Dry Pond Criteria Check

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

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

Pond Name	Valleyview
Municipal Pond ID	4-1
LSRCA Pond ID	-
Certificate of Approval:	-
Facility Type	Dry pond
Facility Function	-
Watershed	NVCA
Receiving Waters	Innisfil Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
2380 4th Line, 30-046-64	Latitude:	44°15'0" N	Constructed:	-
	Longitude:	79°36'33" W	Retrofitted:	-

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	7.16	ha	-	ha	5.0		OK	*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 %	50	%	-	%					
Fisheries Protection Level	Basic	Level	Basic	Level	Basic		Failed	*Dry ponds cannot achieve higher than basic treatment*	
Part 3a: Pond Design Parameters - Main Pond									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	814	m^2	-	m^2				*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		OK	*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					
Length / Width Ratio	2.0	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Depth of Extended Detention Storage	0	m	-	m		3	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	0	m^3	-	m^3	966		Failed	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	N/A	hours	-	hours	24		OK	*Based on Equation 4.11*	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.27	m	-	m	1	3	OK	*Total active storage including quantity control*	4-81
Maximum Pond Side Slopes	3.9	: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	-	m^2	-	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	-	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		OK	*Minimum forebay length to width ratio is 2:1 if single inlet*	4-80
F2	-	l/w	-	l/w	2		OK		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	1		-			1	OK		4-81
Inlet 1									
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	65.6	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		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		OK	*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	380	mm	-	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-79
Outlet Pipe Slope	2.3	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-79
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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*	4-79, 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									
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	m^3/year	-	m^3/year					6-14
Estimated sediment volume	195.39	m^3	-	m^3					
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									

Dry Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

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

Municipal Address:	GIS Coordinates:		Year:	
2304 Meadowland St., 2-256-22	Latitude:	44°15'22" N	Constructed:	1990
	Longitude:	79°36'28" W	Retrofitted:	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									
Contributing Drainage Area	18.41	ha	-	ha	5.0		OK	*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	Basic	Level	Basic	Level	Basic		Failed	*Dry ponds cannot achieve higher than basic treatment*	
Part 3a: Pond Design Parameters - Main Pond									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	3827	m^2	4100	m^2				*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					
Length / Width Ratio	5.6	l/w	-	l/w	3		OK	*Preferred is 4:1 to 5:1*	4-59
Depth of Extended Detention Storage	0	m	-	m		3	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	0	m^3	-	m^3	2210		Failed	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	0	hours	-	hours	24		OK	*Based on Equation 4.11*	4-58
Active Storage Depth (total storage @ spillway Elev.)	2.73	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									
Total Forebay Surface Area	-	m^2	-	m^2		1276	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	825	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_1	4.46	%	-	%	1		OK	*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	-	%	-	%	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		OK	*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									
Inlet Pipe Diameter_2	Swale	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	-	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	Yes	yes/no	-	yes/no	yes		OK	*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									
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	500	mm	-	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-79
Outlet Pipe Slope	0.53	%	-	%	1		Failed	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-79
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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*	4-79, 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									
Top of Berm Elevation	271.25	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	271	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									
Annual sediment loading	23	m^3/year	-	m^3/year					6-14
Estimated sediment volume	1147.82	m^3	-	m^3					
Number of years before clean-out required	#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage	0	m^3/ha	-		120				
Treatment Level	>3		-						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

Pond Name	Previn Court
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 Coordinates:		Year:	
1006 Quarry Dr., 023-005-02	Latitude:	44°18'0" N	Constructed:	#N/A
	Longitude:	79°32'58" W	Retrofitted:	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									
Contributing Drainage Area	73.7	ha	107.8	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	22	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	24080	m^2	-	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					
Length / Width Ratio	3.7	l/w	-	l/w	3		OK	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	1.2	m	1	m	1	2	OK	*Average permanent pool depth should be between 1 - 2 m*	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	m^3/ha	38	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	5503	m^3	4115	m^3	4631		OK	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	1.2	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	14569	m^3	-	m^3	2,947		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)	1.0	m	-	m		2	OK	*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	3.4	:1 (h/v)	3:1	: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	-	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	-	yes/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	-	l/w	-	l/w	2			*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	-	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
Part 3c: Pond Design Parameters - Inlet									
Number of pond inlets	1		-			1	OK		4-62
Inlet 1									
Inlet Pipe Diameter_1	900 x 1800	mm	-	mm	450		OK	*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					
Submerged Inlet_1	-	yes/no	-	yes/no	no			*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	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
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	300	mm	200	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope	0.3	%	-	%	1		Failed	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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; 4-69
Orifice Diameter	-	mm	155	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	200	mm	50		OK	*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 Equation 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	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*	4-60
Part 4: Sediment									
Annual sediment loading	44.2	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	997.18	m^3	Not defined	m^3					
Number of years before Pond clean-out required	57	yrs	Not defined	yrs			OK		
Adjusted water quality storage	115	m^3/ha	Not defined		87		OK	*Target efficiency required storage*	
Treatment Level	TBD		Not defined						

END OF CHECKLIST

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Municipal Address:	GIS Coordinates:		Year:	
East of 930 Booth Ave., 023-238-92	Latitude:	44°18'6" N	Constructed:	2005
	Longitude:	79°32'40" W	Retrofitted:	2008

Part 1: General Information

Pond Name	Tepco North
Municipal Pond ID	6-2
LSRCA Pond ID	I-S72
Certificate of Approval:	2416-6HZKC3
Facility Type	Wet pond
Facility Function	Water quality and quantity control
Watershed	Innisfil Creeks
Receiving Waters	Ditch north side of Seventh Line / Banks Creek
Receiver 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		8.50	ha	9.7	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse		-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %		35	%	-	%					
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										
Pond Fenced (vegetative barrier or fence)		Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative barriers very effective*	4-60
Interpretive & Warning signage		-	yes/no	-	yes/no	yes			*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		2991	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio		1.8	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length		72.2	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width		31.1	m	-	m					
Length / Width Ratio		2.3	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth		0.54	m	-	m	1	2	Failed	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool		0.57	m	-	m	1	3	Failed	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit		74	m^3/ha	57	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume		**630**	m^3	**549**	m^3	**850**		Failed	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage		0.51	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage		1030	m^3	1204	m^3	340		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)		1.2	m	-	m		2	OK	*Total active storage including quantity control*	4-60
Maximum Grade at Permanent Pool		3.33	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes		3.33	:1 (h/v)	-	:1 (h/v)		3	OK	*Maximum pond side slopes 3:1 or flatter*	4-61
Pond shape optimized for shading/open water shaded		-	yes/no	-	yes/no				*Length to width ratio maximized*	4-10
Outlet channel is shaded /designed to mitigate temp.		-	yes/no	-	yes/no		#VALUE!		*Temperature mitigation measures recommended*	H-8
Part 3b: Pond Design Parameters - Forebay										
Total Forebay Surface Area		380	m^2	-	m^2		997.01	OK	*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	1.01	m	-	m	1	3	OK	*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	0.95	l/w	-	l/w	2		Failed	*Minimum forebay length to width ratio is 2:1 if single inlet*	
	F2	-	l/w	-	l/w	2				
Submerged Forebay Berm:	F1	No	yes/no	-	yes/no	yes		Failed	*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										
Number of pond inlets		1		1			1	OK		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		0.90	%	-	%	1		Failed	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1		6.7	m	-	m					
Submerged Inlet_1		No	yes/no	-	yes/no	no		OK	*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		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		*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		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		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)*	4-9
Reverse Sloped Pipe Diameter, if provided		-	mm	250	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; 4-69
Orifice Diameter		-	mm	80	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used		-	mm	-	mm	50		OK	*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 Equation 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		225.7	m	-	m				*Data input*	
Top of Emergency Spillway Elevation		225.48	m	-	m				*Data input*	
Provided Freeboard (@ spill elev.)		0.22	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		5.1	m^3/year	-	m^3/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	m^3/ha	-		115		Failed	*Target efficiency required storage*	
Treatment Level		2		-						
END OF CHECKLIST										

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

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

Municipal Address:	GIS Coordinates:		Year:	
West of 965, Nantyr Dr., 023-238-32	Latitude:	44°17'49" N	Constructed:	2005
	Longitude:	79°32'35" W	Retrofitted:	2009

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	5.86	ha	5.5	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage 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									
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	-	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	2806	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	1.5	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	24.6	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	30.3	m	-	m					
Length / Width Ratio	0.8	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	1.04	m	-	m	1	2	OK	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool	1.14	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	221	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	**1298**	**m^3**	**453**	**m^3**	**703**		OK	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	0.16	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	284	m^3	619	m^3	234		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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	5.625	: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	-	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				*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	-	l/w	-	l/w	2			*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	-	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
Part 3c: Pond Design Parameters - Inlet									
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	18.9	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*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	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		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	-	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**				***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	450	mm	450		OK	*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; 4-69
Orifice Diameter	-	mm	75	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 4.1			*Ice thickness*	4-8
Submerged outlet depth	0.57	m		m	562		Failed	*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	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									
Annual sediment loading	6.4	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	-1547.66	m^3	Not defined	m^3					
Number of years before Forebay A clean-out required							Failed		
Number of years before Pond clean-out required	162	yrs	Not defined	yrs					
Adjusted water quality storage	270	m^3/ha	-		129		OK	*Target efficiency required storage*	
Treatment Level	1		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

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

Part 1: General Information

Pond Name	Royal Alcona
Municipal Pond ID	7-1
LSRCA Pond ID	No Data
Certificate of Approval:	0.0
Facility Type	Wet Pond
Facility Function	0.0
Watershed	Innisfil Creeks
Receiving Waters	Lake Simcoe Tributary / Banks Creek Watershed
Receiver 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									
Contributing Drainage Area	40.37	ha	-	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	47.75	%	-	%					
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									
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	-	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	6610	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		OK	*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	14.93	m	-	m					
Length / Width Ratio	11.5	l/w	-	l/w	3		OK	*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	0.25	m	-	m	1	3	Failed	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	6	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	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	0.19	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	410	m^3	-	m^3	1,615		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)	1.8	m	-	m		2	OK	*Total active storage including quantity control*	4-60
Maximum Grade at Permanent Pool	4.2	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes	3.1	: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	512.62	m^2	-	m^2		2203.23	OK	*Forebay area should be less than 1/3 of pond surface area*	4-56
Forebay provided at each inlet	No	yes/no	-	yes/no				*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	0.38	m	-	m	1	3	Failed	*Minimum forebay depth is 1 m*	
Provided Length to Width Ratio: F1	1.2	l/w	-	l/w	2		Failed	*Minimum forebay length to width ratio is 2:1 if single inlet*	
F2	2.0	l/w	-	l/w	2		OK		
Submerged Forebay Berm: F1	No	yes/no	-	yes/no	yes		Failed	*Submerged preferred for safety reasons*	4-58
F2	No	yes/no	-	yes/no	yes		Failed	*Submerged preferred for safety reasons*	4-58
Part 3c: Pond Design Parameters - Inlet									
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		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1	2.1	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	15.6	m	-	m					
Submerged Inlet_1	-	yes/no	-	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	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	1220 x 1930	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_2	0.64	%	-	%	1		Failed	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_2	52.2	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	Yes	yes/no	-	yes/no	yes		OK	***Biotechnical structures highly preferred***	**4-81**
Inlet 3									
Inlet Pipe Diameter_3	900	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_3	4.00	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_3	41.7	m	-	m					
Submerged Inlet_3	No	yes/no	-	yes/no	no			*A submerged inlet is not preferred*	4-81
Submerged Pipe Grade_3	-	%	-	%	1		OK	*Submerged pipe slope should be a minimum of 1 %*	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*	
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	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	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)*	4-9
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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; 4-69
Orifice Diameter	-	mm	-	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 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	222.6	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	222.6	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	57.7	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	615.52	m^3	Not defined	m^3					
Number of years before Forebay A clean-out required							Failed		
Number of years before Pond clean-out required	0	yrs	Not defined	yrs					
Adjusted water quality storage	16	m^3/ha	-		137.75		Failed	*Target efficiency required storage*	
Treatment Level	<3		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Municipal Address:	GIS Coordinates:		Year:	
1896 Webster Blvd., 23-636-10	Latitude:	44°18'9" N	Constructed:	#N/A
	Longitude:	79°33'37" W	Retrofitted:	2002

Part 1: General Information

Pond Name	Wallace Mills
Municipal Pond ID	7-3
LSRCA Pond ID	I-S68
Certificate of Approval:	3-1808-98-996
Facility Type	Wet pond
Facility Function	-
Watershed	Innisfil Creeks
Receiving Waters	Banks Creek
Receiver 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	28.12	ha	-	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	40	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	1.7	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	55.35	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	79.32	m	-	m					
Length / Width Ratio	0.7	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	1.87	m	-	m	1	2	OK	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool	1.87	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	57	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	**1604**	m^3	-	m^3	**3164**		Failed	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	0.94	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	2620	m^3	-	m^3	1,125		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)	0.8	m	-	m		2	OK	*Total active storage including quantity control*	4-60
Maximum Grade at Permanent Pool	2.2	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes	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	-	m^2		1330.71	Failed	*Forebay area should be less than 1/3 of pond surface area*	4-56
Forebay provided at each inlet	no	yes/no	-	yes/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	-	l/w	-	l/w	2			*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	-	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
Part 3c: Pond Design Parameters - Inlet									
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		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1	1.1	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	91.0	m	-	m					
Submerged Inlet_1	-	yes/no	-	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	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	300	mm	-	mm	450		Failed	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_2	1.05	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_2	21.1	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	**Yes**	**yes/no**	-	**yes/no**	**yes**		OK	***Biotechnical structures highly preferred***	**4-81**
Inlet 3									
Inlet Pipe Diameter_3	530	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_3	1.00	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_3	22.2	m	-	m					
Submerged Inlet_3	No	yes/no	-	yes/no	no			*A submerged inlet is not preferred*	4-81
Submerged Pipe Grade_3	-	%	-	%	1		OK	*Submerged pipe slope should be a minimum of 1 %*	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*	
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	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	220	mm	-	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	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		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; 4-69
Orifice Diameter	-	mm	-	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 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	239	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	238.74	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	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	590.1	m^3	Not defined	m^3					
Number of years before Forebay A clean-out required							Failed		
Number of years before Pond clean-out required	36	yrs	Not defined	yrs					
Adjusted water quality storage	97	m^3/ha	-		124		Failed	*Target efficiency required storage*	
Treatment Level	2		Not defined						
END OF CHECKLIST									

Dry Pond Criteria Check

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

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Municipal Address:	GIS Coordinates:		Year:	
1891 Forest Valley Dr., 019-033-28	Latitude:	44°16'37" N	Constructed:	1998
	Longitude:	79°40'10" W	Retrofitted:	0

Part 1: General Information

Pond Name	Forest Valley
Municipal Pond ID	7-4
LSRCA Pond ID	No Data
Certificate of Approval:	-
Facility Type	Dry pond
Facility Function	-
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver 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	9.86	ha	-	ha	5.0		OK	*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)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	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					
Length / Width Ratio	1.3	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Depth of Extended Detention Storage	-	m	-	m		3	Failed	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	0	m^3	-	m^3	406		Failed	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24		OK	*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									
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	-	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	1		-			1	OK		4-81
Inlet 1									
Inlet Pipe Diameter_1	600	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_1	1.65	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_1	13.3	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*A submerged inlet is not preferred*	4-81
Submerged Pipe Grade_1	-	%	-	%	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		OK	*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	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	-	mm	-	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*	4-79, 4-83
Orifice Diameter	200	mm	-	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-82
Part 3e: Pond Design Parameters - Major Flow Outlet									
Top of Berm Elevation	283.6	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	283.6	m	-	m				*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									
Annual sediment loading	6	m^3/year	-	m^3/year					6-14
Estimated sediment volume	239.17	m^3	-	m^3					
Number of years before clean-out required	#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage	0	m^3/ha	-		41.1				
Treatment Level	<3		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

Pond Name	Innisbrook Estates (IH)
Municipal Pond ID	7-5
LSRCA Pond ID	-
Certificate of Approval:	0693-5PAQ7A
Facility Type	Infiltration Pond
Facility Function	Water quality and quantity control
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		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	Min. Design	Max. Design	Criteria Check	Notes	MOE Page
Part 2: Catchment Information									
Contributing Drainage Area	23.70	ha	23.6	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	32.75	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	3953	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	3.2	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	127.78	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	26.9	m	-	m					
Length / Width Ratio	4.8	l/w	-	l/w	3		OK	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	0.58	m	-	m	1	2	Failed	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool	0.63	m	-	m	1	3	Failed	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	24	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	557	m^3	-	m^3	2234		Failed	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	0.22	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	517	m^3	400	m^3	948		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)	0.5	m	-	m		2	OK	*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	5	: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	433	m^2	-	m^2		1317.69	OK	*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	0.74	m	-	m	1	3	Failed	*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	0.8	l/w	-	l/w	2		Failed	*Minimum forebay length to width ratio is 2:1 if single inlet*	
F2	-	l/w	-	l/w	2				
Submerged Forebay Berm: F1	No	yes/no	-	yes/no	yes		Failed	*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									
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		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	13.3	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*A submerged inlet is not preferred*	4-63
Submerged Pipe Grade_1	-	%	-	%	1		OK	*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*	
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	-	mm	-	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; 4-69
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	-	mm	150	mm	50		OK	*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 Equation 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*	
Top of Emergency Spillway Elevation	260.82	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	14.2	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	763.3	m^3	Not defined	m^3					
Number of years before Forebay A clean-out required							Failed		
Number of years before Pond clean-out required	0	yrs	Not defined	yrs					
Adjusted water quality storage	45	m^3/ha	-		111		Failed	*Target efficiency required storage*	
Treatment Level	<3		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Municipal Address:	GIS Coordinates:		Year:	
1295 Gina St., 023-057-32	Latitude:	44°18'43" N	Constructed:	#N/A
	Longitude:	79°33'21" W	Retrofitted:	-

Part 1: General Information

Pond Name	Innisbrook Developments
Municipal Pond ID	7-6 (BMP 4Q1)
LSRCA Pond ID	I-S64
Certificate of Approval:	6045-5J2TP3
Facility Type	Wet pond
Facility Function	Water quality control
Watershed	Innisfil Creeks
Receiving Waters	Bon Secuors Creek (Ck #4)
Receiver 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	5.96	ha	5.56	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	50	%	-	%					
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									
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	-	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	1784	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	7.5	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	56.7	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	19.4	m	-	m					
Length / Width Ratio	2.9	l/w	-	l/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	1.04	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	38	m^3/ha	63	m^3/ha				As per Table 3.2 (MOE)	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	0.4	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	393	m^3	818	m^3	238		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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	6.9	: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	-	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	-	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	-	l/w	-	l/w	2			*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	-	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
Part 3c: Pond Design Parameters - Inlet									
Number of pond inlets	1		-			1	OK		4-62
Inlet 1									
Inlet Pipe Diameter_1	900	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1	3.49	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	8.89	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*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	yes	yes/no	-	yes/no	yes		OK	*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	No	yes/no	-	yes/no	yes		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									
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	300	mm	-	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope	6.53	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided	300	mm	-	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; 4-69
Orifice Diameter	-	mm	-	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 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 Outlet									
Top of Berm Elevation	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									
Annual sediment loading	9.4	m^3/year	-	m^3/year					6-14
Estimated sediment volume	238.6	m^3	-	m^3					
Number of years before Pond clean-out required	0	yrs	Not defined	yrs			Failed		
Adjusted water quality storage	78	m^3/ha	-		141		Failed	*Target efficiency required storage*	
Treatment Level	3		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

Pond Name	Orsi/Bayshore Estates
Municipal Pond ID	7-8
LSRCA Pond ID	I-S67
Certificate of Approval:	4163-4P6GPY
Facility Type	Wet pond
Facility Function	Water quality and quantity control
Watershed	Innisfil Creeks
Receiving Waters	Banks Creek (Ck #5)
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
W of 1097, Anna Maria Ave., 023-015-57	Latitude:	44°18'5" N	Constructed:	1999
	Longitude:	79°33'8" W	Retrofitted:	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									
Contributing Drainage Area	32.50	ha	45	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	11	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	12242	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	3.3	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	136.14	m	-	m				*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	-	l/w	3		OK	*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	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	68	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	**2219**	m^3	**6800**	m^3	**1021**		OK	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	0.56	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	2794	m^3	-	m^3	1,300		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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	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									
Total Forebay Surface Area	-	m^2	-	m^2		4080.59	Failed	*Forebay area should be less than 1/3 of pond surface area*	4-56
Forebay provided at each inlet	no	yes/no	-	yes/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	-	l/w	-	l/w	2			*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	-	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
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	1350	mm	-	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	24.0	m	-	m					
Submerged Inlet_1	-	yes/no	-	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	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		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	-	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									
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	Yes	yes/no	-	yes/no	yes		OK	*Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation*	4-11
Outlet Pipe Diameter	250	mm	250	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope	4.5	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided	300	mm	-	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; 4-69
Orifice Diameter	-	mm	128	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	200	mm	50		OK	*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 Equation 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	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									
Annual sediment loading	19.5	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	3721.28	m^3	Not defined	m^3					
Number of years before Pond clean-out required	189	yrs	Not defined	yrs					
Adjusted water quality storage	108	m^3/ha	-		63.6		OK	*Target efficiency required storage*	
Treatment Level	1		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Municipal Address:	GIS Coordinates:		Year:	
2163 Jans Blvd, 23-184-00	Latitude:	44°18'53 N	Constructed:	1991
	Longitude:	79°33'30" W	Retrofitted:	-

Part 1: General Information

Pond Name	Crossroads
Municipal Pond ID	8-3
LSRCA Pond ID	-
Certificate of Approval:	8844-7PZJAS
Facility Type	Wet pond
Facility Function	Water quality and quantity control
Watershed	Innisfil Creeks
Receiving Waters	Leonard's Ck (Ck #3) & Bon Secuors Creek (Ck #4)
Receiver 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	20.54	ha	34.05	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	49.25	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	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		OK	*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					
Length / Width Ratio	0.8	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	1.83	m	-	m	1	2	OK	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool	2.13	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	181	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	3708	m^3	3303	m^3	2773		OK	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	0.04	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	342	m^3	2622	m^3	822		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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	OK	*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									
Total Forebay Surface Area	-	m^2	-	m^2		2217.00	Failed	*Forebay area should be less than 1/3 of pond surface area*	4-56
Forebay provided at each inlet	no	yes/no	yes	yes/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	-	l/w	-	l/w	2			*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	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									
Inlet Pipe Diameter_1	1350	mm	(WQual), 1350 (Wq	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1	1.5	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	14.4	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*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	Yes	yes/no	yes	yes/no	yes		OK	*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		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	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					
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	Yes	yes/no	-	yes/no	yes		OK	***Biotechnical structures highly preferred***	**4-81**
Inlet 3									
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	0	yes/no	-	yes/no		0	FALSE	*An exposed pilot channel is not preferred*	
Inlet Headwalls and Wingwalls_3	0	yes/no	-	yes/no	yes		FALSE	*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	600	mm	0 (minor), 600 (maj	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope	1.0	%	-	%	1		Failed	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided	-	mm	300	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; 4-69
Orifice Diameter	-	mm	0 (minor), 200 (maj	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 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	240.3	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	240.1	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	31.3	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	454.26	m^3	Not defined	m^3					
Number of years before Pond clean-out required	47	yrs	Not defined	yrs					
Adjusted water quality storage	221	m^3/ha	-		140		OK	*Target efficiency required storage*	
Treatment Level	1		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Municipal Address:	GIS Coordinates:		Year:	
1041 Corrie St, 23-176-00	Latitude:	44°19'5" N	Constructed:	1993
	Longitude:	79°33'23" W	Retrofitted:	0

Part 1: General Information

Pond Name	Crossroads #2
Municipal Pond ID	8-4
LSRCA Pond ID	I-N2
Certificate of Approval:	3-0825-91-006
Facility Type	Wet pond
Facility Function	Water quality and quantity control
Watershed	Innisfil Creeks
Receiving Waters	Leonard's Ck (Ck #3)
Receiver 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										
Contributing Drainage Area		19.87	ha	10.2	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage 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		Enhanced	Level	Enhanced	Level	Enhanced		OK	*All streams within NVCA and LSRCA require Enhanced Protection (Level 1)*	
Part 3a: Pond Design Parameters - Main Pond										
Pond Fenced (vegetative barrier or fence)		Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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		7513	m^2	-	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		187.08	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width		100.76	m	-	m					
Length / Width Ratio		1.9	l/w	-	l/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	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit		73	m^3/ha	-	m^3/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**
Depth of Extended Detention Storage		0.11	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage		422	m^3	1275	m^3	795		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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		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	-	m^2		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	-	m	-	m	1	3		*Minimum forebay depth is 1 m*	
Provided Length to Width Ratio:	F1	4.50	l/w	-	l/w	2		OK	*Minimum forebay length to width ratio is 2:1 if single inlet*	
	F2	-	l/w	-	l/w	2				
Submerged Forebay Berm:	F1	Yes	yes/no	-	yes/no	yes		OK	*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										
Number of pond inlets		1		-			1	OK		4-62
Inlet 1										
Inlet Pipe Diameter_1		1000	mm	-	mm	450		OK	*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		57.2	m	-	m					
Submerged Inlet_1		No	yes/no	-	yes/no	no		OK	*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		Yes	yes/no	-	yes/no	yes		OK	*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		Yes	yes/no	-	yes/no	yes		OK	*Biotechnical structures highly preferred*	4-65
Inlet Area Depth_1		0.78	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		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		850	mm	300	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope		1.71	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided		-	mm	-	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; 4-69
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		-	mm	300	mm	50		OK	*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 Equation 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		237	m	300	m				*Data input*	
Top of Emergency Spillway Elevation		237	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										
Annual sediment loading		28.1	m^3/year	-	m^3/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			Failed		
Adjusted water quality storage		113	m^3/ha	-		138		Failed	*Target efficiency required storage*	
Treatment Level		3	%	-						
END OF CHECKLIST										

Wet Pond Criteria Check

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

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG Environmental Engineers & Scientists

Municipal Address:	GIS Coordinates:		Year:	
1041 Corrie St, 23-176-00	Latitude:	44°19'5" N	Constructed:	1993
	Longitude:	79°33'23" W	Retrofitted:	0

Part 1: General Information

Pond Name	Crossroads #2
Municipal Pond ID	8-4
LSRCA Pond ID	I-N2
Certificate of Approval:	3-0825-91-006
Facility Type	Wet pond
Facility Function	Water quality and quantity control
Watershed	Innisfil Creeks
Receiving Waters	Leonard's Ck (Ck #3)
Receiver 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									
Contributing Drainage Area	19.87	ha	10.2	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage 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	Enhanced	Level	Enhanced	Level	Enhanced		OK	*All streams within NVCA and LSRCA require Enhanced Protection (Level 1)*	
Part 3a: Pond Design Parameters - Main Pond									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	7513	m^2	-	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					
Length / Width Ratio	1.9	l/w	-	l/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	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	73	m^3/ha	-	m^3/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:

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

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

Municipal Address:	GIS Coordinates:		Year:	
2324 Jack Cres, 030-196-00	Latitude:	44°19'33" N	Constructed:	1999
	Longitude:	79°32'39" W	Retrofitted:	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									
Contributing Drainage Area	11.92	ha	10.11	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage 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	Enhanced	Level	Enhanced	Level	Enhanced		OK	*All streams within NVCA and LSRCA require Enhanced Protection (Level 1)*	
Part 3a: Pond Design Parameters - Main Pond									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	3998	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	23	PBA/PA	-	PBA/PA	1.5		OK	*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	71.47	m	-	m					
Length / Width Ratio	1.2	l/w	-	l/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	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	187	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	2226	m^3	-	m^3	1579		OK	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	0.45	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	1118	m^3	1870	m^3	477		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)	1.0	m	-	m		2	OK	*Total active storage including quantity control*	4-60
Maximum Grade at Permanent Pool	3.7	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes	2.7	:1 (h/v)	-	:1 (h/v)		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*	4-56
Forebay provided at each inlet	Yes	yes/no	no	yes/no				*If multiple inlets*	4-56
Max Depth of Forebay: F1	1.62	m	2	m	1	3	OK	*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	1.06	l/w	5	l/w	2		Failed	*Minimum forebay length to width ratio is 2:1 if single inlet*	
F2	-	l/w	-	l/w	2				
Submerged Forebay Berm: F1	Yes	yes/no	yes	yes/no	yes		OK	*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	1		1			1	OK		4-62
Inlet 1									
Inlet Pipe Diameter_1	650	mm	750	mm	450		OK	*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	-	%	-	%	1		OK	*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		no	OK	*An exposed pilot channel is not preferred*	4-62
Inlet Headwalls and Wingwalls_1	Yes	yes/no	yes	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
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	Yes	yes/no	-	yes/no	yes		OK	*Recommended in conjunction with deeper outlet area (2-3 m): temp. mitigation*	4-11
Outlet Pipe Diameter	Ditch	mm	500	mm	450		OK	*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		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; 4-69
Orifice Diameter	-	mm	125	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 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	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									
Annual sediment loading	16.8	m^3/year	-	m^3/year					6-14
Estimated sediment volume	274.28	m^3	-	m^3					
Number of years before Forebay A clean-out required									
Number of years before Pond clean-out required	79	yrs	-	yrs			OK		
Adjusted water quality storage	227	m^3/ha	-		138		OK	*Target efficiency required storage*	
Treatment Level	1	%	-						

END OF CHECKLIST

Dry Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

Pond Name	Alcona Woods
Municipal Pond ID	9-1
LSRCA Pond ID	No Data
Certificate of Approval:	0.0
Facility Type	0.0
Facility Function	0.0
Watershed	Innisfil Creeks
Receiving Waters	-
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
698 Trinity St, 40-139-00	Latitude:	44°19'59" N	Constructed:	1988
	Longitude:	79°32'20" W	Retrofitted:	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									
Contributing Drainage Area	5.76	ha	-	ha	5.0		OK	*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	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)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	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	l/w	-	l/w	3		OK	*Preferred is 4:1 to 5:1*	4-59
Depth of Extended Detention Storage	0	m	-	m		3	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	-	m^3	-	m^3	692		OK	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24		OK	*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									
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	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	1		-			1	OK		4-81
Inlet 1									
Inlet Pipe Diameter_1	600	mm	-	mm	450		OK	*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		OK	*A submerged inlet is not preferred*	4-81
Submerged Pipe Grade_1	-	%	-	%	1		OK	*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	-	mm	-	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*	4-79, 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									
Top of Berm Elevation	220.1	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	220.1	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									
Annual sediment loading	7	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	-23.43	m^3	Not defined	m^3					
Number of years before clean-out required	0	yrs	Not defined	yrs			Failed		
Adjusted water quality storage	0	m^3/ha			120				
Treatment Level	<3		Not defined						
END OF CHECKLIST									

Dry Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

Pond Name	Southview
Municipal Pond ID	9-2
LSRCA Pond ID	No Data
Certificate of Approval:	-
Facility Type	-
Facility Function	-
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
7883 Yonge St, 36-028	Latitude:	44°19'21" N	Constructed:	1988
	Longitude:	79°36'57" W	Retrofitted:	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									
Contributing Drainage Area	28.03	ha	-	ha	5.0		OK	*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 %	42.5	%	-	%					
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)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	21300	m^2	-	m^2				*Measured at PP level or through mid section of the pond*	
Pond Block Area / Pond Area (top surface) ratio	1	PBA/PA	-	PBA/PA	1.5		Failed	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	182	m	-	m				*Measured at top of berm*	
Overall Pond Width	159	m	-	m					
Length / Width Ratio	1.1	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Depth of Extended Detention Storage	-0.39	m	-	m		3	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	1244	m^3	-	m^3	3196		Failed	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	#DIV/0!	hours	-	hours	24		#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									
Total Forebay Surface Area	-	m^2	-	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				*If multiple inlets*	4-80
Max Depth of Forebay: F1	-	m	-	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	-	l/w	-	l/w	2		OK	*Minimum forebay length to width ratio is 2:1 if single inlet*	4-80
F2	-	l/w	-	l/w	2		OK		4-80
Forebay Berm: F1	-	yes/no	-	yes/no	yes		FALSE	*Submerged preferred for safety reasons*	4-80
F2	-	yes/no	-	yes/no	yes		FALSE	*Submerged preferred for safety reasons*	4-80
Part 3c: Pond Design Parameters - Inlet									
Number of pond inlets	-		-			1		*More than one inlet may require increases in effective storage volumes*	4-81
Inlet 1									
Inlet Pipe Diameter_1	675	mm	-	mm	450		OK	*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					4-81
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*A submerged inlet is not preferred*	4-81
Submerged Pipe Grade_1	-	%	-	%	1		OK	*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	675	mm	-	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-79
Outlet Pipe Slope	2.5	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-79
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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*	4-79, 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									
Top of Berm Elevation	225.2	m	-	m				*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									
Annual sediment loading	30	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	0	m^3	Not defined	m^3					
Number of years before clean-out required		yrs	Not defined	yrs			Failed		
Adjusted water quality storage	0	m^3/ha			114				
Treatment Level	<3		Not defined						
END OF CHECKLIST									

Dry Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

Pond Name	Victoria Green
Municipal Pond ID	9-3
LSRCA Pond ID	-
Certificate of Approval:	-
Facility Type	Dry pond
Facility Function	-
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
2600 Lawrence Ave., 33-048-49	Latitude:	44°19'4" N	Constructed:	-
	Longitude:	79°37'29" W	Retrofitted:	-

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	23.82	ha	-	ha	5.0		OK	*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 %	46.5	%	-	%					
Fisheries Protection Level	Basic	Level	Basic	Level	Basic		Failed	*Dry ponds cannot achieve higher than basic treatment*	
Part 3a: Pond Design Parameters - Main Pond									
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	-	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	8799	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	105.9	m	-	m				*Measured at top of berm*	
Overall Pond Width	58.8	m	-	m					
Length / Width Ratio	1.8	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Depth of Extended Detention Storage	-	m	-	m		3	Failed	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	-	m^3	-	m^3	3002		OK	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	NA	hours	-	hours	24		OK	*Based on Equation 4.11*	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.72	m	-	m	1	3	OK	*Total active storage including quantity control*	4-81
Maximum Pond Side Slopes	3.3	: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	-	m^2	-	m^2		2933.15	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	1		-			1	OK		4-81
Inlet 1									
Inlet Pipe Diameter_1	525	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_1	-	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_1	-	m	130	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*A submerged inlet is not preferred*	4-81
Submerged Pipe Grade_1	-	%	-	%	1		OK	*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	-	yes/no	yes		OK	*Outlet structure should be located in embankment for maintenance purposes*	4-82
Outlet Pipe Diameter	600	mm	-	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-79
Outlet Pipe Slope	5.32	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-79
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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*	4-79, 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									
Top of Berm Elevation	262.3	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	262.05	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									
Annual sediment loading	32	m^3/year	-	m^3/year					6-14
Estimated sediment volume	690	m^3	-	m^3					
Number of years before clean-out required		yrs	-	yrs			Failed		
Adjusted water quality storage	0	m^3/ha	-		126				
Treatment Level	<3		-						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

Pond Name	Doral Business Park
Municipal Pond ID	9-4
LSRCA Pond ID	I-NW9
Certificate of Approval:	-
Facility Type	Wet pond
Facility Function	-
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
N of 2521, Bowman St., 020-164-80	Latitude:	44°18'18" N	Constructed:	-
	Longitude:	79°40'39" W	Retrofitted:	-

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	21.67	ha	-	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	25.5	%	-	%					
Fisheries Protection Level	Normal	Level	Normal	Level	Enhanced		Failed	*All streams within NVCA and LSRCA require Enhanced Protection (Level 1)*	
Part 3a: Pond Design Parameters - Main Pond									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	8744	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	1.8	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	118.9	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	57	m	-	m					
Length / Width Ratio	2.1	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	1.06	m	-	m	1	2	OK	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool	1.11	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	151	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	**3273**	**m^3**	-	**m^3**	**1610**		OK	***Compare Unit rate volume to actual design***	**3-10**
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 Extended Detention Storage	7097	m^3	-	m^3	867		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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	3.9	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes	3.9	: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	-	m^2		2914.71	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	1.01	m	-	m	1	3		*Minimum forebay depth is 1 m*	4-55
F2	0.91	m	-	m	1	3		*Minimum forebay depth is 1 m*	
Provided Length to Width Ratio: F1	1.8	l/w	-	l/w	2			*Minimum forebay length to width ratio is 2:1 if single inlet*	
F2	1.5	l/w	-	l/w	2				
Submerged Forebay Berm: F1	No	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
F2	No	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
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	1000	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1	8.9	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	30.0	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*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	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	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	Swale	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	-	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									
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	500	mm	-	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope	1.6	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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; 4-69
Orifice Diameter	-	mm	-	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 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	297.4	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	297.3	m	-	m				*Data input*	
Provided Freeboard (@ spill elev.)	0.1	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	13.0	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	158.46	m^3	Not defined	m^3					
Number of years before Pond clean-out required	798	yrs	Not defined	yrs					
Adjusted water quality storage	191	m^3/ha	-		95.7		OK	*Target efficiency required storage*	
Treatment Level	1		Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Municipal Address:	GIS Coordinates:		Year:	
Doral Dr., 020-166-80	Latitude:	44°18'12" N	Constructed:	#N/A
	Longitude:	79°40'57" W	Retrofitted:	-

Part 1: General Information

Pond Name	Doral Business Park
Municipal Pond ID	9-5
LSRCA Pond ID	I-NW10
Certificate of Approval:	-
Facility Type	Wet pond
Facility Function	-
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver 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		7.65	ha	-	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse		-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %		21.25	%	-	%					
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										
Pond Fenced (vegetative barrier or fence)		Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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		5264	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio		2.0	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length		73.3	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width		12.2	m	-	m					
Length / Width Ratio		6.0	l/w	-	l/w	3		OK	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth		0.78	m	-	m	1	2	Failed	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool		0.78	m	-	m	1	3	Failed	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit		113	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume		862	m^3	-	m^3	459		OK	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage		0.7	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage		2610	m^3	-	m^3	306		OK	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)		1.0	m	-	m		2	OK	*Total active storage including quantity control*	4-60
Maximum Grade at Permanent Pool		5.6	: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		5.6	: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	-	m^2		1754.77	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	1.08	m	-	m	1	3	OK	*Minimum forebay depth is 1 m*	4-55
	F2	0.98	m	-	m	1	3	Failed	*Minimum forebay depth is 1 m*	
Provided Length to Width Ratio:	F1	2.2	l/w	-	l/w	2		OK	*Minimum forebay length to width ratio is 2:1 if single inlet*	
	F2	1.9	l/w	-	l/w	2		Failed		
Submerged Forebay Berm:	F1	Yes	yes/no	-	yes/no	yes		OK	*Submerged preferred for safety reasons*	4-58
	F2	Yes	yes/no	-	yes/no	yes		OK	*Submerged preferred for safety reasons*	4-58
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		900	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1		1.6	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1		20.0	m	-	m					
Submerged Inlet_1		No	yes/no	-	yes/no	no		OK	*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		Yes	yes/no	-	yes/no	yes		OK	*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		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		Swale	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		-	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		Yes	yes/no	-	yes/no	yes		OK	*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										
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		350	mm	-	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope		0.0	%	-	%	1		Failed	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided		-	mm	-	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; 4-69
Orifice Diameter		-	mm	-	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used		-	mm	-	mm	50		OK	*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 Equation 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		302.6	m	-	m				*Data input*	
Top of Emergency Spillway Elevation		302.6	m	-	m				*Data input*	
Provided Freeboard (@ spill elev.)		0.0	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		4.6	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume		412.08	m^3	Not defined	m^3					
Number of years before Pond clean-out required		768	yrs	Not defined	yrs					
Adjusted water quality storage		153	m^3/ha	-		85.0		OK	*Target efficiency required storage*	
Treatment Level		1		Not defined						
END OF CHECKLIST										

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

Pond Name	Brandy Lane
Municipal Pond ID	10-1
LSRCA Pond ID	No Data
Certificate of Approval:	6832-5F5JU4
Facility Type	Wet pond
Facility Function	Water quality and quantity control
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
2706 Dempster Ave., 33-040-28	Latitude:	44°19'12" N	Constructed:	1988
	Longitude:	79°37'34" W	Retrofitted:	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										
Contributing Drainage Area		15.46	ha	0.45	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse		-		-					*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										
Pond Fenced (vegetative barrier or fence)		Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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		1698	m^2	-	m^2				*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		18.4	m	-	m					
Length / Width Ratio		3.3	l/w	-	l/w	3		OK	*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	-	m	1	3	Failed	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit		1	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume		9	m^3	55.2	m^3	2125		Failed	*Compare Unit rate volume to actual design*	3-10
Depth of Extended Detention Storage		-0.32	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage		-7	m^3	48.2	m^3	618		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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		2.8	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes		3.1	: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	-	m^2		566.07	Failed	*Forebay area should be less than 1/3 of pond surface area*	4-56
Forebay provided at each inlet		no	yes/no	-	yes/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	-	l/w	-	l/w	2			*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	-	yes/no	-	yes/no	yes			*Submerged preferred for safety reasons*	4-58
Part 3c: Pond Design Parameters - Inlet										
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		1000	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1		4.6	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1		14.4	m	-	m					
Submerged Inlet_1		No	yes/no	-	yes/no	no		OK	*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		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		300	mm	-	mm	450		Failed	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_2		0.47	%	-	%	1		Failed	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_2		23.9	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		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		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		-	mm	-	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; 4-69
Orifice Diameter		-	mm	200	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used		-	mm	150	mm	50		OK	*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 Equation 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		267.4	m	150	m				*Data input*	
Top of Emergency Spillway Elevation		267.28	m	-	m				*Data input*	
Provided Freeboard (@ spill elev.)		0.1	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		24.6	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume		-49.55	m^3	Not defined	m^3					
Number of years before Pond clean-out required		0	yrs	Not defined	yrs					
Adjusted water quality storage		41	m^3/ha	-		141.3		Failed	*Target efficiency required storage*	
Treatment Level		<3		Not defined						
END OF CHECKLIST										

Dry Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

Pond Name	Village North
Municipal Pond ID	10-2
LSRCA Pond ID	-
Certificate of Approval:	-
Facility Type	Dry pond
Facility Function	-
Watershed	Lovers Creek
Receiving Waters	Upper Lovers Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
2856 Dempster Ave., 32-020-02	Latitude:	44°19'44" N	Constructed:	1988
	Longitude:	79°37'51" W	Retrofitted:	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									
Contributing Drainage Area	30.97	ha	-	ha	5.0		OK	*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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	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		OK	*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	0.8	m	-	m		3	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	1965	m^3	-	m^3	4088		Failed	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	0	hours	-	hours	24		OK	*Based on Equation 4.11*	4-58
Active Storage Depth (total storage @ spillway Elev.)	1.80	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									
Total Forebay Surface Area	-	m^2	-	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		OK	*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									
Inlet Pipe Diameter_2	Swale	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	-	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									
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	-	mm	-	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*	4-79, 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									
Top of Berm Elevation	267.5	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	267	m	-	m				*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									
Annual sediment loading	46	m^3/year	-	m^3/year					6-14
Estimated sediment volume	290.14	m^3	-	m^3					
Number of years before clean-out required	#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage	0	m^3/ha	-		132				
Treatment Level	<3		-						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

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

Municipal Address:	GIS Coordinates:		Year:	
2877 Ireton St., 043-153-50	Latitude:	44°21'0" N	Constructed:	#N/A
	Longitude:	79°32'12" W	Retrofitted:	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									
Contributing Drainage Area	11.76	ha	9.36	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	35	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	3468	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	2.2	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	97.91	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	22.15	m	-	m					
Length / Width Ratio	4.4	l/w	-	l/w	3		OK	*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	1.68	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	108	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	1276	m^3	-	m^3	1176		OK	*Compare Unit rate volume to actual design*	3-10
Depth of Extended Detention Storage	-0.38	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	-581	m^3	912	m^3	470		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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	-	m		2	OK	*Total active storage including quantity control*	4-60
Maximum Grade at Permanent Pool	3.4	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes	4.7	:1 (h/v)	-	:1 (h/v)		3	OK	*Maximum pond side slopes 3:1 or flatter*	4-61
Part 3b: Pond Design Parameters - Forebay									
Total Forebay Surface Area	-	m^2	-	m^2		1155.85	Failed	*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	1.88	m	-	m	1	3	OK	*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	1.5	l/w	15/x	l/w	2		Failed	*Minimum forebay length to width ratio is 2:1 if single inlet*	
F2	-	l/w	-	l/w	2				
Submerged Forebay Berm: F1	Yes	yes/no	-	yes/no	yes		OK	*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									
Number of pond inlets	1		-			1	OK		4-62
Inlet 1									
Inlet Pipe Diameter_1	750	mm	1150 x 750	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1	1.22	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	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	-	%	-	%	1		OK	*Submerged pipe slope should be a minimum of 1 %*	4-63
Energy dissipation provided to prevent scour_1	Yes	yes/no	-	yes/no	yes		OK	*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
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	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)*	4-9
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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; 4-69
Orifice Diameter	-	mm	95	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	***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 Equation 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	222.4	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	222.34	m	-	m				*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									
Annual sediment loading	7.1	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	-11.1	m^3	Not defined	m^3					
Number of years before Forebay A clean-out required									
Number of years before Pond clean-out required	70	yrs	-	yrs			OK		
Adjusted water quality storage	148	m^3/ha	Not defined		115		OK	*Target efficiency required storage*	
Treatment Level	0	%	Not defined						
END OF CHECKLIST									

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Municipal Address:	GIS Coordinates:		Year:	
1729 Wilkonson St., 54-200-00	Latitude:	44°22'23" N	Constructed:	2004
	Longitude:	79°36'6" W	Retrofitted:	0

Part 1: General Information

Pond Name	Monrepos (Bay Point Estates)
Municipal Pond ID	13-1
LSRCA Pond ID	I-N83
Certificate of Approval:	-
Facility Type	Wet pond
Facility Function	-
Watershed	Innisfil Creeks
Receiving Waters	Kempenfelt Bay
Receiver 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	37.43	ha	-	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	40	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	4064	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	2.2	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	58.55	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	36.5	m	-	m					
Length / Width Ratio	1.6	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	2.25	m	-	m	1	2	Failed	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool	2.40	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	39	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	1477	m^3	-	m^3	4210		Failed	*Compare Unit rate volume to actual design*	3-10
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
Existing Extended Detention Storage	-228	m^3	-	m^3	1,497		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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	4.0	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes	4.4	: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	357.9	m^2	-	m^2		1354.56	OK	*Forebay area should be less than 1/3 of pond surface area*	4-56
Forebay provided at each inlet	No	yes/no	-	yes/no				*If multiple inlets*	4-56
Max Depth of Forebay: F1	0.38	m	-	m	1	3	Failed	*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	2.1	l/w	-	l/w	2		OK	*Minimum forebay length to width ratio is 2:1 if single inlet*	
F2	-	l/w	-	l/w	2				
Submerged Forebay Berm: F1	No	yes/no	-	yes/no	yes		Failed	*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									
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	1.1	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	15.0	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*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	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	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	900	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_2	0.44	%	-	%	1		Failed	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_2	50.0	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	Yes	yes/no	-	yes/no	yes		OK	*Biotechnical structures highly preferred*	4-81
Inlet 3									
Inlet Pipe Diameter_3	400	mm	-	mm	450		Failed	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_3	1.60	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_3	27.8	m	-	m					
Submerged Inlet_3	No	yes/no	-	yes/no	no			*A submerged inlet is not preferred*	4-81
Submerged Pipe Grade_3	-	%	-	%	1		OK	*Submerged pipe slope should be a minimum of 1 %*	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*	
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	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	600	mm	-	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
Outlet Pipe Slope	0.3	%	-	%	1		Failed	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-9
Reverse Sloped Pipe Diameter, if provided	-	mm	-	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; 4-69
Orifice Diameter	-	mm	-	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	-	mm	50		OK	*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 Equation 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	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	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	263.88	m^3	Not defined	m^3					
Number of years before Pond clean-out required	0	yrs	Not defined	yrs					
Adjusted water quality storage	79	m^3/ha	-		124		Failed	*Target efficiency required storage*	
Treatment Level	<3		Not defined						
END OF CHECKLIST									

Dry Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

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

Municipal Address:	GIS Coordinates:		Year:	
W of 1708, Wilkonson St, 54-201-00	Latitude:	44°22'10" N	Constructed:	1988
	Longitude:	79°36'29" W	Retrofitted:	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										
Contributing Drainage Area		22.37	ha	-	ha	5.0		OK	*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 %		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)		Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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		5311	m^2	-	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		OK	*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		43.3	m	-	m					
Length / Width Ratio		2.8	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
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		18	m^3	322	m^3	2215		Failed	*Actual volume must equal or exceed the design volume*	3-10
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		3.3	: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		-	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	yes/no	no	yes/no				*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	-	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	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		1		-			1	OK		4-81
Inlet 1										
Inlet Pipe Diameter_1		Swale	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_1		-	%	-	%	1		OK	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_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		OK	*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	-	yes/no	yes		OK	*Outlet structure should be located in embankment for maintenance purposes*	4-82
Outlet Pipe Diameter		600	mm	300	mm	450		OK	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-79
Outlet Pipe Slope		2.65	%	-	%	1		OK	*Outlet pipe slope preferred > 1% (Cold climate min. requirement)*	4-79
Reverse Sloped Pipe Diameter, if provided		-	mm	200	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*	4-79, 4-83
Orifice Diameter		-	mm	100	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-82
Part 3e: Pond Design Parameters - Major Flow Outlet										
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										
Annual sediment loading		18	m^3/year	-	m^3/year					6-14
Estimated sediment volume		-476.16	m^3	-	m^3					
Number of years before Pond clean-out required		#VALUE!	yrs	-	yrs			#VALUE!		
Adjusted water quality storage		0	m^3/ha	-		99				
Treatment Level		<3		-						
END OF CHECKLIST										

Wet Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald XCG

Part 1: General Information

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

Municipal Address:	GIS Coordinates:		Year:	
E of Dalkab, Shoreview Dr., 053-121-06	Latitude:	44°23'0" N	Constructed:	#N/A
	Longitude:	79°34'26" W	Retrofitted:	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									
Contributing Drainage Area	37.71	ha	73.3	ha	5.0		OK	*Minimum drainage area should be 5 ha to sustain wet pond, preferred drainage area is >10 ha*	4-52
Catchment Predominate Landuse	-		-					*Describe % / Is curb & gutter or ditch system pre-dominant*	
Catchment Imperviousness %	24	%	-	%					
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									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	4350	m^2	-	m^2				*Measured at top of berm*	
Pond Block Area / Pond Area (top surface) ratio	14.4	PBA/PA	-	PBA/PA	1.5		OK	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	111.09	m	-	m				*Measured at PP level or through mid section of the pond*	
Overall Pond Width	16.88	m	-	m					
Length / Width Ratio	6.6	l/w	-	l/w	3		OK	*Preferred is 4:1 to 5:1*	4-59
Average Permanent Pool depth	0.98	m	-	m	1	2	Failed	*Average permanent pool depth should be between 1 - 2 m*	4-60
Max Depth Permanent Pool	1.08	m	-	m	1	3	OK	*Maximum permanent pool depth should be less than 3 m*	4-60
Permanent Pool Volume Unit	25	m^3/ha	-	m^3/ha				As per Table 3.2 (MOE)	3-10
Existing Permanent Pool Volume	938	m^3	800	m^3	2586		Failed	***Compare Unit rate volume to actual design***	**3-10**
Depth of Extended Detention Storage	0.02	m	-	m		1.5	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-60
Existing Extended Detention Storage	0	m^3	1257	m^3	1,508		Failed	*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 storm runoff volume (~ 40m3/ha used as a minimum criteria)*	4.52; 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.)	1.0	m	-	m		2	OK	*Total active storage including quantity control*	4-60
Maximum Grade at Permanent Pool	4.3	:1 (h/v)	-	:1 (h/v)	5	7	Failed	*Minimum slope at the permanent pool should be 5:1 - 7:1 preferred maximum*	4-61
Maximum Pond Side Slopes	4.3	: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	767	m^2	-	m^2		1450.04	OK	*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	1.07	m	-	m	1	3	OK	*Minimum forebay depth is 1 m*	4-55
F2	1.09	m	-	m	1	3	OK	*Minimum forebay depth is 1 m*	
Provided Length to Width Ratio: F1	0.3	l/w	-	l/w	2		Failed	*Minimum forebay length to width ratio is 2:1 if single inlet*	
F2	0.4	l/w	-	l/w	2		Failed		
Submerged Forebay Berm: F1	No	yes/no	-	yes/no	yes		Failed	*Submerged preferred for safety reasons*	4-58
F2	No	yes/no	-	yes/no	yes		Failed	*Submerged preferred for safety reasons*	4-58
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	960	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-9
Inlet Pipe Slope_1	0.7	%	-	%	1		Failed	*Inlet pipe slope preferred > 1%*	4-9
Inlet Pipe Length_1	23.0	m	-	m					
Submerged Inlet_1	No	yes/no	-	yes/no	no		OK	*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	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	900	mm	-	mm	450		OK	*Minimum inlet pipe diameter of 450mm*	4-81
Inlet Pipe Slope_2	0.75	%	-	%	1		Failed	*Inlet pipe slope preferred > 1%*	4-81
Inlet Pipe Length_2	22.2	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	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	250	mm	600	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	4-9
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	-	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; 4-69
Orifice Diameter	-	mm	50	mm	75	100	OK	*Smallest acceptable diameter is 75 mm*	4-58
Perforated Riser Orifice Plate Dia., if riser pipe used	-	mm	250	mm	50		OK	*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 Equation 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	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	m^3/year	Not defined	m^3/year					6-14
Estimated sediment volume	42.95	m^3	Not defined	m^3					
Number of years before Pond clean-out required	0	yrs	Not defined	yrs					
Adjusted water quality storage	65	m^3/ha	-		91.4		Failed	*Target efficiency required storage*	
Treatment Level	<3		Not defined						
END OF CHECKLIST									

Dry Pond Criteria Check

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

Innisfil

STORMWATER MANAGEMENT MASTER PLAN - PART 1

By: Hatch Mott MacDonald, XCG

Part 1: General Information

Pond Name	Goldcrest
Municipal Pond ID	15-1
LSRCA Pond ID	-
Certificate of Approval:	3-0662-89-006
Facility Type	Dry pond
Facility Function	Water quantity control
Watershed	Innisfil Creeks
Receiving Waters	White Birch Creek
Receiver Type	-

Municipal Address:	GIS Coordinates:		Year:	
2098 Fennel Dr, 74-186-22	Latitude:	44°12'58" N	Constructed:	1980
	Longitude:	79°34'58" W	Retrofitted:	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									
Contributing Drainage Area	12.57	ha	14.4	ha	5.0		OK	*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 %	49.5	%	-	%					
Fisheries Protection Level	Basic	Level	Basic	Level	Basic		Failed	*Dry ponds cannot achieve higher than basic treatment*	
Part 3a: Pond Design Parameters - Main Pond									
Pond Fenced (vegetative barrier or fence)	Yes	yes/no	-	yes/no	no		OK	*Standards for fencing vary from municipality to municipality, thorny vegetative 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	1997	m^2	-	m^2				*Measured at PP level or through mid section of the pond*	
Pond Block Area / Pond Area (top surface) ratio	1.2	PBA/PA	-	PBA/PA	1.5		Failed	*Check for retrofit feasibility - pond expansion not feasible if ratio <1.5*	
Overall Pond Length	11.5	m	-	m				*Measured at top of berm*	
Overall Pond Width	11.5	m	-	m					
Length / Width Ratio	1.0	l/w	-	l/w	3		Failed	*Preferred is 4:1 to 5:1*	4-59
Depth of Extended Detention Storage	0	m	-	m		3	OK	*Active storage depth for water quality/erosion control - 1.0 m preferred maximum*	4-81
Existing Extended Detention Storage	-	m^3	-	m^3	1697		OK	*Actual volume must equal or exceed the design volume*	3-10
Extended Detention Storage Drawdown Time	0	hours	-	hours	24		OK	*Based on Equation 4.11*	4-58
Active Storage Depth (total storage @ spillway Elev.)	2.17	m	-	m	1	3	OK	*Total active storage including quantity control*	4-81
Maximum Pond Side Slopes	2.7	:1 (h/v)	-	:1 (h/v)	4		Failed	*Maximum pond side slopes 4:1 or flatter*	4-79
Part 3b: Pond Design Parameters - Forebay									
Total Forebay Surface Area	-	m^2	-	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	-	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	750	mm	-	mm	450		OK	*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	-	%	-	%	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		OK	*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									
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	-	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	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	300	mm	300	mm	450		Failed	*Minimum outlet pipe diameter of 450mm (Cold climate min. requirement)*	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		OK	*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									
Top of Berm Elevation	289.55	m	-	m				*Data input*	
Top of Emergency Spillway Elevation	289.5	m	-	m				*Data input*	
Provided Freeboard (@ spill elev.)	0.05	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	19	m^3/year	-	m^3/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	m^3/ha	-		135				
Treatment Level	<3		-						
END OF CHECKLIST									