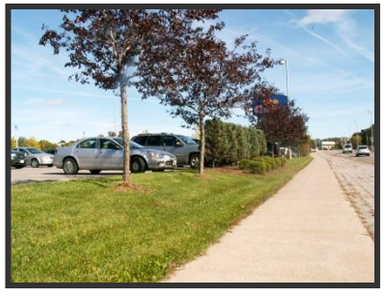
City of Sault Ste. Marie

Planning Division



Sustainable Site Plan Guidelines

For commercial and institutional developments.

Approved by Council: September 12, 2011

Sustainable Site Plan Guidelines

For Commercial and Institutional Developments.

Introduction

The following is a guideline for the sustainable development of commercial and institutional sites. The guideline was developed, with input from:

- Other municipalities
- City departments and agencies
- Public open house
- Planning Advisory Committee
- Municipal Environmental Initiatives Committee

Purpose

The concept of sustainability includes economic, environmental, social and health elements. This guide serves to better the environmental, social and public health aspects of commercial and institutional sites to complement the economic investment of new developments and to create sites that befit our "Naturally Gifted" Community. This guideline provides a sustainable approach to efficient site layout, drainage, landscaping, accessibility, pedestrian, transit and age-friendly design.

Guideline Contents

The guideline is divided into eight categories derived from those parts of Section 41 of the *Planning Act* concerned with the approval of site plans. These categories and their corresponding sections of the *Planning Act* are:

- Building and Site Layout; 4 (1, 2)
- Roads, Access Points and Directional Signage; 7 (1, 2)
- Parking; 7 (3)
- Pedestrian, Cycling and Barrier-Free Design; 7 (4, 4.1)
- Lighting; 7 (5)
- Landscaping; 7 (6)
- Refuse Areas; 7 (7)
- Stormwater Management; 7 (8, 9)

Summary of Site Plan Control Application Process

New Site Plan Applications shall be reviewed to ensure consistency with this guideline. New development will be expected to incorporate the design elements outlined in this guideline, or similar measures to address sustainable site design. The Site Plan Application process requires the following separate drawings:

- Site Plan
- Landscape Plan with planting details
- Building Elevation Plan
- Stormwater Management/Servicing Plan

Applications submitted that do not include the above-mentioned plans will be considered incomplete and will not be reviewed. Pre-application consultation is required. The Site Plan review process generally takes 3 to 6 weeks, based on a complete application. This does not include any review or approvals required by the Ministry of Environment with respect to on-site stormwater management. Appendix A contains a flow chart of the Site Plan Control process. Where development requires that a Site Plan Agreement be formalized, no building permit applications can be reviewed and no permits can be issued until such agreement has been finalized.

General Official Plan Policies Relating to Sustainable Site Design

The City's Official Plan supports the provision of sustainable site design. The following general policies shall guide future development in the Community.

- The City shall continue to develop and promote itself as an attractive, clean, culturally rich, friendly and safe community.
- Design streets, places and facilities to be safe, active and accessible to all.
- Utilize ecologically based planning methods and procedures.
- Develop the physical form of the community to be environmentally sustainable, functionally efficient and aesthetically pleasing.

Interpretation

This Guideline is meant to be read in its entirety, and in conjunction with the City's Official Plan & Zoning By-law. Site Design must also consider other applicable City regulations including, but not limited to, the Streets By-law (2008-131), Sewer By-law (2009-50), Signs By-law (2005-166), the Ontario Building Code, etc., or any other applicable laws or regulations.

1. Building and Site Layout

The layout of the built environment has a large impact on the overall health of community residents. A built environment that supports and encourages active (walking and cycling) and public (transit) transportation can lead to developments that support healthy lifestyles, and that are more environmentally sustainable. New development should also occur in a manner that enhances the streetscape and facilitates future intensification opportunities.

Official Plan Policies:

- Human scale compatibility with surrounding development shall be encouraged
- A high standard of site design shall be promoted in strategic or prominent locations, i.e. along major arterials.
- The visual quality of visitor access corridors should be enhanced. Front yard landscaping and landscaped buffers should be provided to separate and visually screen parking areas from the street and abutting properties.

1.01 Orient the front facade to face the public street and locate front doors to be visible, and directly accessible, from the public street.

The front doors and the front facades of these buildings face and enhance the streetscape.

1.02 Locate buildings close to each other and along the front of the street to encourage ease of walking between buildings and to public transit. For large developments that require on-site transit service, coordinate the location and integration of transit stops and shelters early in the design process to ensure sufficient space and adequate design.

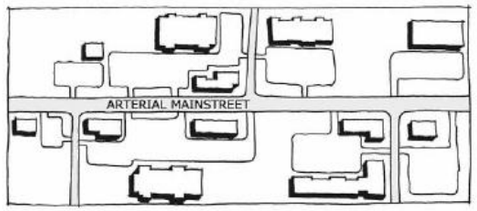
New buildings should not exceed minimum Zoning setbacks for the front and exterior yards, in order to define the street edge and create pedestrian scale streetscapes.

Density and location of buildings create a streetscape and encourage public transit and pedestrian travel

Parking located behind buildings

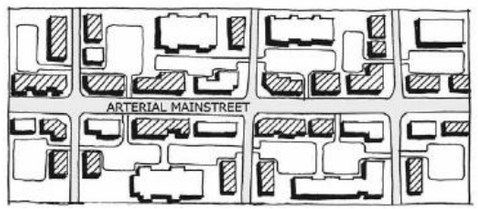
1.03 Base new and adjoining developments on an internal circulation pattern that allows logical movement throughout the site that will accommodate, and not preclude, intensification over time. Design the internal circulation pattern with direct connections to the surrounding streets.

Before



Internal access roads are logical connections to and from the mainstreet and support future intensification.

After



1.04 Use buildings, landscaping and other streetscape elements to create continuous streetscapes.

1.05 Plan the site to include areas for temporary snow storage, if needed, without conflicting with site circulation, landscaping, required parking and accessible walkways.

1.06 Locate and design ground-mounted and wall-mounted signs to complement the character and scale of the building and area. Integrate landscape features with ground-mounted signs.

1.07 Consolidate signage on properties with multiple uses.

1.08 Design signage to adhere to Signage By-law.

2. Roads, Access Points and Directional Signage

The goal of new developments shall be to enhance connections that link a development site to public transit, roads and pedestrian walkways. Vehicular access and internal site circulation must be complementary to pedestrian, cycling and transit access.

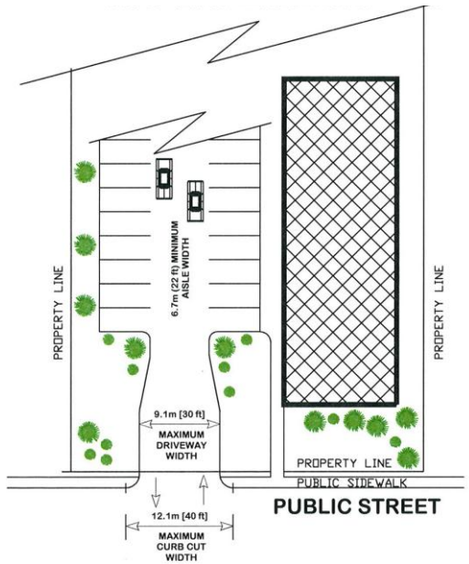
Official Plan Policies:

- Site design shall consider the impact on street functions and pedestrian, cycling and vehicular access.
- Alternative transportation and energy efficient forms of transportation such as public transit, cycling and walking shall be supported.
- Shared driveways and direct vehicular access between commercial uses shall be encouraged.
- Ensure layout of the parking lots and adjacent buildings will accommodate future connections to adjoining properties.

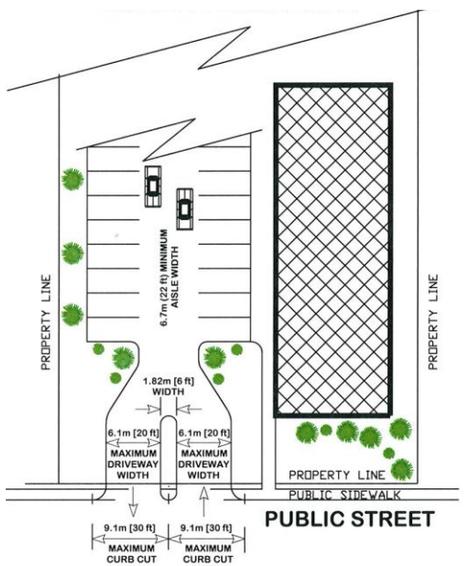
2.01 Design and locate internal roads and parking lots to minimize the number of vehicle crossings over primary pedestrian routes.

2.02 Limit number of individual access points directly onto major arterials and encourage shared access between abutting uses to allow for the circulation of vehicles between sites. Provide access to parking lots from secondary streets whenever possible.

2.03 Minimize the width of access driveways. For two way driveways, the maximum allowed width is 9.1 m (30 ft) measured perpendicular to the centre line of driveway at street line. At the street, the maximum allowed width of a curb cut is 12.1 m (40 ft). (If the distance from the sidewalk to the roadway is greater than 3 m (10 ft) this dimension may be increased at the discretion of the Commissioner of Engineering and Planning to provide a deceleration area).



For one way driveways (including each half of a divided driveway), the above dimensions shall be reduced by 3.0 m (10 ft) (Sault Ste. Marie, Streets By-law).



2.04 Locate vehicular access points to the sites as far away as possible from street intersections or any other adjoining driveways.

2.05 Curb returns may be allowed, depending on traffic volumes, subject to the approval of the Commissioner of Public Works and Transportation. Flaring of curb-ramps is not permitted.

2.06 Define street access driveways and internal vehicle routes with curbed landscaped areas, tree planting and lighting.

2.07 For uses with drive-through facilities, locate the start point to the stacking lane in a manner that queued vehicles do not block traffic along the public streets, sidewalks, or the movement of pedestrians or other vehicles on site. Locate stacking lanes away from adjacent sensitive uses, such as residential and outdoor amenity areas, to reduce the impacts of noise and pollution that could be caused by stacking cars. Use landscaping and fencing to help buffer the impacts of idling vehicles.

2.08 Where circulation routes require wider driveways and turning radii (i.e. fire lanes, service areas), coordinate the location of these routes with major drive aisles.

2.09 For car washes, allow a sufficient driving distance from the car wash exit to the public street to minimize tracking water onto the street during winter conditions.

2.10 External and internal directional signage, when needed, shall be shown on a separate plan and reviewed as part of the Site Plan Application process.

3. Parking

Parking design should consider urban heat island and stormwater run off effects, while providing a visually pleasing environment.

Official Plan Policies:

- Rather than one extensive parking area, have several smaller-sized parking areas defined by landscaping and pedestrian amenities.

3.01 Where possible, locate parking lots to the rear or side of buildings and minimize parking between the public right-of-way and the front and exterior side facade of the building. Orient parking to accommodate future intensification.

3.02 Provide only the minimum number of parking spaces required in the Zoning By-law to support the use in an effort to reduce the surface parking area.

3.03 Divide larger parking lots both visually and functionally into smaller parking areas.

3.04 For developments with multiple phases, parking areas should be constructed incrementally to match land use build-out schedules. Areas not required for parking and interim parking should be landscaped or remain in a natural state.

3.05 Shopping cart corrals are encouraged to extend the width of two parking rows and incorporate landscaping to buffer adjacent parking spaces.

3.06 Limit the use of dark, impervious surfaces within the parking lot: use light-coloured materials, such as concrete or light-coloured pavers to reduce surface temperatures and contribution to the urban heat island effect.

3.07 Reserve sufficient and correctly sized parking spaces for barrier-free access as per the Zoning By-law.

4. Pedestrian, Cycling and Barrier-Free Design

In order to create an environment that encourages healthy, alternative modes of travel, site design should account for accessible, safe, and clearly defined pathways for walking, cycling and wheelchair use, that do not conflict with vehicular traffic.

Official Plan Policies:

- The physical form of the community shall be friendly and accessible to all users and development shall respect and reinforce the human scale.
- Public Transit and pedestrian travel shall be promoted in new development through the creation of pedestrian-friendly environments. New developments shall provide walking facilities to separate pedestrian and vehicular travel, and ensure reasonable walking distances to transit stops.
- For all new development and redevelopment, accessibility parking will be provided in accordance with the requirements of the City of Sault Ste. Marie's Comprehensive Zoning By-law.
- All new development sites shall be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

4.01 Design pedestrian connections that are convenient, comfortable, safe, easily navigable, continuous and barrier-free, and that lead directly to and from the building entrances to public sidewalks and transit stops.

A walkway provides a safe pedestrian connection through a parking lot

4.02 Distinguish walkways from driving surfaces by using varied paving treatments that differ from asphalt, such as concrete or paving stone.

Pedestrian walkways enhance safety for crossing driveways

4.03 Provide unobstructed pedestrian walkways that are a minimum of 1.5 m (5') wide along any façade with a customer entrance, along any façade adjacent to parking areas, and between the primary entrance and the public sidewalk. Provide additional width and elevation where doors swing out and car bumpers can potentially interfere with the walkway.

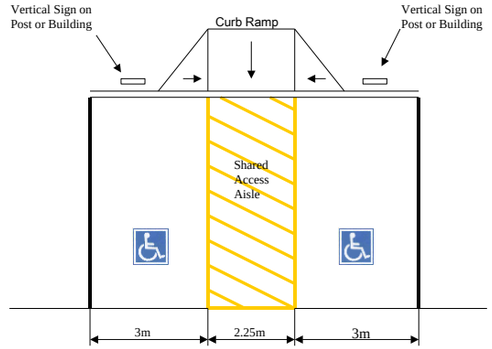
4.04 Provide an unobstructed 1.5 m (5') wide sidewalk in the public right-of-way across private access driveways. Ensure little or no elevation change.

Enhanced pedestrian crosswalk across private access driveway

4.05 Provide convenient bicycle parking that is close to building entrances, protected from the weather, visible from the interior of the building and that does not impede the movement of pedestrians.

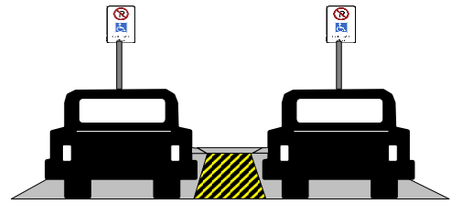
Accessible Sites

4.06 Barrier-Free parking shall be clearly marked with a sign that is visible during all times of the year, in accordance with the Highway Traffic Act. Minimum dimensions of a barrier-free parking space shall be 3m by 5.8m (9.8'x19') with a 2.25m (7.4') wide access aisle between or adjacent to each barrier-free space.



4.07 Barrier-free parking spaces shall be close and accessible to the main entrance of the building.

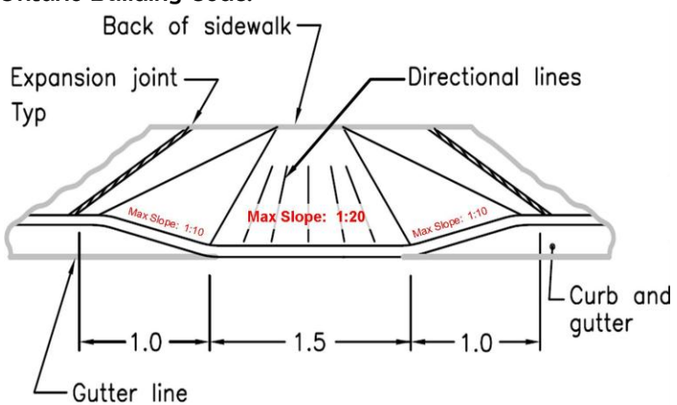
4.08 Wherever possible, barrier-free parking spaces shall be located so that users do not have to cross traffic, driveways, or aisle ways, when travelling from the parking stall to the entrance of the building.



4.09 Required Barrier-free Parking Spaces
The following barrier-free parking spaces shall be provided as part of the overall parking requirements, as outlined in Section 5 of Sault Ste. Marie's Zoning By-law 2005-150.

Number of Required Parking Spaces	Minimum Number of Required Barrier-free Parking Spaces
0-5	1- such space need not be marked as a barrier-free parking space, however it must be dimensioned at 5.0m by 5.8m
6-10	1
11-35	2
36-50	3
Greater than 50	3 + 1 barrier-free space shall be supplied for every additional 50 required parking spaces, or part thereof.

4.10 Curbing and abrupt grade differences shall be discouraged, resulting in one continuous grade, from parking lot through to the inside of the building. Where curbing or abrupt grade separations are necessary, barrier-free ramping with a maximum slope of 1:20 and a minimum width of 1.5 m (5') will be required. Where space limitations exist, alternate ramping solutions may be accepted in accordance with the Ontario Building Code.



RAMP ELEVATION

4.11 All barrier free paths of travel and parking shall be located so that snow storage, parked vehicles, goods on display, garbage receptacles, etc. do not block access to such features.

4.12 For large development sites, provide a pedestrian drop off/pick up area within close proximity of the main entrance(s).

5. Lighting

Opportunities to establish sustainable sites can be achieved through the provision of energy efficient lighting. Lighting is a significant contributor to the overall energy consumption of new developments. Using energy efficient fixtures, as well as a coordinated lighting approach, can add both to the aesthetic value of a development and reduce overall energy use.

Official Plan Policies:

- The use of energy efficient development standards shall be encouraged in all new development.

5.01 Consider a comprehensive lighting plan for the site which demonstrates lighting levels, as well as the type of fixtures and efficiency levels. Consider lighting elements which add aesthetic value to the development and enhance the streetscape.


Pedestrian Light


Parking lot light


Building entrance light


A coordinated lighting scheme

5.02 Lighting shall be directed downward and not spill over onto surrounding properties. Light poles should usually be no higher than the proposed building(s).

5.03 Provide pedestrian-scaled lighting such as bollards or lower-scale pole lights to define pedestrian pathways.

5.04 Proposed luminaries locations, aiming angles, minimum and average lighting levels shall be shown on a separate plan as part of the Site Plan review.

A pedestrian pathway defined and lit with appropriately-scaled fixtures

6. Landscaping

Trees and other plants help cool the environment, making vegetation a simple and effective way to reduce urban heat islands. Vegetation and landscaped areas also reduces stormwater runoff and improves water quality by absorbing and filtering rainwater. The incorporation of trees and landscaped areas as part of new developments provide both positive environmental impacts and is consistent with the City's "Naturally Gifted" character.

Official Plan Policies:

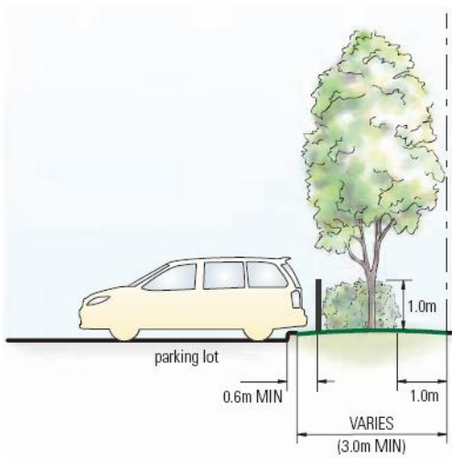
- Maintain and reinforce natural features such as wooded areas within or next to development sites.
- Maintain existing trees. Tree planting shall be required for new development and encouraged in existing developments.
- Front and exterior yard and internal landscaping and landscaped buffers shall be provided. Outdoor storage, service, refuse and parking areas shall be visually screened.

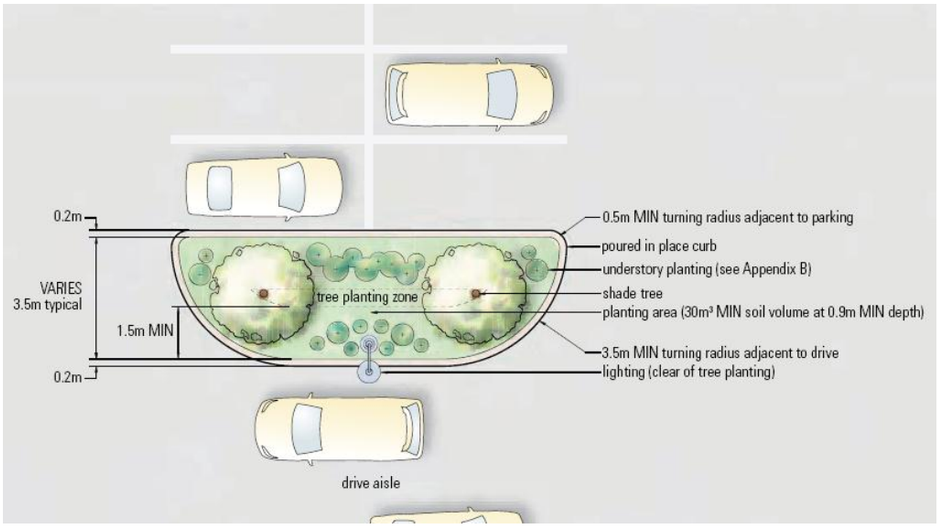
6.01 Utilize a combination of shade trees, shrubs and permeable landscaped areas and where possible, light coloured hard surfaces to help reduce urban heat and to create a more comfortable microclimate.

6.02 Parking lots within new developments will include 1 shade tree (minimum crown size upon maturity of 100 m^2) for every 12 parking spaces, and planted in a manner to maximize shading of the parking surface. Existing developments are encouraged to comply with tree shading requirements when general parking lot improvements are completed. As part of Site Plan submissions, Landscape plans will be required showing the types of plants and materials to be used as part of the development. (Please refer to the Sustainable Sites Tree Species list)

6.03 Divide large parking areas into smaller and well-defined sections using soft and hard landscaping in order to minimize the amount of paved areas and define vehicular and pedestrian routes, and to provide areas for tree shading requirements. Soft landscaped areas include islands, medians, bio-retention areas and other consolidated planting areas.

6.04 To ensure proper growing conditions, trees are to be planted in areas with access to at least 9m^2 of permeable landscaped area with good quality soil. Trees should be planted at least 1.5m from curbs, sidewalks, driveways and other hard surfaces to buffer from stress caused by salt, snow piling, vehicle overhang and compacted soils. Ensure appropriate separation of tree roots away from underground services.





6.05 Select plant material that is suitable to the growing environment of the parking lot: use species (native and non-native) that are hardy, drought- and salt-tolerant, and resistant to the stresses of compacted soils and weather exposure.

6.06 Incorporate a variety of deciduous and coniferous trees and shrubs for year-round interest, texture, shape and seasonal colour. Avoid planting invasive species and monocultures which can be susceptible to disease. If more than 10 trees are required, no more than 50% of the trees may be of the same type. The City encourages the use of native species where ever possible.

Seasonal variety with trees and understory planting

6.07 Minimum acceptable sizes for plant materials at time of initial planting are:

- Deciduous Trees: 50 mm caliper; 2 to 3 metres in height
- Coniferous Trees: 1.5 meter height
- Shrubs: 60 cm high

6.08 Provide continuous medians for every 3 banks of parking to accommodate pedestrian pathways, lighting, shade trees or other landscaping. A "bank" of parking consists of 2 parking rows and a drive aisle.

Screening

6.09 Provide the required landscape area along the edge of a site and use ornamental or coniferous trees, shrubs and low walls to screen parking areas from view while allowing eye level visibility into the site, and maintain required site triangles. Edge treatments along streets and other public spaces should visually screen parked vehicles, but not completely obstruct views into and out of the parking lot for the purpose of supporting pedestrian and vehicular safety and security.

6.10 Enclose all on-site utility equipment, service and garbage areas within buildings or provide screening using landscaping and enclosures from both the public street and private properties and ensure that noise is attenuated. This includes utility boxes, garbage and recycling container storage, loading docks and ramps and air conditioner compressors.

Decorative wall and landscaping screens the loading area from street view

This building is designed with an internal service area

7. Refuse Areas

The functional necessity of refuse areas need not diminish site aesthetics. In addition to landscaped screening, proper building materials can screen refuse containers and visually blend the refuse area with the rest of the site.

7.01 Design aesthetically pleasing garbage enclosures, utilizing decorative fencing or walls to ensure that refuse containers are completely concealed.

8. Stormwater Management

Traditionally, stormwater on development sites has been managed using civil engineering methods to maintain pre-development stormwater flow levels off of the site and direct it to the municipal stormwater facilities (i.e. storm sewers, waste water treatment facilities). This places a burden on the municipal storm water system. Although traditional engineering methods are required to manage stormwater, these methods can be augmented using natural vegetation to absorb and filter stormwater and reduce the amount of water entering into the municipal stormwater system or being discharged into the natural environment. Using a combination of vegetative stormwater management controls can help mimic pre-development drainage patterns while lessoning the strain on the municipal stormwater system.

Official Plan Policies:

- New developments will be required to minimize their impact on the Municipality's stormwater management system by incorporating vegetative stormwater management measures to limit the amount of stormwater entering the municipal service system.

8.01 Minimize the extent of impermeable surfaces within the parking lot by utilizing a combination of landscaped areas and vegetative stormwater management controls such as bio-retention areas, bio-swales and vegetated retention ponds to assist in the collection and treatment of stormwater run-off. These measures coupled with other approaches such as limiting the size and number of parking spaces to the required minimums stated in the Zoning By-law; limiting the width of drive aisles; and looking for opportunities to share access routes, will assist in limiting the amount of impermeable surfaces on site.

Bio-retention areas can be situated adjacent to parking areas to collect stormwater runoff and encourage infiltration

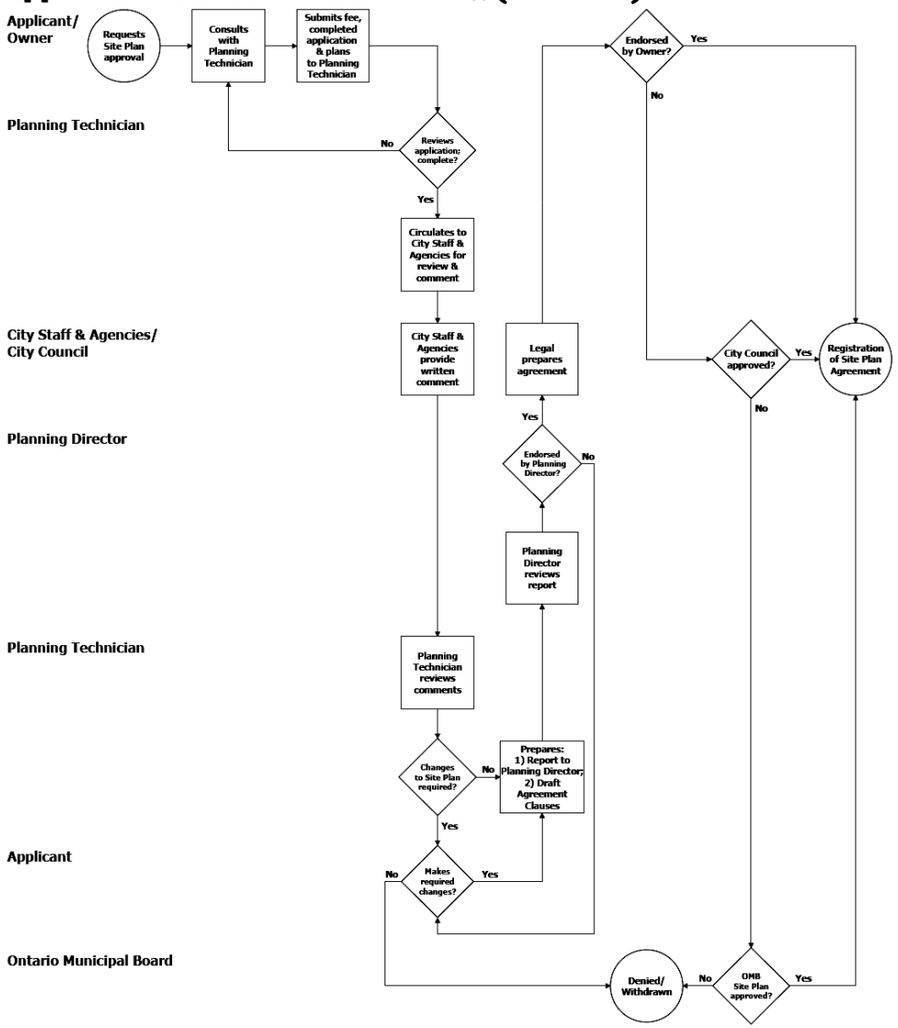
8.02 Apply a cross-grade for paved surfaces as low as 1 to 2% to encourage slower stormwater flow and slope surfaces to direct stormwater toward vegetative stormwater control areas.

Paved areas are sloped towards vegetative stormwater control area

8.03 Although the design of stormwater management areas should be site specific, consider the following: select plant species that are tolerant of extreme conditions, such as flooding, drought, salt and other contaminants; provide a planting medium, composed of good quality soil, with a minimum depth of 0.6m and at least 0.9m depth if trees are planted; plant trees above grade from ponding areas and clear of stormwater flow; ensure that any surface water is fully drained within 48 hours or less; use poured in place curbs with cuts for water inlets; include a perforated subdrain, check dams and overflow catchbasins as required to manage excess water. For stormwater analysis, use the 1 in 100 year storm measure.

Bioswale incorporated into landscaped area within parking. Curb cuts allow water to enter into bioswale area

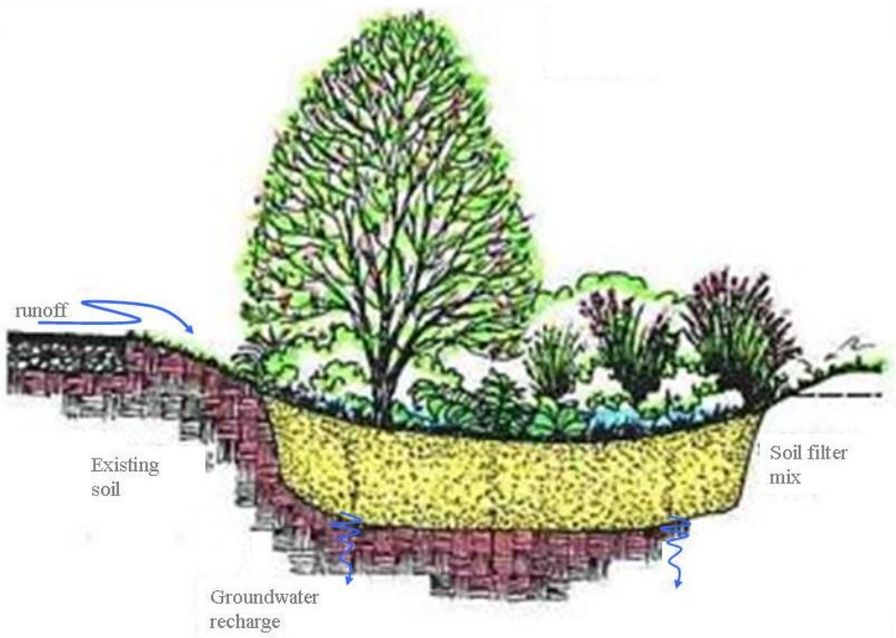
Appendix A: Site Plan Control Process (Section 41)



Appendix B: Examples of Vegetative Stormwater Management Measures

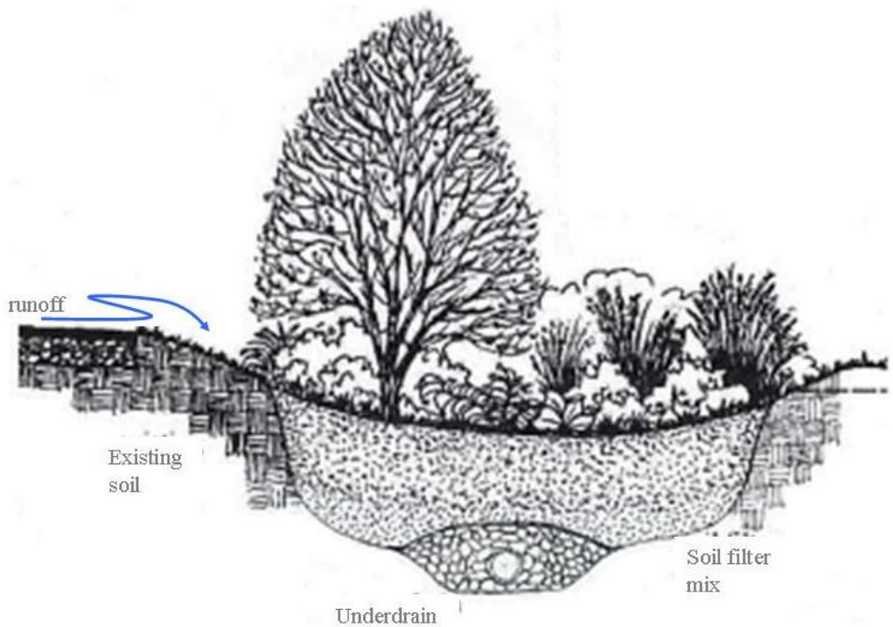
BIORETENTION AREA: Example: Infiltration/Recharge Facility

This type of facility is recommended for areas where high recharge of groundwater would be beneficial. Because there is no underdrain, the in situ soils need to have a high infiltration rate to accommodate the inflow levels. The infiltration rate of the in situ soils must be determined through proper soil testing. Preferably, facilities of this type should have infiltration rates of 1 inch/hour or greater. Facilities must be at least 2.5 feet deep to allow adequate filtration processes to occur.



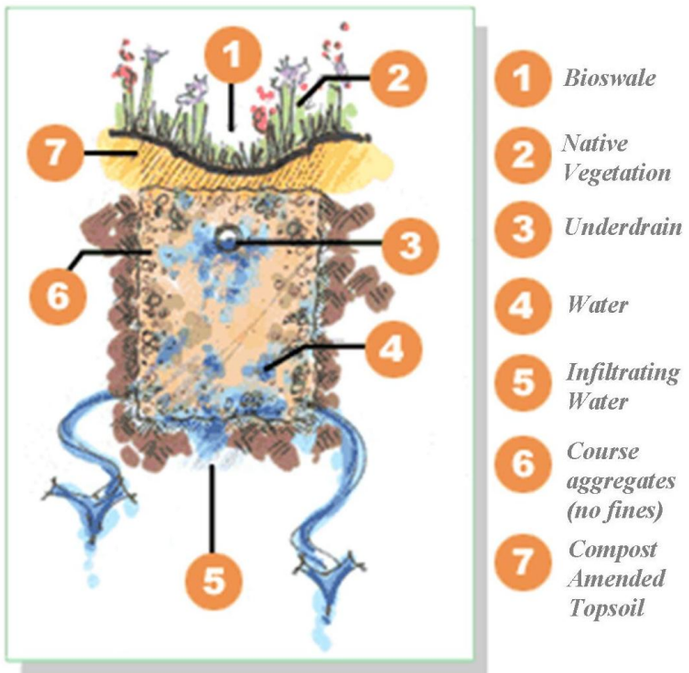
BIORETENTION AREA: Example: Filtration / Partial Recharge Facility

The use of an underdrain ensures that the facility will drain at a desired rate. Partial groundwater recharge is also achieved. An impervious liner can be used to eliminate the risk of groundwater contamination in urban environments. The underdrain can be blocked for clean-up in the event of a spill.



BIOSWALE concept rendering:

A bioswale is a vegetated open trench designed specifically to temporarily store and infiltrate stormwater. Bioswales are planted with deep-rooted native grasses or wet soil tolerant plants, that enhance infiltration, cooling, and cleansing of water in order to improve water quality. Bioswales can reduce runoff volumes and rates by slowing water down through the vegetation and encourage groundwater infiltration, reducing the area for stormwater detention.



1. *Bioswale*
2. *Native Vegetation*
3. *Underdrain*
4. *Water*
5. *Infiltrating Water*
6. *Course aggregates (no fines)*
7. *Compost Amended Topsoil*

Sustainable Site Plan Guidelines: Tree Planting List for Urban Conditions in the City of Sault Ste. Marie

Tree Forms

Rounded	Oval	Broad-vase	Pyramidal	Open/Spreading	Upright	Irregular	Upright-rounded	Weeping

Key to Salt Rating:		Key to Drought Rating:		Key to Light Needs:	
1	Sensitive To Salt	1	Sensitive To Drought	○	Full Sun
2	Moderately Sensitive To Salt	2	Moderately Sensitive To Drought	◑	Partial Sun/Partial Shade
3	Moderately Tolerant Of Salt	3	Moderately Tolerant Of Drought	●	Shade
4	Tolerant Of Salt	4	Tolerant Of Drought		
5	Very Tolerant Of Salt	5	Very Tolerant Of Drought		

Scale Rating: 1 = Least Tolerant to Conditions 5 = Most Tolerant to Conditions.

This index is not intended to represent a comprehensive list of all species acceptable for Landscape Plans related to Site Plan Approval. Species and site specific planting locations should be determined using detailed plant knowledge and professional judgment.

SHADE TREES FOR URBAN CONDITIONS

BOTANIC NAME **Common Name** Native Species	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ◯◑●	**Soil Needs:**	**Height: m** **Crown: Sq m**	**Tree Form / Cultural Comments:**
ACER platanoides **Norway Maple** cultivars Acer p. 'Crimson King' Acer p. ' Deborah' Acer p. 'Drummondii' Acer p. 'Princeton Gold' Acer p 'Royal Red'	4	3	1	Yes	◯	Not particular as to soil type or pH	15 m 100 Sq m	• Rounded to Spreading • Clearance of 7 feet from the ground • Only prune in summer after the leaves have fully developed, as it may 'bleed' sap if pruned in late winter or early spring • No significant negative characteristics, low maintenance tree
ACER Rubrum 'Northwood' **Northwood Maple**	3	1	1	Yes	◯	Damp, slightly acidic soils	14 m 113 Sq m	• Rounded to Oval • Shelter from drying winds • Hardiest of Red Maples
CELTIS occidentalis **Hackberry**	3	3	4	Yes	◯◑	Loam, Clay	20 m 254 Sq	• Rounded • Elm-like • light green foliage turns yellow in fall • Distinct bark is corky, rough and grey
GLEDITSIA triacanthos **Honey Locust**	4	5	5	Yes	◯	Deep well-drained to moist, to dry, sandy, loam, or clay	12-15 m 176 Sq m	• Open spreading • Fast growing, dappled shade • Resistant to salt spray • In fall, the leaves dry and crumble as they fall.
GLEDITSIA triacanthos 'Dursan' **Prairie Silk Honey Locust**	3	5	5	Yes	◯	Deep well-drained to moist, to dry, sandy, loam, or clay	9 m 75 Sq m	• Open spreading • Improved hardiness and resistance to insects and diseases • Resistant to salt spray
GLEDITSIA triacanthos **'Northern Acclaim'** **Northern Acclaim Honey Locust**	3	5	5	Yes	◯◑	Deep well-drained to moist, to dry, sandy, loam, or clay	12 m 80 Sq m	• Open spreading • Greater winter hardiness • It is thornless, seedless, fast-growing and fairly upright in form. • With age, the sturdy tree widens. • Resistant to salt spray

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SHADE TREES FOR URBAN CONDITIONS

BOTANIC NAME **Common Name** Native Species	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown: Sq m**	**Tree Form / Cultural Comments:**
GLEDITSIA triacanthos ‘Shademaster’ **Shademaster Honey Locust**	4	5	5	Yes	○◑	Deep well-drained to moist, to dry, sandy, loam, or clay	16 m 80 Sq m	• Open spreading • Needs space for root depth • It is thornless, seedless • Resistant to salt spray
GLEDITSIA triacanthos 'Skycole' **Skyline Honey Locust**	4	5	5	Yes	○◑	Deep well-drained to moist, to dry, sandy, loam, or clay	16 m 130 Sq m	• Open spreading • Needs space for root depth • Resistant to salt spray
QUERCUS alba **White Oak**	3	3	3	Yes	○	acidic soils moist, to dry, sandy, loam, or clay	20 m 314 Sq m	• Upright to wide rounded spreading • Extremely tough but rather slow growing Purple in the fall • Messy
QUERCUS macrocarpa **Burr Oak**	2	4	4	Yes	○	Wide range soil type or pH	20 m 314 Sq m	• Oval to wide rounded spreading • Slow growing • Messy • Resistant to salt spray
QUERCUS rubra **Red Oak**	3	3	1	Yes	○	Most soil types and is subject to chlorosis (yellowing) of the leaves in alkaline soils	20M 300 Sq M	• Rounded • Average to moist conditions
TILIA americana 'Redmond' **Redmond Linden**	3	1	1	Yes	○	Highly adaptable to a wide range of soils but cannot tolerate drought.	27 m 132 Sq m	• Dense pyramidal form • Hardy and fast growing

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SHADE TREES FOR URBAN CONDITIONS

BOTANIC NAME **Common Name** Native Species	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown: Sq m**	**Tree Form / Cultural Comments:**
TILIA flavescens 'Glenleven' **Glenleven Linden**	2	1	1	Yes	○◑	not tolerant of high pH soils	16 m 113 Sq m	• Open rounded • Dark green leaves, yellow in fall, cream colored flowers in July, very fragrant • Resistant to Linden mite • Fast growing
TILIA x flavescens 'Dropmore' **Dropmore Linden**	4	1	1	Yes	○◑	Highly adaptable to wide range of soils	15 m 100 Sq m	• Open rounded • Disease resistant
TILIA cordata 'Norlin' **Norlin Linden**	3	1	1	Yes	○	Highly adaptable to a wide range of soils	13 m 80 Sq m	• Has a broad pyramidal crown • Grows rapidly and has good resistance to sunscald
ULMUS americana **American Elm**	2	3	3	Yes	○	Adaptable: not particular as to soil type or pH	17 m 154 Sq m	• Vase-shaped form • Adaptable plant, tolerating both dry conditions and even some standing water • Dutch elm disease is known to be a problem
ULMUS japonica x 'Wisoniana 'Morton' **Accolade Elm**	2	5	5	Yes	○	not particular as to soil type or pH	13 m 80 Sq m	• Vase-shaped form • extremely resistant to Dutch elm disease • It's highly tolerant of urban conditions adaptable to both dry and moist locations
ULMUS davidiana 'Discovery' **Discovery Elm**	2	3	3	Yes	○	not particular as to soil type or pH	9 m 80 Sq m	• Vase-shaped form • Neat and tidy; very hardy and adaptable, low maintenance tree • Extremely resistant to Dutch elm disease • Adaptable to both dry and moist locations

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CONIFEROUS TREES FOR URBAN CONDITIONS

BOTANIC NAME **Common Name** Native Species	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown:** **Sq m**	**Tree Form / Cultural Comments:**
PICEA glauca **White Spruce**	2	3	3	Yes	○	Most soil types or pH Sand, loam, clay	20 m 50 Sq m	• Pyramidal, Conical • Grows at a medium rate • Adaptable to both dry and moist locations • No significant negative characteristics
PICEA pungens **Colorado Spruce**	2	5	5	Yes	○	Sand, loam, clay	20 m 50 Sq m	• Pyramidal, Conical • Will not tolerate any standing water
PICEA pungens 'Hoopsii' **Hoopsii Blue Spruce**	2	5	5	Yes	○	Sand, loam, clay	20 m 50 Sq m	• Pyramidal, Conical • Will not tolerate any standing water • Low maintenance tree • No significant negative characteristics
PICEA pungens 'Glauca' **Colorado Blue Spruce**	2	5	5	Yes	○	Most soil types or pH Sand, loam, clay	20 m 50 Sq m	• Pyramidal, Conical • Grows at a slow rate • Will not tolerate any standing water • Extremely hardy and rugged
PINUS banksiana **Jack Pine**	2	1	4	Yes	○	Sandy soils	18 m 70 Sq m	• High crown small, irregular • Dead branches self-prune poorly • Poor, sandy, windy sites • Will not tolerate any standing water
PINUS nigra **Austrian Pine**	4	3	4	Yes	○◑	Fair range of soil types including clay	18 m 80 Sq m	• Pyramidal, Conical • Tolerant of wind and extreme cold, road salt, air pollution and resists heat and drought • Easy to transplant
ABIES balsamea **Balsam Fir**	1	1	1	No	○◑	Acid moist soil	20 m 80 Sq m	• Pyramidal, Conical • Not for exposed or windy sites • Intolerant of urban pollution
ABIES concolor **Silver Fir**	3	1	1	Yes	○◑	Not particular as to soil type or pH, sand	20 m 80 Sq m	• Conical, branches to the base, upper half of the tree tends to point upwards, the lower horizontal or deflected downwards • Relatively low maintenance • Average to moist conditions, and shouldn't be allowed to dry out, Avoid hot or dry sites

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ORNAMENTAL TREES FOR URBAN CONDITIONS

BOTANIC NAME **Common Name** **Native Species**	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown:** **Sq m**	**Tree Form / Cultural Comments:**
Amelanchier canadensis **Serviceberry**	3	5	1	Yes	○◑	Not particular as to soil type or pH Well-drained to moist	5 m 28 sq m	• Upright spreading • Multi-stemmed • White flowers in early spring • Outstanding orange in the fall • Average to wet conditions, and will even tolerate some standing water.
ACER ginnala 'Flame' **Flame Amur Maple**	3	3	5	Yes	○◑	Tolerates dry and alkaline	7 m 39 sq. m	• Oval to rounded, shapely small tree • Multi-stemmed • Brilliant red fall colour
AESCULUS glabra **Ohio Buckeye**	3	5	3	Yes	○	Slightly acidic, well-drained, rich, moist soils	7 m 39 sq. m	• Showy in spring when bearing white flowers, casts a dense shade • Easy to transplant, needs a sunny exposure sheltered from wind. • A shade and street tree in rich, moist soils
BETULA papyrifera **Paperbark Birch**	2	3	1	Yes	○◑	Not particular as to soil type or pH Well-drained to moist	15m 87 sq. m	• Pyramidal to Oval • Short lived tree • Shouldn't be allowed to dry out • Tolerant of salt spray
BETULA nigra 'Heritage' **Heritage River Birch**	3	3	3	Yes	○	Needs acidic soils, and will suffer from chlorosis in alkaline soils	13 m 60 sq m	• Pyramidal or oval, often multi-trunked • More resistant to insect and disease pests than any of the other birches • Very tolerant of flooding or drought. • Noted for its unique bark characteristics.

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ORNAMENTAL TREES FOR URBAN CONDITIONS

BOTANIC NAME **Common Name** **Native Species**	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown:** **Sq m**	**Tree Form / Cultural Comments:**
CARPINUS caroliniana **Blue-beech**	3	1	3	Yes	○◑●	Adaptable to soil type or pH, Moist to wet, Well drained	10 m 65 sq m	• Small multi-purpose shade tree • Low canopy with a typical clearance of 4 feet • Smooth silvery blue bark • Outstanding orange in the fall • Tolerating both dry conditions and even some standing water
ELAEAGNUS angustifolia **Russian Olive**	4	5	5	Yes	○	Adaptable	10 m	• Form Irregular, Growth Rate Rapid • Very salt and drought tolerant. • Tolerates high wind areas • Silvery yellow berries in fall.
JUGLANS cinerea **Butternut**	3	1	1	No	○	Moist, rich well drained soils of fine to medium texture.	16 m 98 sq m	• Broad, open spreading crown • Shade-intolerant, short life span • Found most frequently in rich woods of coves and stream benches and terraces, on slopes Will grow on shallow, rocky sites, especially those of limestone origin • Butternut Canker is known to be a problem • Butternut is now considered Endangered in Canada due to the impact and potential impact of the disease
MALUS cultivated varieties	3-4	1	1	Yes	○	Heavy loam, well-drained, moist, and acidic (pH 5.0-6.5) soils	6-9 m 20-30 sq m	• Ranges from round, tall, dwarf, informal-spreading to densely-oval • Cultivated and Asiatic forms are much more resistant to disease than the forms native to North America

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BOTANIC NAME **Common Name** **Native Species**	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown:** **Sq m**	**Tree Form / Cultural Comments:**
MALUS 'Adirondack' **Adirondack Crabapple**	4	1	1	Yes	○	Heavy loam, well-drained, moist, and acidic (pH 5.0-6.5) soils	6m 25 sq m	• Oval • Foliage: Medium green • Fall Foliage: Yellow • Flower Color: White with red tint • Fruit: Orange 1/2" • Disease Resistance: Apple Scab - Excellent Cedar-Apple Rust - Excellent Mildew - Good Fireblight - Good
MALUS 'Purple Prince' PP 8478 Purple Prince Flowering Crab	3	1	1	Yes	○◑	Heavy loam, well-drained, moist, and acidic (pH 5.0-6.5) soils	6 m 20 sq m	• Rounded Foliage: Purple, becoming bronze green Flower: Rose red Fruit: Maroon, 3⁄8" - 1⁄2" • Disease Resistance: Apple Scab - Excellent Cedar-Apple Rust - Excellent Mildew - Good Fireblight - Good • Does not suffer from stem splitting and is faster growing
MALUS 'Prairiefire' **Prairiefire Flowering Crab**	4	1	1	Yes	○	Heavy loam, well-drained, moist, and acidic (pH 5.0-6.5) soils	7 m 38 sq m	• Upright, spreading, becoming rounded • Foliage: Reddish-purple • Fall Foliage: Orange-yellow, insignificant • Flower Color: Pinkish-red • Fruit: Red 1/8"-1/2" • Disease Resistance: Apple Scab - Excellent Cedar-Apple Rust - Good Mildew - Excellent Fireblight - Excellent

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ORNAMENTAL TREES FOR URBAN CONDITIONS

BOTANIC NAME **Common Name** **Native Species**	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown:** **Sq m**	**Tree Form / Cultural Comments:**
MALUS 'Donald Wyman' **Donald Wyman Flowering Crab**	4	1	1	Yes	○	Heavy loam, well-drained, moist, and acidic (pH 5.0-6.5) soils	6 m 20 sq m	• Rounded • Foliage: Medium green • Fall Foliage: Insignificant • Flower Color: White • Season: Spring • Fruit: Bright red, roughly 3/8" in diameter • Tolerances: Urban tolerant • Disease Resistance: Apple Scab - Good Cedar-Apple Rust - Excellent Mildew - Excellent Fireblight - Good
MALUS 'Spring Snow'	3	1	3	Yes	○	Heavy loam, well-drained, moist, and acidic (pH 5.0-6.5) soils	9 m 30 sq m	• Dense, oval • Foliage: Medium green • Fall Foliage: Yellow, insignificant • Flower Color: White • Bloom: Sterile • Fruit: None • Disease Resistance: Apple Scab - Fair Cedar-Apple Rust - Good Mildew - Excellent Fireblight - Fair
MORUS alba 'Pendula' **Non-fruiting Weeping Mulberry**	4	3	1	Yes	○◑	Loam, well-drained, moist	4 m 20 sq m	• Weeping • Excellent shade tree • Fast growth • Small streetscapes

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BOTANIC NAME **Common Name** **Native Species**	**Zone**	**Salt Rating:** (1-5)	**Drought Rating:** (1-5)	**Urban Tolerant**	**Light Needs:** ○◑●	**Soil Needs:**	**Height: m** **Crown:** **Sq m**	**Tree Form / Cultural Comments:**
OSTRYA virginiana **Ironwood**	3	1	3	No	○◑	Adaptable to soil type or pH, well-drained	10 m 28 sq m	• Shapely oval form • Low canopy with a typical clearance of 4 feet • Adaptable to both dry and moist locations
PRUNUS virginiana 'Shubert' **Choke cherry**	2	3	3	Yes	○	Moist soil, well-drained	7.5 m 30 sq m	• Oval • New leaf growth is vibrant green, turning to red as leaves mature.
SORBUS acuparia 'Rossica' **Russian mountain-ash**	2	2	3	Yes	○	Adaptable to soil type or pH,	10 m 30 sq m	• Pyramidal • White flowers in spring followed by orange-red berries into winter • Resistant to fireblight, a tough, urban tolerant tree
SORBUS decora **Showy Mountain Ash**	2	2	4	Yes	○	Adaptable to soil type or pH	9 m 30 sq m	• Shapely oval • One of the prettiest & hardiest Mt. Ash trees • Showy flowers & fruit that persists into winter • Outstanding fall colour • Disease resistant • Adaptable to both dry and moist locations
SYRINGA reticulata 'Ivory Silk' **Ivory Silk Japanese Tree Lilac**	3	5	1	Yes	○	Adaptable to soil type or pH	7.5 m 28 sq m	• Upright, open • Tough tree for urban conditions • Low maintenance tree, and should only be pruned after flowering to avoid removing any of the current season's flowers • Shouldn't be allowed to dry out • Tolerant of salt spray

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Bioswale Key:

Zone A: Bottomland Plants
This area is frequently inundated during storm events, and is well-drained between rainfall events.

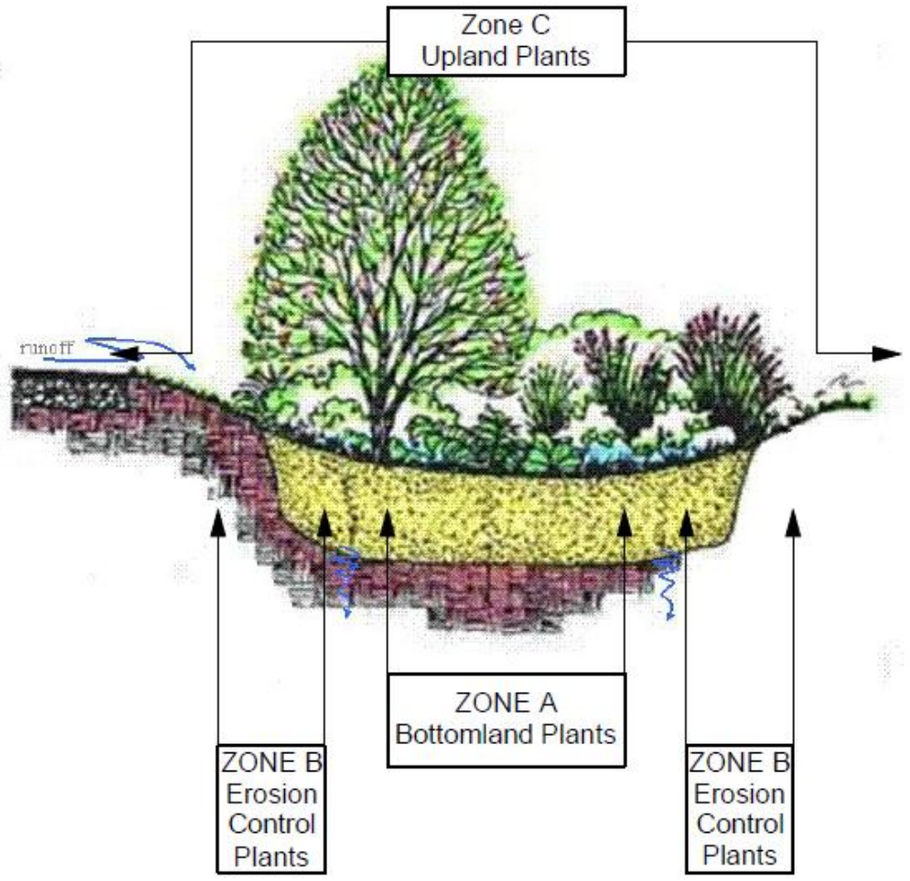
- Mineral Meadow Marsh plant community: Grasses, Sedges, rushes, wildflowers, ferns and shrubs.
- Wetland species that are flood tolerant as they will persist in average years and flourish in wetter years.
- Plants that are likely to occur in wetlands or adjacent to wetlands.
- Plants with dense root structure and /or vegetative cover are favoured for their ability to act as pollution filters and
- tendency to slow water velocity
- Be advised these practices are not constructed wetlands and are designed to fully drain within 48 hours.

Zone B: Bank Stabilization Plants
This zone is inundated less frequently and has periodically high levels of moisture in the soil. The ecology of this zone is a transition from the Mineral Meadow Marsh/Beach-type community to an upland community.

- Plants able to survive in soils that are seasonally saturated, yet can also tolerate periodic drought.
- Species include grasses and groundcovers, as well as low shrub species.

Zone C: Upland Plants
The ecology of this zone is terrestrial due to its elevation in relation to the filter bed.

- Plants should have deep roots for structure, be drought-tolerant and capable of withstanding occasional soil saturation.
- Trees and large shrubs planted in this zone will aid in the infiltration and absorption of stormwater.
- This area can be considered a transition area into other landscape or site areas.
- A minimum variety of five species should be used to prevent a monoculture.



DRY SWALE WITHOUT UNDERDRAIN

BIO-RETENTION/ SWALE SUGGESTED PLANT LIST

Scientific Name **Common Name** ***Recommended as Seed** **All Are Native Species Unless Noted:** **NN (Non Native)**	**Zone**	**A=Bottomland** **B=Erosion Control** **C=Upland**	**Salt Tolerance** **High** **Med** **Low**	**Drought Tolerance** **High** **Med** **Low**	**Urban Tolerance** **P = Pollution** **C=Compaction**	**Soil Type** **Sand** **Loam** **Clay**	**Soil Moisture** **Wet** **Moist** **Dry**	**Light Needs:** ○◑●	**Height / Spread at Maturity**	**Aesthetic Attributes / Other Information**
NURSE CROPS										
***Avena sativa** Cultivated Oat NN	2	C	H	H	C	SLC	M	○	40-60 cm 10-15 cm	Nurse crop for soil stabilization.
***Lolium multiflorum** Annual Ryegrass NN	N/A Annual	A B C	H	H	P,C	SLC	Variable	○◑	40-50 cm 30-50 cm	Low-growing cool season meadow grass Nurse Crop for soil stabilization; considered minimally invasive - to be controlled if necessary and limit spread to other areas.
GRASSES AND RUSHES										
Andropogon gerardii Big Bluestem	4	A B	M	H	C	SLC	WM-MD	○	45-70 cm 28-45 cm	Turkey-foot shaped head, very tall. Grows in clumps, sod-forming. Suitable for planters.
Calamagrostis acutiflora 'Karl Foerster' Karl Foerster Feather Reed Grass NN	4	C	M	M	P C	SLC	M-D	○	100-150 cm 100 cm	Maintains structure throughout winter. Cool season; clump forming; cut down in early spring prior to new growth.
Calamagrostis canadensis Canada Blue-joint	3	A B	M	L-M	P C	SLC	W-M	○	100-150 cm 100 cm	Vertical fluffy seed heads, arching foliage. Grows in clumps or small patches.
***Carex bebbii** Bebb's Sedge	3	A	M	L-M	C	SLC	W-M	○	30 cm 30 cm	Small spiky plant with small but attractive

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GRASSES AND RUSHES CONT.										
Carex hystericina Porcupine Sedge	3	A	M	L		SLC	W	○	45 cm 30-40 cm	Bottlebrush-shaped seed heads. Tolerates temporary flooding; spreading; useful for erosion control.
Carex pensylvanica Pennsylvania Sedge	3	A B C	M	M-H		SL	D	◑	30-45 cm spread	Delicate foliage, forms low mound. Spreads rapidly; sod-forming in full sun.
***Carex vulpinoidea Fox Sedge	3	A	M	L-M	P,C	SLC	W-M	○	40-50cm 50-60 cm	Brown-yellow upright seed heads in mid-summer. Grows in clumps; highly suitable.
Danthonia spicata Poverty Oatgrass	3	B C	H	H/M	C	SL	M-D	○	15-30 cm 30 cm	Small plant, thin curly leaves. Highly suitable.
Deschampsia cespitosa 'Pixie Fountain' - Dwarf Tufted Hair Grass	3	A B C	M-H	M		SLC	D	◑	20-30 cm 30-60 cm	Very fine texture, evergreen. Grows in clumps.
***Elymus canadensis Canada Wild-rye	3	A B C	H	M-H	C	SLC	M-MD	○	60-90cm 60-90 cm	Attractive drooping seed heads Individual plants do not persist, but does self- seed.

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GRASSES AND RUSHES CONT.										
Elymus virginicus var. virginicus Virginia Wild-rye	4	A	M	M	C	SLC	W-M	○◑	60-75 cm 60-90 cm	Attractive upright seed heads. Highly suitable; will grow more robust in full sun; clumping.
Helictotrichon sempervirens Blue Oat Grass NN	3	B C	M	M		SLC	M-D	○	60-90 cm 60-75 cm	Mounding blue-grey grass, larger than Festuca glauca Ornamental; suitable for formal plantings.
Juncus effusus ssp. Solutus Lamp Rush	3	A	H	L	P C	SLC	W-M	○	28-35 cm 28-35 cm	Evergreen rush. Seeds in fall. Highly suitable.
Pennisetum alopecuroides 'Hameln' Dwarf Fountain Grass NN	4	B C	H	H	P C	SLC	M-D	○	60-90cm 60 cm	Elegant ornamental grass with plumes resembling bottle brushes appear that in summer.
Schizachyrium scoparium (Andropogon scoparius) Little Bluestem	3	B C	M-H	H	P,C	S	D	○	60-90 X 45-60 cm	Blue summer colour, reddish fall colour stems remain upright during winter. Clump forming; best on poor, dry soil to avoid being outcompeted. Sometimes difficult to establish.
***Scirpus atrovirens Dark-green Bulrush	3	A	M	L	P	LC	W	○	30 -200 cm H	Rush with clustered reddish seed heads. Highly suitable.
***Scirpus cyperinus Cottongrass Bulrush	3	A	M	M		SLC	W	○	75-100cm 50-60 cm	Rush with attractive woolly seed heads.

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GRASSES AND RUSHES CONT.										
Sorghastrum nutans Indian-grass	3	B C	M-H	H	C	SLC	M-D	○◑	90-150cm 60-90 cm	Tall grass with attractive reddish seed head. Spreading, can be aggressive. Very drought-tolerant.
***Sporobolus neglectus Small Dropseed	3	C	H	H	C	SL	MD-D	○	15-25cm 10-20 cm	Distinctive when mass-planted on dry soils. Develops late in growing season; self-seeds.
HERBACEOUS PLANTS										
Achillea millefolium ssp. Lanulosa Common Yarrow	2	B C	M	M-H	P,C	SL	M	○	60cm 60 cm	Flat-topped white flowers, feathery foliage. Highly suitable; naturalizes readily in disturbed areas.
***Allium schoenoprasum var. sibiricum Wild Chives	4	A B	L	M		SLC	M	○	30-45cm	Pale green stems, globose pink flowers
Anemone canadensis Canada Anemone	3	A	M	L-M		SLC	WM-M	○◑	30-60 cm 60-75 cm	White flowers in spring. Spreading groundcover, foliage Highly suitable.
***Aquilegia canadensis Wild Columbine	3	A B	M	M	C	SLC	M	○◑	60-90 cm 30-60 cm	Red pendulous flowers. Suitable for nutrient-poor, low competition situations; habitat value for butterflies & hummingbirds; self sows; easy to maintain once established.

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HERBACEOUS PLANTS Cont.										
Armeria maritima 'Dusseldorf Pride' Dusseldorf Pride Sea Thrift NN	2	B C	H	H	P C	SLC	M-D	○	10-15 cm 15-30 cm	Blooms mid-Spring to early-Summer; deep pink. Ornamental plantings only.
Artemisia schmidtiana 'Silver Mound' Silver Mound Artemesia NN	2	B C	H	M-H	P	SLC	M-D	○◑	25-30 cm 30-60 cm	Silver-green mound, blooms small white flowers Ornamental plantings only.
Baptisia leucantha White Wild Indigo NN	3	B C	H	H		SLC	D	○	75-90 cm 75-90 cm	White flowers in late spring. Deep tap-root. Attracts butterflies.
Baptisia australis Blue Wild Indigo NN	3	B C	H	H		S	D	○	75-90 cm 75-90 cm	Blue flowers in early summer Deep rooted.
***Cerastium tomentosum Snow in Summer	1	C	M	M		S	D	○◑	10-25 cm 30-45 cm	Spreading, delicate white flowers
***Coreopsis lanceolata 'Sterntaler' Lance-leaved Coreopsis	3	C	H	H		SLC	M-D	○◑	30-90 cm H	Abundant yellow flowers. Intolerant of compaction, easily grown from seed.
***Coreopsis rosea Pink-flowered Tickseed NN	4	C	M	M		SLC	M	○	30-55 cm 45-60 cm	Blooms early-summer to early- autumn; pink/white flowers.
Echinacea purpurea Purple Coneflower	3	C	M	M		SL	M-MD	○	75-120 cm 45-60 cm	Large pink/purple flowers on stiff stalks in mid-late summer. Attracts butterflies and birds.

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HERBACEOUS PLANTS Cont.										
Hemerocallis Daylily	3	C	H	H	P, C	SLC	MWD	○◑●	60-75 cm 45-60 cm	Vigorous, adapatable plant.
Leucanthemum x superbum Shasta Daisy NN	3	C	M	H		SLC	MD	○	75- 90 cm 30-45 cm	White double daisy-like flowers.
Lupinus perennis Lupine	3	A B C	L	H	P	S	WM	◑	60 cm 60 cm	Can tolerate poor, sandy, or gravely soil, preferably acid soil; roots are strong and deep
*Rudbeckia fulgida Brown-Eyed Susan NN	3	A B C		H		SLC	M-MD	○	60-75 cm 45-60 cm	Golden daisy flower June-October, typical cultivar: 'Goldstrum'. Very drought-tolerant; attractive to bees, butterflies and/or birds; self-sows freely; deadhead if you do not want volunteer seedlings.
*Rudbeckia hirta Black-Eyed Susan	3	C	H	M-H		SLC	WM-DM	○	60-75 cm 45-60 cm	Yellow daisy flower June-October Self sows easily, dry-mesic meadow habitat.
*Solidago altissima var. altissima Tall Goldenrod	2	C	M	M	P,C	SLC	W-M	○◑	100-150 cm 100 cm	Large, loose, upright yellow flower cluster in fall. Spreads rapidly, self-seeds; very aggressive - plant only with the most aggressive species. Attracts birds and butterflies.

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HERBACEOUS PLANTS Cont.										
Solidago canadensis var. canadensis Canada Goldenrod	2	A B C	M	M	P,C	SLC	W-M	○◑	90-180cm	Large, loose, upright yellow flower cluster in fall. Spreads rapidly, self-seeds; very aggressive - plant only with the most aggressive species. Attracts birds and butterflies.
Solidago flexicaulis Zig-zag Goldenrod	3	C	M-H	M	P	L	M	○◑	30-50 cm 50+ cm	Showy golden flowers, finely fringed dark green leaves. Highly suitable; endures conditions of difficult urban sites.
*Solidago rugosa ssp. Rugosa Wrinkleleaf Goldenrod	3	C	M	L-M	C	SLC	WMM	○	90-120 cm 60-75 cm	Large upright yellow flower cluster in late summer/fall. Highly suitable; clumps spread readily; transplants best with added leaf mold & manure.
*Symphyotrichum cordifolium Heart-leaved Aster	3	C	M-H	M-H	P	SLC	D	◑	25-45 cm 75-90 cm	White flowers in August, large heart- shaped leaves Highly suitable; forms colonies; excellent groundcover in partial shade.
*Symphyotrichum novae-angliae New England Aster	3	A	M-H	M	P,C	SLC	M	○◑	120-150 cm 45-60 cm	Blue/light purple flowers in fall. Highly suitable; grows easily from seed, spreads quickly; dry-mesic meadow habitat.

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HERBACEOUS PLANTS Cont.										
Thalictrum pubescens Tall Meadow-Rue	3	A	M	M		SLC	W-M	◑	60-70 cm 50-75 cm	Delicate rounded white flower clusters, very tall Highly suitable.
Thelypteris palustris var. pubescens Marsh Fern	2	A	L-M	L		SLC	W-M	●	75-90 cm 75-90 cm	Upright deciduous fern. Highly suitable; intolerant of long-lasting standing water or dense shade.
***Verbena hastata** Blue Vervain	3	A	M-H	L-M	P,C	SLC	W-M	○	50-100 cm 50 cm	Spikes of blue flowers. Highly suitable, spreading, self-sows; easy to grow from seed.
***Verbena urticifolia** White Vervain	3	A	M	H	C	SLC	M	◑	50-75 cm 40-60 cm	Spikes of very small white or lavender flowers. Highly suitable, spreading, can be weedy, self-seeds.
SHRUBS										
Amelanchier arborea Downy Serviceberry	3	C	L	M		SL	M-D	○◑	5 X 3 m	White flowers- spring, red fall colour Sensitive to salt & compaction.
Amelanchier laevis Smooth Serviceberry	4	C	M	M		SL	M-D	◑	5-8 X 4-6 m	Showy.

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SHRUBS CONT.										
Cornus alternifolia Alternate-leaf Dogwood	3	C	L-M	M	C	L	M	○◑	2-3 X 3-4 m	Very attractive tiered growth pattern, white flowers in spring Highly suitable; sensitive to pollution; recovers slowly from transplanting; avoid planting in fall; tolerant of periodic short-term inundation.
Cornus foemina spp. Racemosa Gray Dogwood	3	B C	M-H	M	C	SLC	M-D	○◑	2-3 X 2-3 m	White fruit, red fall colour. Highly suitable; tolerant of periodic short-term inundation; colony forming.
Cornus sericea ssp. sericea (Cornus stolonifera) Red-Osier Dogwood	3	A B	L	M	C	SLC	W-M	○◑	1.8-2.8 X 2.4-3.6 m	White flowers in late spring, showy red twigs in winter. Highly suitable; sensitive to salt, tolerant of periodic short-term inundation. CAUTION: Cornus alba often mistakenly used instead.
Juniperus communus Common Juniper	2	C	H	H	P	S	D	○	80-120 X 150-200 cm	Blue-green foliage, blue berry-like fruits, aromatic in warm weather. Shoreline and rocky site species; fine pointed leaves discourage pedestrians

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SHRUBS CONT.										
Juniperus horizontalis Creeping Juniper	3	C	H	H	P	S	D	○	15-10 X 100-150 cm	Blue-green foliage, blue berry-like fruits, aromatic in warm weather Shoreline and rocky site species
Myrica pensylvanica Bayberry	2	B	H	H		S	M-D	○◑	1.5-3 X 1.5-3 m	Evergreen; attracts birds; fragrant and showy foliage; showy fruit.
Physocarpus opulifolius Eastern Ninebark	2	C	H	M-H		SLC	W-D	○◑	1.5-2.4 X 1.2-1.8 m	Lobed leaves, peculiar shredded bark, whitish flowers, drooping clusters of inflated fruits, arching habit. Easy to cultivate; very adaptable; use local genotypes as cultivars are commonly grown.
Potentilla fruticosa Potentilla	2	C	M	M-H	C	SLC	W-D	○◑	0.5-1 X 1-1.5 m	Abundant yellow flowers. Attracts pollinators. CAUTION: only use the native species for natural areas (there are a few nurseries that supply it); European varieties appropriate for ornamental settings.

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SHRUBS CONT.										
Prunus pumila var. pumila Sand Cherry	3	C	M	H		S	W-D	○	30-50 X 75-100 cm	Creeping shrub, white flowers, relatively large cherry fruit Forms colonies on suitable barren soils/rocky sites; low-growing may be suitable for green roofs.
Prunus virginiana 'Shubert' Shubert Chokecherry	3	C	H	M	C	SL	M-D	○◑●	6 m 5 m	White flowers in a spike, reddish- black berries, Highly suitable; aggressive; tolerant of periodic short-term inundation; colony forming.
Rhus aromatica Fragrant Sumac	3	B C	M	M-H	C	SL	M-D	○◑	1-2 X 2-3 m	Red fruit, aromatic leaves. Colony forming; smaller and less aggressive than Rhus typhina ; may be suitable on some green roofs (semi-intensive); will not persist on richer sites due to competition.
Rhus typhina Staghorn Sumac	3	B C	H	H	P, C	SLC	M-D	○	2.7-4.5 X 2.7-4.5 m	Red fruit, red fall color, fuzzy new growth. Highly suitable; transplants easily; colony forming; needs lots of space.

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SHRUBS CONT.										
Salix bebbiana Bebb's Willow		A B	unknown	L-M	C	SLC	W	○◑	2-10 m 2-4 m	Leaf margins mostly without teeth, shiny grey-green bark with reddish marks. Highly suitable; usually multi-stemmed; does not form colonies; tolerates inundation. Caution: some Salix species have extensive root systems. Avoid planting if there is an underdrain.
Salix petiolaris Meadow Willow	2	A B	unknown	L-M	P	C, Variable	W-M	○	1-6 m 1-3 m	Highly suitable; tolerates inundation; colony forming.
Sambucus canadensis Common Elderberry	3	B C	L-M	L-M	C	SLC	W-M	○◑	2-3 m 2-3 m	White flower clusters June-July, purple fruits Aug-Sept. Highly suitable; suckers to form large thickets; tolerant of periodic short-term inundation; sensitive to salt and pollution.
Sambucus racemosa ssp. Pubens Red Elderberry	3	B C	M	M-H	C	SL	M	○◑	1.5-2 m 1.5-2 m	White flower clusters June-July, red fruits Aug-Sept. Highly suitable; fruit very attractive to birds; prefers drier soils than Sambucus canadensis.

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SHRUBS CONT.										
Viburnum dentatum Arrowwood		A B C	M	M		SLC	M-D	○◑	2-3 X 2-3 m	White flowers in summer, blue fruits in fall. Transplants well; not native to Toronto area, suitable for Hamilton south.
Viburnum lentago Nannyberry	2	FAC+	L-M	M	P	SLC	W-M	○	4-5 X 2-4 m	White flowers, brilliant red fall color. Highly suitable; tolerant of periodic short-term inundation.
Viburnum rafinesquianum Downy Arrowwood	2	C	M	H	P	SL	D	○◑	1-2 X 1-2 m	White flowers in summer, blue fruits in fall. Colony-forming, excellent screening and wildlife cover
TREES										
Acer rubrum Red Maple	3	A B C	L	M	P, C	SLC	W-M	○◑	10-20 X 10-20m	Medium-sized shade tree, orange to bright red fall color.Common on poorly aerated soils, tolerant of periodic short-term inundation, best planted in early spring, sensitive to salt; requires acidic soils and will go chlorotic on alkaline.

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TREES CONT.										
Acer x freemanii 'Autumn Blaze' Freeman Maple	3	A B C	L-M	M	C	SLC	W-M	○◑	15-20 m 12 m	Medium-large shade tree. Naturally-occurring hybrid between A. rubrum & A.saccharinum .
Betula papyrifera Paper Birch	1	A B C	M-H	M-H		SL	M-D	○	13 m 10 m	Medium shade tree, attractive peeling white bark. Difficult to transplant - use small size container stock.
Betula nigra 'Heritage' Heritage River Birch	4	A B C	M-H	M-H		SL	MD	○	13 m 10 m	Medium shade tree, attractive peeling gray-salmon bark.
Celtis occidentalis Common Hackberry	3	C	M	M	C	L	M	○	20 m 18 m	Large shade tree, smooth gray bark with "warts". Easily transplanted in spring, plant with care in fall, generally tolerant.
Gleditsia tricanthos var. inermis Thornless Honey Locust	4	B C	H	H	C,P	SLC	M-D	○◑	12-25 m 10-20 m	Yellow fall colour, delicate texture. Intolerant of inundation or standing water.
Picea glauca White Spruce	2	A	L	M	P	LC	M	○	25 m 5 m	Medium-large cone-shaped conifer.
Picea pungens Colorado Spruce	2	A	H	M		SL	M	○	20 m 6 m	Medium-large cone-shaped conifer, blue cultivar commonly available.

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TREES CONT.										
Pinus mugho Mugo Pine NN	2	B C	H	M		SLC	M-D	○◑	10 m 2.5 m	Mounding/spreading conifer, dwarf cultivar available. Dwarf or semi-dwarf ornamental of high- altitude European environments; will not persist long-term in competition.
Populus balsamifera ssp. Balsamifera Balsam Poplar	2	A B C	H	M		SLC	M	○	20 m 16 m	Highly suitable; very aggressive roots; tolerant of periodic short-term inundation; fast maturing; colony forming; short-lived trees that are appropriate for sites away from utilities, homes roadways and infrastructure.
Populus deltoides Eastern Cottonwood	2	A B C	M-H	H	P, C	SLC	M	○	30 m 12 m	Fluffy seeds in spring. Highly suitable; very aggressive roots; easily transplanted in spring or fall, fast maturing; short-lived trees that are appropriate for sites away from utilities, homes roadways and infrastructure.
Populus grandidentata 'Durman' Large-tooth Aspen	3	B C	M-H	H		SL	M	○	15-25 X 5-8	Fluffy seeds in spring. Orange-tinted bark. Highly suitable; fast maturing; colony forming.

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TREES CONT.										
Populus tremuloides Trembling Aspen	2	A B C	M-H	M		SLC	M	○	15 m 7 m	Smallest leaf of the Populus species, leaf rattles in wind. Highly suitable; very aggressive roots; sensitive to pollution & compaction; tolerant of periodic short-term inundation; transplant in early spring or fall, fast maturing; colony forming.
Quercus alba White Oak	3	B C	H	H		SL	M-D	○◑	20 m 20 m	Large canopy tree. Extremely sensitive to compaction; difficult to transplant but very much worth the effort to do so; suitable in non-compacted soil where there is room; use plugs/small containers or seed; maintain carefully for 1-2 yrs after planting.
Quercus bicolor Swamp White Oak	4	A	M-H	H	C	LC	W-M	○	15 m 15 m	Large canopy tree, coarse branching, bark peeling when young. Withstands spring season inundation; wildlife food/shelter; Planted with increasing frequency outside its natural habitat and range.

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TREES CONT.										
Quercus macrocarpa Bur Oak	3	A B C	M-H	H	C	SLC	W-D	○	20 m 20 m	Large canopy tree. coarse branching structure, corky bark, unique acorn. Highly suitable; wildlife food/shelter.
Quercus bicolor Swamp White Oak	4	A	M-H	H	C	LC	W-M	○	15 m 15 m	Large canopy tree, coarse branching, bark peeling when young. Withstands spring season inundation; wildlife food/shelter; Planted with increasing frequency outside its natural habitat and range.
Quercus macrocarpa Bur Oak	3	A B C	M-H	H	C	SLC	W-D	○	20 m 20 m	Large canopy tree. coarse branching structure, corky bark, unique acorn. Highly suitable; wildlife food/shelter.
Quercus rubra Red Oak	3	B C	H	M	P	SLC	M-D	○	18 m 16 m	Large canopy tree, red fall color. Sensitive to compaction, provides wildlife food/shelter, transplants easily in early spring. Ensure plant material suitable to local growing conditions, often sources for Q. rubra are from populations outside of Ontario.

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BIO-RETENTION/ SWALE SUGGESTED PLANT LIST

Scientific Name **Common Name** ***Recommended as Seed** **All Are Native Species Unless Noted:** **NN (Non Native)**	**Zone**	**A=Bottomland** **B=Erosion Control** **C=Upland**	**Salt Tolerance** **High** **Med** **Low**	**Drought Tolerance** **High** **Med** **Low**	**Urban Tolerance** **P = Pollution** **C=Compaction**	**Soil Type** **Sand** **Loam** **Clay**	**Soil Moisture** **Wet** **Moist** **Dry**	**Light Needs:** ○◑●	**Height / Spread at Maturity**	**Aesthetic Attributes / Other Information**
TREES CONT.										
Salix amygdaloides Peach-Leaved Willow	4	A B	H	L-M	C	SL	W	○	10 m 10 m	Underside of leaves white, twigs often drooping. Highly suitable; can be multi-stemmed; does not form colonies; tolerates inundation. Caution: some Salix species have extensive root systems. Avoid planting if there is an underdrain.
Salix lucida Shining Willow	3	A	H	L-M	C	LC	W	○	5 m 5 m	Highly suitable; colony forming; tolerates inundation. Caution: some Salix species have extensive root systems. Avoid planting if there is an underdrain.
VINES										
Parthenocissus quinquefolia Virginia Creeper	3	A B C	H	M	P,C	SLC	M	○◑	5 m	Blue berries, Red color, in fall. Climbing vine, good for fences or trellises. Spreading, competitive; use away from existing natural areas and trees. Attractive to songbirds.
Vitis riparia Riverbank Grape	3	A B	H	M	P, C	SLC	M	○◑	20 m	Large leaves, grapes in fall. Extremely aggressive and competitive; use mostly in situations where invasive exotics are a major threat, can smother small trees and shrubs, wildlife food & habitat.

This index is not intended to represent a comprehensive list of all species acceptable for Landscape Plans related to Site Plan Approval.
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