

14.0 STORMWATER MANAGEMENT FACILITIES

Definitions

Forebay - Storage area provided at the inlet for the primary removal of suspended solids.

Dry Ponds- Least effective of the three pond types for water quality treatment. No permanent pool required for the treatment of runoff. Requires the largest treatment volume due to the lack of a permanent pool.

Wet Ponds- More effective than Dry Ponds but less effective than Wetlands Ponds due to the depth of the permanent pool and the lack of aquatic plantings. Treated volumes are less than the volumes required in a Dry Pond.

Wetlands- Most effective type of water quality facility. Shallow permanent pool allows for diversity of plant material which aids in pollutant removal (nutrient uptake) and entrapment of suspended solids simulating the natural processes. Blends in well with the surrounding natural areas making the facility more aesthetically pleasing. Requires the smallest treatment volume.

Micropool- Storage area provided at the outlet as a tertiary treatment before discharging to the receiving water body.

Standards for Plans of Subdivision and Site Plans

The purpose of this section is to provide principles to augment the MOEE "Stormwater Management Practices Planning and Design Manual and to achieve the highest level of utilization, aesthetics, environmental benefits and ease of maintenance for stormwater management facilities in our community."

These principles have been prepared by a joint committee of representatives from all municipalities within the Region of Waterloo, City of Guelph and the Grand River Conservation Authority in consultation with the local development industry.

These principles were originally adopted by Kitchener City Council for use within the City of Kitchener on September 30, 1996.

In recognition of diverse development conditions, consideration by the City of Kitchener will be given to all innovative approaches and/or techniques that can be demonstrated to meet its storm water management objectives.

- Stormwater management areas for subdivisions will be on lands conveyed at no cost to the City in addition to any lands required to be dedicated for park purposes under the Planning Act. Construction costs will be borne by the owner while long term maintenance of the storm water management facility will be borne by the City.
- Stormwater management areas, subject to site plan approval, will be on lands retained by the owner. All costs associated with the construction and continuing maintenance of stormwater management facilities shall be borne by the owner.
- Stormwater management Dry Ponds shall be designed to limit the maximum depth of water to 1.8m above the lowest point of the stormwater basin. An additional 0.3m freeboard is required above the maximum peak flow flood level. The maximum depth of the extended detention zone shall not exceed 1.0m above the lowest point of the pond (see Figure 14.2).
- A maximum 5:1 slope shall extend from the bottom of the pond to the limit of maximum extended detention, with a minimum horizontal length of 3.0m. The minimum allowable gradient on the bottom of the basin shall be 1.0% and the maximum gradient shall be 5.0%.
- Stormwater management Wetlands shall be designed to limit the maximum depth of water to 2.1m above the lowest point of the stormwater basin excluding micropools. An additional 0.3m freeboard is required above the maximum peak flow flood level. The maximum depth of the

extended detention zone shall not exceed 1.0m above the permanent pool elevation. Maximum peak flow attenuation zone shall not exceed 1.8m above the permanent pool elevation. The permanent pool depth shall range between a minimum depth of 0.15m to a maximum depth of 0.3m.

- A maximum 5:1 slope below the permanent pool level shall be permitted around the entire stormwater management pond.
- A maximum 5:1 slope above the permanent pool level shall be permitted around the entire stormwater management pond. The slope shall extend from the permanent pool level, to the limit of maximum extended detention. The horizontal distance of this slope must be a minimum of 3.0m.
- Micropools shall not exceed an additional maximum depth of 0.3m below the permanent pool level. Micropools shall not exceed 5% of the total wetland permanent pool surface area (see Figures 14.2 and 14.3).
- Stormwater management Wet Ponds shall be designed to limit the maximum depth of water to 3.3m above the lowest point of the stormwater basin. An additional 0.3m freeboard is required above the maximum peak flow flood level. The maximum depth of the extended detention zone shall not exceed 1.0m above the permanent pool elevation. Maximum peak flow attenuation zone shall not exceed 1.8m above the permanent pool elevation. The permanent pool depth shall range between a minimum depth of 1.0m to a maximum depth of 1.5m (see Figure 14.2).
- A maximum 5:1 slope below the permanent pool level shall be permitted around the entire stormwater management pond. The horizontal distance of this slope must be a minimum of 3.0m. A slope commencing from this point to the lowest point of the stormwater basin shall be a maximum of 3:1.
- A maximum 5:1 slope above the permanent pool level shall be permitted around the entire stormwater management pond. The slope shall extend from the permanent pool level, to the limit of maximum extended detention. The horizontal distance of this slope shall be a minimum of 3.0m.
- Forebays are required for all of the above described stormwater management facilities. The permanent pool depth shall range between a minimum depth of 1.0m to a maximum depth of 1.5m in which a maximum depth of 0.5m shall be used for sediment accumulation. Forebays shall not exceed 33% of the total wet pond surface area and 20% of the wetland permanent pool surface area. All other aspects regarding the design of forebays shall conform to the above Wet Pond standards. Excluding maintenance access routes, all access to forebays shall be discouraged through shrub plantings (see Figures 14.2 and 14.4). Consideration should be given to provide a liner and a means to draw the forebay via gravity to facilitate maintenance.
- From the point of maximum extended detention, to the lower limits of the “safety separation” area or property line where it abuts private property, slopes shall vary between 2:1 to 6:1 and have a maximum average slope of 4:1, not including the maximum 10:1 maintenance access slope.
- Native and non-invasive trees, shrubs, ground covers and aquatic plants are required in a low maintenance landscape design, which has regard for the ecology of the site and the eco-region. See plant lists at end of chapter.
- For Wet Ponds and Wetlands, all slopes 5:1 and steeper ranging from a minimum horizontal distance of 3.0m from the permanent pool level to the property line (not including walkways and trails) shall be planted. For Dry Ponds, all slopes 5:1 and steeper ranging from a minimum horizontal distance of 3.0m from the pond bottom level to the property line (not including walkways

and trails) shall also be planted. Incorporating a wide range of slopes and ponding depths into facility design that conform to the design principles is strongly encouraged and desirable in order to facilitate a wide range of flora and fauna habitat conditions.

- Where trees are to be planted, they must be planted at a minimum rate of 1 tree (40mm cal.) per 50 square metres. The density of shrub plantings, for safety purposes, shall vary depending on the degree of slope. Shrub plantings shall prevent public access on all 2:1 slopes and discourage access on all 3:1 slopes. 100% density equals 1 shrub per square metre, 25% density equals 1 shrub per 4 square metres. The purpose of the bar scale is not to encourage repetitive landscape design but to act as a relative guide to associate shrub plant densities with the appropriate slope.

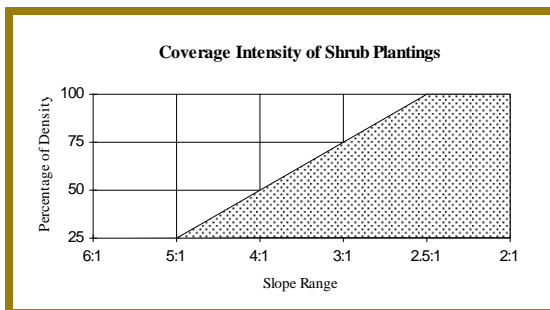


Figure 14.1: Required Density of Shrub Plantings

- Designed pedestrian access areas shall not exceed a maximum slope of 6:1.
- Fencing of stormwater management facilities shall be discouraged; however it may be required as determined by the City.
- Notwithstanding the above criteria in the case of headwall designs, the depth of water related to adjoining side slopes may vary and fencing may be required for safety purposes.

- That in all cases, implementation of these principles shall have regard for approved Watershed, Sub-Watershed and Master Drainage Plans.
- Areas subject to the collection of contaminants or spills shall be fitted with adequate oil/grit separators.

For subdivisions only:

In addition to above requirements the following principles shall apply to subdivisions only:

- That a Landscape Plan of the storm water management facilities be approved by the Manager of Site Development and Customer Services in Community Services Department and the Supervisor of Design and Development in Community Services prior to the registration of the Plan of Subdivision. All landscaping of areas above the 5 year storm level shall be installed at the subdivider's cost, in accordance with the approved plan, during the first planting season after occupancy of the first unit. The remainder of the planting shall commence at such time as required by the Manager of Site Development and Customer Services in Community Services Department and the Supervisor of Design and Development in Community Services. The subdivider shall maintain the planting for a period of one year from the completion of final planting. Landscape plans are to be prepared by an Environmental Professional acceptable to the Municipality. See plant lists at end of chapter.
- In the event that a community trail has been identified and/or required by the City in the vicinity or adjacent to a stormwater management pond, they shall be implemented above the maximum extended detention level or 5 year storm level, which ever is greater, in order to prevent frequent flooding. Trails shall have a minimum width of 3.0m (see Figure 14.5).
- To enhance user comfort and safety, a 3.0m zone on each side of the community trail shall be

designed in such a way that sightlines are preserved. If barriers are required, they must not interfere with visibility or create entrapment areas. In situations where a community trail is designed within the maximum peak flow depth zone, the 3.0m separation above the trail shall have a maximum slope of 3:1. Below the trail, the 3.0m separation shall have a maximum slope of 6:1. This zone shall be planted with low ground covers (see Figure 14.5).

- Deciduous trees should be planted at a minimum distance of 1.5m from the edge of the trail. Maintenance is required to ensure that tree canopies are raised to a minimum of 2.2m and shrubs must be regularly prevented from naturalizing this zone. The planting of coniferous trees within this zone is not permitted.
- Maintenance access requirements are to be determined on a site-by-site basis, however, the following general criteria are recommended. Controlled maintenance access routes shall be provided to both inlet and outlet structures and forebays. A minimum 3.0m wide surface to accommodate maintenance vehicles with a minimum 10m turning radius (inside radius) and a flat 10m loading area is required. Maintenance access routes shall not exceed a maximum slope of 10:1. The design of maintenance routes and loading areas shall be to the approval of the Engineering Division.
- Prior to the City accepting the stormwater management pond as shown on the approved landscape plan, the Subdivider agrees to erect one or more information signs at (a) public access point(s) detailing the purpose of the pond, phone number for further information and any other relevant information, to be approved by the Manager of Site Development and Customer Services in Community Services Department and the Supervisor of Design and Development in Community Services, all at the cost of the Subdivider.

- In order to prevent surcharging of storm sewers upstream, pond inlet inverts shall not be lower than the maximum extended detention level (see Figure 14.6).
- Minimize the number of inlets / forebays to one (1) where possible.

For Site Plans Only:

In addition to initial clauses applying to both subdivisions and site plans the following principles shall apply to site plans only:

- Children's play equipment shall not be permitted within stormwater management facilities.
- Stormwater QUANTITY management strategies can be accommodated within parking areas to a limit of 0.3m in depth.
- Stormwater QUALITY management strategies may be accommodated within parking areas using, for example oil grit for water quality management.
- In cases where stormwater management facilities can not be aesthetically accommodated at grade, underground and roof top storage shall be considered as alternatives.
- Rooftop runoff shall be considered as clean stormwater and shall be infiltrated as appropriate. A geotechnical report with infiltration assessment should accompany site application.

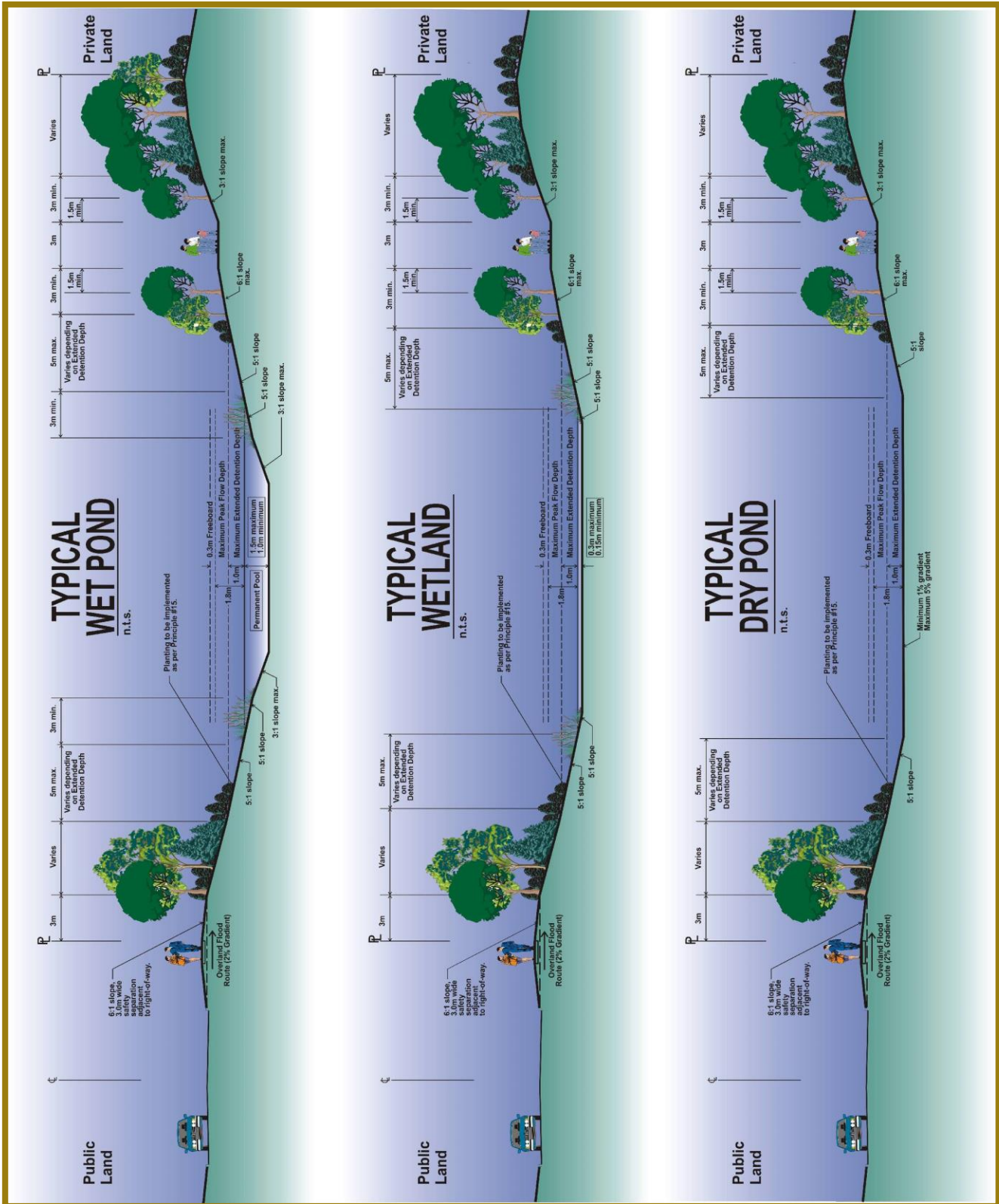


Figure 14.2: Stormwater Management Pond Configuration

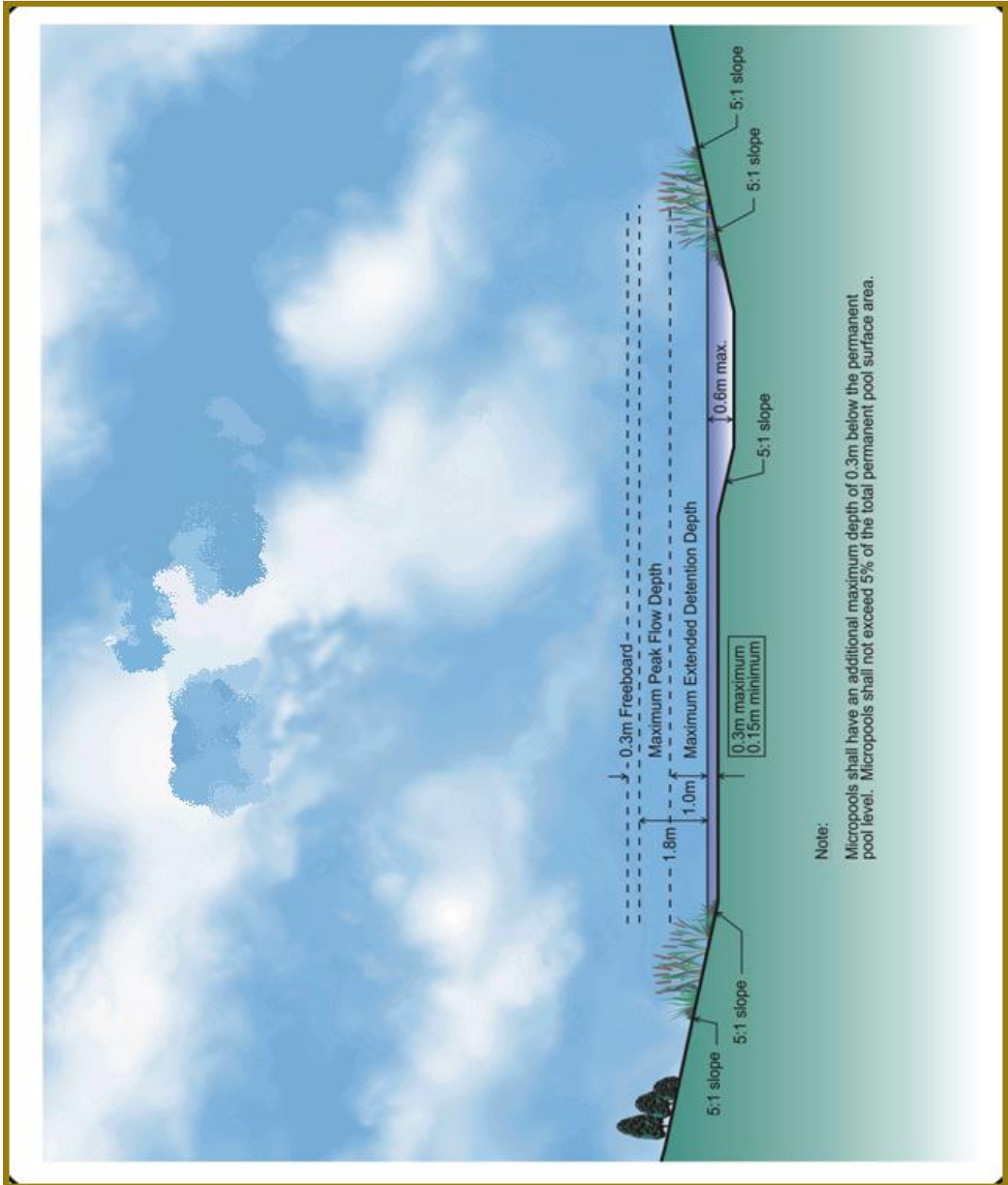


Figure 14.3 Micropool Detail

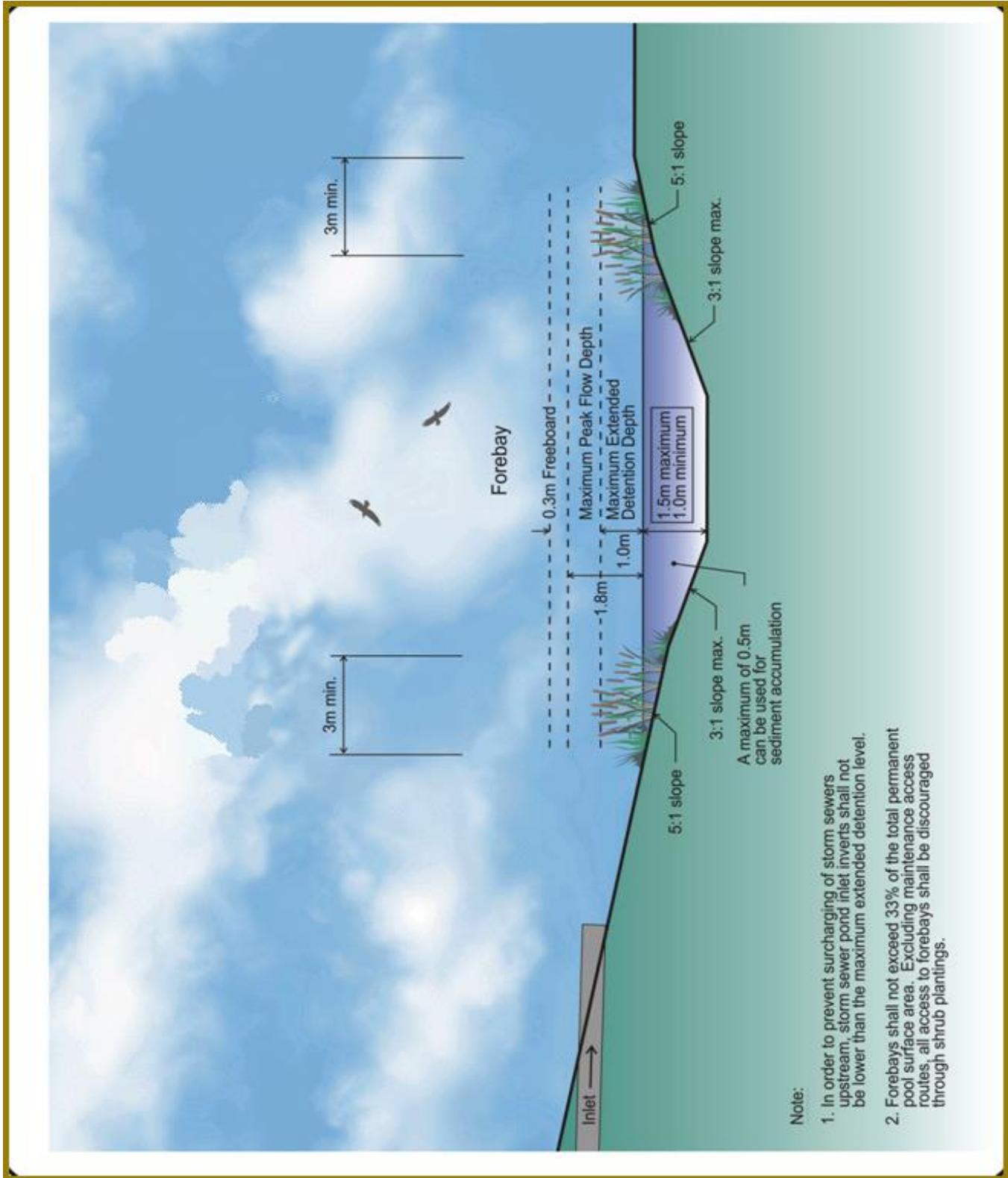


Figure 14.4 Forebay Detail

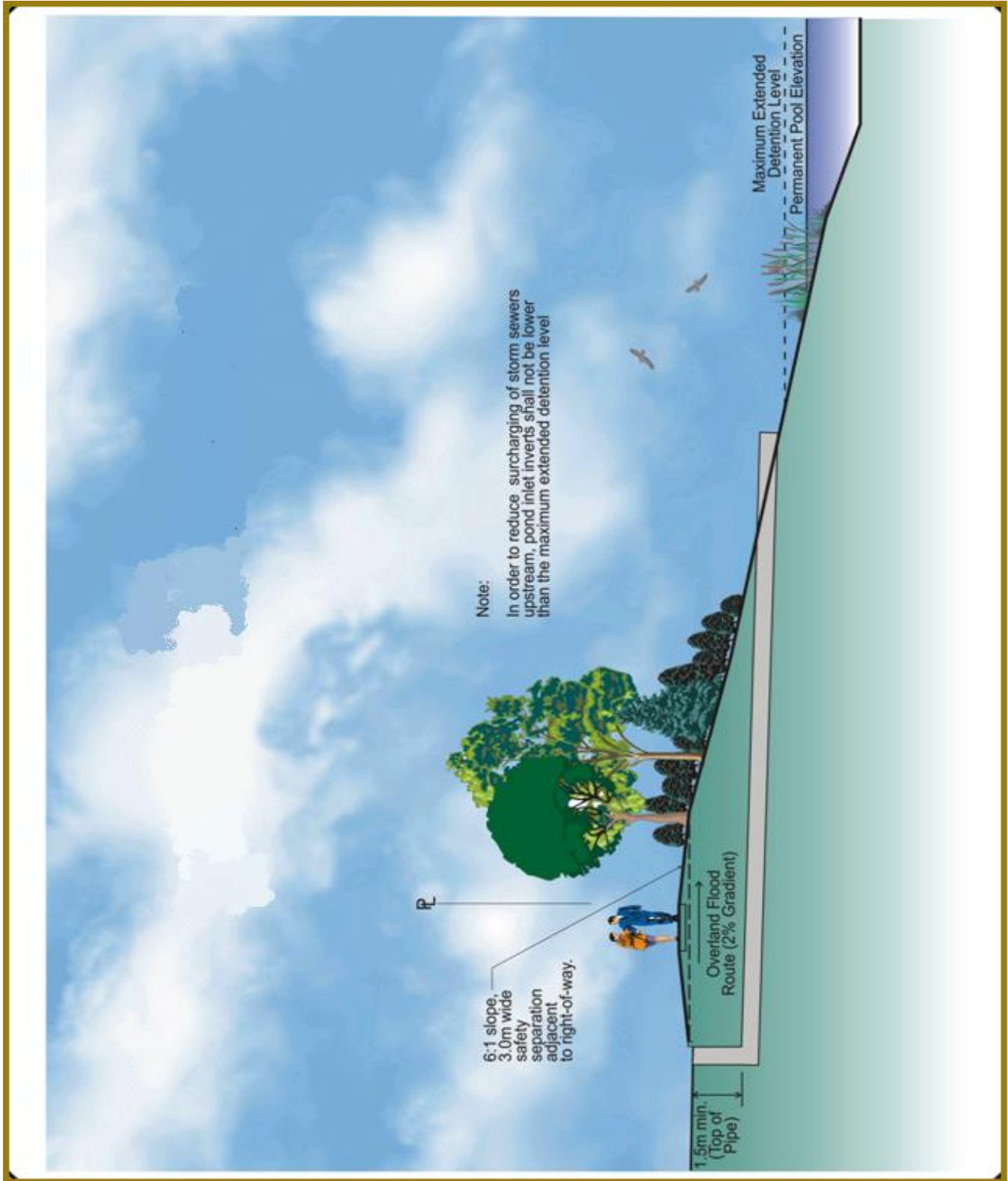


Figure 14.6 Preferred Pond Inlet Detail

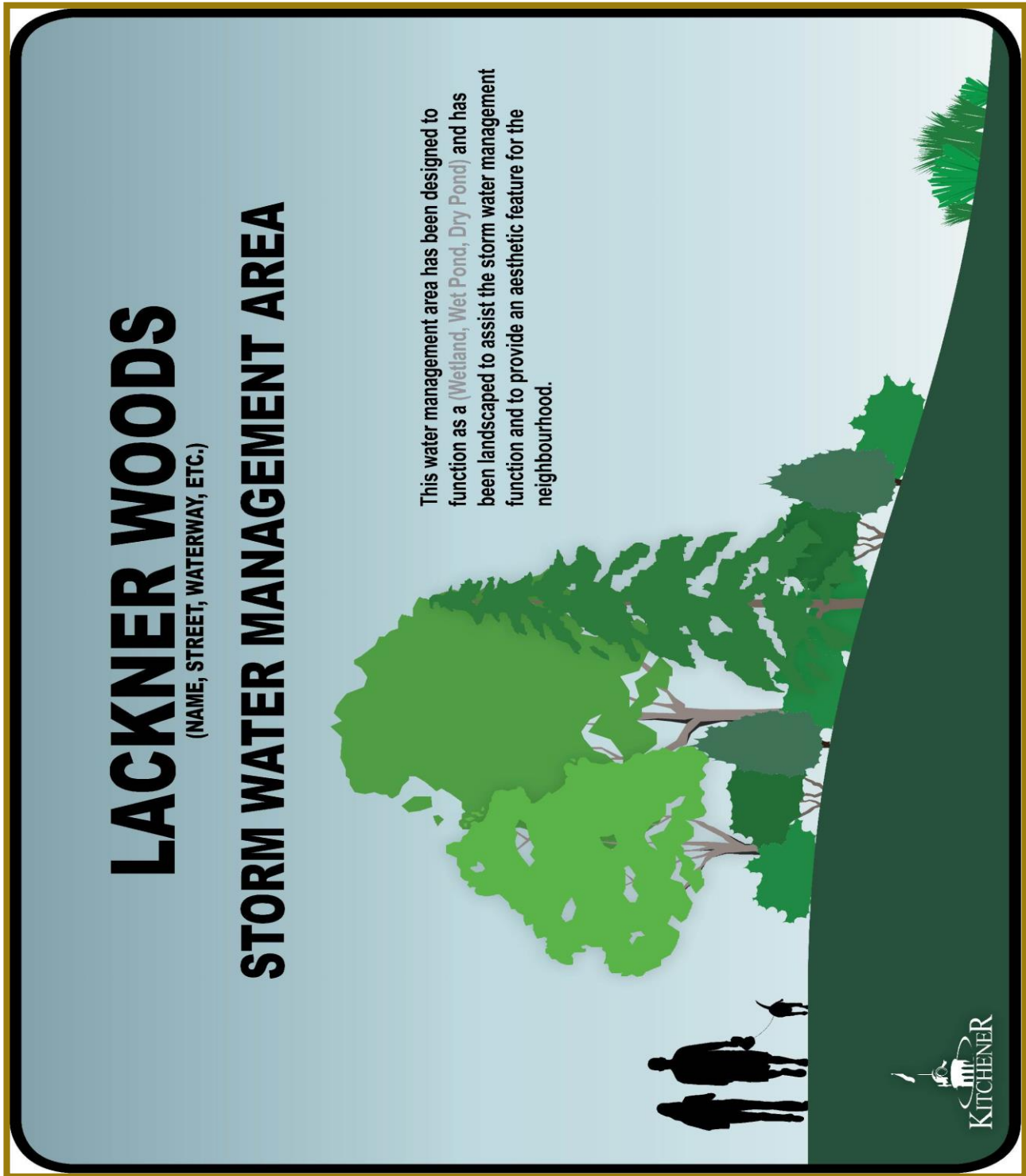


Figure 14.7: Example of Storm Water Pond Signage

Stormwater Management (SWM) Facilities:

SWM facility design should match ecosystems and “ecoregions” (ecosections, Ontario Land Inventory Units). Guelph, Elmira, New Hamburg, and the tri-city area of Kitchener-Waterloo and Cambridge are all located in different “ecoregions”. For example, in Kitchener, SWM wetlands should resemble those in the Borden-Laurentian complex. In fact, seed and plant materials could be selectively taken from those wetlands and used locally. But, for design and construction in Guelph, wetlands in that area would be used.

The plant species listed should be considered as to the performance and functionality of those chosen for a specific site. The amount of planting stock of species we depend upon for shade, erosion control, and filtering should always be greater than that providing colour and food for wildlife.

Native Shrubs and Trees of Waterloo Region:

The committee established for the Stormwater Management Facilities Design Principles supported the general concept of creating a policy to encourage the planting of native shrubs and trees surrounding SWM ponds of Waterloo Region. In doing this, the area’s natural integrity will be preserved and SWM areas will be protected from the general encroachment of alien species.

On April 1, 1992, Regional staff in association with Larry Lamb of the University of Waterloo, prepared a list of native trees and shrubs which could be used as a guide for planting in and around ESPAs. This list can also be used as a guide for plantings in and around SWM ponds. (A list of Invasive Alien species is also provided which should not be planted).

The species making up the preferred list are all indigenous to the Waterloo Region and some are Regionally Significant. Species restricted to the Carolinian Forest Zone have been noted.

Although most Carolinian species are only found in North Dumfries Township some do occur north of this area. Also noted are those species which are found, and should only be used in North Dumfries Township.

For species where the local genotypes are considered relatively pure, it is preferable to use these local genotypes only to avoid importing genetic material from other areas. By using stock which originated in Waterloo Region, the integrity of Regional populations will be preserved. The closest genotype available

should be used for all species unless otherwise indicated.

The desired/required performance of each plant species to be planted or allowed to invade the facility must be considered. Sizes of planting stock, growth rates, and maintenance requirements of species must be compared with desired functions and effects; and, the desired functions must be prioritized. For example, where shading is required as soon as possible to keep water temperatures low, a native fast growing species is preferable. A number of large caliper shade trees could be planted in the appropriate locations. Biodiversity, leaf colour, and blossom would be secondary functions and would be provided by other species possibly planted farther away from the water. Similarly, where erosion control is required, the right species for that job should be planted. In some situations, planting of non-native plants may be necessary to establish cover and native plants with lower performance ratings in erosion control, but higher in terms of biodiversity, wildlife food and cover and aesthetics be included in the overall strategy.

Key to Numbers:

1-Regionally Significant to Waterloo

2-Mainly restricted to Carolinian Forest Zone

3-Use only in North Dumfries Township (removed from following list for Kitchener)

4-Use local genotypes only

SCIENTIFIC NAME COMMON NAME

Trees

Pinaceae

Pine Family

<i>Abies balsamea</i>	Balsam fir 4
<i>Larix laricina</i>	Tamarack
<i>Pinus strobus</i>	Eastern white pine
<i>Picea mariana</i>	Black spruce 1
<i>Tsuga canadensis</i>	Eastern hemlock

Cupressaceae

Cypress Family

<i>Juniperus virginiana</i>	Eastern red cedar 1,2,4
<i>Thuja occidentalis</i>	Eastern white cedar

Salicaceae

Willow Family

<i>Populus balsamifera</i>	Balsam poplar
<i>Populus grandidentata</i>	Largetooth aspen
<i>Populus tremuloides</i>	Trembling aspen
<i>Salix amygdaloides</i>	Peach-leaved willow
<i>Salix bebbiana</i>	Bebbs' willow
<i>Salix discolor</i>	Pussy willow
<i>Salix lucida</i>	Shining willow
<i>Salix nigra</i>	Black willow

Juglandaceae

Walnut Family

<i>Carya cordiformis</i>	Bitternut hickory
<i>Juglans cinerea</i>	Butternut

Betulaceae

Birch Family

<i>Betula lutea</i>	Yellow birch
<i>Betula papyrifera</i>	White birch
<i>Carpinus caroliniana</i>	Blue-beech
<i>Ostrya virginiana</i>	Hop-hornbeam

Fagaceae

Beech Family

<i>Fagus grandifolia</i>	American Beech
<i>Quercus alba</i>	White oak
<i>Quercus macrocarpa</i>	Bur oak
<i>Quercus rubra</i>	Red oak

Ulmaceae

Elm Family

<i>Celtis occidentalis</i>	Hackberry 1,4
<i>Ulmus americana</i>	White elm
<i>Ulmus rubra</i>	Red or Slippery elm
<i>Ulmus thomasii</i>	Rock elm

Hamamelidaceae

Witch-hazel Family

<i>Hamamelis virginiana</i>	Witch hazel
-----------------------------	-------------

SCIENTIFIC NAME

COMMON NAME

Rosaceae

Rose Family

<i>Amelanchier laevis</i>	Smooth juneberry or serviceberry
<i>Amelanchier arborea</i>	Juneberry, serviceberry
<i>Crataegus chrysocarpa</i>	Golden-fruited hawthorn
<i>Crataegus holmesiana</i>	Holmes' hawthorn
<i>Crataegus pruinosa</i>	Frosty hawthorn
<i>Crataegus punctata</i>	Dotted hawthorn
<i>Prunus nigra</i>	Canada plum
<i>Prunus pensylvanica</i>	Pin cherry
<i>Prunus serotina</i>	Black cherry
<i>Prunus virginiana</i>	Chokecherry

Anacardiaceae

Cashew Family

<i>Rhus typhina</i>	Staghorn sumac
---------------------	----------------

Aceraceae

Maple Family

<i>Acer negundo</i>	Box-Elder or Manitoba maple
<i>Acer rubrum</i>	Red maple
<i>Acer saccharinum</i>	Silver maple
<i>Acer saccharum</i> ssp. <i>nigrum</i>	Black maple 4
<i>Acer saccharum</i> ssp. <i>saccharum</i>	Sugar maple
<i>Acer spicatum</i>	Mountain maple

Tiliaceae

Linden Family

<i>Tilia americana</i>	Basswood
------------------------	----------

Cornaceae

Dogwood Family

<i>Cornus alternifolia</i>	Alternate-leaved dogwood
----------------------------	--------------------------

Oleaceae

Olive Family

<i>Fraxinus americana</i>	White ash
<i>Fraxinus nigra</i>	Black ash
<i>Fraxinus pennsylvanica</i>	Red ash, green ash

Caprifoliaceae

Honeysuckle Family

<i>Viburnum lentago</i>	Nannyberry
-------------------------	------------

SCIENTIFIC NAME COMMON NAME

Shrubs

Taxaceae

Taxus canadensis

Cupressaceae

Juniperus communis

Smilacaceae

Smilax hispida

Salicaceae

Salix exigua

Salix myricoides

Salix rigida

Salix pedicellaris

Salix petiolaris

Salix serissima

Betulaceae

Corylus americana

Corylus cornuta

Ranunculaceae

Clematis virginiana

Rosaceae

Aronia melanocarpa

Physocarpus opulifolius

Potentilla fruticosa

Rosa blanda

Rosa carolina

Rosa palustris

Rubus allegheniensis

Rubus canadensis

Rubus idaeus

Rubus occidentalis

Rubus pubescens

Rubus setosus

Spiraea alba

Yew Family

American yew

Cypress Family

Common juniper 1,4

Greenbrier Family

Bristly greenbrier

Willow Family

Sandbar willow

Blue-leaf willow 1

Willow

Bog willow

Slender willow

Autumn willow

Birch Family

Hazelnut, American hazel

Beaked hazel 1

Buttercup Family

Virgin's-bower

Rose Family

Chokeberry

Ninebark

Shrubby cinquefoil

Smooth wild rose

Pasture rose

Swamp rose

Common blackberry

Smooth blackberry

Red raspberry

Black raspberry

Dwarf raspberry

Bristly blackberry

Narrow-leaved

meadowsweet

Rutaceae

Zanthoxylum

americanum

Aquifoliaceae

Ilex verticillata

Nemopanthus

mucronatus

Celastraceae

Celastrus scandens

Euonymus

atropurpurea

Euonymus obovata

Staphyleaceae

Staphylea trifolia

Rhamnaceae

Ceanothus americanus

Rhamnus alnifolia

Vitaceae

Vitis riparia

Thymelaeaceae

Dirca palustris

Cornaceae

Cornus amomum

ssp. *obliqua*

Cornus canadensis

Cornus foemina

ssp. *racemosa*

Cornus rugosa

Cornus stolonifera

Ericaceae

Vaccinium angustifolium

Vaccinium myrtilloides

Rue Family

Prickly ash 1

Holly Family

Winterberry

Mountain holly 1

Bittersweet Family

Climbing Bittersweet

Burning bush 1,2,4

Running strawberry-bush 2

Bladdernut Family

Bladdernut 1

Buckthorn Family

New Jersey tea

Alder-leaved buckthorn

Grape Family

Riverbank grape

Mezereum Family

Leatherwood

Dogwood Family

Silky dogwood

Bunchberry

Grey dogwood

Round-leaved dogwood

Red-osier dogwood

Heath Family

Lowbush blueberry

Velvet-leaved blueberry

SCIENTIFIC NAME COMMON NAME

SCIENTIFIC NAME COMMON NAME

Rubiaceae

Cephalanthus
occidentalis
Mitchella repens

Madder Family

Buttonbush

Partridgeberry

Caprifoliaceae

Diervilla lonicera
Linnaea borealis
Lonicera canadensis
Lonicera dioica
Sambucus canadensis
Sambucus racemosa
ssp. pubens
Symphoricarpos albus
Viburnum acerifolium
Viburnum cassinoides
Viburnum lentago
Viburnum
rafinesquianum
Viburnum trilobum

Honeysuckle Family

Bush-honeysuckle
Twinflower
Fly-honeysuckle
Smooth honeysuckle
Elderberry, Common elder
Red-berried elder

Snowberry
Maple-leaved viburnum
Wild raisin, Witherod1
Nannyberry
Downy arrow-wood

Highbush cranberry

Potamogeton pectinatus Sago Pondweed

Others:

Ceratophyllum demersum	Coontail
Elodea canadensis	Canada Waterweed
Heteranthera dubia	Water Stargrass
Lemna minor	Lesser Duckweed
Lemna trisulca	Star Duckweed
Nuphar variegatum	Yellow or Bullhead Lily
Nymphaea odorata	Fragrant White Waterlily

Emergent Species:

Typha latifolia	Common Cattail
Scirpus pungens	American Bulrush
Sagittaria latifolia	Common Arrowhead
Pontederia cordata	Pickerelweed
Scirpus validus	Softstem Bulrush
Sparganium eurycarpum	Giant Burreed

Aquatic Plant Species List

The following plant species are recommended by MOE for use in stormwater management ponds; not all species are native to Waterloo Region.

Deep Water Areas (1m < depth < 3m)

Pond Weeds:

Potamogeton pectinatus	Sago pondweed
Potamogeton natans	Floating-leaved pondweed
Potamogeton amplifolius	Large-leaved pondweed

Others:

Heteranthera dubia	Water Stargrass
Elodea canadensis	Canada Waterweed
Ceratophyllum demersum	Coontail
Vallisneria americana	Tapegrass

SHALLOW WATER AREAS (< 0.5m)

Pond Weeds:

Potamogeton natans	Floating-leaved pondweed
--------------------	--------------------------

SCIENTIFIC NAME COMMON NAME

Sedges:

Carex pseudocyperus	Cyperus-like Sedge
Carex retrorsa	Retrorse Sedge
Carex utriculata	Beaked Sedge

Shoreline Fringe (near permanent pool)

Hydric Grasses:

Calamagrostis canadensis	Canada Bluejoint
Leersia oryzoides	Rice-cut Grass
Festuca rubra	Red Fescue (non-native)

Others:

Chelone glabra	Turtlehead
Asclepias incarnata	Swamp Milkweed
Verbena hastata	Blue Vervain
Bidens cernua	Nodding Beggarticks
Bidens frondosa	Devil's Beggarticks
Alisma plantago- aquatica	Water-plantain

SCIENTIFIC NAME COMMON NAME

Pond Berming Areas:

<i>Nymphaea odorata</i>	Fragrant White Waterlily
<i>Scirpus pungens</i>	American Bulrush
<i>Scirpus validus</i>	Softstem

Filter Strips:

<i>Festuca rubra</i>	Red Fescue
<i>Agrostis alba</i>	Redtop
<i>Aster novae-angliae</i>	New England Aster
<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i>	Tall White Aster
<i>Aster puniceus</i>	Purple-stemmed Aster
<i>Solidago canadensis</i>	Canada Goldenrod
<i>Solidago rugosa</i>	Rough Goldenrod
<i>Solidago altissima</i>	Tall Goldenrod

The following dependable species should usually be planted in larger quantities:

Trees:

Eastern White Cedar	Red Ash
Eastern White Pine	White Ash
Trembling Aspen	Balsam Poplar
Alternate-leaved Dog-wood	
Sugar Maple	Silver Maple
Peach-leaved Willow	Red Maple
Bebb's Willow	Chokecherry
Bur Oak	Nannyberry
Smooth Serviceberry	

Shrubs and Vines:

Slender Willow	Common Elder
Ninebark	Red-osier Dogwood
Winterberry	Grey Dogwood
Virginia Creeper	Riverbank Grape
Narrow-leaved Meadowsweet	

Aquatic Plants:

Common Cattail	Softstem Bulrush
Sago Pondweed	Common Arrowhead
Water-plantain	Canada Bluejoint
Sedges (<i>Carex stipata</i> , <i>C. pensylvanica</i>)	

INVASIVE SPECIES

The following species are not suitable for restoration and landscaping within and adjacent to Stormwater Management Areas, woodlands and natural areas because they are alien and highly invasive. Other species may be added to this list as their existence as an invasive problem becomes known.

SCIENTIFIC NAME COMMON NAME

Woody Species:

Salicaceae	Willow Family
<i>Populus alba</i>	White Poplar

Betulaceae	Birch Family
<i>Betula pendula</i>	European birch

Berberidaceae	Barberry Family
<i>Berberis</i> spp.	Barberry species

Rosaceae	Rose Family
<i>Rosa multiflora</i>	Multiflora rose

Leguminosae	Pea Family
<i>Pueraria lobata</i>	Kudzu

Celastraceae	Bittersweet Family
<i>Celastrus orbiculata</i>	Oriental Bittersweet

Aceraceae	Maple Family
<i>Acer platanoides</i>	Norway Maple
<i>Acer pseudoplatanus</i>	Sycamore maple

Rhamnaceae	Buckthorn Family
<i>Rhamnus cathartica</i>	Common Buckthorn
<i>Rhamnus frangula</i>	Glossy Buckthorn

Vitaceae	Grape or Vine Family
<i>Ampelopsis</i> <i>brevipedunculata</i>	Porcelainberry

Elaeagnaceae	Oleaster Family
<i>Elaeagnus angustifolia</i>	Russian-olive
SCIENTIFIC NAME	COMMON NAME

Elaeagnus umbellata	Autumn-olive	SCIENTIFIC NAME	COMMON NAME
Caprifoliaceae	Honeysuckle Family	Euphorbiaceae	Spurge Family
Lonicera japonica	Japanese honeysuckle	Euphorbia cyparissias	Cypress spurge
Lonicera tatarica	Tartarian honeysuckle	Euphorbia esula	Leafy spurge
Viburnum opulus	Gelder-rose (or European Highbush cranberry)	Balsaminaceae	Touch-me-not Family
		Impatiens glandulifera	Pink Touch-me-not
Herbaceous Species:		Malvaceae	Mallow Family
Gramineae	Grass Family	Malva moschata	Musk mallow
Miscanthus sinensis	Feather grass	Violaceae	Violet Family
Phragmites australis	Common Reed	Viola odorata	Sweet violet
Liliaceae	Lily Family	Lythraceae	Loosestrife Family
Convallaria majallis	Lily-of-the-valley	Lythrum salicaria	Purple Loosestrife
Hemerocallis spp.	Daylily	Umbelliferae	Carrot or Parsley Family
Iridaceae	Iris Family	Aegopodium podagraria	Goutweed
Iris pseudacorus	Yellow Flag	Pastinaca sativa	Wild parsnip
Polygonaceae	Buckwheat Family	Primulaceae	Primrose Family
Polygonum cuspidatum	Japanese Knotweed	Lysimachia nummularia	Moneywort
Papaveraceae	Poppy Family	Apocynaceae	Dogbane Family
Chelidonium majus	Greater Celandine	Vinca minor	Periwinkle
Cruciferae	Mustard Family	Boraginaceae	Borage Family
Alliaria petiolata	Garlic mustard	Myosotis scorpioides	True Forget-me-not
Cheiranthus cheiri	Wallflower	Labiatae	Mint Family
Hesperis matronalis	Dame's rocket	Ajuga reptans	Bugleweed
Leguminosae	Pea Family	Glechoma hederacea	Ground-ivy
Coronilla varia	Crownvetch	Rubiaceae	Madder Family
Lotus corniculatus	Birdsfoot-trefoil	Galium mollugo	Wild madder
Lathyrus latifolius	Everlasting or perennial pea	Campanulaceae	Bluebell Family
Melilotus alba	White sweet clover	Campanula rapunculoides	Creeping bellflower
Melilotus officinalis	Yellow sweet clover	Compositae	Aster Family
Trifolium hybridum	Alsike clover	Achillea millefolium	Common yarrow
Trifolium pratense	Red clover	Centaurea maculosa	Spotted Knapweed
Trifolium repens	White clover		
Vicia cracca	Tufted-vetch		

SCIENTIFIC NAME COMMON NAME

Chrysanthemum leucanthemum	Ox-eye daisy
Senecio jacobaea	Stinking willie
Tanacetum vulgare	Tansy
Tussilago farfara	Coltsfoot

Native Trees and Shrubs of the Waterloo Region NOT Suitable for General Use in Natural Areas:

The following native species are not recommended for general use as they are highly restricted to specific habitats in the Waterloo Region. They should be planted only in the immediate vicinity of areas where they now exist or have been reliably documented in the past. This list has been adapted from lists authored by the Region of Waterloo and the Federation of Ontario Naturalists.

Key to Numbers:

- 1-Regionally Significant to Waterloo
- 2-Mainly restricted to Carolinian Forest Zone
- 3-Use only in North Dumfries Township (removed from following list for Kitchener)
- 4-Use local genotypes only

SCIENTIFIC NAME COMMON NAME

Trees:

Pinaceae	Pine Family
Picea glauca	White spruce 1
Betulaceae	Birch Family
Alnus incana ssp. rugosa	Speckled Alder 4
Betula populifolia	Grey birch1
Fagaceae	Beech Family
Quercus ellipsoidalis	Hill's oak 1,4
Rosaceae	Rose Family
Sorbus americana	Mountain-ash

Shrubs:

Myricaceae	Bayberry Family
Comptonia peregrina	Sweet-fern 1
Myrica gale	Sweet gale 1
Betulaceae	Birch Family

Betula pumila	Swamp birch 1
Rosaceae	Rose Family
Amelanchier humilis	Service-, Juneberry
Amelanchier sanguinea	Dwarf Juneberry
Amelanchier spicata var. stolonifera	Serviceberry 1
Rubus flagellaris	Northern dewberry
Rubus hispidus	Swamp dewberry
Rubus odoratus	Purple-flowering raspberry 1

Anacardiaceae	Cashew Family
Rhus aromatica	Fragrant sumac 1

Elaeagnaceae	Oleaster Family
Shepherdia canadensis	Soapberry 1

Araliaceae	Ginseng Family
Aralia hispida	Bristly sarsaparilla 1

Pyrolaceae	Wintergreen Family
Chimaphila umbellata	Pipsissewa 1,3

Ericaceae	Heath Family
Andromeda polifolia ssp. glaucophylla	Bog-rosemary 1,4

Arctostaphylos uva-ursi	Bearberry 4
Chamaedaphne calyculata	Leatherleaf 4
Epigaea repens	Trailing arbutus 1,4
Gaultheria hispidula	Creeping snowberry 1,4
Gaultheria procumbens	Wintergreen 4
Gaylussacia baccata	Black huckleberry 4
Kalmia polifolia	Bog-laurel
Ledum groenlandicum	Labrador-tea 1,4
Vaccinium corymbosum	High-bush blueberry 1,4
Vaccinium macrocarpon	Large cranberry 1,4
Vaccinium oxycoccos	Small cranberry 1,4
Vaccinium pallidum	Dryland blueberry 4

Caprifoliaceae	Honeysuckle Family
Lonicera hirsuta	Hairy honeysuckle 1,4
Lonicera oblongifolia	Swamp fly-honeysuckle 1,4
Viburnum alnifolium	Hobble-bush 1,4