
OTOTIMWATER MANAGEMENT MAST	LITT LAIT - I AIT				,			Wet pond	-
By: Hatch Mott MacDonald //XCG							acility Type		-
IVIACE/OFFICIAL Environmental Engineera & Scientists						Facil	ity Function	Water quality and quantity control	4
Municipal Address:	GIS Coordinate	s:	Year:				Watershed	Innisfil Creeks	
1041 Corrie St, 23-176-00	Latitude:	44°19'5" N	Constructed:	1993		Recei	ving Waters	Leonard's Ck (Ck #3)	
	Longitude:	79°33'23" W	Retrofitted:	0		Receiver Type		0	
	<u> </u>						,,,,		
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information	74.40	5	Поролу	Oilito	Doolgii	Doolgii	OHOOK		
								Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	4-52
Contributing Drainage Area	19.87	ha	10.2	ha	5.0		OK	area is >10 ha	4-52
Catchment Predominate Landuse	-		-					Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	47.5	%		%					
Fisheries Protection Level Part 3a: Pond Design Parameters - Main Por	Enhanced	Level	Enhanced	Level	Enhanced		OK	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
•	iu							Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	ves/no	-	ves/no	no		ок	barriers very effective	4-60
nterpretive & Warning signage								Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
nterpretive & warning signage	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	7513	m²	-	m ²				Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio	5	PBA/PA	-	PBA/PA	1.5		OK	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	187	m	-	m				Measured at PP level or through mid section of the pond	
Overall Pond Width	101	m	-	m					
ength / Width Ratio	1.9	I/w	-	I/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	0.89	m	-	m	1	2	Failed	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool	1.11	m	-	m	1	3	ОК	Maximum permanent pool depth should be less than 3 m	4-60
Permanent Pool Volume Unit	73	m³/ha	-	m³/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	1450	m ³	-	m ³	2633		Failed	Compare Unit rate volume to actual design	3-10

ERROR: OFFENDING COMMAND:

STACK:

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific Asserted Regione & Asserted

Municipal Address: 2324 Jack Cres, 030-196-00 GIS Coordinates: Latitude: 44°19'33" N Constructed: 1999

Part 1: General Information Skivereen 8-5 Municipal Pond ID I-N15 LSRCA Pond ID 3-0257-99-006 Certificate of Approval: Facility Type Wet pond Water quality and quantity control **Facility Function** Innisfil Creeks Watershed Leonard's Ck (Ck #3) Receiving Waters

	Longitude:	79°32'39" W	Retrofitted:	0		Re	ceiver Type	-	
		1		ı					
2	Assessment		Design Value (CofA and/or Design		Min.	Max.	Criteria	Notes	MOE Page
Checklist Part 2: Catchment Information	Value	Units	Report)	Units	Design	Design	Check		. age
rait 2. Outcomicht information								Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	4.50
Contributing Drainage Area	11.92	ha	10.11	ha	5.0		ок	area is >10 ha	4-52
Catchment Predominate Landuse	47.5	0/	•	0/				Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness % Fisheries Protection Level	47.5 Enhanced	% Level	Enhanced	% Level	Enhanced		ок	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond	Limitarioca	LCVCI	Limanoca	Level	Limanoca		O.C	This discussion within 1999 and Editor require Estimated 1 Total and (Edver 1)	
Pond Fenced (vegetative barrier or fence)								Standards for fencing vary from municipality to municipality, thorny vegetative	4-60
Total Fericea (vegetative barrier of ferice)	Yes	yes/no	-	yes/no	no		OK	barriers very effective	4-00
Interpretive & Warning signage		yes/no	_	yes/no	VOC		FALSE	Should describe the pond's function and warn of water level fluctuations, thin ice and other specific hazards	4-60
Total SWM Pond Surface Area	3998	m ²	-	m ²	yes		FALSE	Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio	23	PBA/PA	-	PBA/PA	1.5		ок	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	86.65	m	-	m				Measured at PP level or through mid section of the pond	
Overall Pond Width Length / Width Ratio	71.47 1.2	m I/w	-	m I/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	2.42	m	-	m	1	2	Failed	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool	2.37	m	-	m	1	3	ОК	Maximum permanent pool depth should be less than 3 m	4-60
Permanent Pool Volume Unit	187	m³/ha	•	m³/ha	4570			As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	2226	m³	-	m³	1579		OK	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage	0.45	m	_	m		1.5	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
		1		1				Actual volume must equal or exceed the design volume / Design extended	4.50
Existing Extended Detention Storage								detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52; 3-10
	1118	m³	1870	m³	477		OK	storm runoff volume (~ 40m3/ha used as a minimum criteria)	
Extended Detention Storage Drawdown Time	NA 1.0	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.) Maximum Grade at Permanent Pool	1.0 3.7	m :1 (h/v)	-	m :1 (h/v)	5	2 7	OK Failed	Total active storage including quantity control Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum	4-60 4-61
Maximum Pond Side Slopes		:1 (h/v)		:1 (h/v)	J	3	Failed	Maximum pond side slopes 3:1 or flatter	4-61
Part 3b: Pond Design Parameters - Forebay						,			
Total Forebay Surface Area	523	m ²	45	m ²		1332.78	OK	Forebay area should be less than 1/3 of pond surface area If multiple inlets	4-56
Forebay provided at each inlet Max Depth of Forebay: F1	Yes 1.62	yes/no m	no 2	yes/no m	1	3	ок	Minimum forebay depth is 1 m	4-56 4-55
F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	. 00
Provided Length to Width Ratio: F1	1.06	l/w	5	l/w	2		Failed	Minimum forebay length to width ratio is 2:1 if single inlet	
F2 Submerged Forebay Berm: F1	- Van	I/w	-	I/w	2		014	Cub assumed a vafe word for a sefety was a se	4-58
Submerged Forebay Berm: F1 F2	Yes -	yes/no yes/no	yes yes	yes/no yes/no	yes yes		OK	Submerged preferred for safety reasons Submerged preferred for safety reasons	4-58
Part 3c: Pond Design Parameters - Inlet		,	7.0	,	,			3p	
Number of pond inlets	1		1			1	OK		4-62
Inlet 1 Inlet Pipe Diameter 1	650	mm	750	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	0.79	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1	16.5	m	-	m					
Submerged Inlet_1	-	yes/no	-	yes/no	no		FALSE	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1 Energy dissipation provided to prevent scour_1	No	% yes/no	yes	% yes/no	1 yes		OK Failed	Submerged pipe slope should be a minimum of 1 % Only portions of forebay required to be hardened	4-63 4-63
Exposed Pilot Channel 1	No	yes/no	yes -	yes/no	yes	no	OK	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	yes	yes/no	yes		ОК	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Part 3d: Pond Design Parameters - Outlet Outlet located in embankment	Yes	yes/no	_	yes/no	VAS		ОК	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet	Yes	yes/no	-	yes/no	yes yes		OK OK	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-65
Outlet Pipe Diameter	Ditch	mm	500	mm	450		ок	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	8.6	%	-	%	1		OK	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9
Reverse Sloped Pipe Diameter, if provided	300	mm	300	mm	150		ок	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse slope pipe should have a minimum diameter of 150 mm	4-66; 4- 69
Orifice Diameter	-	mm	125	mm	75	100	OK OK	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used								Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	
, , , , , , , , , , , , , , , , , , , ,	-	mm	•	mm	50		ОК	plate diameter should be greater than 50 mm in diameter	
Design Modifications for Cold Climates: alpha	15	-						Coefficient of ice growth Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	4-8
Df	753.3							2000 - City of Barrie	4-8
h	412	mm		mm	MOE Equ	ation 4.1		Ice thickness	4-8
Submerged outlet depth	- Outlet	m		m	562		ОК	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation	225.15	m	-	m				Data input	
Top of Emergency Spillway Elevation	225.15	m	-	m				Data input	
Provided Freeboard (@ spill elev.)	0.00	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment	10.0	3/		m3/					6 14
Annual sediment loading Estimated sediment volume	16.8 274.28	m³/year m³	-	m ³ /year m ³					6-14
Number of years before Forebay A clean-out required	2. 1.20								
Number of years before Pond clean-out required	79	yrs	-	yrs			ок		
Adjusted water quality storage	227	m³/ha	-		138		OK	Target efficiency required storage	
Treatment Level END OF CHECKLIST	1	%	-						

As per Stormwater Management Planning and Design Manual (March 2003)



Part 1: General Information Municipal Pond ID

Alcona Woods No Data

LSRCA Pond ID 0.0 Certificate of Approval: Facility Type 0.0

Pond Name

0.0 Innisfil Creeks

Facility Function

STORMWATER MANAGEMENT MASTER PLAN - PART 1	

By: Hatch Mott MacDonald Sentential Register As Sentential Register

Municipal Address:	GIS Coordinate	s:	Year:		
698 Trinity St, 40-139-00	Latitude:	44°19'59" N	Constructed:	1988	
	Longitude:	79°32'20" W	Retrofitted:	0	

Municipal Address:	GIS Coordinate	s:	Year:		Watershed			Innisfil Creeks	
698 Trinity St, 40-139-00	Latitude:	44°19'59" N	Constructed:	1988		Recei	ving Waters	· ·	
-		70 000100!! W		0					
	Longitude:	79 32 20 W	Retrofitted:	U		Re	ceiver Type	•	
				,					
	•		Design Value (CofA		Min.	Max.	Criteria		MOE
Ohaaldiak	Assessment	Units	and/or Design	I Indian				Notes	Page
Checklist	Value	Units	Report)	Units	Design	Design	Check		9-
Part 2: Catchment Information		1							
Contributing Drainage Area	5.76	ha		ha	5.0		ок	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha	4-80
Catchment Predominate Landuse	5.76	IIa	-	IIa	5.0		OK	Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	45	%	-	%				Describe 767 is curb a guiter of after system pre-dominant	
Fisheries Protection Level	Basic	Level		Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment	
Part 3a: Pond Design Parameters - Main Pond					240.0			21) period darinet delice ingrier than basic treatment	
•								Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	_	yes/no	no		ок	barriers very effective	4-60
		,		,				Should describe the pond's function and warn of water level fluctuations, thin ice	
Interpretive & Warning signage	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	2700	m ²	-	m ²				Measured at PP level or through mid section of the pond	
Pond Block Area / Pond Area (top surface) ratio	3	PBA/PA	-	PBA/PA	1.5		OK	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	149.2	m	-	m				Measured at top of berm	
Overall Pond Width	9.4	m	-	m					
Length / Width Ratio	15.9	I/w	-	l/w	3		OK	Preferred is 4:1 to 5:1	4-59
Depth of Extended Detention Storage								Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
	0	m	-	m		3	OK		
Existing Extended Detention Storage									3-10
	-	m³	-	m³	692		OK	Actual volume must equal or exceed the design volume	
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24		ок	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	0.90	m	-	m	1	3	OK	Total active storage including quantity control	4-81
Maximum Pond Side Slopes	3.1	:1 (h/v)	-	:1 (h/v)	4		Failed	Maximum pond side slopes 4:1 or flatter	4-79
Part 3b: Pond Design Parameters - Forebay		2		1 2				Facility and the last through the state of t	4.00
Total Forebay Surface Area		m ²	-	m ²		900.12	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet Max Depth of Forebay: F1	No	yes/no	•	yes/no				If multiple inlets	4-80
Max Depth of Forebay: F1 F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	4-80 4-80
Provided Length to Width Ratio: F1	-	m I/w	-	m I/w	2	3		Minimum forebay depth is 1 m Minimum forebay length to width ratio is 2:1 if single inlet	4-80
F2	-	I/W	-	I/W	2			will ill full forebay length to width ratio is 2.1 if single fillet	4-80
Forebay Berm: F1	-	ves/no		yes/no	yes			Submerged preferred for safety reasons	4-80
F2	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-80
Part 3c: Pond Design Parameters - Inlet		, , 00,0		y 00,0	,			Cashina gad protested for early readene	. 00
Number of pond inlets	1		-			1	ОК		4-81
Inlet 1		4							
Inlet Pipe Diameter 1	600	mm	-	mm	450		ок	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_1	0.52	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_1	7.64	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		ок	A submerged inlet is not preferred	4-81
Submerged Pipe Grade_1	-	%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet									
Outlet located in embankment	Yes	yes/no	-	yes/no	yes		OK	Outlet structure should be located in embankment for maintenance purposes	4-82
Outlet Pipe Diameter	230	mm	•	mm	450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-79
Outlet Pipe Slope	1.11	%	-	%	1		OK	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79
Reverse Sloped Pipe Diameter, if provided								Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-79, 4
	-	mm	-	mm	150	466	OK	slope pipe should have a minimum diameter of 150 mm	83
Orifice Diameter	Outlet	mm	•	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-82
Part 3e: Pond Design Parameters - Major Flow		-	_					Data inavit	
Top of Berm Elevation	220.1	m m	-	m				Data input	
Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.)	220.1 0.00	m m	-	m m	0.300		Failed	Data input Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment	0.00		<u> </u>	""	0.300		raned	minimum neeboard above maximum design water ievel should be 0.3 M	4-60
Annual sediment loading	7	m³/year	Not defined	m³/year					6-14
Estimated sediment volume		m ⁷ /year m ³	Not defined	m ⁷ year m ³					0-14
Number of years before clean-out required	-23.43 0	yrs	Not defined	1			Failed		
Adjusted water quality storage	0	m³/ha	Not delilled	yrs	120		raned		
Treatment Level	<3	III /IIa	Not defined		120				
END OF CHECKLIST		4	140t delilled						
END OF OTHERNEOT									

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald MXCG

Municipal Address: 7883 Yonge St, 36-028 GIS Coordinates: 44°19'21" N Constructed: 1988 Latitude:

Part 1: General Information Southview 9-2 Municipal Pond ID No Data LSRCA Pond ID Certificate of Approval: Facility Type **Facility Function Lovers Creek** Watershed Upper Lovers Creek **Receiving Waters**

	Longitude:	79°36'57'' W	Retrofitted:	0		Re	ceiver Type	-	
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information	Value	J Oille	Пероп	Onito	Design	Design	Oncor		
Turt 2. Outofillion information									
Contributing Drainage Area Catchment Predominate Landuse	28.03	ha	-	ha	5.0		ок	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha Describe % / Is curb & gutter or ditch system pre-dominant	4-80
Catchment Imperviousness %	42.5	%	-	%				Describe 767 is curb a guiter of ditch system pre-dominant	
Fisheries Protection Level	Basic	Level	-	Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment	
Part 3a: Pond Design Parameters - Main Pond	Dasic	Level		Level	Dasic	1	raileu	Dry portus caririot acriieve nigrier triari basic treatment	
Fait 3a. Foliu Designi Faranieters - Main Foliu		1		l		1		Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	barriers very effective	4-60
Interpretive & Warning signage								Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
Tetal CWM Dand Confess Area	21300	yes/no m²	-	yes/no m ²	yes		FALSE	and other specific hazards	
Total SWM Pond Surface Area				1	4.5		E	Measured at PP level or through mid section of the pond	
Pond Block Area / Pond Area (top surface) ratio	182	PBA/PA	-	PBA/PA	1.5		Failed	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length		m	-	m				Measured at top of berm	
Overall Pond Width	159	m	•	m	3			D. C	4.50
Length / Width Ratio	1.1	l/w	-	I/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Depth of Extended Detention Storage	-0.39	m	-	m		3	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
Existing Extended Detention Storage									3-10
	1244	m³	_	m ³	3196		Failed	Actual volume must equal or exceed the design volume	
Extended Detention Storage Drawdown Time	#DIV/0!	hours	-	hours	24	1	#DIV/0!	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.20	m	-	m	1	3	OK	Total active storage including quantity control	4-81
Maximum Pond Side Slopes	3.7	:1 (h/v)	-	:1 (h/v)	4		Failed	Maximum pond side slopes 4:1 or flatter	4-79
Part 3b: Pond Design Parameters - Forebay	5.7	J. 1 (11/V)		. 1 (11/ V)		1	i alleu	maximum pond side slopes 4.7 or natter	470
Total Forebay Surface Area	_	m²		m ²		7100.16	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet	No	yes/no	-	yes/no		7100.10	i alleu	If multiple inlets	4-80
Max Depth of Forebay: F1	-	m yes/no	_	m	1	3	Failed	Minimum forebay depth is 1 m	4-80
F2	-	m	-	m	1	3	Failed	Minimum forebay depth is 1 m	4-80
Provided Length to Width Ratio: F1	-	I/w	-	I/w	2	, ,	OK	Minimum forebay departs 1 m Minimum forebay length to width ratio is 2:1 if single inlet	4-80
F2	-	I/W	-	I/w	2		OK	William to to bay to right to width tallo to 2.1 in single inter	4-80
Forebay Berm: F1	_	ves/no	-	yes/no	yes		FALSE	Submerged preferred for safety reasons	4-80
F2	-	yes/no	_	ves/no	ves		FALSE	Submerged preferred for safety reasons	4-80
Part 3c: Pond Design Parameters - Inlet		yes/iie		yes/iie	yes	1	TALOL	Cubinorgea preferred for safety reasons	4 00
Number of pond inlets						1		More than one inlet may require increases in effective storage volumes	4-81
Inlet 1		4						more than one may require mercaces in enecare sterage relative	
Inlet Pipe Diameter 1	675	mm		mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope 1	0.3	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length 1	78.5	m	-	m	·		1 4.104		
Submerged Inlet 1	No	yes/no	-	yes/no	no		ок	A submerged inlet is not preferred	4-81
Submerged Pipe Grade_1	-	%	-	%	1		ок	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Inlet Headwalls and Wingwalls_1	Yes	ves/no	-	yes/no	ves		OK	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet		, ,		,	,	1	•		
Outlet located in embankment	Yes	yes/no		yes/no	ves		ОК	Outlet structure should be located in embankment for maintenance purposes	4-82
Outlet Pipe Diameter	675	mm		mm	450		ок	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-79
Outlet Pipe Slope	2.5	%		%	1		ОК	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79
Reverse Sloped Pipe Diameter, if provided		mm	_	mm	150		ок	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse slope pipe should have a minimum diameter of 150 mm	4-79, 4 83
Orifice Diameter	-	mm	-	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-82
Part 3e: Pond Design Parameters - Major Flow	Outlet				15	100	UK	Chance acceptable diameter is 10 min	4-02
Top of Berm Elevation	225.2	m		m		1		Data input	
Top of Emergency Spillway Elevation	225.2	m	-	m				Data input	
Provided Freeboard (@ spill elev.)	0.00	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment	0.00	·			0.000	1	i alieu	www.man.moebbaru above maximum design water level should be 0.3 III	- -00
Annual sediment loading	30	m³/year	Not defined	m³/year					6-14
Estimated sediment volume	0	m ³	Not defined	m ³					0-14
Number of years before clean-out required		10	NOL GETTINEG	1111					
	0			Vre			Epilod		
		yrs	Not defined	yrs	114		Failed		
Adjusted water quality storage Treatment Level	0 <3			yrs	114		Failed		

Hatch Mott MacDonald

2600 Lawrence Ave., 33-048-49

Municipal Address:

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1

MXCG



Part 1: General Information

Certificate of Approval:

Municipal Pond ID LSRCA Pond ID

Victoria Green

Dry pond

Lovers Creek Upper Lovers Creek Receiving Waters

Facility Type **Facility Function** Watershed

GIS Coordinates: Year: 44°19'4" N Constructed Latitude: 79°37'29" W

Receiver Type Design Value (CofA and/or Design MOE Min. Max. Criteria Notes Page Checklist Value Units Report) Units Design Design Check Part 2: Catchment Information Minimum drainage area should be 5 ha, preferred drainage area is >10 ha 4-80 Contributing Drainage Area 23.82 ha 5.0 ок ha Catchment Predominate Landuse Describe % / Is curb & gutter or ditch system pre-dominant atchment Imperviousness % 46.5 Dry ponds cannot achieve higher than basic treatment Fisheries Protection Level Basic Level Basic Level **Basic** Part 3a: Pond Design Parameters - Main Pond Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective Pond Fenced (vegetative barrier or fence) 4-60 No yes/no yes/no no Should describe the pond's function and warn of water level fluctuations, thin ice Interpretive & Warning signage 4-60 and other specific hazards yes/no yes/no yes Total SWM Pond Surface Area 8799 Measured at PP level or through mid section of the pond Pond Block Area / Pond Area (top surface) ratio PBA/PA PBA/PA 1.5 Check for retrofit feasibility - pond expansion not feasible if ratio <1.5105.9 Overall Pond Length Measured at top of berm m m 58.8 1.8 Overall Pond Width m I/w m I/w ength / Width Ratio 4-59 3 Depth of Extended Detention Storage Active storage depth for water quality/erosion control - 1.0 m preferred maximum 4-81 3 m Existing Extended Detention Storage 3-10 3002 Actual volume must equal or exceed the design volume ок NA 1.72 hours m Extended Detention Storage Drawdown Time hours 24 OK OK Based on Equation 4.11 4-58 Active Storage Depth (total storage @ spillway Elev.) 3 Total active storage including quantity control 4-81 Maximum Pond Side Slopes (h/v) (h/v)Maximum pond side slopes 4:1 or flatter 4-79 Part 3b: Pond Design Parameters - Forebay 4-80 Total Forebay Surface Area m² m² 2933.15 Forebay area should be less than 1/3 of pond surface area If multiple inlets
Minimum forebay depth is 1 m Forebay provided at each inlet yes/no yes/no 4-80 4-80 Max Depth of Forebay: m m F2 F1 m I/w Minimum forebay depth is 1 m Minimum forebay length to width ratio is 2:1 if single inlet m 4-80 Provided Length to Width Ratio: l/w 2 F2 I/w I/w 4-80 F1 F2 Forebay Berm: Submerged preferred for safety reasons yes/no yes/no yes yes ves/no ves/no Submerged preferred for safety reasons 4-80 Part 3c: Pond Design Parameters - Inlet 4-81 Number of pond inlets 1 OK Inlet 1 Inlet Pipe Diameter_1 525 Minimum inlet pipe diameter of 450mm 450 4-81 mm mm Inlet Pipe Slope_1
Inlet Pipe Length_1 % m % m ОК Inlet pipe slope preferred > 1% 4-81 130 A submerged inlet is not preferred 4-81 Submerged Inlet 1 No yes/no yes/no no OK OK Submerged Pipe Grade_1 Submerged pipe slope should be a minimum of 1 % Energy dissipation provided to prevent scour_1
Inlet Headwalls and Wingwalls_1
Part 3d: Pond Design Parameters - Outlet yes yes Only portions of forebay required to be hardened No ves/no yes/no Failed Failed 4-81 Biotechnical structures highly preferred 4-81 Yes 600 yes/no Outlet structure should be located in embankment for maintenance purposes Minimum outlet pipe diameter of 450mm (Cold climate min. requirement) yes/no yes 450 OK OK 4-82 Outlet Pipe Diameter 4-79 mm mm Outlet Pipe Slope 5.32 % % ОК Outlet pipe slope preferred > 1% (Cold climate min. requirement) 4-79 Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse Reverse Sloped Pipe Diameter, if provided slope pipe should have a minimum diameter of 150 mm mm mm 150 ок 83 Orifice Diameter
Part 3e: Pond Design Parameters - Major Flow Outlet mm 100 Smallest acceptable diameter is 75 mm 4-82 mm 75 Top of Berm Elevation
Top of Emergency Spillway Elevation m m 262.05 m Data input Provided Freeboard (@ spill elev.) 0.25 m m 0.300 ${\it Minimum\ freeboard\ above\ maximum\ design\ water\ level\ should\ be\ 0.3\ m}$ 4-60 Part 4: Sediment Annual sediment loading m³/year m³/year 6-14 stimated sediment volume 690 Number of years before clean-out required yrs Failed Adjusted water quality storage 126 Treatment Level
END OF CHECKLIST

By: Hatch Mott MacDonald Someth

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1



Part 1: General Information

Doral Business Park 9-4 Municipal Pond ID I-NW9

LSRCA Pond ID Certificate of Approval:

Receiving Water
Receiver Typ

Facility Type	Wet pond
Facility Function	-
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver Type	-

March Checkstal Checksta	Environmental Engineera & Scientists					1	Facil	ity Function	Lovers Creek	-
Conceptions Checkled Checkl	Municipal Address:			Year:				Watershed		4
Part 2 Californies Information Control of Part 2 Californies Information C	N of 2521, Bowman St., 020-164-80	Latitude:	44°18'18" N	Constructed:	-		Recei	ving Waters	Upper Lovers Creek	4
Part Cachening Commons		Longitude:	79°40'39" W	Retrofitted:	-		Re	ceiver Type	-	
Part Cachening Commons					1					
Command possessed and posses		Assessment		Design Value (CofA		Min.	Max.	Criteria	Notes	MOE
Land High Disclay Acta and Section of Report Part of Section of Register Part of Register	Checklist		Units		Units				Hotes	Page
Completing Primage Primage 10	Part 2: Catchment Information									
College										4-52
Column Part Section Part Pa			ha	-	ha	5.0		OK		. 02
Part of Personal Level Part of Section Par			%		%				Describe % / is curb & guiller or alich system pre-dominant	
Part				Normal	ł	Enhanced		Failed	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part	Part 3a: Pond Design Parameters - Main Pond									
Page	Pond Fenced (vegetative barrier or fence)									4-60
Part	· ·····	Yes	yes/no	-	yes/no	no		OK		
The DE State Park is the Description of the Descrip	Interpretive & Warning signage	-	ves/no	_	ves/no	ves		FALSE		4-60
December 1997 199	Total SWM Pond Surface Area	8744		-		,				
Courts Vision Framework 17						1.5		OK		
Largel, Wards Radio			1		ł				Measured at PP level or through mid section of the pond	
Accing primare from the control of t						2		Foiled	Professed is 4:1 to 5:1	4-59
Max Depth Personent Pool Personent P			 		ł		2			4-60
Existing Extended Description Stangers 1.00 m										4-60
Depth of Extended Denniford Storage										3-10
Extension Standard Calentinon Stange 7-997	Existing Permanent Pool Volume	3273	m³	-	m³	1610		OK	Compare Unit rate volume to actual design	3-10
Extension Extension Storage Extension Extension Storage Extension Extension Storage Extension Extension Storage Description In the storage of the storag	Depth of Extended Detention Storage	1.03	m		m		1.5	OK	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
Existing Exclared Detertion Storage The control of Design Parameters 1 miles 1 miles 1 miles 1 miles 2 mi		1.03					1.5	OK	Actual volume must equal or exceed the design volume / Design extended	
Togother Control Diseased in the Control of Storage Diseased in Time Togother Control of Storage Diseased In Time Togoth	Existing Extended Detention Storage									4.52;
Active Storage Depth total storage 6 epilway Eav) 1.4		7097	m ³	-	m³	867		ОК		3-10
Maximum Gode air Fernmanel Fool 3.0 1 (bV) 1 (bV) 3 (bV)						24				4-58
Meantum Provid Side Signage 1					1	_				4-60
Part 85: Pond Design Parameters - Forebay The Control of State Area Part				-		5				4-61 4-61
Total Forebay Swiften Area . m² .		3.5].1 (II/V)	-	. i (ii/v)		,	OK	waximum pond side slopes 5.1 or natter	4-01
Max Depth of Forebay: Fit 1.01		-	m²	-	m ²		2914.71	Failed	Forebay area should be less than 1/3 of pond surface area	4-56
Provided Length to Width Ratic: F1 1.8 W			yes/no		yes/no					4-56
Provided Langth to Wish Ratio: F1 1 8 W										4-55
Submerged Forbitsy Berm: F1 No yean yean yean yean yean yean yean yean							3			
Submerged Forebox Serm: F1 No Nex									will ill full forebay length to width fallo is 2.1 if single filet	
Part Sci: Pond Design Parameters - Inlet Number of pond index 1 Numb			1	-					Submerged preferred for safety reasons	4-58
Number of pond inlets 2		No	yes/no	-	yes/no				Submerged preferred for safety reasons	4-58
Inited Pipe Diameter_1 1000			1		l				Many the second in late was a second in the state of the	4.00
Intel Pipe Stope 1		2		-			1		More than one inlet may require increases in effective storage volumes	4-62
Intel Pipe Stope 1		1000	mm	-	mm	450		OK	Minimum inlet pipe diameter of 450mm	4-9
Submerged hield 1 Submerged piles (Cande, 1				-						4-9
Submerged Pipe Grade 1 No yesho yesho yeshon provided to prevent scour 1 No yesho yeshon yeshon or yeshon				-	m					
Energy dissipation provided to prevent scour_1 No yes'no y										4-63
Exposed Plot Channel 1 Intel Headwalls and Wingwalls 2 Intel Pipe Darmeter 2 Intel Pipe Darmeter 3 Intel Pipe Darmeter 3 Intel Pipe Darmeter 4 Intel Pipe Darmeter 5 Intel Pipe Darmeter 6 Intel Pipe Darmeter 7 Intel Pipe Darmeter 7 Intel Pipe Darmeter 7 Intel Pipe Darmeter 8 Intel Pipe Darmeter 9 Intel Pipe			1							4-63 4-63
Intel Headwalls and Wingwalls 1					•	yes	0			4-62
Inlet 2 Swale mm				-	-	yes	-			4-65
Intel Pipe Blometer 2 Intel Pipe Length .2 Intel Pi	, =	-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet Pipe Slope 2		O I			1	450			All discount of the state of th	4.04
Intel Pipe Length .2 Submerged Pipe Grade .2 Submerged Pipe Stande .2 No yesino				-	1					4-81 4-81
Submerged Niet 2 Submerged No yesino Submerged Piele Grade 2 Submerged Niet 2 Submerged Niet 2 Submerged Niet 2 Submerged Niet 4 Energy dissipation provided to prevent scour 2 No yesino yesin		-		-				OK	Titlet pipe slope preferred > 1 /8	4-01
Energy dissipation provided to prevent scour 2 Exposed Pilot Channel 2 No yes/no No No yes/no No yes/no No		No		-	ł	no			A submerged inlet is not preferred	4-81
Exposed Pilot Channel 2 No yes/no - ye	Submerged Pipe Grade_2	-		-		1		OK		4-81
Inlet Headwells and Wingwalls 2						yes				4-81
Part 3d: Pond Design Parameters - Outlet Ves Unitel tocated in embankment Ves Unitel tocated in embankment Ves No Unitel tocated in embankment No Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Slope Unitel Pipe Slope Ves/no Verezes/sope outlet recommended in copiunction with deeper outlet ampe to 450mm (Cold climate min. requirement) Verezes/sope outlet recommended in conjunction with deeper outlet ampe to 450mm (Cold climate min. requirement) Verezes/sope outlet recommended in conjunction with deeper outlet ampe to 450mm (Cold climate min. requirement) Verezes/sope outlet recommended for ponds gerater than 1 m deep. Perforated isser oritice Verefroated isser oritice Vere			-		-	voc	U			4-81
Outlet located in embarkment Stottom Draw Outlet No yes'no you'defancter if zo'no' (by of Barrie locatienter is zou'de diser outlets may be used in pond year perfered 1% (Cold climate min. requirement) Action to void year perfered 1% (Not defined yers') yes'n		140	yes/110	-	yes/110	yes	1	raned	2.0.00ou ordotaroo riigriiy protettoo	4-01
Bottom Draw Qullet No Outlet Pipe Diameter 500		Yes	yes/no		yes/no	yes		ОК	Outlet structure should be located in embankment for maintenance purposes	4-65
Outlet Pipe Slope Reverse Sloped Pipe Diameter, if provided . mm Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha If Submerged outlet depth Part 3e: Pond Design Parameters - Major Flow Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.) Annual sediment loading Estimated Sediment Volume Annual sediment Lovel Annual sediment Volume Annual sediment loading Estimated Sediment Volume Annual sediment Lovel Annual sediment Volume Annual sedim	Bottom Draw Outlet	No	yes/no	-	yes/no	yes				4-11
Reverse Sloped Pipe Diameter, if provided Orifice Diameter Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha Design Modifications for Cold				-						4-9
Orifice Diameter Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha Df T53.3 Df T53.3 Df Submerged outlet depth Submerged outlet depth Top of Berm Elevation Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.) Provided Freeboard (@ spill elev.) Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Top of gars before Pond clean-out required Adjusted water quality storage Treatment Level Dright Annual sediment Level Top of gars before Pond clean-out required Top of gars before Pond clean-out required storage Teatment Level Dright Annual sediment volume Top of the provided Freeboard (@ spill elev.) Top of gars before Pond clean-out required Top of germs Bevarion Top of		1.6	%	-	%	1		OK		4-9 4-66; 4
Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: In the part 3e: Post Post Post Post Post Post Post Post	Reverse Sloped Pipe Diameter, if provided	_	mm		mm	150		OK		4-66; 4
Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha Design Modifications for Cold Climates: alpha Design Modifications for Cold Climates: alpha Dif	Orifice Diameter	-		-			100			4-58
Design Modifications for Cold Climates: alpha Total Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berme Elevation Provided Freeboard (@ spill elev.) Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment Volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level Top of Serm Elevation Provided Freeboard (@ spill elev.) Part 4: Sediment Adjusted water quality storage Treatment Level Top of Serm Belevation Top of Elevation To			-						Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	
Df 753.3 mm MOE Equation 4.1 Submerged outlet depth - m MOE Equation 4.1 lee thickness Submerged outlets obvert to be set 150 mm lower than ice cover 4 Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berne Elevation 297.4 m - m MOE Equation 297.3 m - m MOE Equation 4.1 Data input Top of Emergency Spillway Elevation 297.3 m - m MOE Equation 4.1 Data input Provided Freeboard (@ spill elev.)	, , , , ,	-	mm	-	mm	50		OK		
Submerged outlet depth Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berm Elevation Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level Top of Berm Elevation Top of Emergency Spillway Elevatio	Design Modifications for Gold Climates: alpha	15	-							4-8
Submerged outlet depth - m m m MOE Equation 4.1 ox Submerged outlets obvert to be set 150 mm lower than ice cover Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berm Elevation Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Top description Top of Emergency Spillway Elevation Top of Emergency Spillway Elevatio	Df	753.3								4-8
Submerged outlet depth	h		mm		mm	MOE Equ	ation 4.1			4-8
Top of Berm Elevation 297.4 m — m Data input Top of Emergency Spillway Elevation 297.3 m — m 0.300 Failed Minimum freeboard above maximum design water level should be 0.3 m 4 Provided Freeboard (@ spill elev.) 0.1 m — m 0.300 Failed Minimum freeboard above maximum design water level should be 0.3 m 4 Part 4: Sediment Annual sediment loading 13.0 m³/year Estimated sediment volume 158.46 m³ Not defined Number of years before Pond clean-out required 798 yrs Not defined Adjusted water quality storage 191 m³/ha — 95.7 OK Target efficiency required storage Treatment Level 1 Not defined		-	1		1			ОК		4-9
Top of Emergency Spillway Elevation 297.3 m - m 0.300 Provided Freeboard (@ spill elev.) Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level Data input Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level should be 0.3 m 4 Minimum freeboard above maximum design water level			1		1		1		Data Sand	
Provided Freeboard (@ spill elev.) Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level O.1 m - m O.300 Failed Minimum freeboard above maximum design water level should be 0.3 m 4 Most defined m³ Not defined yrs OK Target efficiency required storage Treatment Level OK Target efficiency required storage				-						
Part 4: Sediment Annual sediment loading				-		0.300		Failed		4-60
Annual sediment loading 13.0 m³/year m³ yot defined Not defined Sumber of years before Pond clean-out required Adjusted water quality storage 191 m³/ha Treatment Level 1 Not defined Not defined Sumber of years before Pond clean-out required 191 m³/ha 95.7 OK Target efficiency required storage		0.1		<u> </u>		3.550	1	i andu		4-00
Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level		13.0	m ³ /year	Not defined	m³/year					6-14
Adjusted water quality storage Treatment Level 191 m³/ha - 95.7 OK Target efficiency required storage Not defined	Estimated sediment volume	158.46		Not defined						
Treatment Level 1 Not defined				Not defined	yrs	c= =			Town to Williams and the date	
			m³/ha	Not defined		95.7		OK	Larget efficiency required storage	
		_		Not delined			·			
	ELL OF OTTEONED									

Doral Dr., 020-166-80

END OF CHECKLIST

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1



Constructed

Part 1: General Information

#N/A

Doral Business Park 9-5 Municipal Pond ID I-NW10 LSRCA Pond ID

Certificate of Approval: Wet pond **Facility Type**

Watershed **Receiving Waters**

Facility Function

Receiver Type

Lovers Creek Upper Lovers Creek

Hatch Mott MXCG Municipal Address: **GIS Coordinates:** Year

44°18'12" N

79°40'57" W

Latitude:

Design Value (CofA MOE Min. Max. Criteria Notes and/or Design Page Checklist Value Units Report) Units Design Design Check Part 2: Catchment Information Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage 4-52 Contributing Drainage Area 5.0 7.65 ha ок Catchment Predominate Landuse Describe % / Is curb & gutter or ditch system pre-dominant atchment Imperviousness % 21.25 Fisheries Protection Level Enhanced Level Enhanced Level Enhanced ОК All streams within NVCA and LSRCA require Enhanced Protection (Level 1) Part 3a: Pond Design Parameters - Main Pond Standards for fencing vary from municipality to municipality, thorny vegetative Pond Fenced (vegetative barrier or fence) 4-60 yes/no yes/no barriers very effective Yes no Should describe the pond's function and warn of water level fluctuations, thin ice Interpretive & Warning signage 4-60 and other specific hazards yes/no yes/no yes Total SWM Pond Surface Area 5264 Measured at top of berm Pond Block Area / Pond Area (top surface) ratio Overall Pond Length Check for retrofit feasibility - pond expansion not feasible if ratio <1.5 Measured at PP level or through mid section of the pond 2.0 73.3 PBA/PA PBA/PA 1.5 m m Overall Pond Width m I/w ength / Width Ratio l/w 0.78 0.78 Average permanent pool depth should be between 1 - 2 m Average Permanent Pool depth m m m 2 Failed 4-60 m m³/ha Max Depth Permanent Pool Maximum permanent pool depth should be less than 3 m 4-60 m³/ha Permanent Pool Volume Unit 113 862 As per Table 3.2 (MOE) 3-10 Existing Permanent Pool Volume m^3 m^3 459 ок Compare Unit rate volume to actual design 3-10 Depth of Extended Detention Storage 4-60 Active storage depth for water quality/erosion control - 1.0 m preferred maximum 0.7 m m 1.5 ОК Actual volume must equal or exceed the design volume / Design extended 4.52: Existing Extended Detention Storage detention storage (Table 3.2) should exceed 40 m^3 /ha or 24 hr 25 mm Chicago 3-10 m³ m³ storm runoff volume (~ 40m3/ha used as a minimum criteria) 2610 306 ок Based on Equation 4.11 4-58 xtended Detention Storage Drawdown Time NA hours 48 hours Active Storage Depth (total storage @ spillway Elev.) Total active storage including quantity control m OK OK 4-60 Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum Maximum pond side slopes 3:1 or flatter Maximum Grade at Permanent Pool (h/v) 4-61 Maximum Pond Side Slopes 5.6 (h/v) (h/v) ОК Part 3b: Pond Design Parameters - Forebay 4-56 Total Forebay Surface Area 1754.77 Forebay area should be less than 1/3 of pond surface area m² Failed Forebay provided at each inlet Max Depth of Forebay: yes/no yes/no yes 1.08 If multiple inlets 4-56 Minimum forebay depth is 1 m 4-55 m m Minimum forebay depth is 1 m F2 0.98 m m Failed Provided Length to Width Ratio: l/w ок Minimum forebay length to width ratio is 2:1 if single inlet I/w F2 I/w I/w 2 Failed Submerged Forebay Berm: F1 yes/no yes/no Submerged preferred for safety reasons 4-58 yes F2 ок Yes yes/no yes/no yes Submerged preferred for safety reasons 4-58 Part 3c: Pond Design Parameters - Inlet More than one inlet may require increases in effective storage volumes 4-62 Number of pond inlets 1 Inlet 1 nlet Pipe Diameter_1 900 Minimum inlet pipe diameter of 450mm mm Inlet Pine Slone 1 % % ок Inlet pipe slope preferred > 1% 4-9 nlet Pipe Length_1 20.0 A submerged inlet is not preferred Submerged Inlet 1 No ves/no ves/no no ОК 4-63 Submerged pipe slope should be a minimum of 1 % Only portions of forebay required to be hardened Submerged Pipe Grade_1 4-63 Energy dissipation provided to prevent scour 1 4-63 Yes yes/no yes/no yes OK yes/no An exposed pilot channel is not preferred Exposed Pilot Channel 1 yes/no 0 4-62 Inlet Headwalls and Wingwalls_1 Biotechnical structures highly preferred No 4-65 yes/no yes/no yes 1.0 Depth at the inlet pipe should be a minimum of 1 m (Plunge pool) Inlet Area Depth 1 m m 3.0 4-65 Inlet Pipe Diameter 2 Swale mm mm 450 OK OK Minimum inlet pipe diameter of 450mm 4-81 Inlet Pipe Slope_2
Inlet Pipe Length_2 Inlet pipe slope preferred > 1% m m Submerged Inlet_2 yes/no yes/no A submerged inlet is not preferred 4-81 No no Submerged Pipe Grade_2 Submerged pipe slope should be a minimum of 1 % 4-81 % % OK Energy dissipation provided to prevent scour_2 exposed Pilot Channel_2 Yes yes/no yes/no Only portions of forebay required to be hardened 4-81 yes 0 An exposed pilot channel is not preferred yes/no yes/no Inlet Headwalls and Wingwalls 2 No yes/no ves/no yes Biotechnical structures highly preferred 4-81 Part 3d: Pond Design Parameters - Outlet Dutlet located in embank Yes ves/no ves/no ves ок Outlet structure should be located in embankment for maintenance purposes 4-65 Bottom Draw Outlet Failed Failed Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation 4-11 yes/no yes 450 Minimum outlet pipe diameter of 450mm (Cold climate min. requirement) Outlet Pipe Diameter 350 mm mm 4-9 Outlet pipe slope preferred > 1% (Cold climate min. requirement)
Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse Outlet Pipe Slope % % 4-9 4-66; Reverse Sloped Pipe Diameter, if provided mm mm 150 OK OK slope pipe should have a minimum diameter of 150 mm 69 mm Smallest acceptable diameter is 75 mm mm 100 4-58 Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice Perforated Riser Orifice Plate Dia., if riser pipe used 4-67 50 plate diameter should be greater than 50 mm in diameter mm mm Design Modifications for Cold Climates: alpha 15 Coefficient of ice growth 4-8 Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-4-8 753.3 2000 - City of Barrie MOE Equation 4.1 Ice thickness 4-8 412 mm Submerged outlet depth Submerged outlets obvert to be set 150 mm lower than ice cover 4-9 562 m m Part 3e: Pond Design Parameters - Major Flow Outlet
Top of Berm Elevation 302.6 Γορ of Berm Elevation Γορ of Emergency Spillway Elevation 302.6 m m m Data input ovided Freeboard (@ spill elev.) 0.0 0.300 $\dot{\text{Minimum}}$ freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment nnual sediment loading Not defined m³/yeaı Estimated sediment volume 412.08 m Not defined Number of years before Pond clean-out required 768 Not defined 153 85.0 Target efficiency required storage Adjusted water quality storage eatment Level Not defined

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

GIS Coordinates:

Latitude: 44°19'12" N

By: Hatch Mott MacDonald Scientific MacDonald

2706 Dempster Ave., 33-040-28

Municipal Address:

1988

Constructed:

Part 1: General Information Brandy Lane Municipal Pond ID No Data LSRCA Pond ID 6832-5F5JU4 Certificate of Approval: Wet pond Facility Type Water quality and quantity control **Facility Function Lovers Creek** Watershed Upper Lovers Creek Receiving Waters

	Longitude:	79°37'34" W	Retrofitted:	0		Re	ceiver Type	-	
		1	D	1					
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information	Value	Onito	пероп	Onits	Design	Design	Officer		
Contribution Desirance Association	45.40		0.45					Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage	4-52
Contributing Drainage Area Catchment Predominate Landuse	15.46	ha	0.45	ha	5.0		OK	area is >10 ha Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	50.25	%	-	%					
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		OK	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond								Standards for fencing vary from municipality to municipality, thorny vegetative	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	barriers very effective	4-60
Interpretive & Warning signage		voo/no		voo/no	V00		FALCE	Should describe the pond's function and warn of water level fluctuations, thin ice and other specific hazards	4-60
Total SWM Pond Surface Area	1698	yes/no m ²	-	yes/no m ²	yes		FALSE	Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio	1.1	PBA/PA	-	PBA/PA	1.5		Failed	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	59.93	m	-	m				Measured at PP level or through mid section of the pond	
Overall Pond Width Length / Width Ratio	18.4 3.3	m I/w	-	m I/w	3		ок	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	0.37	m	-	m	1	2	Failed	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool	0.42	m 3,, .	-	m 3 n	1	3	Failed	Maximum permanent pool depth should be less than 3 m	4-60
Permanent Pool Volume Unit Existing Permanent Pool Volume	9	m³/ha m³	- 55.2	m³/ha m³	2125		Failed	As per Table 3.2 (MOE) Compare Unit rate volume to actual design	3-10 3-10
Depth of Extended Detention Storage			00.2					Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
Depth of Extended Detention Glorage	-0.32	m	-	m		1.5	OK	. , , , , , , , , , , , , , , , , , , ,	4-00
Existing Extended Detention Storage								Actual volume must equal or exceed the design volume / Design extended detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52;
g	-7	m³	48.2	m³	618		Failed	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.4	m	-	m	_	2	OK	Total active storage including quantity control	4-60
Maximum Grade at Permanent Pool Maximum Pond Side Slopes	2.8 3.1	:1 (h/v) :1 (h/v)	-	:1 (h/v) :1 (h/v)	5	7	Failed OK	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum Maximum pond side slopes 3:1 or flatter	4-61 4-61
Part 3b: Pond Design Parameters - Forebay									
Total Forebay Surface Area	-	m ²	-	m ²		566.07	Failed	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet Max Depth of Forebay: F1	no -	yes/no m	-	yes/no m	1	3		If multiple inlets Minimum forebay depth is 1 m	4-56 4-55
F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	. 00
Provided Length to Width Ratio: F1	-	I/w	-	l/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	
F2 Submerged Forebay Berm: F1	-	l/w yes/no	-	I/w yes/no	2 yes			Submerged preferred for safety reasons	4-58
F2	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-58
Part 3c: Pond Design Parameters - Inlet		·		1					
Number of pond inlets Inlet 1	2		1	ļ		1		More than one inlet may require increases in effective storage volumes	4-62
Inlet Pipe Diameter 1	1000	mm	-	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-9
Inlet Pipe Slope_1	4.6	%	-	%	1		ок	Inlet pipe slope preferred > 1%	4-9
Inlet Pipe Length_1	14.4	m voo/no	-	m voo/no	no		OV	A submarged inlat is not professed	4-63
Submerged Inlet_1 Submerged Pipe Grade_1	No -	yes/no %	-	yes/no %	no 1		OK OK	A submerged inlet is not preferred Submerged pipe slope should be a minimum of 1 %	4-63
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-63
Exposed Pilot Channel_1	No	yes/no	-	yes/no		0	Failed	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1 Inlet Area Depth 1	Yes -	yes/no m	-	yes/no m	yes 1.0	3.0	OK Failed	Biotechnical structures highly preferred Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65 4-65
Inlet 2									
Inlet Pipe Diameter_2	300	mm	-	mm	450		Failed	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_2 Inlet Pipe Length 2	0.47 23.9	% m	-	% m	1		Failed	Inlet pipe slope preferred > 1%	4-81
Submerged Inlet_2	No	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_2	-	%	-	%	1		ОК	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2 Exposed Pilot Channel 2	No No	yes/no yes/no	-	yes/no yes/no	yes	0	Failed Failed	Only portions of forebay required to be hardened An exposed pilot channel is not preferred	4-81
Inlet Headwalls and Wingwalls_2	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet		1 .		1 .	·				
Outlet located in embankment Bottom Draw Outlet	Yes No	yes/no yes/no	-	yes/no yes/no	yes yes		OK Failed	Outlet structure should be located in embankment for maintenance purposes Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-65 4-11
Outlet Pipe Diameter	900	mm	750	mm	450		OK	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	0.2	%	-	%	1		Failed	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-9
Reverse Sloped Pipe Diameter, if provided		m.m.			150		OV	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse slope pipe should have a minimum diameter of 150 mm	4-66; 4- 69
Orifice Diameter	-	mm mm	200	mm mm	75	100	OK OK	Smallest acceptable diameter is 75 mm	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used								Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	
Design Modifications for Cold Climates: alpha	15	mm	150	mm	50		OK	plate diameter should be greater than 50 mm in diameter Coefficient of ice growth	4-8
,	15							Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971-	
Df	753.3							2000 - City of Barrie	4-8
h Submorgad outlet donth	412	mm		mm	MOE Equ	ation 4.1	CV	Ice thickness Submorrand outlets obvert to be set 150 mm lower than ice cover	4-8 4-9
Submerged outlet depth Part 3e: Pond Design Parameters - Major Flow	Outlet	m		m	562		OK	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Top of Berm Elevation	267.4	m	150	m				Data input	
Top of Emergency Spillway Elevation	267.28	m	-	m	0.000			Data input	
Provided Freeboard (@ spill elev.) Part 4: Sediment	0.1	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Annual sediment loading	24.6	m³/year	Not defined	m³/year					6-14
Estimated sediment volume	-49.55	m³	Not defined	m³					
Number of years before Pond clean-out required Adjusted water quality storage	0 41	yrs m³/ha	Not defined	yrs	141.3		Failed	Target efficiency required storage	
Treatment Level	<3	III /IIa	Not defined	1	141.3		ralled	raiget emoleticy required storage	
END OF CHECKLIST									



Part 1: General Information

Pond Name Village North

As per Stormwater Management Planning and Design	Inni	sfil		Municip	oal Pond ID	10-2		
						LSR	CA Pond ID	-
STORMWATER MANAGEMENT MASTER	PLAN - PAR	Т 1				Certificate o	f Approval:	-
By: Hatch Mott						F	acility Type	Dry pond
Hatch Mott MacDonald Statement South						Facili	ty Function	-
Municipal Address:	GIS Coordinate	s:	Year:		Ī		Watershed	Lovers Creek
2856 Dempster Ave., 32-020-02	Latitude:	44°19'44" N	Constructed:	1988		Receiv	ing Waters	Upper Lovers Creek
	Longitude:	79°37'51" W	Retrofitted:	0	Receiver Type			-
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes
Part 2: Catchment Information					3			
Contributing Drainage Area	30.97	ha	_	ha	5.0		ок	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha
Catchment Predominate Landuse	-		-					Describe % / Is curb & gutter or ditch system pre-dominant
Catchment Imperviousness %	48.5	%		%				
Fisheries Protection Level	Basic	Level	Basic	Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment
Part 3a: Pond Design Parameters - Main Pond				1				
Devide the second (second second seco								Standards for fencing vary from municipality to municipality, thorny vegetative

	Assessment		Design Value (CofA and/or Design		Min.	Max.	Criteria	Notes	MOE
Checklist	Value	Units	Report)	Units	Design	Design	Check		Page
Part 2: Catchment Information					, i				
Contributing Drainage Area	30.97	ha		ha	5.0		ок	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha	4-80
Catchment Predominate Landuse	-							Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	48.5	%	-	%					
Fisheries Protection Level	Basic	Level	Basic	Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment	
Part 3a: Pond Design Parameters - Main Pond	· ·								
Dand Farrad (constative begins on farras)								Standards for fencing vary from municipality to municipality, thorny vegetative	4.00
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	barriers very effective	4-60
Interpretive & Warning signage				-				Should describe the pond's function and warn of water level fluctuations, thin ice	4.60
Interpretive & Warning signage	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	12620	m ²	-	m ²				Measured at PP level or through mid section of the pond	
Pond Block Area / Pond Area (top surface) ratio	1.9	PBA/PA	-	PBA/PA	1.5		ОК	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	116.7	m	-	m				Measured at top of berm	
Overall Pond Width	45.2	m	-	m					
Length / Width Ratio	2.6	l/w	-	l/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Depth of Extended Detention Storage								Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
Departor Extended Determion oforage	0.8	m	•	m		3	ок	riouve diorage departer mater quality/erector contact. The impresented maximum	+ 01
Existing Extended Detention Storage									3-10
	1965	m³	-	m ³	4088		Failed	Actual volume must equal or exceed the design volume	
Extended Detention Storage Drawdown Time	0	hours		hours	24		ок	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.80	m		m	1	3	ОК	Total active storage including quantity control	4-81
Maximum Pond Side Slopes	3.1	:1 (h/v)		:1 (h/v)	4		Failed	Maximum pond side slopes 4:1 or flatter	4-79
Part 3b: Pond Design Parameters - Forebay		• ` ′		` ′					
Total Forebay Surface Area	-	m²		m ²		4207	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet	no	yes/no	-	yes/no				If multiple inlets	4-80
Max Depth of Forebay: F1	-	m		m	1	3		Minimum forebay depth is 1 m	4-80
F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	4-80
Provided Length to Width Ratio: F1	-	l/w	-	l/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	4-80
F2	-	l/w	-	l/w	2				4-80
Forebay Berm: F1	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-80
F2	-	yes/no	•	yes/no	yes			Submerged preferred for safety reasons	4-80
Part 3c: Pond Design Parameters - Inlet		_							
Number of pond inlets	2		-			1		More than one inlet may require increases in effective storage volumes	4-81
Inlet 1		,							
Inlet Pipe Diameter_1	1200	mm	-	mm	450		OK	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_1	11.92	%	-	%	1		OK	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_1	41.1	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	A submerged inlet is not preferred	4-81
Submerged Pipe Grade_1	-	%	•	%	1		ОК	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_1	No	yes/no	•	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Inlet 2		1							
Inlet Pipe Diameter_2	Swale	mm	•	mm	450		ок	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_2	-	%	-	%	1		OK	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_2	-	m	-	m					
Submerged Inlet_2	No	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Submerged Pipe Grade_2	-	%	-	%	1		OK	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_2	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_2	No	yes/no	-	yes/no		0	Failed	An exposed pilot channel is not preferred	
Inlet Headwalls and Wingwalls_2	No	yes/no	•	yes/no	yes		Failed	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet	1		1						
Outlet located in embankment	0	yes/no	•	yes/no	yes		FALSE	Outlet structure should be located in embankment for maintenance purposes	4-82
Outlet Pipe Diameter	300	mm	-	mm	450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-79
Outlet Pipe Slope	0.63	%	-	%	1		Failed	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79
Reverse Sloped Pipe Diameter, if provided								Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-79, 4-
' '	-	mm	•	mm	150		OK	slope pipe should have a minimum diameter of 150 mm	83
Orifice Diameter		mm	-	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-82
Part 3e: Pond Design Parameters - Major Flow		1							
Top of Berm Elevation	267.5	m	-	m				Data input	
Top of Emergency Spillway Elevation	267	m	-	m	0.000			Data input	
Provided Freeboard (@ spill elev.)	0.50	m	-	m	0.300		OK	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment		3.		3,					
Annual sediment loading	46	m³/year	-	m³/year					6-14
Estimated sediment volume	290.14	m³	-	m³					
Number of years before clean-out required		1/20	-	yrs			#VALUE!		
	#VALUE!	yrs		,					
Adjusted water quality storage	0	m³/ha	-	,	132				
			-	,	132				

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific Representations as Scientific Representation Representation

Municipal Address: 2877 Ireton St., 043-153-50 GIS Coordinates: Latitude: 44°21'0" N Constructed: #N/A

Part 1: General Information McKee 10-3 Municipal Pond ID I-N36 LSRCA Pond ID 3-0464-99-006 Certificate of Approval: Facility Type Wet pond Water quality control **Facility Function** Innisfil Creeks Watershed Mooselanka Ck (Ck # 2) Receiving Waters

	Longitude:	79°32'12" W	Retrofitted:	0		Re	ceiver Type		
	Longitude.		Tietroniteu.		L	110	ociver Type		
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information									
Contributing Drainage Area	11.76	ha	9.36	ha	5.0		ок	Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha	4-52
Catchment Predominate Landuse Catchment Imperviousness %	35	%	-	%				Describe % / Is curb & gutter or ditch system pre-dominant	
Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		ок	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part 3a: Pond Design Parameters - Main Pond				l				Oter that to the first of the second of the	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
Interpretive & Warning signage	-	yes/no	-	yes/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	3468	m ²	-	m²				Measured at top of berm	
Pond Block Area / Pond Area (top surface) ratio Overall Pond Length	2.2 97.91	PBA/PA m	-	PBA/PA m	1.5		OK	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5 Measured at PP level or through mid section of the pond	
Overall Pond Width	22.15	m	-	m				measured at FF level of through this section of the polici	
Length / Width Ratio	4.4	l/w	-	I/w	3		ок	Preferred is 4:1 to 5:1	4-59
Average Permanent Pool depth	1.38	m	-	m	1	2	OK	Average permanent pool depth should be between 1 - 2 m	4-60
Max Depth Permanent Pool Permanent Pool Volume Unit	1.68 108	m m³/ha	-	m m³/ha	1	3	OK	Maximum permanent pool depth should be less than 3 m As per Table 3.2 (MOE)	4-60 3-10
Existing Permanent Pool Volume	1276	m ³	-	m ³	1176		ок	Compare Unit rate volume to actual design	3-10
Depth of Extended Detention Storage								Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
Existing Extended Detention Storage	-0.38	m	-	m		1.5	ок	Actual volume must equal or exceed the design volume / Design extended detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	4.52;
Existing Extended Esternion Storage	-581	m³	912	m ³	470		Failed	storm runoff volume (~ 40m3/ha used as a minimum criteria)	3-10
Extended Detention Storage Drawdown Time	NA	hours	36	hours	24	48	Failed	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	0.8	m 4 (h h h	-	m	_	2	OK .	Total active storage including quantity control	4-60
Maximum Grade at Permanent Pool Maximum Pond Side Slopes	3.4 4.7	:1 (h/v) :1 (h/v)	-	:1 (h/v) :1 (h/v)	5	7	Failed OK	Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum Maximum pond side slopes 3:1 or flatter	4-61 4-61
Part 3b: Pond Design Parameters - Forebay		(11/4)		(, .,			OK .	maining point did dispose on a maker	
Total Forebay Surface Area	-	m²	-	m ²		1155.85	Failed	Forebay area should be less than 1/3 of pond surface area	4-56
Forebay provided at each inlet Max Depth of Forebay: F1	Yes 1.88	yes/no m	no -	yes/no	1	3	ок	If multiple inlets Minimum forebay depth is 1 m	4-56 4-55
F1 F2	-	m	-	m m	1	3	OK	Minimum forebay depth is 1 m	4-55
Provided Length to Width Ratio: F1 F2	1.5	I/w I/w	15/x -	l/w l/w	2 2		Failed	Minimum forebay length to width ratio is 2:1 if single inlet	
Submerged Forebay Berm: F1 F2	Yes	yes/no	-	yes/no	yes		ОК	Submerged preferred for safety reasons	4-58 4-58
Part 3c: Pond Design Parameters - Inlet	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-58
Number of pond inlets	1		-			1	ок		4-62
Inlet 1	750		4450 750	1	450			Minimum into the discrete of 450	4.0
Inlet Pipe Diameter_1 Inlet Pipe Slope 1	750 1.22	mm %	1150 x 750	mm %	450 1		OK OK	Minimum inlet pipe diameter of 450mm Inlet pipe slope preferred > 1%	4-9 4-9
Inlet Pipe Length_1	24.3	m	-	m	-				
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	A submerged inlet is not preferred	4-63
Submerged Pipe Grade_1 Energy dissipation provided to prevent scour_1	Yes	% yes/no	-	% yes/no	1 yes		OK OK	Submerged pipe slope should be a minimum of 1 % Only portions of forebay required to be hardened	4-63 4-63
Exposed Pilot Channel 1	No	yes/no	-	ves/no	yes	0	Failed	An exposed pilot channel is not preferred	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	-	yes/no	yes		ОК	Biotechnical structures highly preferred	4-65
Inlet Area Depth_1	_	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Part 3d: Pond Design Parameters - Outlet Outlet located in embankment	Yes	yes/no	_	yes/no	yes		ОК	Outlet structure should be located in embankment for maintenance purposes	4-65
Bottom Draw Outlet	No	yes/no	-	yes/no	yes		Failed	Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation	4-11
Outlet Pipe Diameter	300	mm	300	mm	450		Failed	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-9
Outlet Pipe Slope	0	%	-	%	1		Failed	Outlet pipe slope preferred > 1% (Cold climate min. requirement) Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-9 4-66; 4-
Reverse Sloped Pipe Diameter, if provided	_	mm	_	mm	150		ок	slope pipe should have a minimum diameter of 150 mm	4-66; 4- 69
Orifice Diameter	-	mm	95	mm	75	100	ок	Smallest acceptable diameter is 75 mm Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	_	mm	-	mm	50		ок	plate diameter should be greater than 50 mm in diameter	4-67
Design Modifications for Cold Climates: alpha	15							Coefficient of ice growth	4-8
Df	753.3							Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie	4-8
h	412	mm		mm	MOE Equ	ation 4.1		Ice thickness	4-8
Submerged outlet depth	-	m		m	562		ок	Submerged outlets obvert to be set 150 mm lower than ice cover	4-9
Part 3e: Pond Design Parameters - Major Flow								Data input	
Top of Berm Elevation Top of Emergency Spillway Elevation	222.4 222.34	m m	-	m m				Data input Data input	
Provided Freeboard (@ spill elev.)	0.06	m	#VALUE!	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment		3.	N. C. C.	3.					0.11
Annual sediment loading Estimated sediment volume	7.1 -11.1	m³/year m³	Not defined Not defined	m³/year m³					6-14
Number of years before Forebay A clean-out required			110t definied						
Number of years before Pond clean-out required	70	yrs	-	yrs			ок		
Adjusted water quality storage Treatment Level	148	m³/ha	Not defined		115		ОК	Target efficiency required storage	
END OF CHECKLIST	0	%	Not defined						

As per Stormwater Management Planning and Design Manual (March 2003)



Part 1: General Information

Monrepos (Bay Point Estates) Municipal Pond ID

I-N83 LSRCA Pond ID Certificate of Approval: Facility Type Wet pond

Facility Function Innisfil Creeks Watershed Kempenfelt Bay

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific MacDonald

GIS Coordinate:	s:	Year:		
Latitude:	44°22'23" N	Constructed:	2004	
Longitude:	79°36'6" W	Retrofitted:	0	
	,			
	Latitude:		Latitude: 44°22'23" N Constructed:	

	Municipal Address:	GIS Coordinate		Year:	0004			Watershed	Vermonfelt Box	A
March Marc	1729 Wilkonson St., 54-200-00	Latitude:	44°22"23" N	Constructed:	2004		Recei	ving Waters	Kempenfelt Bay	4
Page		Longitude:	79°36'6" W	Retrofitted:	0		Re	ceiver Type	•	
Page						_				
Page						Min	May	Oultonia		MOE
Fig. 2 1.5 1	Charlist		Unito		Unito				Notes	
Comment Section Comment Comm		value	Units	нероп)	Units	Design	Design	Check		J-
Companying Description 1974 197	Part 2. Catchinient information		1						Minimum drainage area should be 5 ha to sustain wet nond, preferred drainage	
Company Comp	Contributing Drainage Area	37.43	ha	-	ha	5.0		ОК		4-52
Face in Principle Lead Principle Lea		-		-		0.0		o		
Part 32		40	%		%					
Pack Proceedings Process Pro	Fisheries Protection Level	Enhanced	Level	Enhanced	Level	Enhanced		OK	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
Part	Part 3a: Pond Design Parameters - Main Pond		,							
Part	Pond Fenced (vegetative barrier or fence)									4-60
Part	The state of the s	Yes	yes/no	•	yes/no	no		ок	,	
Total Staffer Area Total S	Interpretive & Warning signage	_	voc/no	_	voc/no	Voc		EALCE		4-60
Fired Black Age Part Age ago partice) ago Fired Plance Age Part Age ago partice) ago Fired Plance Age ago partice) ago par	Total SWM Pond Surface Area	4064				yes		FALSE		
Contact Cont				-		1.5		OK		
Court Provided 1.5				-				O.C		
Ansaige, Premanent Pool Supplies										
Max Light Personner Hould Value	Length / Width Ratio	1.6	I/w	-	l/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Permanent Per Visione Control Contro	Average Permanent Pool depth		m	-	m	1		Failed	Average permanent pool depth should be between 1 - 2 m	
Finding Previous						1	3	ок		
Section of Extended Determine Surgery Section of Extended Determine Dete										
Accorded Detention Storage Company Storage	Existing Permanent Pool Volume	1477	m°	-	m°	4210		Failed	Compare Unit rate volume to actual design	3-10
According Frounded Tollerifon Storage According Frounded Tollerifon Storage Consequence According Frounded Tollerifo	Depth of Extended Detention Storage	-0.14	m	_	m		1.5	OK	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-60
Search Content Conte		-0.14	""	-			1.5	UK		
Age	Existing Extended Detention Storage								, ,	
All Design Family Control Tender Control Con	Zasang Extended Daterition Oldrage	-228	m ³		m ³	1.497		Failed		3-10
Active Description Septime (Descriptions) Expert (Descriptions) 4.9	Extended Detention Storage Drawdown Time						48			4-58
Assembly 1 10 1 10 1 10 1 10 1 1										
Manument Print Strick Stopps Farmerienes - Foreigness			1			5				
Part 315 Tond Design Parameters - Forebay Tond Ton										4-61
Feebbar provided an each hint Mour Depth of Front Provided Feebbar Feebba Feebbar Feebbar Feebbar Feebbar Feebbar Feebbar Fe										
Max Depth of Forebary File 1			1				1354.56	OK		
Part State Part P					•		_			
Provided regard provided protein by Width Flatio Fig. 1			1					Failed		4-55
Submoraged Forebox Bern: Fiz No years							3	01/		
Submerger Front Sur- Provide Control Fig. 10			1					OK	Minimum forebay length to width ratio is 2:1 if single inlet	
## 1			1					Eailed	Submarged preferred for safety reasons	1-58
Part Str. Part Str. Part Str. Part Str. Part Str.					-	-		raileu		
Name Proceedings Process Pro			yesine		yeshio	yes	Į.		Cabinorgea prototrea tor carety reacons	4 00
Index 1		2		-			1		More than one inlet may require increases in effective storage volumes	4-62
Intelligible Signary 1.1.1 %			,							
Intelligent Langiff_1	Inlet Pipe Diameter_1	600	mm	-	mm	450		ок	Minimum inlet pipe diameter of 450mm	4-9
Submiraged Pine Carded 1					%	1		ок	Inlet pipe slope preferred > 1%	4-9
Submiregior Pipe Grade 1										
Energy dissipation provided to prevent scour_1 No										
Exposed PRic Channel 1 No			1						0 11 1	
Math Headwalls and Wingwalls 1						yes				
Intel A tea Depth					-	V00	U			
Inlex Pipe Dameter - 2 900			1 -				3.0			
Intell Pipe Diameter 2 900			""	-	111	1.0	3.0	raileu	Depth at the linet pipe should be a minimum of 1 m (Fidinge poor)	4-03
Intel Pipe Stope 2		900	mm		mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-81
Intel Pipe Cardin 2 Submerged Pipe Cardin 2 No yesho Submerged Pipe Cardin 2 No yesho Submerged Pipe Cardin 2 No yesho Y			1							
Submerged Pipe Grade 2 No yesho yesho provided to prevent sour 2 No yesho yesho peshod possibult be a minimum of 1 % 4.81 Energy dissipation provided to prevent sour 2 No yesho yes	Inlet Pipe Length_2	50.0	m	-	m					
Energy dissipation provided to prevent scour. 2 No yesho yesho - yesho - yesho		No	yes/no	-	yes/no	no			A submerged inlet is not preferred	4-81
Exposed Pilot Channel, 2 No yes'no intel Headwalds and Wingrowalls 2 Yes yes'no intel Headwalds and Wingrowalls 2 Yes yes'no intel Pipo Blameter, 3 1.60 % 1.80 % 1.80 No yes'no 1.80			1	-	%	1				
Intel Headwalls and Wingwalls 2					•	yes				4-81
Inlet 3			1 -				0			4.04
Intel Pipe Diameter 3 400 mm		Yes	yes/no	•	yes/no	yes	Į.	OK	Biotechnical structures nignly preferred	4-81
Intel Pipe Longh 3		400	mm		mm	450		Failed	Minimum inlet nine diameter of 450mm	4-81
Intell Pipe Length 3									• •	
Submerged finet 3			1			•		O.K	5.55 6.0.0.00 2 1.70	, 51
Submerged Pipe Grade 3 Exposed Pilor Channel 5 Exposed Pilor Channel 3 Exposed Pilor Channel 5 Exposed			1	-		no			A submerged inlet is not preferred	4-81
Energy dissipation provided to prevent scour 3								ок		
Exposed Pilot Channel. 3 not preferred intel Headwalfs and Wingwalfs. 3 Yes yes in o Head Headwalfs and Wingwalfs. 3 Yes yes in o Headwalfs. 3 Yes i						-				
Part 3d: Pond Design Parameters - Outlet Ves yes/no Outlet located in embankment No Outlet (Diameter Outlet (Diameter) (Diameter Outlet (Diameter Outlet (Diameter) (Diameter) (Diameter) (Diameter Outlet (Diameter) (Diameter Outlet (Diameter) (Diameter Outlet (Diameter) (Diameter Outlet (Diameter) (Diameter) (Diameter) (Diameter) (Diameter) (Diameter) (Diameter Outlet (Diameter)			yes/no		yes/no		0		An exposed pilot channel is not preferred	
Outlet located in embankment Setom Draw Outlet Outlet Pipe Diameter Outlet Pipe Diameter, if provided Outlet Pipe Diameter, if provided On mm Outlet Pipe Diameter, if provided Outlet Pipe Slope Pipe Pipe Outlet Pipe Slope Pipe Pipe Outlet Pipe Slope Pipe Pipe Slope Outlet Recommended in conjunction with deep pond gerater than 1 meap. Requirement) Outlet Pipe Slope Pipe Pipe Slope Pipe Pipe Vipe Slope Pipe Should have a minimum diameter of 150 mm Outlet Pipe Slope Pipe Should have a minimum diameter of 150 mm Outlet Pipe Slope Pipe Should have a minimum diameter of 150 mm Outlet Pipe Slope Pipe Should have a minimum diameter of 150 mm Outlet Pipe Slope Pipe Slope Outlet Recommended in conjunction with deep Pipe Pipe Slope Pipe Slope Outlet Recommended In conjunction of Slope Pipe Slope Outlet Recommended In conjunction of Slope Pipe Slope Outlet Pipe Slope Pipe Slope Outlet Pipe Slope Outlet Slope Outlet Pipe Slope Pipe Slope Pipe Slope Pipe Slope Pipe Slope Pip		Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Bottom Draw Outlet Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Bishope Outlet Pipe Bishope Orifice Diameter, if provided Orifice Diameter Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: In March 15 Dif 753.3 In March 15 Submerged outlet depth Part 3e: Pond Design Parameters - Major Flow Outlet Pipe Sidnent Design Modifications Outlet Pipe Sidnent Outlet pipe slowed have a minimum diameter of 150 mm of search of 150 mm of 150 mm of search of 150 mm of 150		.,	1							
Outlet Pipe Diameter Outlet Pipe Slope Pipe Diameter, if provided Outlet pipe slope preferred > 1% (Cold climate min. requirement) A-9					-	-				
Outlet Pipe Slope Reverse Sloped Pipe Diameter, if provided			1 -		-					
Reverse Sloped Pipe Diameter, if provided - mm - mm 150 Orifice Diameter - mm - mm 75 100 Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha Df 753.3 Name - mm 50 Design Modifications for Cold Climates: alpha Df 753.3 Name - mm MOE Equation 4.1 Not defined Part 4: Sediment Annual sediment loading Estimated sediment volume Adjusted water quality storage Adjusted water quality storage Teatment Level A 66, 4 A-66, 4 A-69 OK Slope pipe should have a minimum diameter of 150 mm A 50 OK Simplest acceptable diameter is 75 mm A-58 Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice A-67 A-68 A-69 OK Solpe pipe should have a minimum diameter of 150 mm A-58 Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice A-69 OK Smallest acceptable diameter is 75 mm Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice A-69 A-69 OK Smallest acceptable diameter is 75 mm Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice A-67 A-67 A-68 A-69 OK Smallest acceptable diameter is 75 mm Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice A-67 A-68 A-67 A-67 A-68 A-67 A-69 A-67 A-68 A-69 A-67 A-68 A-67 A-8 A-8 A-8 A-8 A-8 A-8 A-8 A-										
Perforated Riser Orifice Diameter, it provided Perforated Riser Orifice Plate Dia., it riser pipe used Design Modifications for Cold Climates: alpha Df 753.3 Df 753.3 N N N N N N N N N N N N N N N N N N	, ,	0.0	/0	-	/6			raneu		
Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha Dif 753.3 h 412 mm m m MOE Equation 4.1 submerged outlet depth m m 562 N Submerged outlets obvert to be set 150 mm lower than ice cover 4-8 Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berm Elevation 7 provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Teatment Level Perforated Riser Orifice Plate Dia., if riser pipe used - mm	Reverse Sloped Pipe Diameter, if provided	_	mm		mm	150		ОК		
Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha Dif T53.3 h 412 mm m MOE Equation 4.1 Top of Berm Elevation Top of Bermegency Spillway Elevation Perforated Riser Orifice Plate Dia., if riser pipe used in pond <= 1 m deep. Perforated riser orifice plate diameter should be greater than 50 mm in diameter Coefficient of ice growth Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie Ice thickness Submerged outlet depth Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation Top of Berm Elevation Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.) Pom Top of Berm Elevation Top of Berm Elevation Top of Berm Elevation Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Not defined Treatment Level Treatment Level Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice plate in pond in plane	Orifice Diameter	-	1	-			100			
Performation riser Office Plate Dist., if riser pipe used Design Modifications for Cold Climates: alpha Df 753.3 Alpha Df 753.3 Bubmerged outlet depth Al12 Bubmerged outlet depth Top of Berm Elevation Top of Emergency Spillway Elevation Part 4: Sediment Annual sediment loading Estimated sediment volume Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level Top of defined mrs. Annual sediment loading Top of years before Pond clean-out required Treatment Level Top of years before Pond clean-out required storage Treatment Level Top of Emergency Spillway Elevation Top of Emer										
Df 753.3 h 4.8 Submerged outlet depth - m 562 OK Submerged outlets obvert to be set 150 mm lower than ice cover 4-9 Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berm Elevation Top of Emergency Spillway Elevation 236.03 m - m 0.300 Failed Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment loading Sediment volume Sediment volume Sediment volume Of years before Pond clean-out required Adjusted water quality storage Treatment Level Sediment Sediment Sedime		-	mm	-	mm	50		OK	plate diameter should be greater than 50 mm in diameter	4-67
Top of Berm Elevation 236.03 m m on mode and the spill elev.) Part 3e: Pond Design Parameters - Major Flow Outlet Top of Emergency Spillway Elevation 236.03 m on mode and the spill elev.) Provided Freeboard (@ spill elev.) Annual sediment loading 34.6 m on mode and the sediment volume 263.88 m on the sediment vol	Design Modifications for Cold Climates: alpha	15								4-8
A submerged outlet depth A submerged outlet obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be set 150 mm lower than ice cover A submerged outlets obvert to be	Df									4-8
Submerged outlet depth - m 562 OK Submerged outlets obvert to be set 150 mm lower than ice cover 4-9 Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berm Elevation 236.03 m - m Data input Top of Emergency Spillway Elevation 236.03 m - m Data input Provided Freeboard (@ spill elev.) -0 m - m 0.300 Failed Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Annual sediment loading 34.6 m³/year m³ Not defined m³/year before Pond clean-out required 0 yrs Not defined yrs Not defined yrs Treatment Level -3 Not defined State - m³/ha - 124 Failed Target efficiency required storage						MODE	otion 4.1			
Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berm Elevation 236 m - m Data input Top of Emergency Spillway Elevation 236.03 m - m Data input Provided Freeboard (@ spill elev.) -0 m - m 0.300 Failed Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Annual sediment loading 34.6 m³/year Adjusted water quality storage 79 m³/ha - 124 Failed Target efficiency required storage Treatment Level 79 Not defined Modelined Storage 124 Failed Target efficiency required storage		412	1				ation 4.1	OV		
Top of Berm Elevation 236 m - m Data input Top of Emergency Spillway Elevation 236.03 m - m 0.300 Falled input Provided Freeboard (@ spill elev.) - 0 m 0.300 Falled Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Annual sediment loading 34.6 m³/year Adjusted sediment volume 263.88 m³ Not defined yrs Not defined yrs Adjusted water quality storage 79 m³/ha - 124 Failed Target efficiency required storage Treatment Level - Not defined Not defined Yrs Not defined Not defined Yrs Not defined Yrs Not defined Not defined Yrs Not defined Yrs Not defined Not defined Not defined Not defined Yrs Not defined Not defined Not defined Yrs Not defined Not defined Yrs Not defined Yrs Not defined Yrs Not defined Not defined Yrs Not defined Yrs Not defined Yrs Not defined Not defined Yrs Not defined		Outlet	m		m	562		OK	Submergea outlets obvert to be set 150 mm lower than ice cover	4-9
Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level Page 1.			m		m				Data input	
Provided Freeboard (@ spill elev.) Part 4: Sediment Annual sediment loading Estimated sediment volume Number of years before Pond clean-out required Adjusted water quality storage Treatment Level Provided Freeboard (@ spill elev.) m 0.300 Falled Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Minimum freeboard above maximum design water level should be 0.4 m 4-60 Minimum freeboard above maximum design water level should be 0.4 m 4-60 Minimum freeboard above maximum design water level should be 0.4 m 4-60 Minimum freeboard above maximum design water level should be 0.4 m 4-60 Minimum freeboard above maximum design water										
Part 4: Sediment Annual sediment loading Annual sediment volume Sedimen			4			0.300		Failed	•	4-60
Annual sediment loading Stimated sediment volume Stimated sediment volume Dumber of years before Pond clean-out required Adjusted water quality storage Treatment Level Treatment Level Treatment Level Treatment loading 34.6 Not defined Not defined Not defined yrs Not defined yrs Total freatment Level Treatment loading Not defined Not defined Not defined Yrs Not defined Yrs Treatment Level Treatment loading Malyear			·				1			. 50
Estimated sediment volume 263.88 m³ Not defined m³ Number of years before Pond clean-out required 0 yrs Not defined yrs Adjusted water quality storage Treatment Level Not defined Not defined Target efficiency required storage		34.6	m ³ /year	Not defined	m ³ /year					6-14
Number of years before Pond clean-out required O yrs Not defined yrs Adjusted water quality storage Treatment Level Not defined Target efficiency required storage Not defined										
Adjusted water quality storage 79 m³/ha - 124 Failed Target efficiency required storage Treatment Level Not defined		0	yrs							
			m³/ha	•		124		Failed	Target efficiency required storage	
END OF CHECKLIST		<3		Not defined						
	END OF CHECKLIST									

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific MacDonald

Municipal Address:
W of 1708, Wilkonson St, 54-201-00 GIS Coordinates: Latitude: 44°22'10" N Constructed: 1988

Part 1: General Information Monrepos (Bay Point Estates) 13-2 Municipal Pond ID No Data LSRCA Pond ID 7553-5SZHFP Certificate of Approval: Facility Type Dry pond **Facility Function** Innisfil Creeks Watershed Kempenfelt Bay **Receiving Waters**

	Longitude:	79°36'29" W	Retrofitted:	0	Receiver Type		ceiver Type	-	1
	,						7,1		
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information		1		1					
Contributing Drainage Area	22.37	ha	_	ha	5.0		ок	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha	4-80
Catchment Predominate Landuse	- 22.31	lia .	-	IIa	5.0		OK	Describe % / Is curb & gutter or ditch system pre-dominant	
Catchment Imperviousness %	38	%	-	%					
Fisheries Protection Level	Basic	Level	-	Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment	
Part 3a: Pond Design Parameters - Main Pond		,							
Pond Fenced (vegetative barrier or fence)	V							Standards for fencing vary from municipality to municipality, thorny vegetative	4-60
	Yes	yes/no	-	yes/no	no		ОК	barriers very effective Should describe the pond's function and warn of water level fluctuations, thin ice	
Interpretive & Warning signage	_	yes/no	_	ves/no	yes		FALSE	and other specific hazards	4-60
Total SWM Pond Surface Area	5311	m²	-	m ²	,			Measured at PP level or through mid section of the pond	
Pond Block Area / Pond Area (top surface) ratio	2	PBA/PA	-	PBA/PA	1.5		ок	Check for retrofit feasibility - pond expansion not feasible if ratio <1.5	
Overall Pond Length	120.8	m	-	m				Measured at top of berm	
Overall Pond Width Length / Width Ratio	43.3	m I/w	-	m I/w	3		Failed	Droformed in 4:1 to E:1	4-59
	2.8	I/W	-	I/W	3		railed	Preferred is 4:1 to 5:1	
Depth of Extended Detention Storage	-	m	0.2	m		3	Failed	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
Existing Extended Detention Storage									3-10
	18	m³	322	m³	2215		Failed	Actual volume must equal or exceed the design volume	
Extended Detention Storage Drawdown Time	-	hours	-	hours	24		OK	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.70	m	1.73	m	1	3	OK	Total active storage including quantity control	4-81
Maximum Pond Side Slopes Part 3b: Pond Design Parameters - Forebay	3.3	:1 (h/v)	-	:1 (h/v)	4		Failed	Maximum pond side slopes 4:1 or flatter	4-79
Total Forebay Surface Area		m ²	_	m ²		1770.36	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet	no	ves/no	no	ves/no		1770.00	ranca	If multiple inlets	4-80
Max Depth of Forebay: F1	-	m	1	m	1	3		Minimum forebay depth is 1 m	4-80
F2	-	m	-	m	1	3		Minimum forebay depth is 1 m	4-80
Provided Length to Width Ratio: F1	-	l/w	-	I/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	4-80
F2 Forebay Berm: F1	-	l/w ves/no	-	l/w ves/no	2 ves			Submerged preferred for safety reasons	4-80 4-80
F2	-	yes/no	yes -	yes/no	ves			Submerged preferred for safety reasons Submerged preferred for safety reasons	4-80
Part 3c: Pond Design Parameters - Inlet		, , ,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,	1			
Number of pond inlets	1		-			1	OK		4-81
Inlet 1		1						100	
Inlet Pipe Diameter_1	Swale	mm %	-	mm %	450 1		OK OK	Minimum inlet pipe diameter of 450mm Inlet pipe slope preferred > 1%	4-81 4-81
Inlet Pipe Slope_1 Inlet Pipe Length_1	-	m	-	m	•		UK	The pipe slope preferred > 1 /8	4-01
Submerged Inlet 1	No	yes/no	-	yes/no	no		ок	A submerged inlet is not preferred	4-81
Submerged Pipe Grade_1	-	%	-	%	1		ОК	Submerged pipe slope should be a minimum of 1 %	4-81
Energy dissipation provided to prevent scour_1	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Inlet Headwalls and Wingwalls_1	No	yes/no	-	yes/no	yes		Failed	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet Outlet located in embankment	Yes	yes/no	_	ves/no	ves		ОК	Outlet structure should be located in embankment for maintenance purposes	4-82
Outlet Pipe Diameter	600	mm	300	mm	yes 450		OK	Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-02
Outlet Pipe Slope	2.65	%	-	%	1		ок	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79
Reverse Sloped Pipe Diameter, if provided								Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse	4-79, 4
, , ,	-	mm	200	mm	150		OK	slope pipe should have a minimum diameter of 150 mm	83
Orifice Diameter	- Outlet	mm	100	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-82
Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation	242.7	m	-	m				Data input	
Top of Emergency Spillway Elevation	242.7	m	-	m				Data input	
Provided Freeboard (@ spill elev.)	0.00	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Part 4: Sediment		1 2	_	1 2					
Annual sediment loading	18	m³/year	-	m³/year					6-14
Estimated sediment volume Number of years before Pond clean-out required	-476.16 #VALUE!	m³ yrs	-	m³			#VALUE!		
Adjusted water quality storage	#VALUE!	m³/ha	-	yrs	99		#VALUE!		
Treatment Level	<3	/ 110	-		30				
END OF CHECKLIST		•		,		•			

As per Stormwater Management Planning and Design Manual (March 2003)



STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald Scientific MacDonald

Municipal Address:

E of Dalkab, Shoreview Dr., 053-121-06 GIS Coordinates: Latitude: 44°23'0" N Constructed: #N/A

Part 1: General Information **South Shore Woods** 13-3 Municipal Pond ID I-N74 LSRCA Pond ID 4589-5UYQTH Certificate of Approval: Wet pond Facility Type Water quality and quantity control **Facility Function** Innisfil Creeks Watershed Kempenfelt Bay Receiving Waters

Submerged Net 2		Longitude:	79°34'26" W	Retrofitted:	0		Receiver Type		-	
Checklate Part Cachlamen Part Part Part Cachlamen Part				Danism Value (Onth						
Part Common (Common (Commo	Checklist		Units	and/or Design	Units				Notes	
Company for purpose Page		value	Onito	пероп	Onito	Design	Design	Officer		
Combine Professional submana Professional submana Professional Personne Person										4-52
Companies provincenses 1		37./1	ha	73.3	na	5.0		OK		
Part Sur Principal Parameters - Main Pound		24	%	•	%				Describe 707 is early a gatter or attent system pre dominant	
Part		Enhanced	Level	Enhanced	Level	Enhanced		ОК	All streams within NVCA and LSRCA require Enhanced Protection (Level 1)	
The content of the first own of the properties of them is grouping and grouping in the properties of them is grouping and grouping in the properties of them is grouping and grouping in the properties of the p	Part 3a: Pond Design Parameters - Main Pond									
	Pond Fenced (vegetative barrier or fence)	Yes	yes/no		yes/no	no		ок	barriers very effective	4-60
Teal NOW Profess Surface Acce 1980	Interpretive & Warning signage	_	ves/no	-	ves/no	ves		FALSE		4-60
Coveral Front Coveral Fron	Total SWM Pond Surface Area	4350		•		,,,,			•	
County Worth Vision 1.5 and					1	1.5		OK		
Sergin Worth Flade	ŭ				1				Measured at PP level or through mid section of the pond	
Average Permanent Proof depth 1						3		ок	Preferred is 4:1 to 5:1	4-59
Permatent Port Volume 193				•	ł		2	Failed		
Section Permanent Pool Volume 936						1	3	OK		
Content of Elemented Description Starrage Content of Elemented Description Starrage (applied on each real startage) presented on the processing of the p						2506		Falled		
Author Column C	*	930	""	800	""	2300		ralled	•	
Seating Extended Debrefore Storage 1	Depth of Extended Detention Storage	0.02	m	-	m		1.5	ОК	- , , , , , , , , , , , , , , , , , , ,	4-60
Annex Anne	Existing Extended Detention Storage								detention storage (Table 3.2) should exceed 40 m ³ /ha or 24 hr 25 mm Chicago	
Acute Storage Depth robil stronge Popth robin stronge Popth robil stronge Popth robin stronge Popth robil stronge Popth robin stronge Popth robi	Estadol Batalla Circ. S. J. E.				1					
Maximum Grade at Permanent Foot 4.3 1 (hv)					1	24				
Maximum Proof side Sidepee 4.5 1 (hor)						5				
Total Forebays Surface Area 767	Maximum Pond Side Slopes									
Second a seach miet			1 3		1 2		1			
Max Depth of Forebay: File 1.07					ł		1450.04	OK		
Provised Length to Width Ratio: Fig. 9.3 Iw Iw 2 Failed			-		-	1	3	OK		
Submerged Forebay Bern: F1 No yesho					1					
Submerged Forebay Remn: F1									Minimum forebay length to width ratio is 2:1 if single inlet	
Part 3c: Pond Design Parameters - Inlet Number of pond inlets					i				Culturary and professed for aniaty reasons	4 50
Part Sc: Pond Design Parameters - Inlet Number of pond inlets 2										
Intel The Diameter 1										
mate Pipe Diameter_1 960		2		-			1		More than one inlet may require increases in effective storage volumes	4-62
Intell Pipe Slope 1		060	mm	_	mm	450		OK	Minimum inlet nine diameter of 450mm	4.0
Intell Pipe Length 1										
Submerged Pipe Grade_1 -				٠						-
Energy dissipation provided to prevent sour 1		No								
Exposed Plot Channel 1		- No			ł					
New Headwalls and Wingwalls 1						yes	0			
Inlet Pipe Diameter 2				-	-	yes				4-65
Inlet Pipe Diameter 2 900		-	m	-	m	1.0	3.0	Failed	Depth at the inlet pipe should be a minimum of 1 m (Plunge pool)	4-65
Inlet Pipe Slope 2		900	mm	_	mm	450		OK	Minimum inlet nine diameter of 450mm	/ ₋ 81
Inlet Pipe Length, 2 Submerged Inlet 3 Submerged										
Submerged Pipe Grade 2 Energy dissipation provided to prevent scour 2 No Exposed Pipe Channel 2 No Pesho yes/no Peth Edwards and Wingwalls 2 No Peth Edwards and Wingwalls 2 Part 3d: Pond Design Parameters - Outlet Outlet Deated in embankment Submerged Pipe Sippe should be a mininum of 1 % Falled Only portions of forebay required to be hardened An exposed pilet channel is not preferred An exposed pilet cha	Inlet Pipe Length_2	22.2	m	•	1					
Energy dissipation provided to prevent scour_2		No	-	•	-					
Exposed Pilot Channel 2 No Intel Headwalls and Wingwalls 2 Yes No Intel Headwalls and Wingwalls 2 Yes Ves No Untel Housted in embankment Sottom Draw Outlet Outlet located in embankment Sottom Draw Outlet Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Diameter, if provided Original Parameters if provided Original Pipe Diameter, if provided Original Pipe Diameter Original Pipe Diameter, if provided Original Pipe Diameter, if provide		No.		-						
Inlet Headwalls and Wingwalls 2 Part 3d: Pond Design Parameters - Outlet Part 3d: Pond Design Parameters - Outlet Outlet located in embankment Bottom Draw Outlet No yes/no Quite Pipe Diameter Outlet Pipe Slope Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: alpha Dif 753.3 Df 753			-		-	yes	0			4-01
Outlet located in embankment Bettom Draw Outlet No Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Diameter, if provided Outlet Pipe Slope preferred > 1% (Cold climate min. requirement) Outlet Pipe Slope preferred > 1% (Cold climate min. requirement) Outlet Pipe Slope preferred > 1% (Cold climate min. requirement) Outlet Pipe Slope preferred > 1% (Cold climate min. requirement) Outlet Pipe Slope preferred > 1% (Cold climate min. requirement) Outlet Pipe Slope preferred > 1% (Cold climate min. requirement) Outlet Pipe Slope preferred > 1% (Cold climate min. requirement) Outlet Pipe Slope preferred > 1% (Cold climate in min requirement) Outlet Pipe Slope preferred > 1% (Cold climate in min requirement) Outlet Pipe Slope preferred > 1% (Cold climate in min requirement) Outlet Pipe Slope preferred > 1% (Cold climate in min requirement) Outlet Pipe Slope preferred > 1% (Cold climate in min requirement) Outlet Pipe Slope preferred > 1% (Cold climate in min requirement) Outlet Pipe Slope preferred > 1% (Cold climate in min requirement) Outlet Pi	Inlet Headwalls and Wingwalls_2					yes			Biotechnical structures highly preferred	4-81
Bottom Draw Outlet Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Slope Reverse Sloped Pipe Diameter, if provided Orifice Diameter Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: Dif T53.3 Design Modifications for Col			I						Outland admirations are could be described to such and could be	4.05
Outlet Pipe Diameter Outlet Pipe Diameter Outlet Pipe Slope Reverse Slope Diameter, if provided OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) OK Smallest acceptable diameter is 75 mm OK Smallest acceptable diameter is 75 mm Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice Plate diameter should be greater than 50 mm in diameter Coefficient of ice growth Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie Ice thickness OK Submerged outlets obvert to be set 150 mm lower than ice cover 4-9 Part 3e: Pond Design Parameters - Major Flow Top of Emergency Spillway Elevation Top of Emergency Spillway El					-					
Outlet Pipe Slope 3.7 % - % 1 OK Outlet pipe slope preferred > 1% (Cold climate min. requirement) 4-9 Reverse Sloped Pipe Diameter, if provided - mm	Outlet Pipe Diameter									
Perforated Riser Orifice Diameter Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser Orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Dia., if riser pipe used Perforated Riser orifice Plate Riser or Riser pipe used Perforated Riser or Riser pipe used Not Smallest acceptable diameter is 75 mm Perforated Riser or Riser pipe used Not Smallest acceptable diameter is 75 mm Perforated Riser or Riser pipe used Not Smallest acceptable diameter is 75 mm Perforated Riser or Riser pipe used Not Smallest acceptable diameter is 75 mm Perforated Riser or Riser pipe used Not Smallest acceptable diameter is 75 mm Perforated Riser or Riser pipe used Not Riser Perforated Riser or Riser pipe used Not Submerged outlet Ann 50 mm Indiameter Orice Perforated Riser or Riser Perforated Riser or Riser Perforated Riser or Riser Perforated Ris	Outlet Pipe Slope	3.7	%	-	%	1		OK		
Orifice Diameter Orifice Plate Dia., if riser pipe used Orifice Plate Dia., if riser pipe used in pond <= 1 m deep. Perforated riser orifice Perforated riser orifice Orifice Plate Dia., if riser pipe used Orifice Plate Dia., if riser pipe used in pond <= 1 m deep. Perforated riser orifice Perforated riser orifice Plate Dia., if riser pipe used in pond <= 1 m deep. Perforated riser orifice Orifice Plate Dia., if riser pipe used in pond <= 1 m deep. Perforated riser orifice Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Diameter Should be greater than 50 mm in diameter or 10 min Orifice Dia	Reverse Sloped Pipe Diameter, if provided					450				
Perforated Riser Orifice Plate Dia., if riser pipe used Design Modifications for Cold Climates: Dif 753.3 Num Part 3e: Pond Design Parameters - Major Flow Part 4: Sediment Annual sediment loading Perforated Riser orifice Plate Dia., if riser pipe used Num Perforated riser outlets may be used in pond <= 1 m deep. Perforated riser orifice plate diameter should be greater than 50 mm in diameter Coefficient of ice growth Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie Ice thickness Submerged outlets obvert to be set 150 mm lower than ice cover 4-8 Submerged outlets obvert to be set 150 mm lower than ice cover 4-9 Part 4: Sediment OK Minimum freeboard above maximum design water level should be 0.3 m 4-60 Annual sediment loading Part 4: Sediment Annual sediment loading Part 4: Sediment OK Minimum freeboard inser outlets may be used in pond <= 1 m deep. Perforated riser orifice plate diameter should be greater than 50 mm in diameter Coefficient of ice growth Sum of freezing degree-days - Based on MSC Canadian Climate Normals 1971- 2000 - City of Barrie Ice thickness Submerged outlets obvert to be set 150 mm lower than ice cover 4-8 Submerged outlets obvert to be set 150 mm lower than ice cover 4-8 Submerged outlets obvert to be set 150 mm lower than ice cover 4-8 OK Minimum freeboard above maximum design water level should be 0.3 m 4-60 OK Minimum freeboard above maximum design water level should be 0.3 m 4-60		-		50	1		100			
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Df 753.3 mm MOE Equation 4.1 lce thickness 4-8 Submerged outlet depth - m MOE Equation 4.1 Top of Berm Elevation 230.5 m - m MOE Equation 4.1 Top of Emergency Spillway Elevation 230.2 m - m MOE Equation 4.1 Top of Emergency Spillway Elevation 0.3 m - m 0.300 OK Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Loading 22.6 m³/year Not defined m³/year 6-14		-	mm	250	mm	50		ОК	plate diameter should be greater than 50 mm in diameter	4-67
753.3		15								
h 412 mm m m MOE Equation 4.1 lcc thickness 4-8 Submerged outlet depth - m 562 OK Submerged outlets obvert to be set 150 mm lower than icc cover 4-9 Part 3e: Pond Design Parameters - Major Flow Top of Berm Elevation 230.5 m 250 m Data input Top of Emergency Spillway Elevation 230.2 m - m 0.300 OK Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Annual sediment loading 22.6 m³/year Not defined m³/year 6-14	Df	753.3								4-8
Part 3e: Pond Design Parameters - Major Flow Outlet Top of Berm Elevation 230.5 m 250 m Data input Top of Emergency Spillway Elevation 230.2 m - m Data input Provided Freeboard (@ spill elev.) 0.3 m - m 0.300 OK Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Annual sediment loading 22.6 m³/year Not defined m³/year 6-14					ł		ation 4.1		Ice thickness	
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Top of Emergency Spillway Elevation Provided Freeboard (@ spill elev.) 0.3 m 0.300 Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Annual sediment loading 22.6 m³/year Not defined m³/year			m	250	m				Data input	
Provided Freeboard (@ spill elev.) OK Minimum freeboard above maximum design water level should be 0.3 m 4-60 Part 4: Sediment Annual sediment loading 22.6 m³/year Not defined m³/year 6-14										
Annual sediment loading 22.6 m³/year Not defined m³/year 6-14	Provided Freeboard (@ spill elev.)			-		0.300		OK		4-60
Annual sediment loading 22.6 m ⁻ /year Not defined m ⁻ /year 6-14		00.0	3,	No. 1 .	3.					0
Estimated sediment volume 42.95 m³ Not defined m³			m³/year m³							б-14
Estimated sequinent volume 42.95 III Not defined Not defined yrs Not defined yrs					1					
Adjusted water quality storage 65 m³/ha 91.4 Failed Target efficiency required storage	Adjusted water quality storage			-	_	91.4		Failed	Target efficiency required storage	
Treatment Level < 3 Not defined		<3		Not defined						
ENDOFOREGREES	END OF CHECKLIST									

By: Hatch Mott MacDonald Series

As per Stormwater Management Planning and Design Manual (March 2003)

STORMWATER MANAGEMENT MASTER PLAN - PART 1



Part 1: General Information

Municipal Pond ID LSRCA Pond ID Certificate of Approval:

Facility Type

3-0662-89-006

Goldcrest

Dry pond Water quantity control Innisfil Creeks

Facility Function Watershed

Municipal Address:	GIS Coordinate	s:	Year:	
2098 Fennel Dr, 74-186-22	Latitude:	44°12'58" N	Constructed:	1980
	Longitude:	79°34'58" W	Retrofitted:	0
		,		

2098 Fennel Dr, 74-186-22	Latitude:	44°12'58" N	Constructed:	1980	Receiving Waters			White Birch Creek	
	Longitude:	79°34'58" W	Retrofitted:	0	_				Ī
	Longitude:		netronited:		Receiver Type		ceivei Type		
Checklist	Assessment Value	Units	Design Value (CofA and/or Design Report)	Units	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information		1							
Contributing Drainage Area Catchment Predominate Landuse	12.57	ha	14.4	ha	5.0		ОК	Minimum drainage area should be 5 ha, preferred drainage area is >10 ha Describe % / Is curb & gutter or ditch system pre-dominant	4-80
Catchment Imperviousness % Fisheries Protection Level Part 3a: Pond Design Parameters - Main Pond	49.5 Basic	% Level	- Basic	% Level	Basic		Failed	Dry ponds cannot achieve higher than basic treatment	
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		ок	Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective Should describe the pond's function and warn of water level fluctuations, thin ice	4-60
Interpretive & Warning signage Total SWM Pond Surface Area	1997	yes/no m²	-	yes/no m²	yes		FALSE	and other specific hazards	4-60
Pond Block Area / Pond Area (top surface) ratio Overall Pond Length	1.2 11.5	PBA/PA m	-	PBA/PA m	1.5		Failed	Measured at PP level or through mid section of the pond Check for retrofit feasibility - pond expansion not feasible if ratio <1.5 Measured at top of berm	
Overall Pond Width Length / Width Ratio	11.5 1.0	m I/w		m I/w	3		Failed	Preferred is 4:1 to 5:1	4-59
Depth of Extended Detention Storage	0	m	-	m		3	ок	Active storage depth for water quality/erosion control - 1.0 m preferred maximum	4-81
Existing Extended Detention Storage	-	m³	-	m³	1697		ок	Actual volume must equal or exceed the design volume	3-10
Extended Detention Storage Drawdown Time	0	hours	-	hours	24		ОК	Based on Equation 4.11	4-58
Active Storage Depth (total storage @ spillway Elev.) Maximum Pond Side Slopes	2.17	m	-	m	1 4	3	OK	Total active storage including quantity control Maximum pond side slopes 4:1 or flatter	4-81 4-79
Part 3b: Pond Design Parameters - Forebay	2.7	:1 (h/v)	-	:1 (h/v)	4		Failed	maximum pond side slopes 4.1 or natter	4-79
Total Forebay Surface Area	-	m²	-	m ²		666	Failed	Forebay area should be less than 1/3 of pond surface area	4-80
Forebay provided at each inlet	no	yes/no	-	yes/no				If multiple inlets	4-80
Max Depth of Forebay: F1	-	m	-	m	1	3		Minimum forebay depth is 1 m	4-80
F2 Provided Length to Width Ratio: F1	-	m I/	-	m	1 2	3		Minimum forebay depth is 1 m	4-80 4-80
F2	-	I/w I/w	-	l/w l/w	2			Minimum forebay length to width ratio is 2:1 if single inlet	4-80
Forebay Berm: F1	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-80
F2	-	yes/no	-	yes/no	yes			Submerged preferred for safety reasons	4-80
Part 3c: Pond Design Parameters - Inlet		1						Manufacture Calabara and Calabara Calab	4.04
Number of pond inlets	2		•			1		More than one inlet may require increases in effective storage volumes	4-81
Inlet 1 Inlet Pipe Diameter 1	750	mm	-	mm	450		ОК	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope 1	0.94	%	-	%	1		Failed	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_1	23.3	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	A submerged inlet is not preferred	4-81
Submerged Pipe Grade_1	- Voc	%	-	%	1		OK	Submerged pipe slope should be a minimum of 1 % Only portions of forebay required to be hardened	4-81 4-81
Energy dissipation provided to prevent scour_1 Inlet Headwalls and Wingwalls_1	Yes Yes	yes/no yes/no	-	yes/no yes/no	yes yes		OK OK	Biotechnical structures highly preferred	4-81
Inlet 2	103	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,00,0	,00		•	Distribution of distribution ingrity proteined	
Inlet Pipe Diameter_2	450	mm	-	mm	450		OK	Minimum inlet pipe diameter of 450mm	4-81
Inlet Pipe Slope_2	-	%	-	%	1		OK	Inlet pipe slope preferred > 1%	4-81
Inlet Pipe Length_2 Submerged Inlet 2	- Na	m	-	m				A submerged inlet is not preferred	4.01
Submerged Pipe Grade_2	No	yes/no %	-	yes/no %	no 1		ок	Submerged pipe slope should be a minimum of 1 %	4-81 4-81
Energy dissipation provided to prevent scour_2	No	yes/no	-	yes/no	yes		Failed	Only portions of forebay required to be hardened	4-81
Exposed Pilot Channel_2	No	yes/no	-	yes/no	•	0	Failed	An exposed pilot channel is not preferred	
Inlet Headwalls and Wingwalls_2	Yes	yes/no	-	yes/no	yes		OK	Biotechnical structures highly preferred	4-81
Part 3d: Pond Design Parameters - Outlet Outlet located in embankment	V	1		/			014	Outlet structure should be leasted in each column to the maintenance of the second structure of the se	4.00
Outlet Pipe Diameter	Yes 300	yes/no mm	300	yes/no mm	yes 450		OK Failed	Outlet structure should be located in embankment for maintenance purposes Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)	4-82 4-79
Outlet Pipe Slope	0.00	%	-	%	1		Failed	Outlet pipe slope preferred > 1% (Cold climate min. requirement)	4-79
Reverse Sloped Pipe Diameter, if provided	_	mm	_	mm	150		ок	Reverse slope outlet recommended for ponds greater than 1 m deep. Reverse slope pipe should have a minimum diameter of 150 mm	4-79, 4- 83
Orifice Diameter	-	mm	-	mm	75	100	OK	Smallest acceptable diameter is 75 mm	4-82
Part 3e: Pond Design Parameters - Major Flow		,							
Top of Berm Elevation	289.55	m	-	m				Data input	
Top of Emergency Spillway Elevation	289.5	m	-	m	0.000			Data input	4
Provided Freeboard (@ spill elev.) Part 4: Sediment	0.05	m	-	m	0.300		Failed	Minimum freeboard above maximum design water level should be 0.3 m	4-60
Annual sediment loading	19	m³/year	-	m³/year					6-14
Estimated sediment volume	552.38	m ³	-	m ³					
Number of years before clean-out required	#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage	0	m³/ha	-		135				
Treatment Level	<3		-						
END OF CHECKLIST									