

**NOTTAWASAGA VALLEY
CONSERVATION AUTHORITY
DEVELOPMENT REVIEW GUIDELINES**

Section 1: Introduction

Section 2: Stormwater Management

Section 3: Stormwater Management Pond Planting

This guideline is a living document. It is date stamped and will be updated and posted on the Authority web site when alterations are made to reflect changes and innovations that are occurring in the engineering community. Users of this document are advised to always check our website (www.nvca.on.ca) for the latest version of NVCA guidelines.

1 INTRODUCTION

The Nottawasaga Valley Conservation Authority is mandated through the: Conservation Authority Act and associated Regulations, the Planning Act, Provincial Policy Statement, and the Conservation Ontario, Ministry of Natural Resources, and Ministry of Municipal Affairs and Housing Memorandum of Understanding on Procedures to Address Conservation Authority Delegated Responsibility. This delegated responsibility involves enhancing, protecting, and managing the watershed through the endorsement of sustainable development practices. As development pressures increase throughout the watershed, the Authority's management role will become even more important.

The Authority's role in the watershed management process was documented in "The Nottawasaga Valley Watershed Management Plan 1996 - 2015," which was developed in co-operation with watershed municipalities, residents, the development industry, government and non-government organizations, and special interest groups to provide direction for resource management in the Nottawasaga Valley Watershed. The Watershed Management Plan outlines several management objectives that reflect the significant features of each municipality. The objectives are as follows:

- A commitment to the integration and co-ordination of water resource management;
- A commitment to the preservation, conservation, enhancement and rehabilitation of significant natural heritage features;
- Enhancement of water conservation practices;
- Maintenance and enhancement of groundwater and surface water quality and quantity;
- Control of discharges into surface and groundwater;
- Identification and protection of significant recharge, discharge, and headwater areas; and,
- The protection of human life and property from water related hazards.

To achieve these goals, the NVCA has initiated a number of proactive programs related to the identification and protection of significant natural heritage features and development of stewardship opportunities with local landowners. In addition, the Authority has regulatory capacity relating to fill, construction or alteration of a watercourse, and risk management associated with natural hazards. The Authority also acts as a commenting agency to the Municipalities with respect to Environmental Impact Assessment, and Stormwater Management. The limits of the NVCA's jurisdictional area can be seen at www.nvca.on.ca/pdf/watershed_map2.pdf.

The Development Review Guidelines, as outlined in this document, were developed to provide a fair, reasonable and uniform basis for development approval decisions within the Nottawasaga Valley Watershed. The Guidelines are based on the most current versions and associated amendments of the following documents:

- Conservation Authorities Act R.S.O. 1990 (CAA);
- Provincial Policy Statement (2005) – issued under Section 3 of the Planning Act;
- Nottawasaga Valley Watershed Management Plan (1995);
- Stormwater Management Planning and Design Manual (MOE, 2003);
- Fish Habitat Protection Guidelines for Developing Areas (MNR, 1994);
- Erosion and Sediment Control Training Manual (MOE, 1997);
- Natural Channel Systems: Adaptive Management of Stream Corridors in Ontario, including Natural Hazards Technical Guides for River and Stream Systems: Flooding Hazard Limit, Erosion Hazard Limit and Hazardous Sites Technical Guides (MNR 2002);
- Great Lakes – St. Lawrence River System and Large Inland Lakes Technical Guides for Flooding, Erosion and Dynamic Beaches in support of Natural Hazards Policies 3.1 of the Provincial Policy Statement (MNR 2002).

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The Guidelines require a systems approach to resource management including both upstream and downstream considerations for all development, as emphasized within the Nottawasaga Valley Management Plan. They present policies specific to the NVCA, summarize typical application information required for NVCA technical review, and outline standard parameters to be applied throughout the watershed. The Development Guidelines are a growing document and in future they will provide guidance for each of the NVCA's most common review areas, including:

- Stormwater Management;
- Sediment and Erosion Control;
- Flood Plain Management;
- Floodproofing;
- Landscaping; and
- Environmental Impact Assessment.

To identify the NVCA's minimum required Terms of Reference for all other types of study, please contact staff directly.

The Guidelines present procedures, computation methods, and input parameters that are commonly accepted by NVCA staff, however it is still the designer's responsibility to recommend and justify the most appropriate methods. If the designer determines that alternative procedures, computation methods, or parameters are required to best describe the development site, an explanation of the rationale must be provided to assist the Conservation Authority in their review. The application of hydrologic / hydraulic computer simulation models to drainage design should be undertaken with sound engineering judgment.

The selection of a procedure, computation method, simulation program, and parameters are dependent on the impacts of failure, the information required, and the hydrologic / hydraulic processes being modelled. The designer should consider the following when utilizing computer simulation programs:

- Determine the exact nature of assistance the program provides;
- Identify the theory on which the program is based;
- Determine the limitations, assumptions, etc. that are included in both the theory and the program;
- Check the validity of the program for the intended applications;
- Make sure the program is correctly used; and
- Verify that the results are correct for each application.

2. STORMWATER MANAGEMENT

The NVCA's expectations for all stormwater management submissions are outlined in the following sections, which include a description of NVCA policies, guidance on approved methods and techniques, a summary of key hydrologic parameters, and a summary of submission requirements.

2.1 Policies

Standards established by individual municipalities, or within watershed / subwatershed studies that exceed the standards identified in this document, are to be given precedence.

Technical reports are to be prepared such that the entire work can be recreated by any qualified person without the need to refer to any additional material. Further, any qualified person must be able to recognize and understand all of the methods, approaches, basic data, and rationale used in the calculations.

With the exception of copy written or proprietary models, equations should be given for all provided calculations. Calculations are to be provided in paper and digital form. All formulas and values used by the program must be clearly identified on the paper copy.

The NVCA must be circulated a complete set of drawings outlining all of the proposed works. Engineering plans and drawings must be signed and sealed by a Professional Engineer registered with the Association of Professional Engineers of Ontario.

2.1.1 Quantity Control

Every effort should be made to maintain existing watershed boundaries and drainage patterns. Pre-consultation will be mandatory for any proposed shift in drainage boundaries.

Unless specified otherwise by the municipality, subwatershed study, or fluvial geomorphic analysis, post development peak flow rates must not exceed corresponding pre-development rates for the 1:2 year through 1:100 year design storm events.

Until further watershed erosion studies are completed, the erosion requirements from the MOE's "Stormwater Management Practices Planning and Design Manual" (1994) will be applied, requiring the 25 mm 4 hr Chicago storm be stored and released over a 24 hour period.

Quantity control facilities are to be designed in accordance with recommendations set out in the MOE's "Stormwater Management Planning and Design Manual," (2003).

Parking Lot Storage and Rooftop Storage

The NVCA does not recommend the use of rooftop and parking lot storage for stormwater management because of the potential for flood damages and because the continual functioning of such devices cannot be guaranteed. Through *normal* operating conditions, parking lot and rooftop storage expose the site owner, Municipality, and Conservation Authority to potential liability for property damage. Additional liability may be incurred should the site owner remove control structures, which could cause flooding and erosion problems downstream.

Typically, design ponding values do not accurately represent anticipated ponding depths or flooding frequencies, as the design does not consider impacts of partially blocked grates and outlets, or localized rainfall patterns such as short duration, intense rainfall bursts typical of summer thunderstorms. Since vehicles may be flooded, with water entering the passenger compartment at depths of less than 0.30m, the use of parking lot storage represents a significant liability risk. Similarly, the retention of stormwater on rooftops increases the potential for property damage.

Where other options for stormwater management practices exist, it is the preference of the NVCA that alternatives to parking lot and rooftop storage be used. NVCA staff will not approve developments incorporating parking lot or rooftop storage without consultation and acceptance from the Municipality. Should parking lot and rooftop storage at the subject site be supported, we will require that the following conditions be met:

1. The developer must provide written acknowledgement that he is aware of the potential liabilities associated with parking lot and rooftop controls, and that he will not hold the NVCA or Municipality liable for any damages related to the installation, operation, modification or removal of proposed parking lot or rooftop controls.
2. Parking lot and rooftop storage devices should be registered on title to be binding on subsequent site owners as part of the Site Plan Agreement to ensure they cannot be removed or altered during future site alterations without the provision of adequate alternative storage, as approved by the Municipality and Conservation Authority. The following clauses should be included in the site plan agreement:
 - The site owner is responsible for all liability related to the proposed parking lot and rooftop controls, including all damages resulting from the designed operating conditions, and any downstream damages resulting from removal, modification, or lack of maintenance to on-site controls;
 - On site controls are to be maintained in accordance with the Maintenance Manual;
 - The site owner must obtain written approval from both the NVCA and Municipality prior to permitting any removal or modification to approved parking lot or roof top controls.

Specific Design Requirements for Parking Lot Storage

- Parking lot storage must be controlled by pipe size reductions within the storm sewer network, and not through the use of orifice plate restrictors.
- Surface ponding is only allowable during storm events greater than the 1:5 year design storm.
- The maximum allowable ponding depth within the parking lot is to be limited to 0.3m; however, maximum ponding depths of 0.2 m are preferred.
- The 100 year ponding elevation and storage volume provided at each ponding location must be shown on the design drawings.

Specific Design Requirements for Rooftop Storage

Where rooftop controls are used, design submissions must indicate:

- the type of control to be installed (i.e., product name and manufacturer);
- the number and placement of proposed drains and weirs;
- product specifications showing design release rates for each structure;
- the maximum ponding depth, drawdown time and detained volume at each structure; and
- the total release rate and detained volume for the roof.
- Wherever possible, tamper-proof structures are to be selected.
- An emergency weir overflow should be provided at the maximum design water elevation

2.1.2 Quality Control

Best management practices must be applied to all development in order to provide enhanced water quality treatment as per the MOE's "Stormwater Management Planning and Design Manual" (March 2003).

Oil and grit separators may be used as part of a multi-component approach to achieve enhanced quality control provided they are sized in accordance with the recommendations set out by both the MOE Manual and Manufacturer. Such systems are not to be used independently, i.e. without the incorporation of other quality control measures, such as naturalized buffers, grassed swales, etc.

A separate maintenance manual must be prepared to highlight standard operating conditions and guide the site owner through recommended maintenance requirements for all aspects of the stormwater management system.

A landscaping plan for end of pipe treatment systems must be submitted for review prior to final site approval.

2.1.3 Hydraulic / Flood Plain Issues

The developer must demonstrate that all major overland flow routes are sized for the regulatory storm event (the greater of the 1:100 year design storm or Timmins Storm).

All major overland flow routes are to be transferred (through ownership or easement) to the governing municipality.

The Stormwater Management Facility must be located outside of the 1:100 year flood plain. If the facility location is proposed within the Regional Storm Floodplain, the proponent should pre-consult with NVCA staff to determine the acceptability of the location, and any other required design constraints.

While development is generally not permitted within the floodplain, please note that all lots should be dry flood-proofed to the regulatory storm elevation. Should dry-flood-proofing of the entire lot not be viable, pre-consultation with the NVCA is required.

2.1.4 Riparian Rights

It is the developer's responsibility to demonstrate safe conveyance of the Regulatory Storm (the greater of the 1:100 year design storm or Timmins storm event) through the development site to a sufficient outlet, such that no adverse impacts will be incurred on up and downstream landowners. A sufficient outlet typically constitutes a permanently flowing watercourse or lake. A public right of way may also provide

sufficient outlet provided the proponent has obtained written permission from the land owner. In the case of privately owned land, the proponent must obtain a legal right of discharge registered on title. Legal documentation, such as right of discharge, and/or written permission to discharge into a public right of way must be provided with the design submission.

2.1.5 Water Balance

A water balance assessment should be completed as per the MOE's "Stormwater Management Planning and Design Manual" (March 2003). Since the Nottawasaga Valley Conservation Authority's area of jurisdiction is largely sand based, a relatively small change in flow can have a significant geomorphic impact. Therefore, every attempt should be made to match post development infiltration volumes to pre development levels on an annual basis. Infiltration targets may be achieved through the incorporation of a variety of best management practices including: reduced lot grading, roof leaders discharging to ponding areas or soak away pits, infiltration trenches, grassed swales/enhanced grassed swales, and pervious pipe and catch basin systems.

2.2 Technical Methods and Approaches

2.2.1 Subcatchment Delineation – Internal & External Drainage Areas

Determine drainage boundaries based on field reconnaissance supplemented through the use of topographic maps and aerial photo interpretation.

Sources must be provided for all topographic information used in the analysis. Reference information should include the: map title, author, publisher, scale, publishing date and flown date, or surveyor name and survey date.

Watershed points of interest must be included in the discretization scheme.

2.2.2 Modeling

Stormwater runoff must be determined using a hydrologic model approved by the Authority. Visual OTTHYMO, SWMHYMO, OTTHYMO, GAWSER, and SWMM, are some of the approved hydrologic models. Other models may be used provided the model is first accepted by the Conservation Authority. The modified rational method and SCS Unit Hydrograph method are also acceptable for small drainage areas less than 5 ha in size.

Modeling should be completed using the most current version of the computer software. Proponents wishing to use outdated programs should contact the NVCA and relevant municipalities to obtain approval.

2.2.3 Precipitation

Both the 4 hour Chicago and the 24 hour SCS Type II design storm distributions should be modelled to demonstrate peak flow control and calculate required storage volumes. Rainfall amounts should be based on the IDF curves for the precipitation station outlined in the municipality's SWM standards. In the absence of a municipal standard, the NVCA will accept IDF curves based on the District 5 MTO IDF Curves for Basins East of Collingwood..

The rainfall time step should be equal to 1/5 of the smallest basin time to peak.

2.2.4 Hydrograph Computation

NVCA standard values/approaches should be used in the selection / calculation of Curve Numbers, Runoff Coefficients (Rational C), Initial Abstraction, Time of Concentration, Overland Flow Lengths, Manning Roughness Coefficients, Infiltration Rates, Orifice Coefficients, and Weir Coefficients. These values are available in Section 2.3.

Under post development conditions, all gravel parking areas, storage yards, etc., must be modeled as asphalt surfaces.

The NVCA does not support modification of the CN value to CN* based on antecedent moisture conditions unless the hydrologic model has been calibrated using WSC gauges within the Nottawasaga Valley. However, the NVCA does support the use of the modified CN method in terms of specifying IA based on landuse.

CALIB*HYD routines must be used for all modeling completed using HYMO based models as some of the standard values applied in the DESIGN*HYD analysis do not meet NVCA standards.

Hydrograph time of concentration should be calculated based on the Airport Method for catchments with a runoff coefficient less than 0.40, or the Bransby-Williams Equation for catchments with a runoff coefficient greater than 0.40 (based on the weighted catchment C) and compared with results obtained from the Upland Method. Whichever method produces the highest T_c should be used in the modeling. These methods are described in Section 2.3. Please note that sketches identifying Uplands travel paths and land use must be included with the submission.

Time to Peak should be calculated as $t_p = 0.67 t_c$, where t_c is Time of Concentration. The number of linear reservoirs for the NASHYD command shall equal 3 unless calibration results indicate otherwise.

The hydrograph computation time step [D(T)] should be equal to 1/5 of the basin time to peak, i.e., $D(T) = 0.2 \times T_p$, and equal to the rainfall time step.

Impervious areas shall be determined by sampling a representative area in each subcatchment.

2.2.5 Channel Routing

Sufficient channel routing should be incorporated into the hydrologic model.

Rating curves and travel times used in channel routing shall be determined by preliminary hydraulic calculations of the backwater profile or by procedures available in the approved hydrologic model.

Hydrographs should be combined before being routed through watercourse reaches.

Cross-sections required for the hydrologic model routing procedure must be obtained from 1:5,000 or 1:2,000 topographic mapping, or from field surveys. Cross-sections shall be extended sufficiently to ensure that the flows do not exceed the range of the travel timetable.

The routing computation time step must be relative to the smallest channel section, and at a maximum equal to the hydrograph time step.

Selected Manning's roughness parameters must be in accordance with the values/approaches set out in Section 2.3.

Dynamic wave routing shall be undertaken for channel reaches with mild slope where the diffusive wave model criterion cannot be satisfied. U.S. National Weather Service Dynamic Wave Operational Model (DWOPER) is acceptable to carry out this analysis.

2.2.6 Reservoir Routing

When calculating orifice discharge, the orifice equation is only to be applied for water levels above the centroid of the orifice. Flows for water levels below the orifice centroid should be calculated using the weir equation.

$$Q_w = 1.65 \left[\left(\frac{\pi D^2}{4} \right) (2 \cos^{-1} \left[\frac{((D/2)-d)/(D/2)}{1} \right] \right) (180/\pi) / 360 - ((D/2)-d)(Dd-d^2)^{0.5} \right] / d^{1.5}$$

Where: Q_w = Weir Flow (m³/s)
 D = Orifice diameter (m)
 d = Depth of flow above the invert (m)

Where routing is applied, the technical report should discuss the method of routing used and assumptions made in determining routed flows.

2.2.7 Pre-Development Validation

Modeled pre-development flows should be substantiated through a comparison to design flows generated using the design flow and headwater drainage area equations as per Appendix G and Section 3.3.4.1 respectively of:

MacLaren Plansearch, 1988. "Watershed Hydrology Study for Nottawasaga, Pretty and Batteaux Rivers, Black Ash, Silver and Sturgeon Creeks", Volume 1-Technical Report", Canada-Ontario Flood Damage Reduction Program.

*Linear Regression Analysis of Peak Flow vs. Drainage Area
Headwater Drainage Areas Formula:*

$$Q=CA^n$$

Where: Q = Peak discharge in m³/s
A = Drainage area in km²

Table 2.1: Summary of Linear Regression Analysis Parameters for Headwater Drainage Areas

WATERCOURSES	5 Year		10 Year		20 Year		50 Year		100 Year	
	C	n	C	N	C	n	C	n	C	n
Innisfil/Beeton/Bailey	0.556	0.751	0.683	0.753	0.826	0.750	0.993	0.753	1.12	0.757
Upper Nottawasaga	0.639	0.652	0.820	0.643	0.957	0.647	1.19	0.644	1.35	0.646
Boyne River	0.767	0.894	1.05	0.883	1.47	0.851	1.79	0.869	2.31	0.842
Pine River	0.228	1.00	0.289	0.999	0.332	0.999	0.396	0.998	0.443	0.999
Mad River	2.43	0.489	2.99	0.489	3.51	0.489	4.24	0.489	4.81	0.489
Willow Creek	0.553	0.880	0.624	0.880	0.698	0.878	0.789	0.878	0.879	0.872
Georgian Bay Inflows	1.58	0.817	2.02	0.808	2.51	0.790	3.37	0.749	3.99	0.729

2.3 Hydrologic Input Parameters

Table 2.2: NVCA Rainfall Intensity Duration Frequency Values

Duration min	2 year mm/hr	5 year mm/hr	10 year mm/hr	25 year mm/hr	50 year mm/hr	100 year mm/hr
5	95	125	150	175	195	215
10	79	100	115	130	145	160
15	62	82	95	110	125	135
30	40	53	62	73	81	89
60	25	34	41	49	55	61
120	14	19	23	27	30	33
360	6.1	8.4	10	12	13	15
720	3.3	4.6	5.5	6.6	7.4	8.2
1440	2.1	2.7	3.1	3.6	4	4.4

Ref: Design Chart 1.01(e): District IDF Curves, District 5 – Owen Sound: for Basins East of Collingwood, Ontario Ministry of Transportation, “MTO Drainage Management Manual,” MTO. (1997)

Table 2.3: SCS Curve Numbers

Cover	Hydrologic Soil Group						
	A	AB	B	BC	C	CD	D
Wetlands / Lakes / SWMFs	50	50	50	50	50	50	50
Woods	32	46	60	67	73	76	79
Meadows	38	51	65	71	76	79	81
Pasture / Lawn	49	59	69	74	79	82	84
Cultivated	62	68	74	78	82	84	86
Impervious areas	100	100	100	100	100	100	100

Notes: * Table 3 represents AMCII conditions and is not applicable to frozen soils or to the period where snowmelt contributes to runoff.

* CN values should be used as given above. The NVCA does not support the use of CN*.

Ref: Adapted from Design Chart 1.09, Ontario Ministry of Transportation, “MTO Drainage Management Manual,” MTO. (1997)

Table 2.4: Runoff Coefficient (Rational C)

	Cover Soil Group		
	A-AB	B-BC	C-D
	Runoff Coefficient		
Cultivated Land, 0 - 5% grade	0.22	0.35	0.55
Cultivated Land, 5 - 10% grade	0.30	0.45	0.60
Cultivated Land, 10 - 30% grade	0.40	0.65	0.70
Pasture Land, 0 - 5% grade	0.10	0.28	0.40
Pasture Land, 5 - 10% grade	0.15	0.35	0.45
Pasture Land, 10 - 30% grade	0.22	0.40	0.55
Woodlot or Cutover, 0 - 5% grade	0.08	0.25	0.35
Woodlot or Cutover, 5 - 10% grade	0.12	0.30	0.42
Woodlot or Cutover, 10 - 30% grade	0.18	0.35	0.52
Lakes and Wetlands	0.05	0.05	0.05
Impervious Area (i.e. buildings, road, parking lot, etc.)	0.95	0.95	0.95
Gravel (not to be used for proposed parking or storage areas)	0.40	0.50	0.60
Residential - Single Family	0.30	0.40	0.50
Residential - Multiple (i.e. semi, townhouse, apartment)	0.50	0.60	0.70
Industrial - Light	0.55	0.65	0.75
Industrial - Heavy	0.65	0.75	0.85
Commercial	0.60	0.70	0.80
Unimproved Areas	0.10	0.20	0.30
Lawn, < 2% grade	0.05	0.11	0.17
Lawn, 2 - 7% grade	0.10	0.16	0.22
Lawn, > 7% grade	0.15	0.25	0.35

- Notes: *
- * As per MTO Manual, increase coefficients for the 1:25 year storm by 1.1, the 1:50 year design storm by 1.2, and the 1:100 year design storm by 1.25 (to a maximum value of 1.0).
 - * Proposed gravel parking and storage areas must be modeled as asphalt.
 - * Residential values given above are only to be used for preliminary planning stages. The representative area method should be used to calculate a weighted C prior to clearance of draft plan conditions.
- Ref: Adapted from Design Chart 1.07, Ontario Ministry of Transportation, "MTO Drainage Management Manual," MTO. (1997)

Table 2.5: Initial Abstraction / Depression Storage

Cover	Depth (mm)
Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious areas	2

Ref: UNESCO, Manual on Drainage in Urbanized Areas, 1987.

Table 2.6: Manning Roughness Coefficients - Overland Flow

Cover	n
Impervious areas	0.013
Woods	
with light underbrush	0.400
with dense underbrush	0.800
Lawns	
Short grass	0.150
Dense grass	0.240
Agriculture Land	0.050-0.170

Ref: Adapted from Soil Conservation Service, Urban Hydrology for Small Watersheds, U.S. Dept. of Agriculture, Soil Conservation Service, Engineering Division, Technical Release 55, June 1986

Table 2.7: Manning Roughness Coefficients - for Routing

Location	Cover	n
Overbank	Woods	0.080-0.120
	Meadows	0.055-0.070
	Lawns	0.035-0.050
Channel	Natural	0.030-0.080
	Grass	0.030-0.050
	Natural Rock	0.030
	Armour Stone	0.025
	Concrete	0.013
	Articulated Block i.e. Terrafix	0.020
	Gabions	0.025
	Wood	0.015
	Corrugated Steel Pipe - 3"x1"	0.024
	Structural Plate Corrugated Steel Pipe - 6"x2"	0.032

Ref: Adapted from Design Chart 2.01, Ontario Ministry of Transportation, "MTO Drainage Management Manual," MTO. (1997)

Table 2.8: Infiltration Parameters

Soil Group	Minimum Infiltration Rate mm / hr	Maximum Infiltration Rate mm / hr
A	25	250
B	13	200
C	5	125
D	3	75

Decay Parameter 2 hr⁻¹

The parameters listed are for the Horton infiltration equation. The infiltration rate is an exponential decay equation. The decay parameter indicates how fast the maximum infiltration rate will decay to the minimum infiltration rate. ILLUDAS uses a value of 2 hours while the SWMM 5 Manual suggests typical values range between 2 and 7 hours. A larger value indicates a greater soil storage capacity.

Ref: M.L. Terstriep and J.B Stall, Illinois Urban Drainage Area Simulator (ILLUDAS) Illinois State Water Survey Urbana, 1979.

Table 2.9: Routing Coefficients

Application	C
Orifice	0.63
Orifice Tube	0.80
Sharp Crested Weir	1.7
Broad Crested Weir	1.5

A sharp crested weir coefficient should be used when there is air underneath the nappe. Such conditions would exist for a stormwater management pond weir outlet. A broad crested weir assumes the nappe is supported. An example of a broad crested weir would be a road crossing. Generally, when the ratio of flow depth divided by the weir thickness is greater than 0.5 a sharp crested weir coefficient should be used. When the ratio is less than 0.5 the broad crested weir coefficient should be used.

Calculation: Time of Concentration

Airport Equation To be used if "C" value is less than 0.4

$$t_c = 3.26 * (1.1 - C) * L^{0.5} * S_w^{-0.33}$$

Where: t_c = time of concentration, minutes
 C = runoff coefficient
 L = watershed length, m
 S_w = watershed slope, %

Bransby-Williams Formula To be used if "C" value is greater than 0.4

$$t_c = 0.057 * L * S_w^{-0.2} * A^{-0.1}$$

where: t_c = time of concentration, minutes
 L = watershed length, m
 S_w = watershed slope, %
 A = watershed area, ha

Ref: MTO, Drainage Management Manual, page 28, Chapter 8, 1997

Uplands Method

Table 2.10: $V/(S^{0.5})$ Relationship for Various Land Covers

Land Cover	$V/(S^{0.5})$ m/s
Forest with heavy ground litter, hay meadow	0.6
Trash fallow or minimum tillage cultivation	1.5
Short Grass Pasture	2.3
Cultivated, straight row	2.7
Nearly bare soil, untilled	3.0
Grassed Waterway (ditch)	4.6
Paved Areas; small upland gullies	6.1

t_c = sum of travel times for each land use

$$\text{Travel Time} = \text{Travel Length} * \text{Slope}^{0.5} * V/(S^{0.5})$$

Where: S = slope, m/m

- Notes: *
- * Travel times must be calculated individually for each land use
 - * Travel times must be calculated along the longest continuous travel path
- Ref: Figure 3.11: Velocities for Upland Method for Estimating Travel Time for Overland Flow, American Iron and Steel Institute, "Modern Sewer Design: Canadian Edition," Corrugated Steel Pipe Institute. (1996)

Calculation: Overland Flow Lengths for STANDHYD

Pervious Areas

A typical value for urban pervious areas is 40 m, the depth of a residential lot.

Impervious Areas

The overland flow length for un-calibrated watersheds can be calculated using the following equation:

$$LGI = (A / 1.5)^{0.5}$$

A = subcatchment area, m²
LGI = overland flow length, m

Calculation: Subcatchment Width - EPA Stormwater Management Model

$$\text{Subcatchment Width} = (2 - S_k) * L$$

- L = length of main drainage channel, m
- S_k = skew factor = $(A_2 - A_1) / A_t$
- A_2 = largest area to one side of the channel, ha
- A_1 = area to the other side of the channel, ha
- A_t = total basin area, ha

Ref: US EPA, SWMM Version 4, Users Manual, August 1988

2.4 Submission Requirements List

In order to provide more efficient service, the NVCA will only perform a detailed engineering review upon receipt of a complete submission. The following list details items typically required as part of a complete submission, however as the list is intended to cover a broad range of development proposals, portions of the submission list may not be applicable. Exemptions will be made on a site by site basis, through pre-consultation with the NVCA.

Stormwater Management Report

1. Printed and digital copies of the Stormwater Management Report must be submitted with each development proposal. Digital copies are to be submitted in .pdf format, and include report text, drawings and appendices, as well as the full set of engineering drawings. The report must be signed and sealed by a Professional Engineer of Ontario and meet, as a minimum, the submission requirements outlined below.

Background

2. Introductory material describing the property location, including both municipal and legal descriptions, planning status, proposed development scheme, construction phasing plan, intent of the report, and existing / historic land use
3. Reference for the topographic information used to determine internal and external catchment areas under existing and proposed conditions

Criteria

4. Outline the SWM criteria being applied in the report

Water Balance

5. Outline water balance methodology and input parameters, and summarize results, placement detail, and functioning of any proposed infiltration measures

Hydrology and Water Quality

6. Outline pre-development conditions including: internal and external catchment areas and catchment I.D.s, flow routes across the site and applicable external lands, hydrologic parameters used for modeling, and pre-development peak flow rates for the 1:2 through 1:100 year design storms (both 4 hour Chicago and 24 hour SCS Type II distributions) and the Regional Storm Event for each sub catchment.
7. Outline of post development conditions including: internal and external catchment areas and catchment I.D.s, major and minor flow routes, hydrologic parameters used for modeling, and post development peak flow rates for the 1:2 through 1:100 year design storms (both 4 hour Chicago and 24 hour SCS Type II distributions) and the Regional Storm Event for each sub catchment.

8. Certification of safe conveyance of regulatory flows from both the subject site and any external lands, through the development to a sufficient outlet, with no adverse impact to either the upstream or downstream landowners. A sufficient outlet constitutes: a permanently flowing watercourse or lake; a public right of way (provided the proponent has obtained written permission to discharge stormflows from the land owner); or in the case of privately owned lands, a legal right of discharge registered on title.
9. Description of how enhanced level quality control has been achieved across the site
10. Description of proposed erosion and sediment control measures to be in place during the construction period
11. Appended documentation demonstrating all stormflow outlets are sufficient outlets, as described above)
12. Appended printed copies of the hydrologic modeling, including input and detailed output files for the 1:2 through 1:100 year return period events, 25 mm 4 hour Chicago quality storm, and Timmins storm for existing and future landuses
13. Appended digital copies of all modeling. Digital files must include all files necessary to run the model, (i.e., both input and storm files) as well as the detailed output files generated for the regional and 1: 2 through 1:100 year design storm events. Digital files are to include both pre and post development scenarios.
14. Appended paper and digital copies of the NVCA SWM Facility Submission Tool (if required)
15. Appended paper and digital copies of the NVCA Erosion and Sediment Control Submission Tool

Tables

16. Relevant Storm Design Parameters Table - Identifying the design storm duration and distribution; referencing the source of the rainfall intensity duration and frequency values; and listing the intensity-duration-frequency values for the 1:2 through 1:100 year return periods. Any other relevant design storm values not specified above should also be included.
17. Underlying Soil Characteristics of Individual Subcatchments Table – Listing the areal distribution of each soil type (expressed as a %) within every subcatchment
18. Model Input Parameters Table - Summarizing key input parameters for existing and future land use for each catchment including subcatchment I.D., drainage area, CN, IA, Tp, Slope, % impervious, modeling time step, pervious and impervious Manning's roughness, etc.
19. Flow Validation Table - comparing calculated pre-development flows with validation flows obtained using the Headwater Drainage Area Equations given in Section 2.2.7.
20. Summary of Diversions Table (if required) – Listing discharge storage values for each diversion structure, i.e., list is to include total discharge to the structure, total maximum

inlet capture flow rate, number of inlets and inlet capacities of each diversion structure, and the hydrograph ID for major and minor flow systems

21. Stage vs. Discharge and Storage Table (if required) – Note: As a minimum, the table is to include every point used in the reservoir routing command
22. Summary of Significant SWMF Features Table - including:
 - type of facility;
 - contributing drainage area;
 - lumped catchment imperviousness ratio;
 - permanent pool, extended detention and quantity control volumes;
 - elevations for: base of pond, base of forebay, normal water level, active storage and quantity control design high water level, regional and 1:100 year design storm high water levels, and top of berm;
 - inlet and outlet structure design details such as: pipe size, orifice size, weir length, and invert elevation;
 - total draw down time required for the extended detention volume.
16. Comparison of Predevelopment, Uncontrolled Post Development and Controlled Post Development Flows Table – showing peak flows for the Regional and 1:2 through 1:100 year design storm events at significant points of interest throughout the catchment area.

Figures (reference all map sources)

17. Watershed Location Plan
18. Pre-development internal and external catchment areas and catchment I.D.s on a topographic base showing existing land use
19. Post development internal and external catchment areas and catchment I.D.s on a topographic base showing future land use, and major and minor flow routes
20. Pre and post development watershed modeling schematics reflecting the model subcatchment I.D.'s and catchment areas.
21. For routing analysis: watercourse plan and profile plots, labeled with the location of the routing cross sections, and watershed subcatchments; and cross section plots of each routing cross section, labeled with Manning's roughness coefficient values, and downstream channel slope.
22. Pre and post development hydrograph plots for all significant points of interest.
23. Placement and detail of any required infiltration measures
24. Full set of **folded** Engineering Design Drawings, signed and sealed by a licensed Professional Engineer of Ontario

Calculations

25. Model input parameters, i.e., CN, IA, Tc, % imperviousness, etc.
26. Conveyance capacity of the major system flow path
27. Stage vs. discharge spreadsheet. Note: Calculation equations, coefficients, and design values for all hydraulic structures should be clearly identified.
28. Incremental volume calculations for the stormwater management facility
29. Sizing of reservoir emergency outlet for Regulatory flows
30. Sizing of erosion control structures
31. Water balance calculations showing post to pre infiltration volume analysis

Stand Alone Reports

32. Operation and Maintenance Manual
33. Geotechnical Engineering Report, signed and sealed by a Professional Engineer of Ontario, confirming geotechnical feasibility of all stormwater management facilities prior to issuing draft plan conditions, and certifying that all aspects of the proposed stormwater management facilities will function as intended from a geotechnical perspective, that the design meets all current geotechnical standards, and that the proposed operation and maintenance procedures outlined in the manual are suitable from a geotechnical perspective.

3. STORMWATER MANAGEMENT POND PLANTING

3.1 Introduction

The Stormwater Management Pond Planting Guidelines have been produced by the Nottawasaga Valley Conservation Authority (NVCA) to complement its existing municipal stormwater review services. These guidelines follow the recommendations provided in the Stormwater Management Planning and Design Manual (MOE, 2003) and its accompanying document, “The Holistic Landscape”. As part of guideline development, planting guidelines from other conservation authorities were reviewed and key staff members were interviewed. These guidelines apply specifically to wet ponds as they are the most common stormwater management facility used in Ontario.

Stormwater Management Ponds (SWMPs) provide many water quantity and water quality benefits. They hold surplus water from storm events and collect runoff from developed lands. Downstream flooding and erosion are reduced because SWMPs control the peak flow, frequency of peak flow, and velocity of stormwater. Stormwater contains potential pollutants such as suspended soils, nutrients, bacteria, oil and grease, trace metals and organic contaminants such as pesticides, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs). By collecting runoff, SWM facilities reduce the amount of sediment and toxins that would otherwise be discharged into rivers or lakes.

Vegetation plays a key role in improving water quality discharged from stormwater facilities through several mechanisms. Vegetation can control sediment discharge by slowing its movement and allow for settling, and can aid in decreasing water temperature through shading. Aquatic vegetation can also serve as a biological filter as it can retain fine sediments and any bound contaminants. The success of the SWMP in reducing contaminant loadings is directly related to vegetation plantings. Appropriate planting strategies are important to ensure effective SWMP operation.

Layout and orientation of SWMPs is also important, particular when facilities discharge to existing/potential coldwater systems. To minimize temperature increases through shading, wet ponds should be designed with their longest axis aligned along a northwest to southeast direction.

This document is intended for consultants who are developing landscaping plans for municipal stormwater facilities. Planting guidelines are provided for the various planting zones within and adjacent to stormwater facilities, with an emphasis on wet pond facilities. Specific guidelines for tree, shrub and ground cover densities and species composition are provided as well as recommendations for monitoring. A checklist for landscaping plan submissions is provided to facilitate submissions and review.

3.2 Planting Guidelines

3.2.1 Planting Zones

The NVCA's planting strategy guidelines follow the guidelines set out in the 2003 MOE Manual. The manual identifies five planting zones which are defined by the frequency and duration of water inundation. The following guidelines along with best professional judgement should be used to create a planting plan.

1. Upland Areas
 - Area of SWM facility that is highest in elevation
 - Include mature plants to meet shading, aesthetics, wind screening and other objectives
2. Flood Fringe:
 - Area of infrequent inundation due to infrequent storm events (2 to 100 year storm), wetted perimeter, peak control
 - Acceptable plantings include a variety of grass, forb, shrub and tree species
3. Shoreline Fringe
 - Areas that receive frequent wetting due to relatively frequent storm events, permanent pool to high water mark
 - Plantings may include wetland sedges, rushes, wildflowers, ferns and shrubs
4. Shallow Water
 - Includes submergent and emergent vegetation in the zone 0.5m or less, gradual slopes maximize area available for planting
 - Plant most emergents at a water depth of <0.3m
5. Deep Water
 - Includes submergent, free-floating and floating-leaved species adapted for water depths of 0.5m or greater (includes pondweed and duckweed)

3.2.2 Species Selection

As per the Ministry of the Environment's requirements, the NVCA requires the use of native, non-invasive plants for SWMPs. Non-native species are discouraged due to the negative effect they can have on the surrounding environment. Within and adjacent to ponds, they out-compete native species thereby decreasing plant species diversity and the diversity of the local native plant gene pool. Non-native vegetation can degrade ecological functions and can increase the susceptibility of native species to disease and/or insect pests. The introduction of non-native vegetation can also reduce the hardiness and resilience of the natural community to changes in the environment. Suitable native species are available for all levels of moisture (upland to aquatic) and for other imposed environmental conditions, such as road salt exposure.

The following guidelines should be used for species selection:

- Use only non-invasive plants that are native to the watershed (See list at the end of this chapter for Native Planting List); cultivars are not acceptable
- When SWMPs are proposed adjacent to natural areas, native, non-invasive species that are found within or adjacent to these natural area should be planted in keeping with the character of adjacent lands
- The design of planting plans should include a diverse mix of trees, shrubs, ground cover and aquatics as described in further sections
- Consideration should be given to:
 - adjacent plant community composition;
 - species rooting characteristics
 - species ability to filter sediments and trap floating debris
 - species ability to provide bioengineering support for SWMP structures
 - soil conditions (type, moisture regime)
 - frequency and duration of flooding
 - microclimatic conditions
 - downstream temperature and dissolved oxygen regimes (shading)
 - slope stability and erosion mitigation
 - deterrence of nuisance wildlife (i.e. Canada geese)
 - provision of aesthetic benefits, concealment of fencing structures
 - maintenance requirements
 - barriers to public access
 - proximity to roads (airborne pollutants, salt spray).

The common and scientific names for all species proposed for planting (including terrestrial and aquatic plants and seed mixes) are required for all SWMP planting plans.

3.2.3 Planting Densities and Species Composition

Trees

- Proposed tree density after planting should be 5-7 trees per every 100m²
- Provide a minimum of 6 species (combined coniferous & deciduous) that are adapted to their proposed planting location
- Plant in natural configuration using a variety of age classes
- Caliper-sized trees should be used to shade permanent pools
- Use whips or bare-root small caliper stock for future canopy cover where larger stock is not appropriate
- Minimum caliper for deciduous trees is 40mm
- Minimum height for a coniferous tree is 1.8m
- Maximum size for transplanted stock is 200mm dbh
- Remove wire baskets from all stock
- Mulch bowls are to be placed and maintained around the base of trees to retain water
- Appropriate staking should be used
- Rodent protection should be installed around deciduous trees
- Trees and shrubs should be guaranteed for two years from the Maintenance Period start date. If trees and/or shrubs are found dead or in an unhealthy condition within the guarantee period, the defective plants will be replaced and re-guaranteed for an additional two years.

Shrubs

- Plant shrubs 0.75 - 1.5m apart over 30% of the planting area
- Provide a minimum of 6 shrub species that are adapted to their proposed planting location
- Plant in natural configuration
- Minimum height for a deciduous or coniferous shrub is 0.6m
- Bare root, live stake, harvested & transplanted stock methods may be acceptable means of establishing the vegetation community
- Shrub Application-Specific Spacing
 - a) *Barrier Planting*: minimum of 2 rows of thorn-bearing shrubs that extend to 3m past the area limit; offset rows with each other and use maximum spacing of 0.8m on centre
 - b) *Planted Weirs*: space shrubs with 0.8m on centre continuously across the width of the weir for the length of the crest
- Trees and shrubs should be guaranteed for two years from the Maintenance Period start date. If trees and/or shrubs are found dead or in an unhealthy condition within the guarantee period, the defective plants will be replaced and re-guaranteed for an additional two years.

Aquatic Vegetation

- Plant aquatics in a 1.5m band around the perimeter or up to 0.75m deep, whichever is greater, with a maximum spacing of 1m on centre over 40% of the planting area
- Provide at least 4 different species including a minimum of 1 floating, 1 submerged and 1 emergent (robust / broadleaved / narrow leaved) plant species

Seed Cover

- Determine which type of seed cover is appropriate for the location (upland, mesic, wetland) and provide a seed mix with a minimum of 6 different types of seeds and with a minimum component of 70% native, non-invasive species
- For areas adjacent to ANSIs, PSWs, County Greenland or other environmentally designated zones, a seed mix of 100% native, non-invasive species is required
- Application can be done using hydroseeding methods or a custom seed mix impregnated in a nutrient-rich medium (i.e. mesh-like blanket)

3.2.4 When to Plant

Planting Zone	Planting Time	Plant Form	Vegetation Layer			
			Tree	Shrub	Ground Cover	Aquatic
Upland Area/ Flood Fringe	early spring after water levels have declined	ball and burlap, potted, bare root, live stakes	Yes	Yes	Yes	
Flood Fringe/ Shoreline Fringe	mid-May to early June, after water levels have declined	ball and burlap, potted, bare root, live stakes	Yes	Yes	Yes	
Shoreline Fringe/ Shallow Water	late May to early June; submerged plants in late spring or summer	springs, shoot or plugs; submerged plants should be planted as mature vegetative growth				Yes
Deep Water	mid to late spring					Yes

Note: bareroot species should only be planted while dormant (i.e. in spring or in fall after leaf out); container-grown and balled and burlapped vegetation can be planted at any time during the growing season if sufficient water is provided.

For spring plantings, bareroot trees and shrubs should be planted from mid-April to mid-May before bud-break. The soil must be dry and not too heavy or sticky. For fall, trees and shrubs should be planted 2-3 weeks after leaves have dropped. Please refer to the above table for further planting information.

The optimal time for seeding dormant wildflowers is May 15 to June 15. Dormant native grasses should be seeded between October 15 to November 15 if establishment is desired in the spring. To protect seeds/ground cover, annual nurse crops can be hydroseeded until mid to late September as establishment will occur within 2 to 3 weeks.

3.2.5 Topsoil, Stabilization & Erosion Control

Prior to grading, strip topsoil and store on-site away from watercourses or ponds. To reduce sediment runoff, erect sediment fencing around the topsoil pile.

Terrestrial Guidelines

For terrestrial areas, 0.45m to 1.0m of topsoil is required for all areas above the permanent water level. The depth of the topsoil can be spread evenly or in raised and/or excavated beds throughout the facility. Stabilize top soil prior to planting trees and/or shrubs with native, non-invasive herbaceous seed mixes for groundcover. Depending on the time of year, additional stabilization methods may be required, such as hydroseeding with annual nurse crops or staked erosion matting.

If topsoil stabilization can not be completed within the construction year's growing season then topsoil should not be spread until the following spring.

Aquatic Guidelines

A minimum of 0.3m of topsoil is required for the first 1.0m depth of permanent water level. The site supervisor and design engineer should review the suitability of compaction and subsoil material with the landscape architect. Consider providing cattails as interim vegetation in the sediment forebay to aid in sediment trapping. It is accepted that vegetation will be removed from the forebay during sediment cleanout.

3.3 Landscape Drawing Submission Guidelines

Landscape drawings should include:

- Common and scientific names for all species/seed mixes
- Numbers and sizes of trees/shrubs to be planted
- Clearly marked planting locations for all species/seed mixes
- Contours (topographic and bathymetry) to assist in identification of planting zones
- Planting details such as topsoil depths, rodent protection, mulching, and staking
- Planting guarantee
- Location of existing species that will be preserved on the site (if applicable)
- Details indicating how existing vegetation will be protected during construction (if applicable)
- Location of all access roads
- Location of sediment and erosion control devices
- Existing watercourse(s)

3.4 Other Types of Stormwater Management Facilities

Constructed Wetlands

- Preferred stormwater management facility for water quality enhancement
- Suitable for erosion control but limited in quantity (flood) control
- More land-intensive due to shallow depth
- Benefits are similar to wet ponds
- Have similar environmental impacts as wet ponds with respect to increased downstream water temperature
- Planting requirements are the same as those of the wet pond but landscape details will be assessed on a case-by-case basis

Hybrid Wet-Pond/Wetland System

- Wet pond and wetland element combined in a series
- The deep water is less impacted by winter/spring conditions and the wetland provides increased biological removal in the summer
- Greater design flexibility and planting diversity
- Planting requirements are similar to those of the wet pond but landscape details will be assessed on a case-by-case basis

Dry Ponds

- Used for erosion and flood control
- Limited water quality benefits
- Use is restricted to:
 - situations where the contributing area is small (5.0 ha) and it is not felt that there will be enough water supply to sustain a wet pond
 - retrofits where water temperature is the main concern and in those situations where other stormwater management facilities are not feasible
- Plantings can be divided into three zones based on the frequency of inundation: 1) extended detention area; 2) flood fringe area (if applicable i.e. dry pond in combination with a wet SWMP); 3) upland area
- Planting strategy is less aggressive with fewer species and decreased planting intensity generally required; landscape details will be assessed on a case-by-case basis
- More intense monitoring of vegetation post-planting may be required as conditions in a dry pond are harsher than the other stormwater management facilities (due to lack of permanent pool)

Other

- Refer to the SWM Planning and Design Manual (MOE, 2003) for requirements for infiltration trenches, enhanced grass swales, vegetated filter strips, etc.
- Planting requirements (if applicable) will be assessed on a case-by-case basis

3.5 Monitoring

A monitoring component should be included with all landscaping plans and should include:

- Ongoing monitoring and watering of trees, shrubs and ground cover during initial establishment period if drought conditions are prevalent
- A review of tree and shrub survival before the end of the maintenance period to ensure replacement of dead/unhealthy individuals
- Review of health of nurse crops and subsequent ground cover
- Ongoing monitoring and maintenance of sediment and erosion control measures to ensure their integrity and effectiveness until vegetation is firmly established

3.6 References

- Baker, Kim. Natural Heritage Biologist at Lake Simcoe Region Conservation Authority. *Personal Communication*. June 2004.
- Barrett, Kim. Terrestrial Ecologist at Conservation Halton. *Personal Communication*. June, 2004.
- Bishop, C.A., Struger, J, Dunn, L., Forder, D.R. and S. Kok. 1999. *Stormwater Detention Ponds of Southern Ontario: Are They a Risk to Wildlife?* Environment Canada. pp. 12.
- Conservation Halton. *Landscape Restoration and Rehabilitation Guidelines*. August 20004. pp. 16.
- Credit Valley Conservation. *Stormwater Management Facility Planting Guidelines*. pp. 8.
- Delgiudice, Laura. Planning Ecologist, Toronto and Region Conservation Authority. *Personal Communication*. June 2004.
- Jenkins, Paul. Wildflower Farm Inc. *Personal Communication*. June 16, 2004.
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- Ministry of the Environment. *Stormwater Management Planning and Design Manual*. March 2003.
- Ministry of the Environment. *Stormwater Management Planning and Design Manual*. Landscape for Stormwater Management Facilities (accompanying document). March 2003.
- J.L.Riley. *Distribution and Status of the Vascular Plants of Central Region, Ontario Ministry of Natural Resources*. Parks and Recreational Areas Section, OMNR, Central Region, Richmond Hill, Ontario, December 1989.
- Toronto and Region Conservation Authority. *Stormwater Management Facility Planting Guidelines*. July 2004. pp. 3.
- Toronto and Region Conservation Authority. *Post-Construction Restoration Guidelines*. July 2004. pp. 2.

3-A: Native Plant Species of Simcoe County (Riley, 1989).

GENUS	Common Name	Status *
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	X
<i>Abutilon theophrasti</i> Medik.	Velvet-leaf	X
<i>Acalypha virginica</i> L. var. <i>rhomboidea</i> (Raf.) Cooperrider	Three-seeded Mercury	R-4
<i>Acer negundo</i> L.	Manitoba Maple	X
<i>Acer pensylvanicum</i> L.	Striped Maple	X
<i>Acer rubrum</i> L.	Red Maple	X
<i>Acer saccharinum</i> L.	Silver Maple	X
<i>Acer saccharum</i> Marshall ssp. <i>nigrum</i> (Michx. f.) Desmarais	Black Maple	X
<i>Acer saccharum</i> Marshall ssp. <i>Saccharum</i>	Sugar Maple	X
<i>Acer spicatum</i> Lam.	Mountain Maple	X
<i>Acinos arvensis</i> (Lam.) Dandy	Mother-of-thyme	X
<i>Acorus calamus</i> L.	Sweet Flag	X
<i>Actaea pachypoda</i> Elliot	White Baneberry	X
<i>Actaea rubra</i> (Aiton) Willd.	Red Baneberry	X
<i>Adiantum pedatum</i> L.	Northern Maidenhair Fern	X
<i>Adlumia fungosa</i> (Aiton) Greene ex B.S.P.	Climbing Fumitory	R-1
<i>Agalinis paupercula</i> (Gray) Britton var. ?	Small-flowered Agalinis	X
<i>Agalinis tenuifolia</i> (Vahl) Raf. var. ?	Slender-leaved Agalinis	R-1
<i>Agrimonia gryposepala</i> Wallr.	Tall Hairy Agrimony	X
<i>Agrimonia pubescens</i> Wallr.	Hairy Agrimony	R-2
<i>Agropyron subsecundum</i> (Link)		X
<i>Agrostis capillaris</i> L.	Colonial Bent Grass	X
<i>Agrostis gigantea</i> Roth	Red-top	X
<i>Agrostis perennans</i> (Walter) Tuckerm.	Upland Bent Grass	X
<i>Agrostis scabra</i> Willd.	Fly-away Grass	X
<i>Agrostis stolonifera</i> L.	Redtop	X
<i>Ajuga reptans</i> L.	Creeping Bugleweed	X
<i>Alisma plantago-aquatica</i> L.	Common Water-plantain	X
<i>Allium oleraceum</i>	Wild Garlic	R-5
<i>Allium schoenoprasum</i> L. var. <i>sibiricum</i> (L.) Hartm.	Wild Chives	R-1
<i>Allium tricoccum</i> Ait.	Wild Leek, Ramps	X
<i>Alnus incana</i> ssp. <i>Rugosa</i> (Du Roi) Clausen	Speckled Alder	X
<i>Alnus viridis</i> ssp. <i>Crispa</i> (Ait.) Turrill	Green Alder	R-1
<i>Alopecurus aequalis</i> Sobol.	Water Foxtail	X
<i>Alopecurus geniculatus</i> L.	Marsh Foxtail	X
<i>Alopecurus pratensis</i> L.	Meadow Foxtail	X
<i>Alyssum alyssoides</i> (L.) L.	Yellow Alyssum	X
<i>Amaranthus tuberculatus</i> (Moq.) Sauer	Rough-fruit Amaranth	R-1
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	X
<i>Ambrosia trifida</i> L.	Giant Ragweed	R-3
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. Roem.	Saskatoon Berry	X
<i>Amelanchier arborea</i> (Michx. f.) Fern.	Downy Juneberry	X

Stormwater Management Guidelines

April 2006

Amelanchier bartramiana (Tausch) M. Roem.	Bartram's Juneberry	R-2
Amelanchier laevis Wiegand	Smooth Juneberry	X
Amelanchier sanguinea (Pursh) DC.	Roundleaf Juneberry	X
Amelanchier spicata (Lam.) K. Koch	Low Juneberry	X
Amelanchier stolonifera Wiegand	Running Juneberry	X
Amerorchis rotundifolia (Banks ex Pursh) Hulten	Round-leaved Orchis	R-1
Ammophila breviligulata Fern.	Short-liguled Beach Grass	X
Amphicarpaea bracteata (L.) Fern.	Hog Peanut	X
Anaphalis margaritacea (L.) Benth. & Hook. f. ex C.B. Clarke	Pearly Everlasting	X
Andromeda polifolia L. ssp. glaucophylla (Link) Hultén	Bog Rosemary	X
Andropogon gerardii Vitman	Big Bluestem	X
Anemone acutiloba (DC.) G. Lawson	Sharp-lobed Hepatica	X
Anemone americana (DC.) H. Hara	Round-lobed Hepatica	X
Anemone canadensis L.	Canada Anemone	X
Anemone cylindrica A. Gray	Thimbleweed	X
Anemone multifida Poir. var. multifida	Cut-leaved Anemone	X
Anemone quinquefolia L. var. quinquefolia	Wood Anemone	R-1
Anemone virginiana L. var. ?	Thimbleweed	X
Angelica atropurpurea L.	Dark-purple Alexanders	R-5
Antennaria howellii Greene spp. canadensis (Greene) R.J. Bayer	Canadian Pussytoes	X
Antennaria howellii Greene spp. neodioica (Greene) R.J. Bayer	Smaller Pussytoes	X
Antennaria neglecta Greene	Field Pussytoes	X
Antennaria parlinii Fern. ssp. fallax (E. Greene) R.J. Bayer & Stebb.	Parlin's Pussytoes	X
Antennaria parlinii Fern. ssp. Parlinii	Parlin's Pussytoes	X
Apios americana Medik.	Groundnut	X
Aplectum hyemale (Muhl. ex Willd.) Torr.	Puttyroot	R-2
Apocynum androsaemifolium L. ssp. Androsaemifolium	Spreading Dogbane	X
Apocynum cannabinum L. var. ?	Indian Hemp	X
Aquilegia canadensis L.	Wild Columbine	X
Arabidopsis thaliana (L.) Heynh.	Mouse-ear Cress	X
Arabis alpina L. ssp. caucasica (Schlect. ex Willd.) Briq.	Alpine Rock-cress	X
Arabis canadensis L.	Sicklepod	R-2
Arabis divaricarpa A. Nelson var. dacotica (Greene) B. Boivin	Divaricate Rock-cress	X
Arabis drummondii A. Gray	Drummond's Rock-cress	R-3
Arabis glabra (L.) Bernh.	Tower Mustard	X
Arabis hirsuta (L.) Scop. ssp. pycnocarpa (M. Hopk.) Hultén	Hairy Rock-cress	R-1
Arabis holboellii Hornem. var. secunda (Howell) Jepson	Holboell's Rock-cress	X
Arabis lyrata L.	Lyre-leaved Rock-cress	X
Aralia hispida Vent.	Bristly Sarsaparilla	X
Aralia nudicaulis L.	Wild Sarsaparilla	X
Aralia racemosa L. ssp. racemosa	Spikenard	X
Arceuthobium pusillum Peck.	Dwarf Mistletoe	X
Arctostaphylos uva-ursi (L.) Spreng.	Common Bearberry	X
Arethusa bulbosa L.	Arethusa	R-5
Arisaema triphyllum (L.) Schott	Small Jack-in-the-Pulpit	X
Aristida basiramea Engelm. ex Vasey	Forked Triple-awned Grass	R-2
Armoracia lacustris (A. Gray) Al-Shehbaz & V. Bates	Lake Water-cress	R-6

Stormwater Management Guidelines

April 2006

<i>Aronia melanocarpa</i> (Michx.) Elliot	Black Chokeberry	X
<i>Artemisia campestris</i> L. ssp. <i>caudata</i> (Michx.) H.M.Hall & Clements	Tall Wormwood	X
<i>Asarum canadense</i> L.	Wild Ginger	X
<i>Asclepias incarnata</i> L. ssp. <i>incarnata</i>	Swamp Milkweed	X
<i>Asclepias syriaca</i> L.	Common Milkweed	X
<i>Asclepias tuberosa</i> L.	Butterfly-weed	R-4
<i>Asparagus officinalis</i> L.	Garden Asparagus	X
<i>Asplenium platyneuron</i> (L.) Oakes ex Eaton	Ebony Spleenwort	R-5
<i>Asplenium rhizophyllum</i> L.	Walking Fern	X
<i>Asplenium scolopendrium</i> L. var. <i>americanum</i> (Fern.) Kartesz & Gandhi	Hart's-tongue	R-6
<i>Asplenium trichomanes</i> L. ssp. <i>quadrivalens</i> D.E. Mey.	Maidenhair	X
<i>Asplenium trichomanes</i> L. ssp. <i>trichomanes</i>	Maidenhair Spleenwort	R-2
<i>Asplenium trichomanes-ramosum</i> L.	Green Spleenwort	R-6
<i>Aster borealis</i> (Torr. & A.Gray) Prov.	Rush Aster	X
<i>Aster ciliolatus</i> Lindl.	Ciliolate Aster	X
<i>Aster cordifolius</i> L.	Heart-leaved Aster	X
<i>Aster ericoides</i> L. ssp.?	White Heath Aster	R-2
<i>Aster laevis</i> L. var. <i>laevis</i>	Smooth Blue Aster	X
<i>Aster lanceolatus</i> Willd. ssp. <i>lanceolatus</i>	Tall White Aster	X
<i>Aster lateriflorus</i> (L.) Britton var.?	Calico Aster	X
<i>Aster macrophyllus</i> L.	Large-leaved Aster	X
<i>Aster nemoralis</i> Aiton	Bog Aster	R-4
<i>Aster novae-angliae</i> L.	New England Aster	X
<i>Aster oolentangiensis</i> Riddell	Sky Blue Aster	R-4
<i>Aster pilosus</i> Willd. var. <i>pilosus</i>	Hairy Aster	R-5
<i>Aster puniceus</i> L. var.?	Purple-stemmed Aster	X
<i>Aster umbellatus</i> Miller var.?	Flat-top White Aster	X
<i>Aster urophyllus</i> Lindl.	Arrow-leaved Aster	X
<i>Astragalus canadensis</i> L.	Canada Milkvetch	R-5
<i>Athyrium filix-femina</i> (L.) Roth ex Mert var. <i>angustum</i> (Willd.) G. Lawson	Northern Lady Fern	X
<i>Athyrium pycnocarpon</i> Spreng.	Glade Fern	R-2
<i>Atriplex patula</i> L.	Halberd-leaf Saltbush	X
<i>Atriplex prostrata</i> Boucher ex DC.	Creeping Saltbush	X
<i>Bartonia virginica</i> (L.) B.S.P.	Yellow Bartonia	R-2
<i>Beckmannia syzigachne</i> (Steud.) Fern.	American Sloughgrass	R-1
<i>Betula alleghaniensis</i> Britt.	Yellow Birch	X
<i>Betula papyrifera</i> Marsh.	White Birch	X
<i>Betula pumila</i> var. <i>glandulifera</i> Regel	Dwarf Birch	R-2
<i>Bidens cernua</i> L.	Stick-tight	X
<i>Bidens discoidea</i> (Torr. & A.Gray) Britton	Discooid Beggar-ticks	X
<i>Bidens frondosa</i> L.	Devil's Beggar-ticks	X
<i>Bidens tripartita</i> L.	European Beggar-ticks	X
<i>Bidens vulgata</i> Greene	Tall Beggar-ticks	R-4
<i>Boehmeria cylindrica</i> (L.) Sw.	False Nettle	X
<i>Botrychium dissectum</i> Spreng.	Cut-leaved Grape Fern	X
<i>Botrychium lanceolatum</i> (S.G. Gmel.) Angstr. Ssp. <i>angustisegmentum</i> (Pease & A.H. Moore) R.T. Clausen	Narrow Triangle Moonwort	R-1

Stormwater Management Guidelines

April 2006

<i>Botrychium matricariifolium</i> (Doll) A. Braun ex Koch	Daisy-leaf Moonwort	X
<i>Botrychium multifidum</i> (S.G. Gmel.) Rupr.	Leathery Grape Fern	X
<i>Botrychium oneidense</i> (Gilb.) House	Blunt-lobed Grape Fern	R-1
<i>Botrychium rugulosum</i> W.H. Wagner	Rugulose Grape Fern	R-1
<i>Botrychium simplex</i> E. Hitchc.	Least Moonwort	X
<i>Botrychium virginianum</i> (L.) Swartz	Rattlesnake Fern	X
<i>Brachyelytrum erectum</i> (Schreb.) P. Beauv.	Bearded Short-husk	X
<i>Brasenia schreberi</i> J. Gmel.	Water-shield	X
<i>Bromus ciliatus</i> L.	Fringed Brome	X
<i>Bromus hordeaceus</i> L. ssp. <i>hordeaceus</i>	Soft Brome	X
<i>Bromus inermis</i> Leyss. Ssp. <i>inermis</i>	Awnless Brome	X
<i>Bromus japonicus</i> Thunb. Ex Murray	Japanese Chess	X
<i>Bromus kalmii</i> A. Gray	Kalm's Brome	X
<i>Bromus latiglumis</i> (Shear) Hitchc.	Broad-glumed Brome	X
<i>Bromus pubescens</i> Muhl. Ex Willd.	Hairy Brome	R-1
<i>Bulbostylis capillaris</i> (L.) C.B. Clarke ssp. <i>Capillaris</i>	Hair-like Bulbostylis	R-3
<i>Cacalia plantaginea</i> (Raf.) Shin	Tuberous Indian-plantain	R-1
<i>Cakile edentula</i> (Bigelow) Hook.	American Sea-rocket	R-5
<i>Calamagrostis canadensis</i> (Michx.) P. Beauv.	Blue-joint Grass	X
<i>Calamagrostis stricta</i> (Timm) Koeler ssp. <i>inexpansa</i> (A. Gray) C.W. Greene	Narrow Reed Grass	R-1
<i>Calla palustris</i> L.	Wild Calla	X
<i>Callitriche palustris</i> L.	Marsh Water-starwort	R-4
<i>Calopogon tuberosus</i> (L.) B.S.P.	Tuberous Grass-pink	X
<i>Caltha palustris</i> L.	Marsh Marigold	X
<i>Calypso bulbosa</i> (L.) Oakes	Calypso	X
<i>Calystegia sepium</i> (L.) R.Br. ssp. <i>Americanum</i> (Sims) Brummitt	Hedge Bindweed	X
<i>Calystegia spithamea</i> (L.) Pursh ssp. <i>spithamea</i>	Low Bindweed	X
<i>Campanula rotundifolia</i> L.	Blue Bells of Scotland	X
<i>Cardamine bulbosa</i> (Schreb. ex Muhlenb.) B.S.P.	Bulbous Cress	X
<i>Cardamine concatenata</i> (Michx.) Schwein.	Cut-leaved Toothwort	X
<i>Cardamine diphylla</i> (Michx.) Alph. Wood	Two-leaved Toothwort	X
<i>Cardamine douglassii</i> Britton	Purple Cress	R-1
<i>Cardamine parviflora</i> L.	Small-flowered Bitter-cress	R-5
<i>Cardamine pensylvanica</i> Muhlenb. ex Willd.	Pennsylvania Bitter-cress	X
<i>Cardamine pratensis</i> L. ssp. <i>pratensis</i>	Cuckoo-flower	R-2
<i>Cardamine X maxima</i> (Nutt.) Alph. Wood	Hybrid Cress	R-4
<i>Carex aenea</i> Fern.	Sedge	R-5
<i>Carex albursina</i> E. Sheld.	White Bear Sedge	X
<i>Carex alopecoidea</i> Tuckerm.	Foxtail Sedge	R-4
<i>Carex amphibola</i> Steud.	Narrow-leaved Sedge	X
<i>Carex aquatilis</i> Wahlenb.	Aquatic Sedge	X
<i>Carex arcta</i> Boott	Northern Clustered Sedge	R-1
<i>Carex arctata</i> Boott	Drooping Wood Sedge	X
<i>Carex argyrantha</i> Tuckerm.	Silvery Oval Sedge	R-2
<i>Carex atherodes</i> Spreng.	Awned Sedge	R-3
<i>Carex aurea</i> Nutt.	Golden-fruited Sedge	X
<i>Carex backii</i> Boott	Back's Sedge	X

Stormwater Management Guidelines

April 2006

Carex bebbii (L.H. Bailey) Olney ex Fern.	Bebb's Sedge	X
Carex blanda Dewey	Woodland Sedge	X
Carex brevior (Dewey) Mack. ex Lunell	Shorter Sedge	X
Carex bromoides Schkuhr ex Willd.	Bromelike Sedge	X
Carex brunnescens (Pers.) Poir. ex Lam. ssp. brunnescens	Brownish Sedge	X
Carex buxbaumii Wahlenb.	Brown Sedge	X
Carex canescens L. ssp. canescens	Silvery Sedge	X
Carex capillaris L. ssp. capillaris	Hair-like Sedge	R-5
Carex castanea Wahlenb.	Chestnut Sedge	X
Carex cephaloidea (Dewey) Dewey	Thin-leaved Sedge	X
Carex cephalophora Muhlenb. ex Willd.	Oval-headed Sedge	R-5
Carex chordorrhiza Ehrh. ex L. f.	Creeping Sedge	R-4
Carex communis L.H. Bailey	Fibrous Rooted Sedge	X
Carex comosa Boott	Bristly Sedge	X
Carex conoidea Schkuhr ex Willd.	Field Sedge	R-3
Carex conuoluta Mack.	Sedge	X
Carex crawei Dewey	Crawe's Sedge	X
Carex crawfordii Fern.	Crawford's Sedge	R-6
Carex crinita Lam.	Fringed Sedge	X
Carex cristatella Britton	Crested Sedge	X
Carex cryptolepis Mack.	Small Yellow Sedge	R-5
Carex cumulata (L.H. Bailey) Mack.	Accumulating Sedge	R-6
Carex debilis Schwein. & Torr.	White Edged Sedge	X
Carex deflexa Hornem.	Northern Sedge	R-3
Carex deweyana Schwein.	Dewey's Sedge	X
Carex diandra Schrank	Lesser Panicked Sedge	X
Carex disperma Dewey	Soft-leaved Sedge	X
Carex eburnea Boott	Bristle-leaved Sedge	X
Carex echinata Murray ssp echinata	Prickly Sedge	X
Carex exilis Dewey	Coast Sedge	R-1
Carex flava L.	Yellow Sedge	X
Carex foena Willd.	Bronzy Sedge	R-5
Carex folliculata L.	Long Sedge	R-5
Carex formosa Dewey	Handsome Sedge	R-4
Carex garberi Fern.	Garber's Sedge	X
Carex gracillima Schwein.	Graceful Sedge	X
Carex granularis Muhlenb. ex Willd.	Meadow Sedge	X
Carex grayi Carey	Gray's Sedge	R-5
Carex gynandra Schwein.	Nodding Sedge	R-4
Carex gynocrates Wormsk. ex Drejer	Northern Bog Sedge	X
Carex haydenii Dewey	Hayden's Sedge	R-1
Carex hirta L.	Hammer Sedge	X
Carex hirtifolia Mack.	Pubescent Sedge	X
Carex hitchcockiana Dewey	Hitchcock's Sedge	X
Carex houghtoniana Torr. ex Dewey	Houghton's Sedge	X
Carex hystericina Muhlenb. ex Willd.	Porcupine Sedge	X
Carex interior L.H. Bailey	Inland Sedge	X

Stormwater Management Guidelines

April 2006

Carex intumescens Rudge	Bladder Sedge	X
Carex lacustris Willd.	Lake-bank Sedge	X
Carex laevivaginata (Kükenth.) Mack.	Smooth-sheathed Sedge	X
Carex lanuginosa Michx.	Sedge	X
Carex lasiocarpa Ehrh.	Slender Sedge	X
Carex laxiflora Lam.	Loose-flowered Sedge	X
Carex lenticularis Michx.	Lenticular Sedge	R-1
Carex leptalea Wahlenb. ssp. leptalea	Bristle-stalked Sedge	X
Carex leptonevia (Fern.) Fern.	Finely-nerved Sedge	X
Carex limosa L.	Mud Sedge	X
Carex livida (Wahlenb.) Willd.	Livid Sedge	R-3
Carex lucorum Willd. ex Link	Sedge	R-3
Carex lupulina Muhlenb. ex Willd	Hop Sedge	X
Carex lurida Wahlenb.	Sallow Sedge	X
Carex merritt-fernaldii Mack.	Merritt Fernald's Sedge	R-6
Carex molesta Mack.	Troublesome Sedge	X
Carex muhlenbergii Schkuhr ex Willd. var. ?	Muhlenberg's Sedge	X
Carex oligosperma Michx.	Few-seeded Sedge	X
Carex ormostachya Wiegand	Necklace-like Spiked Sedge	X
Carex pallescens L.	Pale Sedge	R-3
Carex pauciflora Lightf.	Few-flowered Sedge	R-2
Carex paupercula Michx.	Sedge	X
Carex peckii Howe	Peck's Sedge	X
Carex pedunculata Muhlenb. ex Willd.	Long-stalked Sedge	X
Carex pennsylvanica Lam.	Pennsylvania Sedge	X
Carex plantaginea Lam.	Plantain-leaved Sedge	X
Carex platyphylla J. Carey	Broad-leaved Sedge	R-3
Carex prairea Dewey	Prairie Sedge	X
Carex prasina Wahlenb.	Drooping Sedge	R-1
Carex projecta Mack.	Necklace Sedge	X
Carex pseudo-cyperus L.	Cypress-like Sedge	X
Carex retrorsa Schwein.	Retorse Sedge	X
Carex richardsonii R. Br.	Richardson's Sedge	R-3
Carex rosea Schkuhr ex Willd.	Stellate Sedge	X
Carex sartwellii Dewey	Sartwell's Sedge	R-4
Carex scabrata Schwein.	Rough Sedge	X
Carex schweinitzii Dewey ex. Schwein.	Schweinitz's Sedge	X
Carex scoparia Schkuhr ex Willd.	Pointed Broom Sedge	X
Carex sparganioides Muhlenb. ex Willd.	Burreed Sedge	X
Carex sprengeii Dewey ex Spreng.	Long-beaked Sedge	X
Carex sterilis Willd.	Sterile Sedge	X
Carex stipata Muhlenb. ex Willd.	Awl-fruited Sedge	X
Carex stricta Lam.	Tussock Sedge	X
Carex tenuiflora Wahlenb.	Sparse-flowered Sedge	R-1
Carex tribuloides Wahlenb.	Blunt Broom Sedge	R-1
Carex trisperma Dewey var. trisperma	Three-seeded Sedge	X
Carex tuckermanii Dewey	Tuckerman's Sedge	X

Stormwater Management Guidelines

April 2006

<i>Carex umbellata</i> Schkuhr ex Willd.	Umbel-like Sedge	R-5
<i>Carex utriculata</i> Boott	Beaked Sedge	X
<i>Carex vaginata</i> Tausch	Sheathed Sedge	X
<i>Carex vesicaria</i> L.	Inflated Sedge	X
<i>Carex viridula</i> Michx. ssp. <i>viridula</i>	Greenish Sedge	X
<i>Carex vulpinoidea</i> Michx.	Fox Sedge	X
<i>Carex woodii</i> Dewey	Wood's Sedge	R-5
<i>Carpinus caroliniana</i> Walt.	American Hornbeam	X
<i>Carya cordiformis</i>	Bitternut Hickory	X
<i>Castilleja coccinea</i> (L.) Spreng.	Indian Paintbrush	X
<i>Caulophyllum giganteum</i> (Farw.) Leconte & Blackwell	Blue Cohosh	X
<i>Caulophyllum thalictroides</i> (L.) Michx.	Blue Cohosh	X
<i>Ceanothus americanus</i> L.	New Jersey Tea	R-4
<i>Ceanothus herbaceus</i> Raf.	Narrow-leaved New Jersey Tea	R-4
<i>Celastrus scandens</i> L.	Climbing Bittersweet	X
<i>Celtis occidentalis</i> L.	Hackberry	X
<i>Cephalanthus occidentalis</i> L.	Eastern Buttonbush	X
<i>Cerastium arvense</i> L. ssp. <i>arvense</i>	Field Chickweed	R-5
<i>Cerastium fontanum</i> Baumg.	Larger Mouse-ear Chickweed	X
<i>Cerastium nutans</i> Raf.	Nodding Chickweed	R-4
<i>Chamaedaphne calyculata</i> (L.) Moench	Leatherleaf	X
<i>Chamaesyce glyptosperma</i> (Engelm.) Small	Ridge-seeded Spurge	X
<i>Chamaesyce maculata</i> (L.) Small	Spotted Spurge	X
<i>Chamaesyce nutans</i> (Lag.) Small	Nodding Spurge	R-2
<i>Chamaesyce polygonifolia</i> (L.) Small	Seaside Spurge	R-3
<i>Chamaesyce vermiculata</i> (Raf.) House	Hairy Spurge	R-5
<i>Chelone glabra</i> L.	Turtlehead	X
<i>Chenopodium foggii</i> H.A. Wahl	Fogg's Goosefoot	R-1
<i>Chenopodium hybridum</i> L.	Maple-leaved Goosefoot	X
<i>Chenopodium rubrum</i> L.	Coast-blite Goosefoot	X
<i>Chimaphila maculata</i> (L.) Pursh var. <i>maculata</i>	Spotted Wintergreen	R-1
<i>Chimaphila umbellata</i> (L.) Barton ssp. <i>cisatlantica</i> (S.F.Blake) Hultén	Common Pipsissewa	X
<i>Chrysosplenium americanum</i> Schwein.	Golden Saxifrage	X
<i>Cicuta bulbifera</i> L.	Bulb-bearing Water-hemlock	X
<i>Cicuta maculata</i> L.	Spotted Water-hemlock	X
<i>Cinna arundinacea</i> L.	Wood Reed Grass	R-4
<i>Cinna latifolia</i> (Trevir. ex Goepp) Griseb. In Ledeb.	Broad-leaved Reed Grass	X
<i>Circaea alpina</i> L.	Smaller Enchanter's Nightshade	X
<i>Circaea lutetiana</i> L. ssp. <i>canadensis</i> (L.) Aschers. & Magnusson.	Yellowish Enchanter's Nightshade	X
<i>Cirsium discolor</i> (Muhlenb. ex Willd.) Spreng.	Field Thistle	R-1
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	R-1
<i>Cirsium muticum</i> Michx.	Swamp Thistle	X
<i>Cladium mariscoides</i> (Muhlenb.) Torr.	Water Bog-rush	X
<i>Claytonia caroliniana</i> Michx.	Carolina Spring-beauty	X
<i>Claytonia virginica</i> L.	Narrow-leaved Spring Beauty	X
<i>Clematis occidentalis</i> (Hornem.) DC. var. <i>occidentalis</i>	Purple Clematis	R-1
<i>Clematis virginiana</i> L.	Virgin's-bower	X

Stormwater Management Guidelines

April 2006

<i>Clintonia borealis</i> (Ait.) Raf.	Blue Bead-lily	X
<i>Cmpanula uliginosa</i> Rydb.	Marsh Bellflower	X
<i>Coeloglossum viride</i> (L.) Hartman	Long-bracted Orchid	X
<i>Collinsia parviflora</i> Douglas ex Lindl. var. <i>parviflora</i>	Small-flowered Collinsia	R-1
<i>Comandra umbellata</i> (L.) Nutt.	Umbellate Bastard Toad-flax	X
<i>Comptonia peregrina</i> (L.) Coult.	Sweet Fern	X
<i>Conopholis americana</i> (L.) Wallr.	Squawroot	X
<i>Conyza canadensis</i> (L.) Cronquist	Horseweed	X
<i>Coptis trifolia</i> (L.) Salisb.	Goldthread	X
<i>Corallorhiza maculata</i> (Raf.) Raf.	Spotted Coral-root	X
<i>Corallorhiza striata</i> Lindley	Striped Coral-root	X
<i>Corallorhiza trifida</i> Chat.	Early Coral-root	X
<i>Coreopsis grandiflora</i> Hogg ex Sweet	Large-flowered Tickseed	X
<i>Corispermum hyssopifolium</i> L.	Common Tick-seed	X
<i>Cornus alternifolia</i> L. f.	Alternate-leaved Dogwood	X
<i>Cornus amomum</i> Miller ssp. <i>obliqua</i> (Raf.) J.S.Wilson	Silky Dogwood	X
<i>Cornus canadensis</i> L.	Bunchberry	X
<i>Cornus foemina</i> Miller ssp. <i>racemosa</i> (Lam.) J.S.Wilson	Red Panicled Dogwood	R-2
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	X
<i>Cornus stolonifera</i> Michx.	Red-osier Dogwood	X
<i>Corydalis aurea</i> Willd. ssp. <i>aurea</i>	Golden Corydalis	R-6
<i>Corydalis sempervirens</i> (L.) Pers.	Pale Corydalis	X
<i>Corylus cornuta</i> Marsh.	Beaked Hazelnut	X
<i>Crataegus aboriginum</i> Sarg.	Hawthorn	R-1
<i>Crataegus brainerdii</i> Sarg.	Brainerd's Hawthorn	R-1
<i>Crataegus chrysocarpa</i> Ashe	Round-leaved Hawthorn	X
<i>Crataegus flabellata</i> (Bosc ex Spach) K. Koch	Bosc's Thorn	R-1
<i>Crataegus fluciatilis</i> Sarg.	Hawthorn	R-2
<i>Crataegus fulleri</i> Sarg.	Hawthorn	R
<i>Crataegus hillii</i> Sarg.	Hawthorn	R-2
<i>Crataegus holmesiana</i> Ashe	Holmes Hawthorn	R-1
<i>Crataegus macrosperma</i> Ashe	Variable Thorn	R-4
<i>Crataegus pedicellata</i> Sarg.	Scarlet Hawthorn	R-1
<i>Crataegus pringlei</i> Sarg.	Pringle's Hawthorn	R-2
<i>Crataegus punctata</i> Jacq.	Large-fruited Thorn	X
<i>Crataegus scabrifolia</i> Sarg.	Hawthorn	R-1
<i>Crataegus submollis</i> Sarg.	Emerson's Thorn	R-1
<i>Crataegus succulenta</i> Schrad. ex Link	Long-spined Thorn	R-2
<i>Cryptogramma stelleri</i> (S.G. Gmel.) Prantl.	Slender Cliff-brake	X
<i>Cryptotaenia canadensis</i> (L.) DC.	Hone wort	X
<i>Cuscuta gronovii</i> Willd. ex Schultz	Gronovius' Dodder	X
<i>Cycloloma atriplicifolium</i> (Spreng.) Coult.	Winged Pigweed	X
<i>Cymbalaria muralis</i> P.Gaertn.,Mey.& Scherb.	Kenilworth-ivy	X
<i>Cynoglossum boreale</i> Fern.	Northern Hound's-tongue	X
<i>Cynoglossum officinale</i> L.	Hound's-tongue	X
<i>Cyperus bipartitus</i> Torr.	Umbrella Sedge	X
<i>Cyperus diandrus</i> Torr.	Low Umbrella Sedge	R-5

Stormwater Management Guidelines

April 2006

<i>Cyperus engelmannii</i> Steud.	Nut Grass	R-1
<i>Cyperus esculentus</i> L.	Yellow Nut Grass	X
<i>Cyperus houghtonii</i> Torr.	Houghton's Cyperus	X
<i>Cyperus lupulinus</i> (Spreng.) Marcks ssp. ?	Slender Cyperus	X
<i>Cyperus squarrosus</i> L.	Squarrose Umbrella Sedge	R-6
<i>Cyperus strigosus</i> L.	Straw-colored Umbrella Sedge	X
<i>Cypripedium acaule</i> Ait.	Pink Lady's-slipper	X
<i>Cypripedium arietinum</i> Ait. F.	Ram's-head Lady's-slipper	X
<i>Cypripedium calceolus</i> L.	Large Yellow Lady's-slipper	X
<i>Cypripedium calceolus</i> var. <i>planipetalum</i>	Small Yellow Lady's-slipper	X
<i>Cypripedium reginae</i> Walt.	Showy Lady's-slipper	X
<i>Cystopteris bulbifera</i> (L.) Bernh.	Bulbet Bladder Fern	X
<i>Cystopteris dickieana</i> Sim	Dickie's Fragile Fern	R-1
<i>Cystopteris fragilis</i> (L.) Bernh.	Fragile Fern	R-1
<i>Cystopteris laurentiana</i> (Weath.) Blasdell	Laurentian Fragile Fern	R-1
<i>Cystopteris tenuis</i> (Michx.) Desv.	Mackay's Brittle Fern	X
<i>Dalibarda repens</i> L.	Dewdrop	X
<i>Danthonia spicata</i> (L.) P. Beauv. Ex Roem. & Schult.	Poverty Oat Grass	X
<i>Decodon verticillatus</i> (L.) Elliot	Swamp Loosestrife	X
<i>Dennstaedtia punctilobula</i> (Michx.) T. Moore	Hay-scented Fern	X
<i>Deparia acrostichoides</i> (Swartz) M. Kato	Silvery Glade Fern	X
<i>Deschampsia cespitosa</i> (L.) P. Beauv. ssp. <i>cespitosa</i>	Tufted Hairgrass	R-5
<i>Deschampsia flexuosa</i> (L.) Trin.	Common Hairgrass	X
<i>Descurainia pinnata</i> (Walter) Britton ssp. <i>brachycarpa</i> (Richardson) Detl.	Pinnate Tansy-mustard	R-1
<i>Desmodium canadense</i> (L.) DC.	Canadian Tick-trefoil	X
<i>Desmodium glutinosum</i> (Muhlenb. ex Willd.) Alph. Wood	Pointed-leaved Tick-trefoil	X
<i>Desmodium nudiflorum</i> (L.) DC.	Naked-flowered Tick-trefoil	R-1
<i>Desmodium paniculatum</i> (L.) DC. var. <i>paniculatum</i>	Panicled Tick-trefoil	X
<i>Dicentra canadensis</i> (Goldie) Walp.	Squirrel-corn	X
<i>Dicentra cucullaria</i> (L.) Bernh.	Dutchman's-breeches	X
<i>Diervilla lonicera</i> Miller	Bush Honeysuckle	X
<i>Diplotaxis tenuifolia</i> (L.) DC.	Slender-leaved Wall-rocket	X
<i>Dirca palustris</i> L.	Leatherwood	X
<i>Dracocephalum parviflorum</i> Nutt.	American Dragonhead	R-3
<i>Dryopteris carthusiana</i> (Vill.) H.P. Fuchs	Spinulose Wood Fern	X
<i>Dryopteris clintoniana</i> (D.C. Eaton) Dowell	Clinton's Wood Fern	X
<i>Dryopteris cristata</i> (L.) A. Gray	Crested Wood Fern	X
<i>Dryopteris filix-mas</i> (L.) Schott	Male-fern	R-4
<i>Dryopteris goldiana</i> (Hook. Ex. Goldie) A. Gray	Goldie's Fern	X
<i>Dryopteris intermedia</i> (Muhlenb. Ex Willd.) A. Gray	Evergreen Wood Fern	X
<i>Dryopteris marginalis</i> (L.) A. Gray	Marginal Wood Fern	X
<i>Dryopteris X boottii</i> (Tuckerm.) Underw.	Boott's Shield Fern	X
<i>Dryopteris X triploidea</i> Wherry	Wood Fern	X
<i>Dulichium arundinaceum</i> (L.) Britton	Reed-like Three-way Sedge	X
<i>Echinochloa microstachya</i> (Wieg).	Barnyard Grass	X
<i>Echinochloa muricata</i> (Beauv.) Fern.	Rough Barnyard Grass	X
<i>Echinocystis lobata</i> (Michx.) Torr. & A.Gray	Prickly Cucumber	X

Stormwater Management Guidelines

April 2006

<i>Elatine minima</i> (Nutt.) Fischer & C.A. Mey.	Small Waterwort	X
<i>Eleocharis acicularis</i> (L.) Roem. & Schult.	Needle Spike-rush	X
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	X
<i>Eleocharis erythropoda</i> Steud.	Red-footed Spike-rush	X
<i>Eleocharis intermedia</i> Schult.	Matted Spike-rush	R-5
<i>Eleocharis obtusa</i> (Willd.) Schult.	Blunt Spike-rush	X
<i>Eleocharis olivacea</i> Torr.	Bright-green Spike-rush	X
<i>Eleocharis pauciflora</i> (Light.) Link	Few-flowered Spike-rush	X
<i>Eleocharis robbinsii</i> Oakes	Robbins' Spike-rush	R-6
<i>Eleocharis rostellata</i> (Torr.) Torr.	Beaked Spike-rush	R-3
<i>Eleocharis smallii</i> Britton	Small's Spike-rush	X
<i>Elodea canadensis</i> Rich. Ex Michx.	Canada Waterweed	X
<i>Elodea nuttallii</i> (Planchon) H. St. John	Nuttall's Waterweed	R-2
<i>Elymus canadensis</i> L.	Nodding Wild Rye	X
<i>Elymus hystrix</i> L.	Bottle-brush Grass	X
<i>Elymus lanceolatus</i> (Scribn. & J.G. Smith) Gould ssp. <i>psammophilus</i> (J.M. Gillett & Senn) A. Love	Great Lakes Wheat Grass	R-2
<i>Elymus riparius</i> Wiegand	River-bank Wild Rye	R-3
<i>Elymus smithii</i> (Rydb.) Gould	Western Wheat Grass	X
<i>Elymus trachycaulus</i> (Link) Gould ssp. <i>trachycaulus</i>	Slender Wheat Grass	X
<i>Elymus villosus</i> Muhlenb. ex Willd.	Slender Wild Rye	R-4
<i>Elymus virginicus</i> L. var. <i>virginicus</i>	Virginia Wild Rye	X
<i>Elymus wiegandii</i> Fern.	Wiegand's Wild Rye	R-3
<i>Epifagus virginiana</i> (L.) Barton	Beech-drops	X
<i>Epigaea repens</i> L.	Trailing Arbutus	X
<i>Epilobium angustifolium</i> L.	Fireweed	X
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i> (Lehm.) Hoch & Raven	Northern Willow-herb	X
<i>Epilobium coloratum</i> Biehler	Purple-veined Willow-herb	X
<i>Epilobium leptophyllum</i> Raf.	Narrow-leaved Willow-herb	X
<i>Epilobium palustre</i> L.	Marsh Willow-herb	R-1
<i>Epilobium paniculatum</i> Nutt. ex Torr. & A. Gray	Panicled Willow-herb	R-1
<i>Epilobium parviflorum</i> Schreb.	Sparse-flowered Willow-herb	X
<i>Epilobium strictum</i> Muhlenb. ex Spreng.	Soft Willow-herb	R-2
<i>Equisetum arvense</i> L.	Field Horsetail	X
<i>Equisetum fluviatile</i> L.	Water Horsetail	X
<i>Equisetum hyemale</i> L. ssp. <i>affine</i> (Engelm.) Calder & Roy	Scouring-rush	X
<i>Equisetum laevigatum</i> A. Braun	Smooth Scouring-rush	R-4
<i>Equisetum palustre</i> L.	Marsh Horsetail	X
<i>Equisetum pratense</i> Ehrh.	Meadow Horsetail	R-2
<i>Equisetum scirpoides</i> Michx.	Dwarf Scouring-rush	X
<i>Equisetum sylvaticum</i> L.	Wood Horsetail	X
<i>Equisetum variegatum</i> Schleich. Ex Fried., Weber & Mohr ssp. <i>variegatum</i>	Variiegated Horsetail	X
<i>Equisetum X litorale</i> Kuhl. Ex Rupr.	Shore Horsetail	R-1
<i>Eragrostis cilianensis</i> (All.) Lutati ex Hubb.	Stink Grass	X
<i>Eragrostis frankii</i> C.A. Mey. ex Steud.	Frank's Love Grass	R-5
<i>Eragrostis hypnoides</i> (Lam.) B.S.P.	Tall Love Grass	R-2
<i>Erigeron annuus</i> (L.) Pers.	Daisy Fleabane	X

Stormwater Management Guidelines

April 2006

Erigeron philadelphicus L. ssp.?	Philadelphia Fleabane	X
Erigeron pulchellus Michx.	Robin's Plantain	R-2
Erigeron strigosus Muhlenb. ex Willd.	Rough Fleabane	X
Eriocaulon septangulare With.	Duck Grass	X
Eriophorum gracile Koch ex Roth	Slender Cotton-grass	R-1
Eriophorum tenellum Nutt.	Rough Cotton-grass	R-2
Eriophorum vaginatum L. ssp.spissum (Fern.) Hultén	Sheathed Cotton-grass	X
Eriophorum virginicum L.	Virginia Cotton-grass	X
Eriophorum viridi-carinatum (Engelm.) Fern.	Thin-leaved Cotton-grass	X
Erythronium americanum Ker-Gawl.	Yellow Trout-lily	X
Euonymus obovata Nutt.	Running Strawberry-bush	R-2
Eupatorium maculatum L. ssp.?	Spotted Joe-Pye-weed	X
Eupatorium perfoliatum L.	Boneset/Perfoliate Thoroughwort	X
Eupatorium rugosum Houtt.	White Snakeroot	X
Euthamia graminifolia (L.) Nutt.	Flat-topped Bushy Goldenrod	X
Festuca obtusa Biehl.	Nodding Fescue	X
Festuca occidentalis Hook.	Western Fescue	X
Festuca saximontana Rydb.	Rocky Mountain Fescue	R-5
Fimbristylis autumnalis (L.) Roem. & Schult.	Slender Fimbristylis	R-4
Floerkea proserpinacoides Willd.	False Mermaid	R-2
Fragaria vesca L. ssp. americana (Porter) Staudt	Woodland Strawberry	X
Fragaria virginiana Miller ssp. glauca (S. Watson) Staudt	Common Strawberry	X
Fraxinus americana L.	White Ash	X
Fraxinus nigra Marshall	Black Ash	X
Fraxinus pennsylvanica Marshall	Red Ash	X
Galearis spectabilis (L.) Raf.	Showy Orchis	X
Galinsoga quadriradiata Ruiz, Lopez & Pavón	Hairy Galinsoga	X
Galium aparine L.	Cleavers	X
Galium asprellum Michx.	Rough Bedstraw	X
Galium boreale L.	Northern Bedstraw	X
Galium circaezans Michx.	White Wild Licorice	R-3
Galium labradoricum (Wiegand) Wiegand	Labrador Marsh Bedstraw	X
Galium lanceolatum Torr.	Spear Wild Licorice	X
Galium obtusum Bigelow	Blunt-leaved Bedstraw	X
Galium palustre L.	Marsh Bedstraw	X
Galium trifidum L. ssp.?	Small Bedstraw	X
Galium triflorum Michx.	Sweet-scented Bedstraw	X
Gaultheria hispidula (L.) Muhlenb. ex Bigelow	Creeping Snowberry	X
Gaultheria procumbens L.	Wintergreen	X
Gaylussacia baccata (Wangenh.) K. Koch	Black Huckleberry	X
Gentiana andrewsii Griseb.	Closed Gentian	X
Gentianopsis crinita (Froel.) Ma	Fringed Gentian	R-4
Gentianopsis virgata (Raf.) Holub	Smaller Fringed Gentian	X
Geocaulon lividum (Richards.) Fern.	Northern Comandra	R-2
Geranium bicknellii Britton	Bicknell's Crane's-bill	X
Geranium carolinianum L. var. ?	Carolina Crane's-bill	R-2
Geranium maculatum L.	Spotted Crane's-bill	R-2

Stormwater Management Guidelines

April 2006

Geranium pusillum L.	Small-flowered Crane's-bill	X
Geranium robertianum L.	Herb-robert	X
Geranium sanguineum L.	Bloody Crane's-bill	X
Geum aleppicum Jacq.	Yellow Avens	X
Geum canadense Jacq..	White Avens	X
Geum laciniatum Murray	Rough Avens	R-3
Geum rivale L.	Purple Avens	X
Glyceria borealis (Nash) Batch.	Northern Manna Grass	X
Glyceria canadensis (Michx.) Trin.	Rattlesnake Grass	X
Glyceria grandis S. Watson	Tall Manna Grass	X
Glyceria striata (Lam.) A. Hitchc.	Fowl Meadow Grass	X
Gnaphalium obtusifolium L.	Fragrant Cudweed	X
Gnaphalium uliginosum L.	Low Cudweed	X
Goodyera oblongifolia Raf.	Green Leaved Rattlesnake P.	X
Goodyera pubescens (Willd.) R. Br. ex Ait. f.	Downy Rattlesnake Plantain	X
Goodyera repens var. ophioides Fern.	Dwarf Rattlesnake Plantain	X
Goodyera tessellata Lodd.	Checkered Rattlesnake Plan.	X
Gratiola aurea Muhlenb. ex Pursh	Golden-pert	R-1
Gratiola neglecta Torr.	Clammy Hedge-hyssop	R-1
Gymnocarpium dryopteris (L.) Newman	Oak Fern	X
Hackelia deflexa (Wahlenb.) Opiz	Spurred Stickweed	X
Halenia deflexa (Sm.) Griseb. ssp. deflexa	Spurred Gentian	R-5
Hamamelis virginiana L.	Witch-hazel	R-2
Hedeoma hispidum Pursh	Rough Pennyroyal	R-2
Hedyotis caerulea (L.) Hook.	Bluets	R-1
Hedyotis longifolia (Gaertn.) Hook.	Venus'-pride	X
Helianthemum bicknellii Fern.	Bicknell's Frostweed	R-1
Helianthemum canadense (L.) Michx.	Long-branched Frostweed	R-3
Helianthus divaricatus L.	Rough Woodland Sunflower	R-4
Helianthus giganteus L.	Tall Wild Sunflower	X
Helianthus rigidus Desf.	Sunflower	X
Helianthus strumosus L.	Pale-leaved Wood Sunflower	R-1
Helianthus tuberosus L.	Jerusalem Artichoke	R-4
Heliopsis helianthoides (L.) Sweet	Sweet Ox-eye	R-4
Heracleum lanatum Michx.	Cow-parsnip	X
Heteranthera dubia (Jacq.) MacM.	Grassleaf Mud-plantain	X
Hieracium canadense Michx.	Canada Hawkweed	X
Hieracium flagellare Willd.	Hawkweed	X
Hieracium gronovii L.	Gronovius' Hawkweed	R-3
Hieracium scabrum Michx.	Rough Hawkweed	X
Hierochloa odorata ssp. odorata	Holy Grass	X
Hippuris vulgaris L.	Common Mare's-tail	R-3
Hydrocotyle americana L.	American Marsh-pennywort	X
Hydrophyllum canadense L.	Canada Water-leaf	X
Hydrophyllum virginianum L.	Virginia Water-leaf	X
Hypericum ascyron L.	Great St. John's-wort	X
Hypericum canadense L.	Canadian St. John's-wort	X

Stormwater Management Guidelines

April 2006

Hypericum kalmianum L.	Kalm's St. John's-wort	X
Hypericum majus (A. Gray) Britton	Larger Can. St. John's-wort	X
Hypericum mutilum L. ssp. boreale (Britton) J.M. Gillett	Northern St. John's-wort	X
Hypericum mutilum L. ssp. mutilum	Dwarf St. John's-wort	X
Hypericum punctatum Lam.	Corymbed St. John's-wort	X
Ilex verticillata (L.) A. Gray	Winterberry	X
Impatiens capensis Meerb.	Spotted Touch-me-not	X
Impatiens pallida Nutt.	Pale Touch-me-not	X
Iris versicolor	Large Blue Flag	X
Iris virginica	Southern Blue Flag	R-2
Isoetes echinospora Durieu	Spiny-spored Quillwort	X
Isoetes engelmannii A. Braun	Engelmann's Quillwort	R-1
Isoetes macrospora Durieu.	Big-spored Quillwort	R-4
Isoetes X eatonii Dodge	Eaton's Quillwort	R-1
Juglans cinerea	Butternut	X
Juglans nigra	Black Walnut	R-1
Juncus acuminatus	Taper-tip Rush	R-5
Juncus alpinoarticulatus	Alpine Rush	X
Juncus articulatus	Jointed Rush	X
Juncus balticus	Baltic Rush	X
Juncus brachycephalus	Short-headed Rush	X
Juncus brevicaudatus	Narrow-Panicle Rush	X
Juncus bufonius	Toad-Rush	X
Juncus canadensis	Canada Rush	X
Juncus dudleyi	Dudley's Rush	X
Juncus effusus	Common Rush	X
Juncus filiformis	Thread Rush	R-2
Juncus militaris	Bayonet Rush	R-1
Juncus nodosus	Knotted Rush	X
Juncus pelocarpus	Brown-fruited Rush	X
Juncus secundus	Secund Rush	R-1
Juncus tenuis var. tenuis	Path Rush	X
Juncus torreyi	Torrey's Rush	R-1
Juniperus communis L. var. depressa Pursh	Common Juniper	X
Juniperus horizontalis Moench	Creeping Juniper	R-4
Juniperus virginiana L.	Eastern Red Cedar	X
Kalmia angustifolia L.	Sheep Laurel	R-6
Kalmia polifolia Wangenh.	Bog Laurel	X
Lactuca biennis (Moench) Fern.	Biennial Lettuce	X
Lactuca canadensis L.	Tall Lettuce	X
Lactuca hirsuta Muhlenb. ex Nutt.	Hairy Wood Lettuce	X
Laportea canadensis (L.) Weddell	Wood Nettle	X
Larix laricina (Du Roi) K. Koch	Tamarack	X
Lathyrus japonicus Willd.	Beach Pea	X
Lathyrus palustris L.	Marsh Vetchling	X
Lechea intermedia Legg.	Large-podded Pinweed	X
Ledum groenlandicum Oeder	Labrador-tea	X

Stormwater Management Guidelines

April 2006

Leersia oryzoides (L.) Sw.	Rice Cut Grass	X
Leersia virginica Willd.	Virginia Cutgrass	R-2
Lemna minor	Lesser Duckweed	X
Lemna trisulca	Star Duckweed	X
Lepidium virginicum L.	Virginia Pepper-grass	R-1
Lespedeza capitata Michx.	Round-headed Bush-clover	R-4
Lespedeza intermedia (S. Watson) Britton	Intermediate Bush-clover	R-2
Lilium canadense L.	Canada Lily	X
Lilium philadelphicum L.	Wood Lily	X
Lindernia dubia (L.) Pennell var.?	Doubtful False Pimpernel	X
Linnaea borealis L. spp longifolia (Torr.) Hultén	Twinflower	X
Linum medium (Planchon) Britton	Stiff Yellow Flax	R-4
Linum striatum Walter	Ridged Yellow Flax	R-1
Liparis loeselii (L.) L.C. Rich.	Bog Twayblade	X
Listera australis Lindl.	Southern Twayblade	R-1
Listera convallarioides (Sw.) Nutt. ex Ell.	Broad-lipped Twayblade	X
Listera cordata (L.) R. Br. ex Ait. f.	Heart-leaved Twayblade	X
Littorella americana Fern.	American Shoreweed	R-1
Lobelia cardinalis L.	Cardinal-flower	X
Lobelia dortmanna L.	Dortmann's Lobelia	R-3
Lobelia inflata L.	Indian Tobacco	X
Lobelia kalmii L.	Kalm's Lobelia	X
Lobelia siphilitica L.	Great Lobelia	X
Lobelia spicata Lam.	Pale-spiked Lobelia	R-3
Lonicera canadensis Bartram	Fly Honeysuckle	X
Lonicera hirsuta Eaton	Hairy Honeysuckle	X
Ludwigia palustris (L.) Elliot	Marsh Purslane	X
Luzula acuminata Raf.	Wood Rush	R-1
Luzula multiflora (Retz) Lej.	Wood Rush	R-1
Lycopodiella inundata (L.) Holub	Northern Bog Club-moss	R-5
Lycopodium annotinum L.	Bristly Club-moss	X
Lycopodium clavatum L.	Running Club-moss	X
Lycopodium dendroideum Michx.	Prickly Club-moss	X
Lycopodium digitatum A.Br.	Crowfoot Clubmoss	X
Lycopodium lagopus (Laest. Ex C. Hartm.) G. Zinserl. Ex Kuzen.	One-cone Club-moss	X
Lycopodium lucidulum Michx.	Shining Clubmoss	X
Lycopodium obscurum L.	Ground-pine	X
Lycopodium selago L.	Mountain Clubmoss	R-1
Lycopodium tristachyum Pursh.	Ground-Cedar	X
Lycopodium X habereri House.	L. digitatum X L. tristachyum	X
Lycopus americanus Muhlenb. ex Bartram	Cut-leaved Water-horehound	X
Lycopus uniflorus Michx.	Northern Water-horehound	X
Lysimachia ciliata L.	Fringed Loosestrife	X
Lysimachia terrestris (L.) B.S.P.	Swamp Loosestrife	X
Lysimachia thyrsoflora L.	Tufted Loosestrife	X
Maianthemum canadense Desf.	Wild-lily-of-the-valley	X
Maianthemum racemosum ssp. racemosum	False Solomon's-Seal	X

Stormwater Management Guidelines

April 2006

<i>Maianthemum stellatum</i> (L.) Link	Starflower False Solomon's-seal	X
<i>Maianthemum trifolium</i> (L.) Sloboda	Three-leaf Solomon's-seal	X
<i>Malaxis monophyllos</i> ssp. <i>brachypoda</i>	White Adder's Mouth	X
<i>Malaxis unifolia</i> Michx.	Green Adder's Mouth	X
<i>Matteuccia struthiopteris</i> (L.) Tod. Var. <i>pennsylvanica</i> (Willd.) C.V. Morton	Ostrich Fern	X
<i>Medeola virginiana</i> L.	Indian Cucumber Root	X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	X
<i>Melica smithii</i> (Porter ex A. Gray) Vasey	Smith's Melic Grass	X
<i>Menispermum canadense</i> L.	Moonseed	X
<i>Mentha arvensis</i> L. ssp. <i>borealis</i> (Michx.) R.L.Taylor & Macbryde	American Wild Mint	X
<i>Mentha x gentilis</i> L.	Red Mint	X
<i>Mentha x piperita</i> L.	Pepper Mint	X
<i>Menyanthes trifoliata</i> L.	Three-leaved Buckbean	X
<i>Milium effusum</i> L.	Wood Millet	X
<i>Mimulus moschatus</i> Douglas ex Lindl.	Musk-flower	R-4
<i>Mimulus ringens</i> L.	Square-stemmed Monkey-flower	X
<i>Mitchella repens</i> L.	Creeping Partridge-berry	X
<i>Mitella diphylla</i> L.	Two-leaved Bishop's Cap	X
<i>Mitella nuda</i> L.	Naked Mitrewort	X
<i>Monarda didyma</i> L.	Oswego-tea	R-1
<i>Monarda fistulosa</i> L.	Wild Bergamot	X
<i>Moneses uniflora</i> (L.) A.Gray	One-flowered Wintergreen	X
<i>Monotropa hypopithys</i> L.	Pinesap	X
<i>Monotropa uniflora</i> L.	Indian-pipe	X
<i>Muhlenbergia frondosa</i> (Poir. In Lam.) Fern.	Leafy Satin Grass	R-4
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Glomerate Satin Grass	X
<i>Muhlenbergia mexicana</i> (L.) Trin. var. <i>filiformis</i> (Willd.) Scribn.	Satin Grass	R
<i>Muhlenbergia mexicana</i> (L.) Trin. var. <i>mexicana</i>	Mexican Satin Grass	X
<i>Muhlenbergia uniflora</i> (Muhlenb.) Fern.	One-flowered Satin Grass	R-1
<i>Myosotis laxa</i> Lehm.	Smaller Forget-me-not	X
<i>Myosotis verna</i> Nutt.	Spring Forget-me-not	R-3
<i>Myrica gale</i> L.	Sweet Gale	X
<i>Myriophyllum alternifolium</i> DC.	Loose-flowered Water-milfoil	R-6
<i>Myriophyllum farwellii</i> Morong	Farwell's Water-milfoil	R-4
<i>Myriophyllum heterophyllum</i> Michx.	Various-leaved Water-milfoil	X
<i>Myriophyllum sibiricum</i> Kom.	Pale Water-milfoil	X
<i>Myriophyllum spicatum</i> L.	Eurasian Water-milfoil	X
<i>Myriophyllum tenellum</i> Bigelow	Slender Water-milfoil	R-6
<i>Myriophyllum verticillatum</i> L.	Whorled Water-milfoil	R-4
<i>Najas flexilis</i> (Willd.) Rost. & W. Schmidt	Slender Najas	X
<i>Najas gracillima</i> (A. Braun ex Engelm.) Magnus	Thread-like Najas	R-4
<i>Najas guadalupensis</i> (Spreng.) Magnusson	Guadaloupe Najas	R-2
<i>Nasturtium microphyllum</i> (Boenn.) Reichb.	Small-leaved Water-cress	X
<i>Nelumbo lutea</i> Willd.	American Lotus	R-1
<i>Nemopanthus mucronatus</i> (L.) Loeske	Mountain-holly	X
<i>Nuphar variegata</i> Durand in Clinton	Bullhead Pond-lily	X
<i>Nymphaea odorata</i> Aiton	Fragrant Water-lily	X

Stormwater Management Guidelines

April 2006

<i>Nymphoides cordata</i> (Elliott) Fern.	8-angled Floating-heart	R-1
<i>Oenothera biennis</i> L.	Common Evening-Primrose	X
<i>Oenothera oakesiana</i> (A. Gray) Robbins ex S. Watson & Coult.	Oakes' Evening-Primrose	R
<i>Oenothera parviflora</i> L.	Small-flowered Evening Primrose	X
<i>Oenothera perennis</i> L.	Perennial Evening-Primrose	X
<i>Ophioglossum pusillum</i> Raf.	Northern Adder's-tongue	X
<i>Orobanche uniflora</i> L.	One-flowered Broom-rape	R-1
<i>Orthilia secunda</i> (L.) House	One-sided Shinleaf	X
<i>Oryzopsis asperifolia</i> Michx.	White-grained Mountain-rice	X
<i>Oryzopsis pungens</i> (Torr. ex Spreng.) A. Hitchc.	Slender Mountain-rice	X
<i>Oryzopsis racemosa</i> (Sm.) Ricker ex A. Hitchc.	Black-fruited Mountain-rice	X
<i>Osmorhiza berterii</i> DC.	Sweet-cicely	X
<i>Osmorhiza claytonii</i> (Michx.) C.B. Clarke	Woolly Sweet-cicely	X
<i>Osmorhiza longistylis</i> (Torr.) DC.	Anise-root	X
<i>Osmunda cinnamomea</i> L.	Cinnamon Fern	X
<i>Osmunda claytoniana</i> L.	Interrupted Fern	X
<i>Osmunda regalis</i> L. var. <i>spectabilis</i> (Willd.) A. Gray	Royal Fern	X
<i>Ostrya virginiana</i> (P. Mill.) K. Koch	Eastern Hop-hornbeam	X
<i>Oxalis acetosella</i> L. ssp. <i>montana</i> (Raf.) Hultén	True Wood-sorrel	X
<i>Oxalis stricta</i> L.	Upright Yellow Wood-sorrel	X
<i>Panax quinquefolius</i> L.	Ginseng	R-5
<i>Panax trifolius</i> L.	Dwarf Ginseng	R-6
<i>Panicum boreale</i> Nash	Northern Witchgrass	R-5
<i>Panicum capillare</i> L.	Old Witch Panic-grass	X
<i>Panicum columbianum</i> Scribner.	American Panic Grass	X
<i>Panicum depauperatum</i> Muhlenb.	Green Panic-Grass	X
<i>Panicum flexile</i> (Gattinger) Scribn.	Wiry Witch Grass	X
<i>Panicum lanuginosum</i> Ell. Var <i>implicatum</i> (Scribn.) Fern.	Panic Grass	X
<i>Panicum latifolium</i> L.	Broad-Leaved Panic Grass	X
<i>Panicum lindheimeri</i> Nash.	Panic Grass	X
<i>Panicum linearifolium</i> Scribner	Slim-leaf Witchgrass	X
<i>Panicum oligosanthes</i> Schultes	Heller's Witchgrass	R-1
<i>Panicum philadelphicum</i> Bernh. ex Trin.	Philadelphia Panic Grass	R-4
<i>Panicum rigidulum</i> Bosc ex Nees	Redtop Panic Grass	R-1
<i>Panicum sphaerocarpon</i> Elliott	Roundfruit Panic Grass	R-1
<i>Panicum spretum</i> Schultes	Panic Grass	R-1
<i>Panicum tuckermanii</i> Fern.	Tuckerman's Panic Grass	R-1
<i>Panicum virgatum</i> L.	Old Switch Panic Grass	X
<i>Panicum xanthophysum</i> A. Gray	Slender Dichantherium	X
<i>Parnassia glauca</i> Raf.	Amer. Grass-of-parnassus	X
<i>Parnassia parviflora</i> DC.	Small-flowered Grass-of-parnassus	R-0
<i>Parthenocissus inserta</i> (A. Kern.) Fritsch	Inserted Virginia-creeper	X
<i>Parthenocissus quinquefolia</i> (L.) Planchon ex DC.	Five-leaved Virginia-creeper	R-1
<i>Pedicularis canadensis</i> L.	Canada Wood-betony	X
<i>Pellaea glabella</i> Mett. Ex Kuhn ssp. <i>glabella</i>	Smooth Cliff-brake	R-4
<i>Peltandra virginica</i> (L.) Schott	Arrow Arum	R-1
<i>Penstemon hirsutus</i> (L.) Willd.	Hairy Beard-tongue	X

Stormwater Management Guidelines

April 2006

Penthorum sedoides L.	Ditch Stonecrop	X
Petasites frigidus (L.) Fr.	Palmate-leaf Sweet-coltsfoot	X
Phalaris arundinacea L.	Reed Canary Grass	X
Phegopteris connectilis (Michx.) Watt	Northern Beech Fern	X
Phlox divaricata L.	Wild Blue Phlox	X
Phragmites australis (Cav.) Trin ex Steud.	Common Reed	X
Phryma leptostachya L.	Lopseed	X
Physalis heterophylla Nees	Clammy Ground-cherry	X
Physocarpus opulifolius (L.) Maxim.	Ninebark	X
Phytolacca americana L.	Pokeweed	X
Picea glauca (Moench) Voss	White Spruce	X
Picea mariana (Miller) B.S.P.	Black Spruce	X
Pilea fontana (Lunell) Rydb.	Springs Clearweed	R-3
Pilea pumila (L.) Gray	Canada Clearweed	X
Pinus resinosa Sol. Ex Aiton	Red Pine	X
Pinus strobus L.	Eastern White Pine	X
Plantago lanceolata L.	Ribgrass	X
Plantago rugelii Decne.	Rugel's Plantain	X
Platanthera aquilonis Sheviak	Northern Green Orchid	X
Platanthera blephariglottis (Willd.) Lindl.	White Fringed Orchid	R-3
Platanthera dilatata (Pursh) Lindl. ex Beck	Tall White Northern Orchid	R-7
Platanthera flava (L.) Lindl.	Southern Rein-orchid	R-4
Platanthera hookeri (Torr. ex Gray) Lindl.	Hooker's Orchid	R-6
Platanthera lacera (Michx.) G. Don	Ragged Fringed Orchid	X
Platanthera leucophaea (Nutt.) Lindl.	Prairie Fringed Orchid	R-1
Platanthera macrophylla P.M. Brown	Large Round-Leaved Orchid	R-5
Platanthera obtusata (Banks ex Pursh) Lindl.	One-leaf Rein Orchid	X
Platanthera orbiculata (Pursh) Lindl.	Round-Leaved Orchid	R-2
Platanthera psycodes (L.) Lindl.	Small Purple Fringed Orchid	X
Poa alsodes A. Gray	Grove Meadow Grass	R-6
Poa glauca Vahl ssp. glauca	Glaucous Poa	R-1
Poa glauca Vahl ssp. glaucantha (Gaudin) Lindm.	Glaucous Poa	R-3
Poa languida Hitchc.	Languid Poa	R-1
Poa palustris L.	Fowl Meadow Grass	X
Poa saltuensis Fern. & Wiegand	Two-rayed Poa	X
Podophyllum peltatum L.	May-apple	X
Pogonia ophioglossoides (L.) Ker-Gawl.	Rose Pogonia	X
Polanisia dodecandra (L.) DC.	Clammyweed	X
Polygala pauciflora Willd.	Gay Wings	X
Polygala polygama Walter	Racemed Milkwort	R-4
Polygala senega L.	Seneca-snakeroot	R-4
Polygonatum pubescens (Willd.) Pursh	Downy Solomon's-seal	X
Polygonum achoreum Blake	Leathery Knotweed	X
Polygonum amphibium L.	Water Smartweed	X
Polygonum arenastrum Jord. ex Boreau	Oval-leaf Knotweed	X
Polygonum arifolium L.	Halberd-leaved Tear-thumb	R-1
Polygonum aviculare L.	Knotweed	X

Stormwater Management Guidelines

April 2006

Polygonum careyi Olney	Carey's Smartweed	R-5
Polygonum cilinode Michx.	Fringed Black Bindweed	X
Polygonum douglasii Greene	Douglas Knotweed	X
Polygonum erectum L.	Erect Knotweed	R-1
Polygonum hydropiperoides Michx.	Mild Water-pepper	X
Polygonum lapathifolium L.	Dock-leaf Smartweed	X
Polygonum persicaria L.	Lady's-thumb	X
Polygonum punctatum Ell.	Dotted Smartweed	X
Polygonum ramosissimum Michx.	Bushy Knotweed	R-2
Polygonum sagittatum L.	Arrow-leaved Tearthumb	X
Polygonum scandens L.	Climbing False Buckwheat	X
Polystichum acrostichoides (Michx.) Schott	Christmas Fern	X
Polystichum lonchitis (L.) Roth	Holly Fern	X
Pontederia cordata L.	Pickerelweed	X
Populus balsamifera L.	Balsam Poplar	X
Populus grandidentata Michx.	Large-toothed Aspen	X
Populus tremuloides Michx.	Trembling Aspen	X
Populus x jackii Sarg.	Balm-of-gilead	R-2
Potamogeton alpinus Balb.	Northern Pondweed	R-1
Potamogeton amplifolius Tuckerm.	Large-leaved Pondweed	X
Potamogeton bicupulatus Fern.	Two-cupped Pondweed	R-5
Potamogeton epihydrus Raf.	Nuttall's Pondweed	X
Potamogeton filiformis Pers.	Filiform Pondweed	R-6
Potamogeton foliosus Raf.	Leafy Pondweed	X
Potamogeton friesii Rupr.	Fries' Pondweed	R-5
Potamogeton gramineus L.	Grass-like Pondweed	X
Potamogeton illinoensis Morong	Illinois Pondweed	X
Potamogeton natans L.	Common Floating Pondweed	X
Potamogeton oakesianus Robb.	Oakes' Pondweed	R-2
Potamogeton pectinatus L.	Fennel-leaved Pondweed	X
Potamogeton perfoliatus L.	Clasping-leaved Pondweed	R-1
Potamogeton praelongus Wulfen.	White-stemmed Pondweed	R-4
Potamogeton pusillus L.	Small Pondweed	X
Potamogeton richardsonii (A. Bennett) Rydb.	Richardson's Pondweed	X
Potamogeton robbinsii Oakes	Robbin's Pondweed	X
Potamogeton spirillus Tuckerm.	Spiral Pondweed	X
Potamogeton strictifolius A. Bennett	Straight-leaved Pondweed	R-6
Potamogeton vaginatus Turcz.	Sheathed Pondweed	R-1
Potamogeton vaseyi Robb.	Vasey's Pondweed	R-4
Potamogeton X longingulatus	P.strictifolius X P.zosteriformis	X
Potamogeton zosteriformis Fern.	Flat-stemmed Pondweed	X
Potentilla anserina L. ssp. anserina	Silverweed	X
Potentilla arguta Pursh	Tall Cinquefoil	R-5
Potentilla canadensis L.	Common Cinquefoil	R-5
Potentilla fruticosa L. ssp. floribunda (Pursh) Elkington	Shrubby Cinquefoil	X
Potentilla norvegica L ssp ?	Rough Cinquefoil	X
Potentilla palustris (L.) Scop.	Marsh Cinquefoil	X

Stormwater Management Guidelines

April 2006

<i>Potentilla simplex</i> Michx.	Old-field Cinquefoil	R-5
<i>Prenanthes alba</i> L.	White Rattlesnake-root	X
<i>Prenanthes altissima</i> L.	Tall White Rattlesnake-root	X
<i>Prenanthes racemosa</i> Michx. ssp. <i>racemosa</i>	Glaucous White Rattlesnake-root	R-3
<i>Primula mistassinica</i> Michx.	Bird's-eye Primrose	X
<i>Proserpinaca palustris</i> L.	Field Mermaid-weed	X
<i>Prunella vulgaris</i> L. ssp. <i>vulgaris</i>	Common Heal-all	X
<i>Prunus nigra</i> Aiton	Canada Plum	X
<i>Prunus pensylvanica</i> L. f.	Pin Cherry	X
<i>Prunus pumila</i> L. var. ?	Sand Cherry	X
<i>Prunus serotina</i> Ehrh.	Black Cherry	X
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	X
<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>latiusculum</i> (Desv.) L. Underw. Ex A. Heller	Eastern Bracken-fern	X
<i>Pterospora andromedea</i> Nutt.	Giant Bird's Nest	R-2
<i>Puccinellia fernaldii</i> (Hitcch.)		R-6
<i>Pycnanthemum virginianum</i> (L.) Durand & Jackson ex Fern. & Robinson	Virginia Mountain-mint	R-3
<i>Pyrola americana</i> Sweet	Round-leaved Pyrola	X
<i>Pyrola asarifolia</i> Michx.	Pink Pyrola	X
<i>Pyrola chlorantha</i> Sw.	Green-flowered Pyrola	X
<i>Pyrola elliptica</i> Nutt.	Shinleaf	X
<i>Quercus alba</i> L.	White Oak	X
<i>Quercus macrocarpa</i> Michx.	Bur Oak	X
<i>Quercus rubra</i> L.	Red Oak	X
<i>Ranunculus abortivus</i> L.	Kidney-leaf Buttercup	X
<i>Ranunculus aquatilis</i> L. var. <i>diffusus</i> With. ? OPL 5-22	White Water-crowfoot?	X
<i>Ranunculus fascicularis</i> Muhlenb. ex Bigelow	Early Buttercup	R-2
<i>Ranunculus flabellaris</i> Raf.	Yellow Water-crowfoot	R-4
<i>Ranunculus flammula</i> L var <i>reptans</i> (L.) E. Meyer	Creeping Spearwort	X
<i>Ranunculus hispidus</i> Michx. var. <i>caricetorum</i> (Greene) T. Duncan	Swamp Buttercup	X
<i>Ranunculus pensylvanicus</i> L. f.	Bristly Buttercup	X
<i>Ranunculus recurvatus</i> Poir. var. <i>recurvatus</i>	Hooked Buttercup	X
<i>Ranunculus rhomboideus</i> Goldie	Prairie Buttercup	R-3
<i>Ranunculus sceleratus</i> L. var. ?	Cursed Buttercup	X
<i>Rhamnus alnifolia</i> L'Hér.	Alder-leaved Buckthorn	X
<i>Rhexia virginica</i> L.	Common Meadow-beauty	R-5
<i>Rhus aromatica</i> Aiton	Fragrant Sumac	R-2
<i>Rhus glabra</i> L.	Smooth Sumac	R-1
<i>Rhus radicans</i> L. ssp. <i>negundo</i> (Greene) McNeill	(Climbing) Poison-ivy	X
<i>Rhus rydbergii</i> Small ex Rydb.	Western Poison-ivy	X
<i>Rhus typhina</i> L.	Staghorn Sumac	X
<i>Rhus vernix</i> L.	Poison Sumac	R-1
<i>Rhynchospora alba</i> (L.) M. Vahl	White Beaked-rush	X
<i>Rhynchospora capillacea</i> Torr.	Capillary Beaked-rush	X
<i>Rhynchospora capitellata</i> (Michx.) M. Vahl	Small-headed Beaked-rush	R-3
<i>Rhynchospora fusca</i> (L.) Aiton f.	Brown Beaked-rush	R-4
<i>Ribes americanum</i> Miller	Wild Black Current	X
<i>Ribes cynosbati</i> L.	Prickly Gooseberry	X

Stormwater Management Guidelines

April 2006

Ribes glandulosum Grauer	Skunk Current	X
Ribes hirtellum Michx.	Smooth Gooseberry	X
Ribes hudsonianum Richardson	Hudson Bay Current	R-2
Ribes lacustre (Pers.) Poir.	Swamp Black Current	X
Ribes odoratum Wendl. f.	Buffalo Current	X
Ribes rubrum L.	Red Current	X
Ribes triste Pall.	Wild Red Current	X
Rorippa palustris (L.) Besser ssp. fernaldiana (Butters & Abbe) Jonsell	Marsh Yellow-cress	X
Rosa acicularis Lindl. ssp. sayi (Schwein.) W. Lewis	Prickly Rose	X
Rosa blanda Aiton	Smooth Rose	X
Rosa carolina L.	Swamp Rose	R-1
Rosa multiflora Thunb. ex Murray	Multiflora Rose	X
Rosa palustris Marshall	Marsh Rose	X
Rubus allegheniensis Porter	Alleghany Blackberry	X
Rubus canadensis L.	Millspaugh's Blackberry	R-1
Rubus flagellaris Willd.	Prickly Raspberry	X
Rubus hispidus L.	Trailing Blackberry	X
Rubus idaeus L. ssp. melanolasius (Dieck) Focke	Wild Red Raspberry	X
Rubus occidentalis L.	Thimble-berry	X
Rubus odoratus L.	Purple Flowering Raspberry	R-5
Rubus pubescens Raf.	Dwarf Raspberry	X
Rubus setosus Bigelow	Bristly Raspberry	R-1
Rudbeckia hirta L.	Black-eyed Susan	X
Rudbeckia laciniata L.	Tall Coneflower	X
Rumex orbiculatus Gray.	Water Dock	X
Rumex triangulivalvis (Danser) Rech. F.	Triangular-valve Dock	R-1
Rumex verticillatus L.	Swamp Dock	X
Sagina procumbens L.	Procumbent Pearlwort	X
Sagittaria cuneata E. Sheld.	Northern Arrowhead	X
Sagittaria graminea Engelm. var. cristata (Engelm.) Bogin	Grass-leaved Arrowhead	X
Sagittaria graminea Michx. Var. graminea	Grass-leaved Arrowhead	R-1
Sagittaria latifolia Willd.	Broad-leaved Arrowhead	X
Sagittaria rigida Pursh	Sessile-fruited Arrowhead	X
Salix alba L.	White Willow	X
Salix amygdaloides Anderss.	Peachleaf Willow	X
Salix bebbiana Sarg.	Bebb Willow	X
Salix candida Fluegge ex Willd	Hoary Willow	X
Salix cordata Michx.	Sand Dune Willow	R-6
Salix discolor Muhl.	Pussy Willow	X
Salix eriocephala Michx.	Heart-leaved Willow	X
Salix exigua Nutt.	Sandbar Willow	X
Salix humilis Marsh.	Tall Prairie Willow	X
Salix lucida Muhl.	Shining Willow	X
Salix myricoides Muhl.	Blue-leaf Willow	R-6
Salix nigra Marsh.	Black Willow	X
Salix pedicellaris Pursh	Bog Willow	R-5
Salix petiolaris Sm.	Meadow Willow	X

Stormwater Management Guidelines

April 2006

Salix pyrifolia Anderss.	Balsam Willow	X
Salix serissima (Bailey) Fern.	Autumn Willow	X
Sambucus canadensis L.	Common Elderberry	X
Sambucus racemosa L. ssp. Pubens (Michx.) House	Red-berried Elderberry	X
Samolus valerandi L. ssp. parviflorus (Raf.) Hultén	Brookweed	R-3
Sanguinaria canadensis L.	Bloodroot	X
Sanicula marilandica L.	Black Snakeroot	X
Sanicula odorata (Raf.) Pryer & Phillippe	Clustered Snakeroot	X
Sanicula trifoliata E.P. Bicknell	Large-fruited Snakeroot	R-3
Sarracenia purpurea L.	Pitcher-plant	X
Satureja vulgaris (L.) Fritsch var. neogaea	Dogmint	X
Saururus cernuus L.	Lizard's-Tail	R-2
Saxifraga virginiana Michx.	Early Saxifrage	X
Scheuchzeria palustris L.	Marsh Scheuchzeria	R-2
Schizachne purpurascens (Torr.) Swallen ssp. purpurascens	False Melic Grass	X
Schizachyrium scoparium (Michx.) Nash	Little Bluestem	X
Scirpus acutus Muhlenb. ex Bigelow	Hard-stemmed Bulrush	X
Scirpus atrovirens Willd.	Dark-green Bulrush	X
Scirpus cespitosus L. ssp. cespitosus	Cespitose Bulrush	R-1
Scirpus clintonii A. Gray	Clinton's Club-rush	R-1
Scirpus cyperinus (L.) Kunth	Wool-grass	X
Scirpus fluviatilis (Torr.) A. Gray	River Bulrush	X
Scirpus heterochaetus Chase	Pale Great Bulrush	R-1
Scirpus hudsonianus (Michx.) Fern.	Hudson Bay Bulrush	X
Scirpus microcarpus C. Presl	Small-fruited Bulrush	X
Scirpus pendulus Muhlenb. ex Willd.	Lined Bulrush	X
Scirpus pungens M. Vahl	Common Three-square	X
Scirpus smithii A. Gray	Smith's Club-rush	R-2
Scirpus subterminalis Torr.	Water Club-rush	X
Scirpus torreyi Olney	Torrey's Bulrush	R-3
Scirpus validus L.	American Great Bulrush	X
Scleria verticillata Muhlenb. ex Willd.	Low Nut-rush	R-4
Scrophularia lanceolata Pursh	Lance-leaved Figwort	X
Scutellaria galericulata L.	Hooded Skullcap	X
Scutellaria lateriflora L.	Mad-dog Skullcap	X
Scutellaria parvula Michx. var. parvula	Small Skullcap	R-6
Selaginella eclipses W.R. Buck	Meadow Spike-moss	X
Selaginella rupestris (L.) Spring	Rock Spike-moss	X
Selaginella selaginoides (L.) P.Beauv. Ex Martius & Schrank	Northern Spike-moss	R-3
Senecio aureus L.	Golden Groundsel	X
Senecio pauperculus Michx.	Balsam Groundsel	X
Shepherdia canadensis (L.) Nutt.	Canada Soapberry	X
Sicyos angulatus L.	One-seeded Bur-cucumber	R-1
Silene antirrhina L.	Sleepy Catchfly	X
Sisyrinchium angustifolium	Stout Blue-eyed Grass	X
Sisyrinchium montanum	Common Blue-eyed Grass	X
Sisyrinchium mucronatum	Slender Blue-eyed Grass	R-5

Stormwater Management Guidelines

April 2006

<i>Sium suave</i> Walter	Hemlock Water-parsnip	X
<i>Smilax herbacea</i> L.	Smooth Herbaceous Greenbrier	X
<i>Smilax hispida</i> Muhl. ex Torr.	Hispid Greenbrier	X
<i>Solidago altissima</i> L. var.?	Tall Goldenrod	R-4
<i>Solidago caesia</i> L.	Blue-stem Goldenrod	X
<i>Solidago canadensis</i> L.	Canada Goldenrod	X
<i>Solidago flexicaulis</i> L.	Zig-zag Goldenrod	X
<i>Solidago gigantea</i> Aiton	Giant Goldenrod	X
<i>Solidago hispida</i> Muhlenb. var.?	Hairy Goldenrod	X
<i>Solidago juncea</i> Aiton	Early Goldenrod	X
<i>Solidago nemoralis</i> Aiton ssp.?	Gray Goldenrod	X
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	X
<i>Solidago patula</i> Muhlenb. ex Willd.	Rough-leaved Goldenrod	R-1
<i>Solidago ptarmicoides</i> (Nees) B.Boivin	Upland White Aster	R-1
<i>Solidago rugosa</i> Aiton ssp. <i>rugosa</i>	Rough Goldenrod	X
<i>Solidago squarrosa</i> Muhlenb. ex Nutt.	Rugged Goldenrod	X
<i>Solidago uliginosa</i> Nutt.	Marsh Goldenrod	X
<i>Sorbus americana</i> Marshall	American Mountain-ash	R-1
<i>Sorbus decora</i> (Sarg.) C.K. Schneid.	Showy Mountain-ash	R-5
<i>Sorghastrum nutans</i> (L.) Nash	Yellow Indian-grass	X
<i>Sparganium americanum</i> Nutt.	Nuttall's Bur-reed	X
<i>Sparganium angustifolium</i> Michx.	Narrow-leaved Bur-reed	X
<i>Sparganium emersum</i> Rehmann ssp. <i>emersum</i>	Green-fruited Bur-reed	X
<i>Sparganium eurycarpum</i> Engelm. Ex A. Gray	Broad-fruited Bur-reed	X
<i>Sparganium fluctuans</i> (Morong) Robinson	Floating Bur-reed	R-6
<i>Sparganium minimum</i> (Hartm.)	Bur-reed	R-5
<i>Spartina pectinata</i> Link.	Fresh Water Cordgrass	X
<i>Sphenopholis intermedia</i> (Rydb.) Rydb.	Slender Wedge Grass	X
<i>Spiraea alba</i> Du Roi	Narrow-leaved Meadow-sweet	X
<i>Spiraea tomentosa</i> L.	Tomentose Meadow-sweet	X
<i>Spiranthes casei</i> Catling & Cruise	Case's Ladies'-Tresses	X
<i>Spiranthes cernua</i> (L.) L.C. Rich.	Nodding Ladies'-Tresses	X
<i>Spiranthes lacera</i> (Raf.) Raf.	Slender Ladies'-Tresses	X
<i>Spiranthes lucida</i> (H.H. Eat.) Ames	Shinning Ladies'-Tresses	R-2
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-Tresses	X
<i>Spirodela polyrhiza</i>	Greater Duckweed	X
<i>Sporobolus cryptandrus</i> (Torr.) A. Gray	Sand Dropseed	X
<i>Sporobolus neglectus</i> Nash	Overlooked Dropseed	R-4
<i>Sporobolus vaginiflorus</i> (Torr. ex A. Gray) Torr. ex Alph. Wood	Ensheathed Dropseed	X
<i>Stachys palustris</i> L.	Hedge-nettle	X
<i>Staphylea trifolia</i> L.	American Bladder-nut	R-2
<i>Stellaria borealis</i> Bigelow ssp. <i>borealis</i>	Northern Chickweed	R-3
<i>Stellaria longifolia</i> Muhlenb. ex Willd.	Long-leaved Chickweed	X
<i>Stipa spartea</i> Trin.	Porcupine Bunch Grass	R-2
<i>Streptopus amplexifolius</i> (L.) DC.	White Mandarin	R-2
<i>Streptopus lanceolatus</i> Michx.	Rose Twisted-Stalk	X
<i>Symphoricarpos albus</i> (L.) S.F. Blake	Snowberry	X

Stormwater Management Guidelines

April 2006

<i>Symplocarpus foetidus</i> (L.) Salisb. ex Nutt.	Skunk Cabbage	R-2
<i>Taenidia integerrima</i> (L.) Drude	Yellow Pimpernel	R-6
<i>Taxus canadensis</i> Marshall	American Yew	X
<i>Teucrium canadense</i> L. ssp. <i>canadense</i>	Wood Germander	R-2
<i>Thalictrum dasycarpum</i> Fischer & Avé-Lall.	Purple Meadow-rue	R-3
<i>Thalictrum dioicum</i> L.	Early Meadow-rue	X
<i>Thalictrum pubescens</i> Pursh	Tall Meadow-rue	X
<i>Thelypteris noveboracensis</i> (L.) Nieuwl.	New York Fern	X
<i>Thelypteris palustris</i> Schott var. <i>pubescens</i> (Lawson) Fern.	Marsh Fern	X
<i>Thuja occidentalis</i> L.	Eastern White Cedar	X
<i>Tiarella cordifolia</i> L.	False Mitrewort	X
<i>Tilia americana</i> L.	American Basswood	X
<i>Tofieldia glutinosa</i> (Michx.) Pers	False Asphodel	X
<i>Triadenum fraseri</i> (Spach) Gleason	Fraser's St. John's-wort	X
<i>Triadenum virginicum</i> (L.) Raf.	Swamp St. John's-wort	R-2
<i>Trichostema brachiatum</i> L.	False Pennyroyal	R-1
<i>Trientalis borealis</i> Raf. ssp. <i>borealis</i>	Star-flower	X
<i>Triglochin maritimum</i> L.	Seaside Arrow-grass	X
<i>Triglochin palustre</i> L.	Marsh Arrow-grass	X
<i>Trillium cernuum</i> L.	Nodding Trillium	X
<i>Trillium erectum</i> L.	Red Trillium	X
<i>Trillium grandiflorum</i> (Michx.) Salisb.	White Trillium	X
<i>Trillium undulatum</i> Willd.	Painted Trillium	X
<i>Triodanis perfoliata</i> (L.) Nieuwl.	Venus' Looking Glass	R-2
<i>Triosteum aurantiacum</i> E.P. Bicknell	Wild Coffee	X
<i>Trisetum melicoides</i> (Michx.) Vasey ex Scribn.	Purple False Oats	R-1
<i>Trisetum spicatum</i> (L.) Richter	Narrow False Oats	R-1
<i>Triticum aestivum</i> L.	Summer Wheat	X
<i>Tsuga canadensis</i> (L.) Carriere	Eastern Hemlock	X
<i>Typha angustifolia</i> L.	Narrow-leaved Cattail	X
<i>Typha latifolia</i> L.	Broad-leaved Cattail	X
<i>Typha X glauca</i> Godron	Glaucous Cattail	X
<i>Ulmus americana</i> L.	American Elm	X
<i>Ulmus rubra</i> Muhl.	Slippery Elm	X
<i>Ulmus thomasii</i> Sarg.	Rock Elm	X
<i>Urtica dioica</i> ssp. <i>Gracilis</i> (Ait.) Seland	Stinging Nettle	X
<i>Utricularia cornuta</i> Michx.	Horned Bladderwort	X
<i>Utricularia geminiscapa</i> Benj.	Hidden-fruited Bladderwort	R-1
<i>Utricularia gibba</i> L..	Humped Bladderwort	X
<i>Utricularia intermedia</i> hayne	Flat-leaved Bladderwort	X
<i>Utricularia minor</i> L.	Lesser Bladderwort	X
<i>Utricularia purpurea</i> Walter	Purple Bladderwort	R-3
<i>Utricularia resupinata</i> Greene ex Bigelow	Inverted Bladderwort	R-4
<i>Utricularia vulgaris</i> L.	Greater Bladderwort	X
<i>Uvularia grandiflora</i>	Large-Flowered Bellwort	X
<i>Vaccinium angustifolium</i> Aiton	Low Sweet Blueberry	X
<i>Vaccinium macrocarpon</i> Aiton	Large Cranberry	X

Stormwater Management Guidelines

April 2006

<i>Vaccinium myrtilloides</i> Michx.	Velvet-leaf Blueberry	X
<i>Vaccinium oxycoccos</i>	Small Cranberry	X
<i>Valeriana sitchensis</i> Bong. ssp. <i>uliginosa</i> (Torr. & A. Gray) F. Mey.	Swamp Valerian	R-5
<i>Vallisneria americana</i> Michx.	Water-celery	X
<i>Verbena hastata</i> L.	Blue Vervain	X
<i>Verbena stricta</i> Vent.	Hoary Vervain	X
<i>Verbena urticifolia</i> L.	White Vervain	X
<i>Veronica americana</i> (Raf.) Schwein. ex Benth.	American Speedwell	X
<i>Veronica arvensis</i> L.	Corn Speedwell	X
<i>Veronica catenata</i> Pennell	Water Speedwell	R-5
<i>Veronica peregrina</i> L. ssp. <i>xalapensis</i> (Kunth) Pennell	Western Purslane Speedwell	X
<i>Veronica scutellata</i> L.	Marsh Speedwell	X
<i>Viburnum acerifolium</i> L.	Maple-leaved Viburnum	X
<i>Viburnum cassinoides</i> L.	Northern Wild Raisin	X
<i>Viburnum lantanoides</i> Michx.	Hobblebush	X
<i>Viburnum lentago</i> L.	Nannyberry	X
<i>Viburnum rafinesquianum</i> Schult.	Downy Arrow-wood	X
<i>Viburnum trilobum</i> Marshall	High Bush Cranberry	X
<i>Viola adunca</i> Sm.	Hooked-spur Violet	R-5
<i>Viola canadensis</i> L.	Canada Violet	X
<i>Viola conspersa</i> Reichb.	American Dog Violet	X
<i>Viola cucullata</i> Aiton	Marsh Blue Violet	X
<i>Viola fimbriatula</i> Sm.	Violet	X
<i>Viola incognita</i> Brain.	White Violet	X
<i>Viola lanceolata</i> L.	Lance-leaved Violet	X
<i>Viola macloskeyi</i> F.E. Lloyd ssp. <i>pallens</i> (Banks ex DC.) M. Baker	Macloskey's Violet	X
<i>Viola nephrophylla</i> Greene	Northern Bog Violet	X
<i>Viola pallens</i> (Banks) Brain.	Smooth White Violet	X
<i>Viola papilionacea</i> Pursh.	Stemless Blue Violet	X
<i>Viola pubescens</i> Aiton	Downy Yellow Violet	X
<i>Viola renifolia</i> A. Gray	Kidney-leaved Violet	X
<i>Viola rostrata</i> Pursh	Long-spurred Violet	X
<i>Viola sagittata</i> Aiton var. ?	Arrow-leaved Violet	R-1
<i>Viola selkirkii</i> Pursh ex Goldie	Selkirk's Violet	X
<i>Viola septentrionalis</i> Greene	Northern Blue Violet	X
<i>Viola sororia</i> Willd.	Woolly Blue Violet	X
<i>Vitis riparia</i> Michx.	Riverbank Grape	X
<i>Waldsteinia fragarioides</i> (Michx.) Tratt.	Barren Strawberry	X
<i>Wolffia borealis</i>	Water-meal	X
<i>Wolffia columbiana</i>	Columbia Wolffia	X
<i>Woodsia ilvensis</i> (L.) R. Br.	Rusty Woodsia	X
<i>Woodwardia virginica</i> (L.) Sm.	Virginia Chain Fern	X
<i>Xanthium strumarium</i> L.	Tumor-curing Cocklebur	X
<i>Xyris difformis</i> Chapman	Slender Yellow-eyed Grass	R-4
<i>Zannichellia palustris</i> L.	Horned Pondweed	R-1
<i>Zanthoxylum americanum</i> Miller	American Prickly-ash	X
<i>Zigadenus elegans</i> Pursh.	White Camas	X

Stormwater Management Guidelines

April 2006

Zizania palustris L.	Northern Wild Rice	X
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(* R= Regionally Rare Species – 0=extremely rare, 7= uncommon)