Design Guidelines





for 'Greening' Surface Parking Lots







TORONTO City Planning

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DRAFT

DESIGN GUIDELINES FOR 'GREENING' SURFACE PARKING LOTS

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1.0 INTRODUCTION

Typically, the emphasis in parking lot design is on accommodating vehicle movements, maximizing the number of parking spaces, and ensuring ease of maintenance and servicing. Once these functional criteria are satisfied, "left-over" spaces may or may not be landscaped or dedicated for pedestrian use.

As a result, there are often few landscaped areas within a parking lot and those that are provided tend to be insufficient in size and design to support healthy trees and vegetation. Pedestrians are also given low priority and may be left to navigate between parked cars and across wide driveways, which presents safety concerns.

When functional requirements are the only objectives considered in parking lot design, the design outcome is generally undesirable, with poor quality landscaping, unattractive streetscapes and a lack of pedestrian safety, comfort and amenity.

Conventional surface parking lots also represent an environmental challenge. Large expanses of asphalt contribute to the urban heat island effect, which raises local air temperature, elevates smog, and, in turn, increases energy demand for summer cooling. Vehicles left to "bake in the sun" can be significant polluters as well, emitting smog-forming contaminants when parked and requiring additional energy for cooling when travel resumes.

Traditional parking lot surfaces prevent rainwater and snowmelt from being absorbed into the soil to replenish groundwater. During storms and winter thaws, impermeable pavement can produce rapid run-off which poses flooding hazards and the risk of carrying pollutants directly into our lake, rivers and streams. Dark surfaces can also increase the temperature of stormwater run-off, disrupting water quality in receiving areas.

The Design Guidelines for 'Greening' Surface Parking Lots respond to both the urban design and environmental challenges associated with a surface parking lot. The Guidelines are intended to create surface parking lots that are not only efficient, but also safe, attractive and environmentally responsible.

'Greening' the surface parking lot involves planting trees, providing good quality soil and generous landscaped areas, enhancing pedestrian and cycling infrastructure, managing stormwater on-site, reducing the urban heat island effect, and using sustainable materials and technologies.

Urban Design and Environmental Challenges



"Left-over" space with poor quality landscaping



Unsightly parking lot dominating the street edge



Large expanse of unshaded asphalt contributing to urban heat and polluted stormwater run-off

2.0 PURPOSE AND OBJECTIVES

The Design Guidelines for 'Greening' Surface Parking Lots implement Built Environment and Natural Environment policies of the Official Plan (Chapters 3.1 and 3.4). This includes policies related to improving the public realm, enhancing pedestrian safety and comfort, increasing shade, enhancing the quality of landscaping, encouraging on-site stormwater management, and promoting the use of sustainable materials and technologies. Specific Official Plan policies relevant to the design of surface parking lots are summarized in Appendix A.

The Guidelines also provide design options and strategies to implement many environmental performance targets of the Toronto Green Development Standard (GDS). GDS performance targets relevant to the design of surface parking lots include measures for reducing the urban heat island effect, improving pedestrian and cycling infrastructure, using energy efficient fixtures and recycled materials, managing stormwater run-off on-site, and preserving and enhancing the urban forest.

Sections in the Design Guidelines for 'Greening' Surface Parking Lots which correspond to the environmental categories and performance targets of the GDS are identified by the following symbols:


Air quality (including urban heat island effect)


Energy efficiency and greenhouse gas emissions


Water quality and efficiency


Solid waste reduction


Urban ecology

TORONTO OFFICIAL PLAN

"New development will provide amenity for adjacent streets and open spaces to make these areas attractive, interesting, comfortable and functional for pedestrians"

3.1.2 Built Form Policy 5

"To support strong communities, a competitive economy and a high quality of life, public and private city-building activities and changes to the built environment, including public works, will be environmentally friendly"

3.4 The Natural Environment Policy 1

Before planning and building surface parking lots, the feasibility of alternatives, such as underground or structured parking, should be considered. When these preferred alternatives are not feasible, surface parking lots should be carefully designed to enhance the urban design and environmental conditions.

Surface parking lot design should reflect the following objectives:

- Respect the existing or planned context
- Enhance the safety and attractiveness of the public realm (adjacent streets, parks and open spaces)
- Create direct, comfortable and safe pedestrian routes
- Provide shade and high-quality landscaping
- Mitigate the urban heat island effect
- Manage stormwater quality and quantity on-site
- Incorporate sustainable materials and technologies



Landscaped street edge



Dedicated pedestrian route



Shade within the lot



Bio-retention area



Permeable surface

3.0 HOW AND WHERE THE GUIDELINES APPLY

The Design Guidelines for 'Greening' Surface Parking Lots apply to the design, review and approval of all developments containing surface parking.

The Guidelines have city-wide applicability and will normally apply to the evaluation of design alternatives in rezoning, official plan amendment and site plan applications. Owners of existing parking lots are not required, but are encouraged, to make alterations and improvements consistent with the Guidelines at the time of resurfacing or other appropriate phase in the development life-cycle.

The Guidelines will also apply to the development of surface parking lots owned and/or operated by the City of Toronto or any Agency, Board or Commission of the City of Toronto. The Guidelines should be considered when opportunities arise to retrofit or enhance existing City parking lots.

The Guidelines are intended to be read together with the Official Plan, applicable Zoning By-laws and Secondary Plans, the Toronto Green Development Standard (GDS) and other applicable City standards, policies and guidelines.

When using the Guidelines in conjunction with the Toronto Green Development Standard, developers, designers and reviewers of sites with surface parking lots should give particular consideration to guidelines marked with the GDS symbols (see 2.0 Purpose and Objectives). The GDS is currently voluntary for the private sector and is to be applied, where feasible, to the City of Toronto or any Agency, Board or Commission of the City of Toronto.

In many areas of Toronto, parking is required to be underground, allowing for intensification, mixed use, open space, etc. at-grade. Adhering to the Design Guidelines for 'Greening' Surface Parking Lots does not constitute approval for surface parking where it is otherwise prohibited by the Zoning By-law.

4.0 DESIGN GUIDELINES

The previous three sections of the Design Guidelines for 'Greening' Surface Parking Lots provide background, policy rationale and design objectives for improving the quality of surface parking lots in the City of Toronto. This section 4.0 Design Guidelines, provides the necessary direction and strategies to implement and achieve a higher standard in surface parking lot design.

The Design Guidelines section is organized into five sub-sections:

4.1 Location and Layout
4.2 Vehicle Access and Circulation
4.3 Pedestrian Access and Circulation
4.4 Landscaping
4.5 Stormwater Management

Each sub-section provides a range of strategies and specific measures intended to improve the urban design and environmental conditions of the surface parking lot.

Designers of surface parking lots are encouraged to generate site-specific solutions that meet the intent of the Guidelines.



Commercial parking lot with internal tree planting

4.1 LOCATION AND LAYOUT

4.1.1 General Requirements

a. Locate surface parking behind or beside buildings, away from primary street frontages and street corners.

b. Parking spaces should not be located between the front facade line of buildings and a street edge.

c. Divide larger parking areas both visually and functionally into smaller parking courts.

d. Organize parking spaces and rows to provide consolidated soft landscaped areas and opportunity for on-site stormwater management. (see also 4.4 Landscaping and 4.5 Stormwater Management)

e. Position parking rows perpendicular to the main building entrance(s) to assist safe pedestrian movement toward the building.

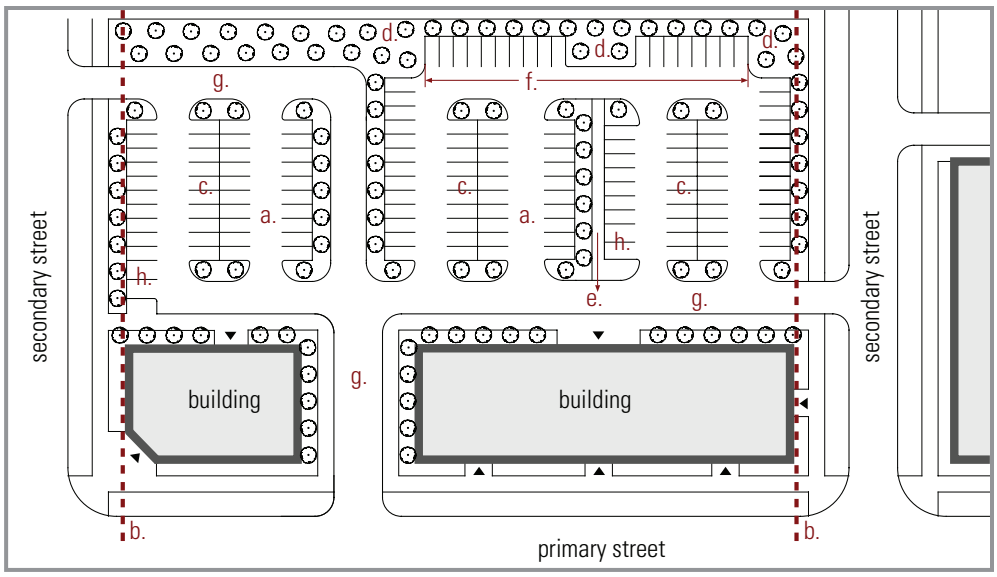
f. Limit the length of parking rows to a maximum of 60m (20-23 contiguous spaces typical). Longer rows should include landscaped breaks, such as islands, with shade trees. (see 4.4.3 Internal Landscaping)

g. To reduce potential vehicle and pedestrian conflicts related to vehicles moving in and out of parking spaces, where possible, avoid locating parking along major drive aisles, street access driveways or in front of building entrances and service areas. Use landscaped islands and medians for separation. (see 4.4.3 Internal Landscape)

Note: Exceptions might include parking lots on small/narrow sites or disabled parking and short-term loading spaces where proximity to building entrances is important; however, no parking spaces shall be located within the clear-throat area of street access driveways as per applicable Access Management Guidelines.

h. Locate and provide accessible parking spaces in accordance with applicable disabled parking by-laws, using the City of Toronto Accessibility Design Guidelines where appropriate.

i. For developments with multiple phases, submit a phasing plan to identify all current and future parking lot requirements. Parking areas should be constructed incrementally to match land use build-out schedules. Areas not required for parking and interim parking lots should be landscaped.



Conceptual parking lot layout – Note: Letters correspond to guidelines in sub-section 4.1.1

4.1.2 Site Grading

a. Ensure that any grade changes at the edge of surface parking lots provide a subtle transition to surrounding areas.

b. Avoid significant changes in grade (greater than 4% slope) between the public sidewalk and pedestrian access and circulation routes. Ensure universally accessible routes are provided across any grade changes.

c. Limit the maximum grades on landscaped areas to 33% (3:1) or less to ensure that grassed slopes can be maintained.

d. Limit the use of retaining walls, particularly along street frontages, parks, ravines and other areas of the public realm.

   Note: Where retaining walls cannot be avoided, minimize the overall height or provide low terraces, use durable, attractive materials, and incorporate intensive soft landscaping.

e. When appropriate, use the existing site grading to enhance the screening of parking lots.



f. Provide a site grading plan compatible with the stormwater management approach selected for the site:

   - apply a cross-grade for paved surfaces as low as 1.5% to encourage slower stormwater flow
   - use manufacturer recommended grading parameters for permeable pavement installations to enable water infiltration
   - slope surfaces to direct stormwater toward landscaping, bio-retention areas or other water collection/treatment areas as identified on the site (see also 4.5 Stormwater Management)



A subtle change in grade at the edge of the parking lot screens parked cars

4.1.3 Lighting

a. Provide a comprehensive Lighting Plan for the parking lot site. Lighting should create an identity for the parking lot, enhance adjacent streets and pedestrian environments and be appropriate to the location, context and scale of the areas being lit.

b. Select different luminaries with a coordinated appearance to light pedestrian pathways, parking spaces, drive aisles, building and site entrances and other relevant parking lot features.

c. Balance the need for safety and security with the reduction of energy consumption and light pollution:

- ensure all parking spaces and circulation routes are well-lit
- install lighting that is appropriately scaled to its purpose, i.e. avoid "over lighting"
- direct light downward and avoid light overspill on adjacent properties, streets and open spaces
- use energy-efficient fixtures and bulbs
- incorporate opportunities for off-grid power generation, e.g. solar, wind, etc.

d. Provide pedestrian-scaled lighting, such as bollards or lower-scale pole fixtures along pedestrian routes.

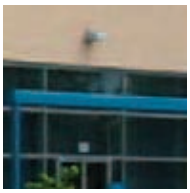
e. Consider lighting elements for their aesthetic and design value, not simply their lighting function or ease of maintenance.

f. Coordinate the location of lighting with pedestrian clearways, tree planting and other landscaping.


A coordinated lighting scheme


Pedestrian light


Parking lot light


Building entrance light


A pedestrian pathway defined and lit with appropriately-scaled fixtures

4.1.4 Other Site Elements

a. Integrate bicycle parking, shopping cart corrals, ticket or payment kiosks, signage, public art, and other applicable site elements into the design and layout of the parking lot. Indicate the location of these elements on the Site Plan.

b. Structures related to site elements, such as bicycle parking or shopping carts, should incorporate sustainable materials and technologies whenever possible.

c. Locate short- and long-term bicycle parking in highly visible, well-lit, accessible and weather protected areas. Incorporate way-finding signage as appropriate.

d. Provide at least 0.6m clearance between parked bicycles and adjacent walls, poles, landscaping, street furniture, drive aisles and pedestrian clearways and at least 1.5m clearance from vehicle parking spaces. (refer to Chapter 9 - Bicycle Parking, in the Toronto Bike Plan for more information)

e. Where shopping carts are associated with parking lot use, position cart corrals so that each row of parking has access to a cart return area.

Note: Shopping cart corrals are encouraged to extend the width of two parking rows and incorporate landscaping to buffer adjacent parking spaces. (see 5.2 Additional Diagrams)

f. Explore opportunities for public art early in the planning process. Examples of public art opportunities in parking lots might include enhancement to the street edge, screening, a marker of the entrance or exit, or a focal point sculpture.



Bicycle parking with a protective canopy creates a unique parking lot edge and integrates well with the streetscape design



This parking lot entry provides an opportunity for bold public art
Artwork credit: "Between Heaven and Earth" by John McEwen

4.2 VEHICLE ACCESS AND CIRCULATION

a. Limit the number and width of curb cuts for street access driveways to minimize interruption to the public sidewalk, streetscape and perimeter landscaping. (refer to the applicable Access Management Guidelines for driveway requirements)

b. Provide access to surface parking lots from secondary streets or laneways whenever possible.

c. Share driveway access between adjacent sites where feasible.

d. Define street access driveways and internal vehicle routes with curbed landscaped areas, tree planting and lighting. Explore opportunities to include public art.

e. Size vehicle circulation routes according to use. Avoid using over-sized driveways, drive aisles and turning radii.

Note: Limiting the width of driveways and drive aisles reduces the expanse of parking areas and provides more opportunity for soft landscaping. Minimizing turning radii reduces the length of pedestrian crossings and encroachment into landscaped areas.



Driveway well defined with landscaping and decorative lighting

f. 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.

g. Provide continuous circulation throughout the site. Avoid dead end driveways and turn around spaces.

h. Ensure unobstructed motorist and pedestrian sight distance and provide clearly marked crossings at all intersections between vehicle routes and pedestrian pathways.



Shared street access driveway to mid-block and rear parking lots

4.3 PEDESTRIAN ACCESS AND CIRCULATION

a. Establish a direct and continuous pedestrian network within and adjacent to parking lots to connect building entrances, parking spaces, public sidewalks, transit stops and other pedestrian destinations.

b. Provide at least one pedestrian route between the main building entrance and the public sidewalk that is uninterrupted by surface parking and driveways.

c. In larger parking lots or where parking lots serve more than one building or destination, provide designated pedestrian pathways for safe travel through the parking lot.

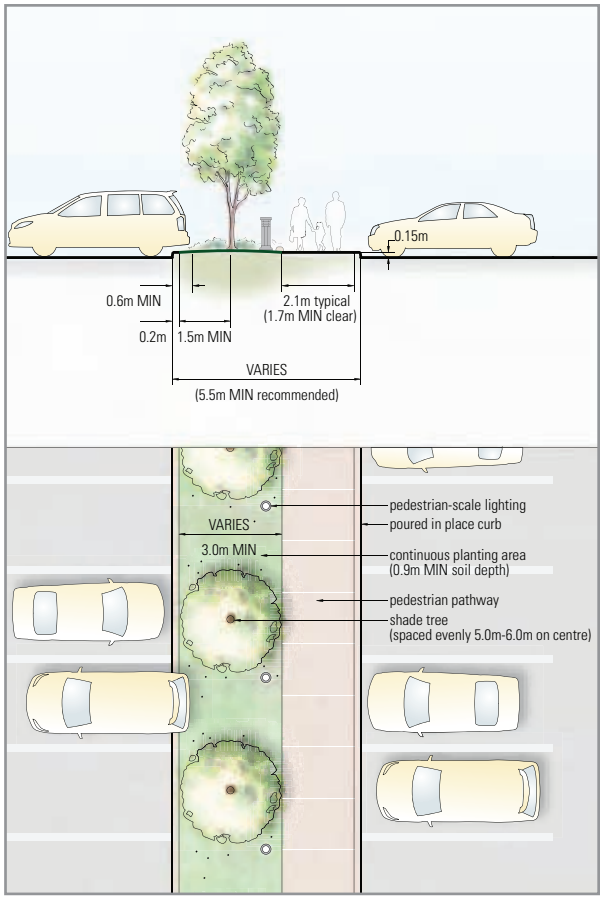
d. The width, number and orientation of pedestrian routes should match the anticipated flow of pedestrian traffic through the site. Consider the space requirements for equipment related to parking lot use, such as shopping carts, strollers and mobility aids, when planning the width and location of pedestrian routes.

e. All pedestrian routes within a parking lot should include:

- a barrier-free pathway, with a minimum clear width of 1.7m (wider pathways are encouraged and may be required depending on parking lot use);
- shade trees (or a shade structure) along one or both sides of the pathway;
- pedestrian-scale lighting to illuminate and define the route; and
- a clear division from vehicular areas, with a change in grade, soft landscaping and a change in surface material



Landscaped pedestrian route provides a safe, direct and pleasant connection between the building entrance, surrounding parking spaces and other buildings

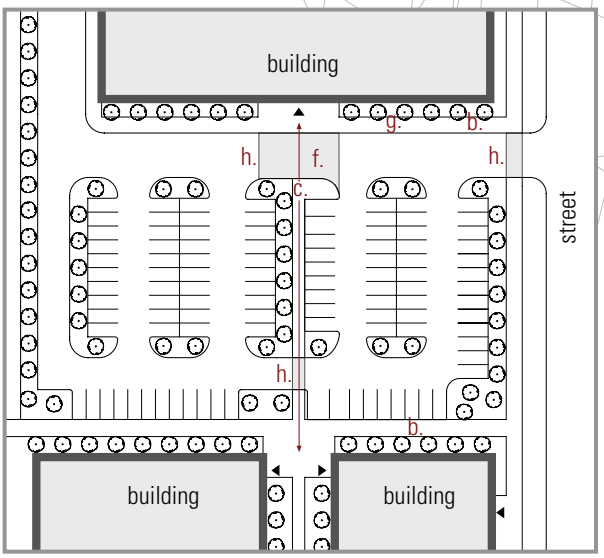


Design concept for pedestrian pathway with single row of shade trees. Note: See 5.2 Additional Diagrams for further design options

f. Consider installing "tables" (rolled curbs bordering slightly elevated crossings) at major internal intersections to serve as a traffic calming feature and provide pedestrian priority.

g. Provide enhanced pedestrian pathways along street access driveways.

h. Where pedestrian routes cross street access driveways and other major drive aisles, clearly mark crossings and provide unobstructed sight distance for both pedestrians and vehicles.



Conceptual pedestrian access and circulation scheme
Note: Letters correspond to guidelines in sub-section 4.3

4.4 LANDSCAPING

4.4.1 General Requirements

a. Retain and protect existing trees, vegetation, natural slopes and native soils and integrate these features into the overall landscape plan.

b. Distribute landscaping throughout the site to soften and screen parking lot edges, reinforce circulation routes, create pleasant pedestrian conditions and maximize shade and stormwater benefits. (see sections 4.3, 4.4.2, 4.4.3, 4.5 for details)

c. Consolidate soft landscaped areas, particularly in larger parking lots, to enhance tree and plant material growing conditions.

d. Landscaped areas should be designed to accommodate the following:

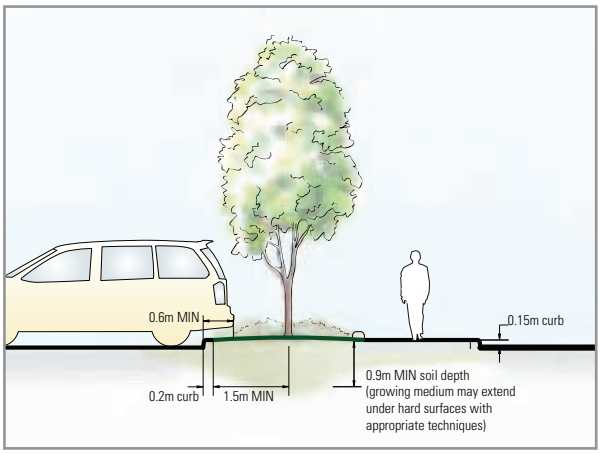
- trees planted with access to at least 30m^3 (at 0.9m depth) of good quality soil (see Appendix B)
- trees planted at least 1.5m from curbs, sidewalks, driveways and other hard surfaces to buffer from stress caused by salt, snow piling, vehicle overhang and compacted soils
- all other plant material, except sod or groundcover, set back a minimum 0.6m from any curb edge to protect from vehicle overhang and mechanical damage
- high-branching, deciduous shade trees planted evenly at 5m to 6m intervals (or as appropriate to the selected species) to quickly establish continuous canopy coverage

e. Expand rooting zones of landscaped areas under adjacent hard surfaces.

Note: Techniques may include the use of structural soils or cells, continuous planting trenches and/or permeable paving.



Existing mature trees protected and incorporated into the parking lot landscape



Design concept for pedestrian pathway with single row of shade trees. Note: See 5.2 Additional Diagrams for further design options.

f. 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
- include suitable native species where possible and appropriate (see Appendix B).
- avoid planting invasive species near ravines and other natural areas
- avoid monocultures which can be susceptible to disease
- consider sun, shade and irrigation requirements
- incorporate a variety of deciduous and coniferous trees and shrubs for year-round interest, texture, shape and seasonal colour

g. Install a permanent irrigation system in all landscaped areas. Where possible, collect rainwater from rooftops and other surfaces for plant irrigation.

h. Identify hose bibs, sprinkler outlets, storage reservoirs, and other applicable irrigation elements on the Landscape Plan. Locate valves and other maintenance controls in discrete, yet accessible areas.

i. Where landscaping might impact motorist/ pedestrian sight distance, keep shrubs below 0.85m in height and prune trees so that the lowest branches will be at least 2m above ground level. Limit any other landscape features that might cause obstructions to a maximum height of 1m.

j. Ensure overhanging branches of trees or shrubs adjacent to pedestrian pathways maintain a clear headspace of at least 2m.

k. Coordinate tree planting with the location of light standards and other utilities.



Seasonal variety with shade trees and understory planting

4.4.2 Streetscape and Perimeter Landscaping

a. Provide a landscaped area at least 3m in width between surface parking and all property lines. Consult the applicable Zoning By-law for additional setback requirements.

b. 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 safety and security.

c. For parking lot edges adjacent to streets, parks or other public open space, provide the following:

- at least one row of shade trees, spaced evenly at 5m to 6m intervals (or as appropriate to the selected species) for the length of the parking lot edge
- screening, consisting of continuous planting, alone or in combination with a low decorative fence/wall or a landscaped berm. Typically, keep shrubs, fences or walls to a maximum height of 1m

  Note: The location, design and character of the screening should fit in with and enhance the existing landscape and built form character of the street or public open space.
- a coordinated appearance with the existing or planned streetscape treatment (refer to the Toronto Urban Design Streetscape Manual)

d. Set back screening at least 1m from the edge of public sidewalks and 0.6m from parking lot curbs. Screening should not encroach into the public street right-of-way.



A low hedge and shade trees enhance the public sidewalk and parking lot edge



A decorative wall, fencing and shade trees screen views into the parking lot



A soft landscaped berm lessens the appearance of parked vehicles from the street

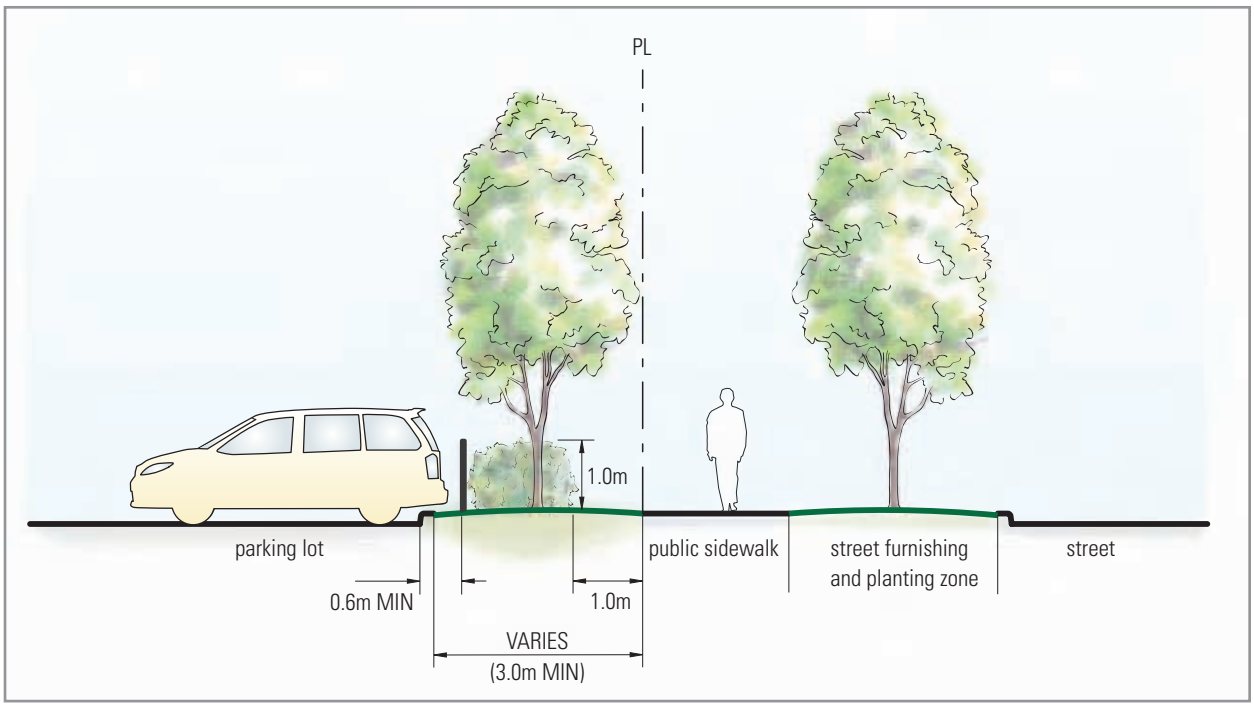
e. For parking lot edges not adjacent to the public realm, provide soft landscaping with a variety of deciduous and coniferous trees and plantings. Include bio-retention or other stormwater management systems as appropriate. (see 4.5 Stormwater Management)

f. Install high-quality privacy fencing with landscaped screening between parking lots and neighbouring, less compatible uses.

g. Where possible, include landscaping and a pedestrian walkway between parking lots and building edges.



High quality privacy fencing, softened with shrubs and shade trees, screens parking lot from neighbouring property



Design concept for street facing parking lot edge

4.4.3 Internal Landscaping

a. Incorporate soft landscaped areas and trees within the parking lot to define major vehicle and pedestrian routes, provide shade and break-up the expanse of paved areas.

Note: Soft landscaped areas include islands, medians, bio-retention areas and other consolidated planting areas.

b. All soft landscaped areas should contain suitable growing medium and be sized and designed to support healthy trees and plants (refer to section 4.4.1 and Appendix B). Consolidate smaller landscaped areas to provide better quality growing conditions and support for a broader range of tree and plant species.

c. Define internal landscaped areas with a continuous 15cm curb to prevent damage from vehicles and snow clearance, to separate planting areas from pedestrian pathways, and to prevent soil and other landscape material from spreading over adjacent surfaces.

Note: Taller or shorter curbs are permitted where vehicle overhang and door clearances are not an issue. Curb cuts are permitted to support accessibility and stormwater initiatives.

d. Plant high-branching deciduous trees throughout the parking lot interior to provide shade for pedestrians, vehicles and surfaces:

- provide internal shade trees at a minimum ratio of one tree planted for every five parking spaces supplied
- distribute internal shade tree planting such that no parking space is more than 30m from a tree

Note: On small or narrow sites, shade trees provided in non-street facing perimeter planting areas can be counted toward the internal tree requirement, provided that the maximum distance from a parking space (30m) is met.



Generously sized islands provide space for shade trees, lighting and understory planting



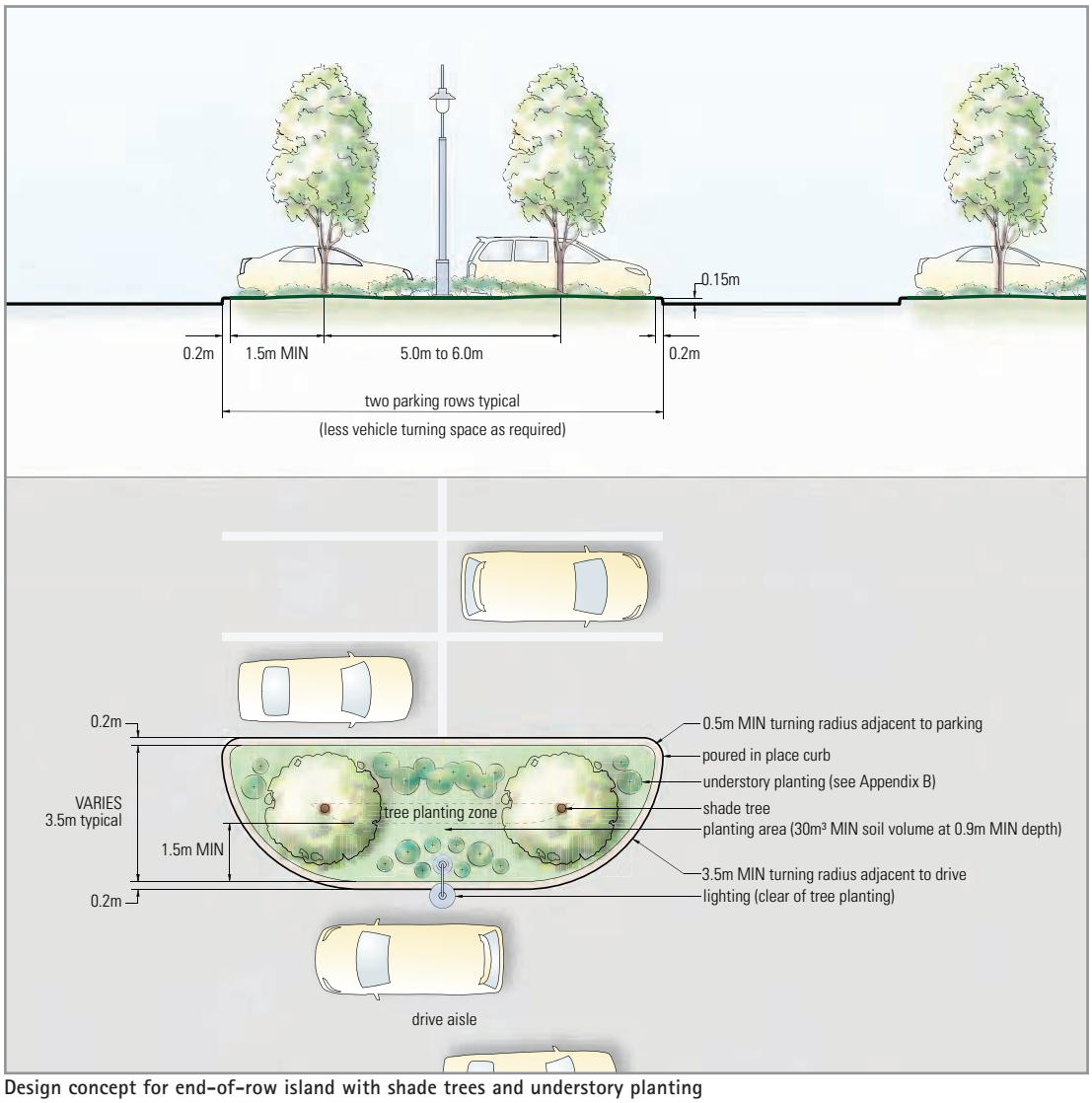
Street access driveway by a curbed median with tree planting, shrubs, colourful flowers and lighting

e. Include landscaped islands at the beginning and end of each parking row and to break up longer rows or highlight special features:

- provide a minimum growing environment of $30m^3$ (at 0.9m depth) of good quality soil (see Appendix B)

  Note: This typically results in a landscaped area at least 3.5m wide for end-of-row islands and 3m wide for mid-row islands

- plant at least 1 high-branching deciduous shade tree (2 preferred) in each island
- include understory planting, such as shrubs, perennials, ornamental grasses and groundcover



Design concept for end-of-row island with shade trees and understory planting

f. Provide continuous landscaped medians every 3 (or fewer) banks of parking.

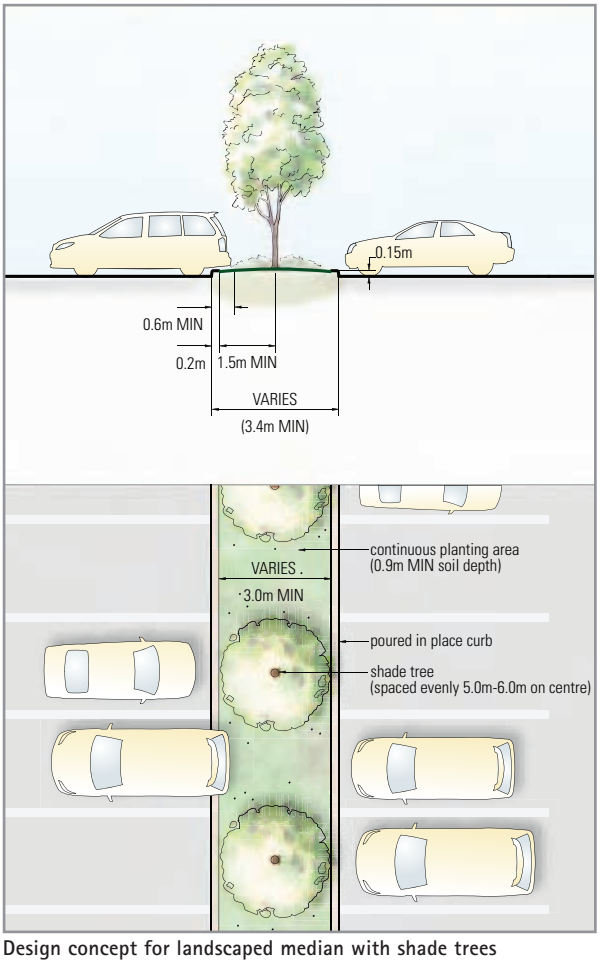
Note: A "bank" of parking consists of 2 parking rows and a drive aisle.

g. Medians should have a landscaped area at least 3m in width and combine with shade tree planting requirements, pedestrian pathways and/or stormwater management as appropriate. (see also 4.3 Pedestrian Access and Circulation and 4.5 Stormwater Management)

Note: Shade structures may replace shade tree planting, only after the minimum interior tree requirement is satisfied or when sufficient soil volume and planting conditions cannot be achieved for proper tree growth. (see 5.2 Additional Diagrams)



A landscaped median shades and cools parked vehicles and surfaces and provides stormwater benefit



Design concept for landscaped median with shade trees

4.4.4 Surfaces

a. Install decorative paving or a change in paving material/colour to emphasize edges, pedestrian routes and crossings, entrances, loading areas and other special features within the parking lot.

b. Where possible, install surfaces containing recycled or sustainable material.

c. Limit the use of dark, impervious surfaces within the parking lot:

- use light-coloured materials, such as concrete, white asphalt or light-coloured pavers, in the hardscape to reduce surface temperatures and contribution to the urban heat island effect
- install permeable/porous pavement, such as open-jointed pavers, porous concrete/ asphalt, or turf/gravel grids, as appropriate to parking lot use and conditions

  Note: Permeable paving should be installed in all overflow parking areas and is encouraged for use in snow storage areas and hardscapes surrounding trees. Consider turf grids/grassy pavers for areas of low traffic or infrequent use.

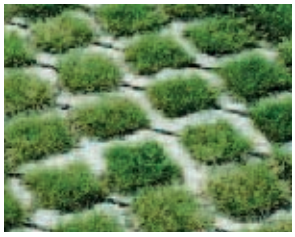
d. When installing porous/permeable paving material, follow manufacturer specifications for minimum and maximum slopes.

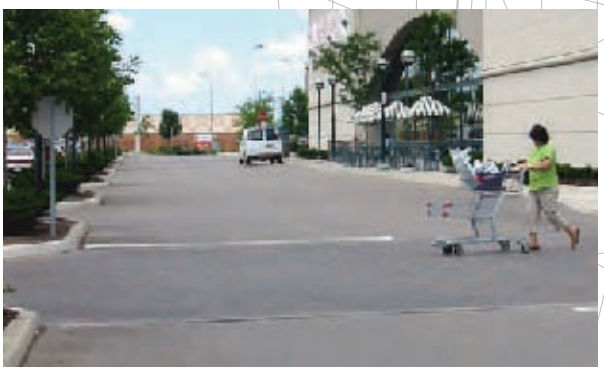
Examples of permeable paving:


Open joint pavers


Porous asphalt


Pervious concrete


Turf grid


Special pavers define the pedestrian crossing leading to the main building entrance

e. Construct the subgrade of any porous pavement to allow adequate drainage and prevent frost heave.

  Note: This is particularly important where clay or silty soil conditions are prevalent.

f. Install perforated subdrains below permeable paving, as required, to store, filter or convey water to additional stormwater facilities.

g. If permeable pavement or pavers are planned for use along driveways leading to public streets or other heavily traveled routes, the surface material and base course must be selected, designed and certified to withstand the anticipated traffic loading stresses and maintenance impacts.

h. Permeable pavements shall be subject to an ongoing maintenance program by the owner (e.g. sweeping, annual vacuuming). Sand should not be used for winter maintenance, unless otherwise specified by the product manufacturer.


Open joint pavers provide opportunity to retain rainwater and snowmelt on-site

4.5 STORMWATER MANAGEMENT

4.5.1 General Requirements

a. Refer to the Toronto Green Development Standard and the Wet Weather Flow Management Guidelines for water balance targets and recommended stormwater management strategies.

b. Minimize the extent of impermeable surfaces within the parking lot.

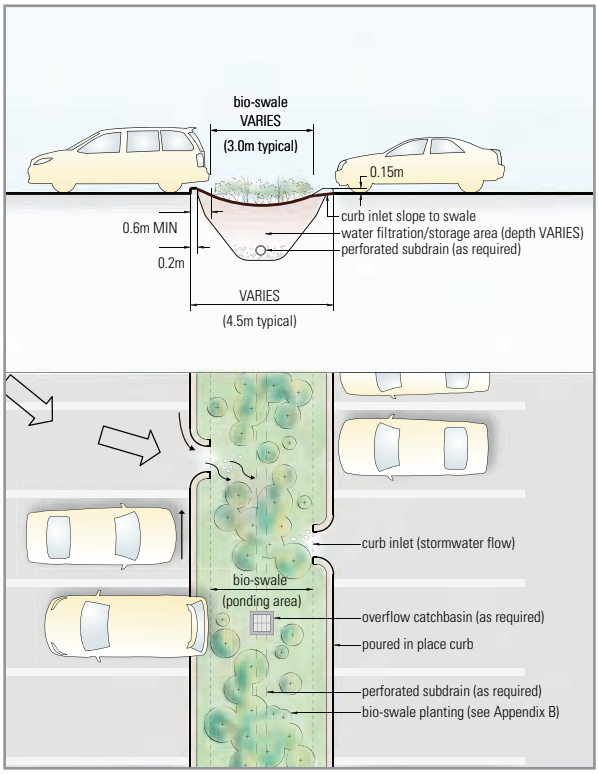
Note: This may be achieved in many ways, including; limiting the size and number of parking spaces to the required minimums stated in the applicable By-laws; limiting the width of drive aisles and looking for opportunity to share access routes as per applicable By-laws and City standards; and/or using permeable paving where hard surfaces are required.

c. Manage rainwater and snowmelt on-site with designs that encourage infiltration, evapotranspiration and water re-use:

- apply a "treatment train" approach
- use permeable paving for parking spaces, drive aisles, overflow parking, snow storage areas and other hard surfaces in the parking lot (refer to 4.4.4 Surfaces)
- plant trees, shrubs and other absorbent landscaping throughout the parking lot to provide shade and places for water uptake (refer to 4.4 Landscaping)
- create bio-retention areas, such as swales, vegetated islands and overflow ponds
- include catchbasin restrictors and oil/grit separators as appropriate
- incorporate opportunities to harvest rainwater (active or passive) from rooftops and other hard surfaces for landscape irrigation



A bio-retention area adjacent to a parking lot drive aisle



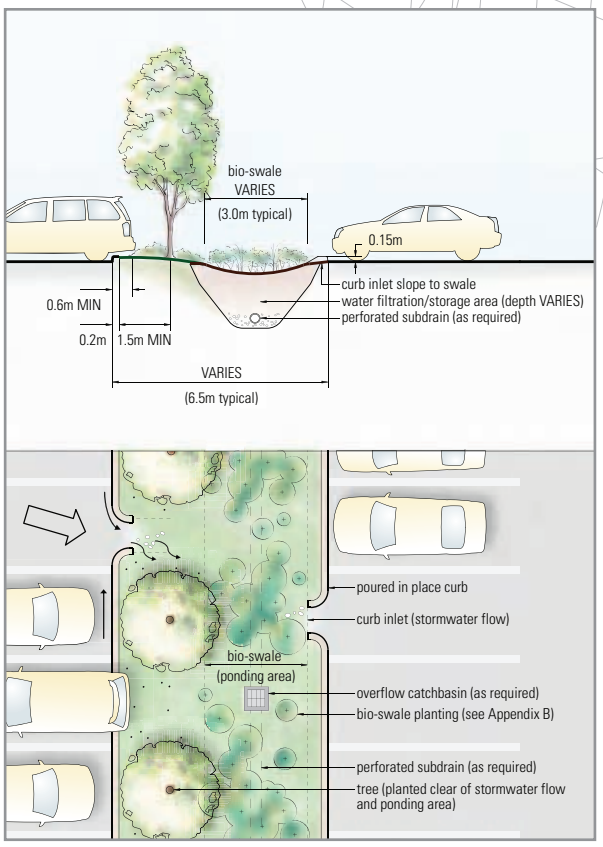
Design concept for bio-retention swale without tree planting

d. Where installed, bio-retention areas should be appropriately designed and located to filter, store and/or convey the expected stormwater flows from surrounding paved areas.

e. Although the design of each bio-retention area should be site specific, consider the following:

- select plant species that are tolerant of extreme conditions, such as flooding, drought, salt and other contaminants (refer to Appendix B)
- 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 (refer to Appendix B)
- plant trees (if applicable) 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

f. Ensure overland flow routes and stormwater inlets and outlets are clear of debris and snow piling.



Design concept for bio-retention swale with tree planting

4.5.2 Snow Storage

a. Snow storage areas should be identified on the Landscape Plan and have a minimum dimension of 2.6m by 1.5m to accommodate snow piling from a typical plough blade.

b. Provide snow storage areas away from public streets and other areas where motorist/pedestrian sight distance and continuous landscape screening are essential.

c. Sodded areas or portions of landscaped areas may be identified for snow storage with plant material selected accordingly.

d. Where overflow parking or bio-retention areas are provided, these areas may be used for snow storage.

e. Hard surfaced areas used for snow storage are encouraged to have permeable paving to retain snowmelt on-site. (see 4.4.4 Surfaces)



A bio-retention area used for snow storage

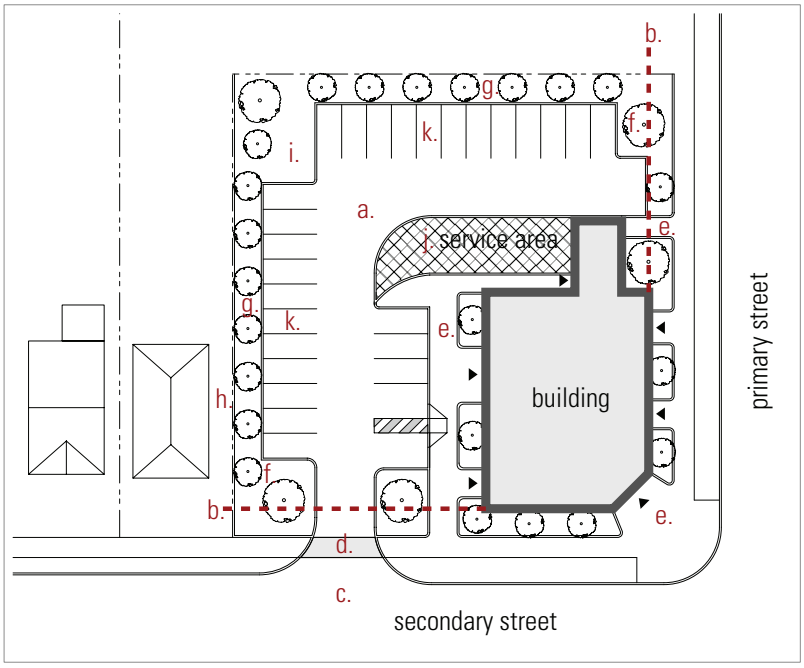
5.0 DIAGRAMS

5.1 SITE PLAN DIAGRAMS

The following concept diagrams summarize and apply various guidelines contained within section 4.0.

The diagrams are for illustration and discussion purposes only. Designers of surface parking lots should meet the intent of the guidelines with site-specific design solutions.

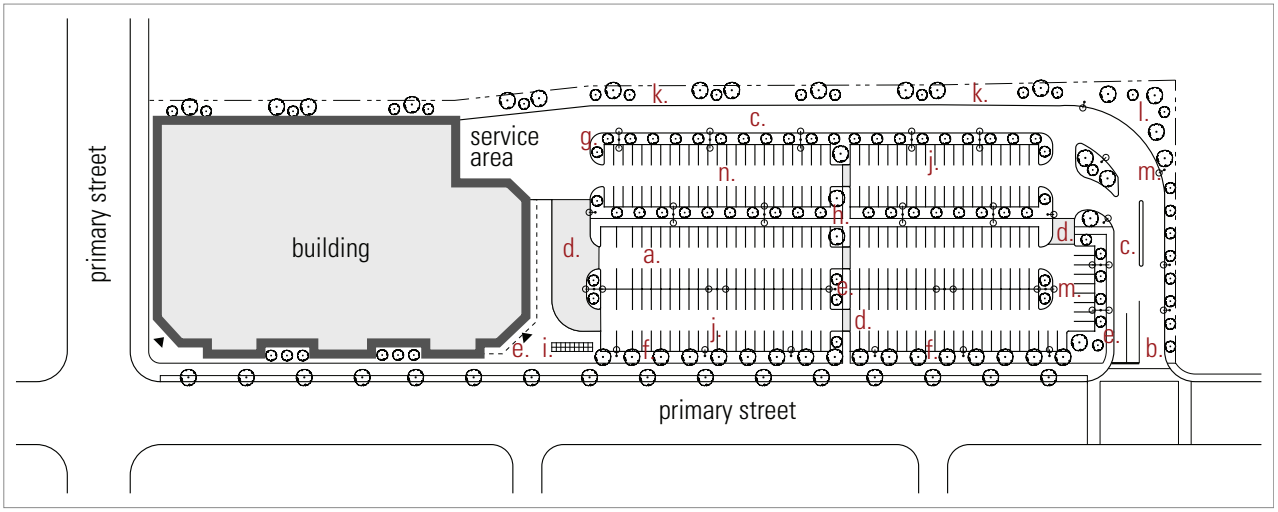
5.1.1 Small Corner Site



LEGEND

a. parking behind/beside building, away from street corner
b. parking spaces behind façade line of building
c. parking lot access from secondary street
d. clearly marked pedestrian crossing
e. direct/connected pedestrian route
f. minimum 3m wide landscaped area with shade trees and low plantings (screening)
g. minimum 3m wide landscaped area with shade trees (bio-retention opportunity)
h. high-quality privacy fencing and plantings buffer less compatible use
i. snow storage/bio-retention area
j. rolled curb and change in paving to mark "no parking" zone
k. permeable surface (when feasible)

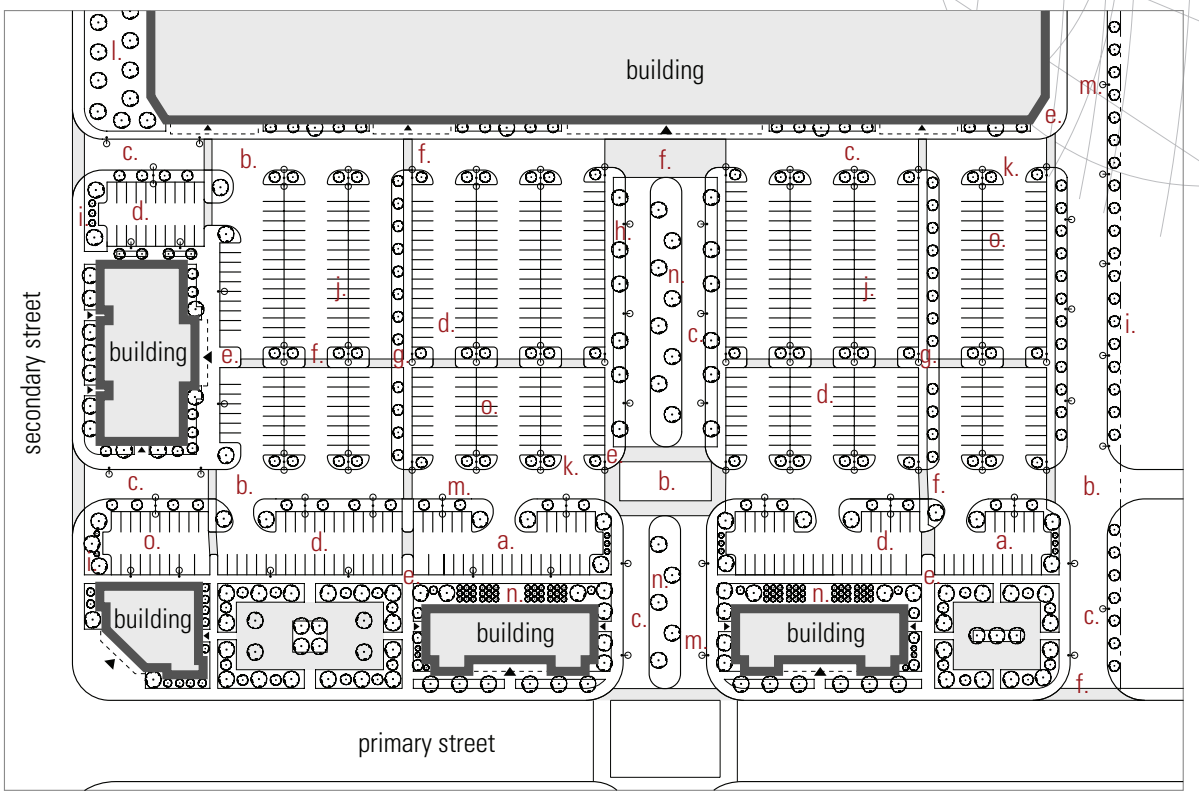
5.1.2 Long Narrow Site



LEGEND

a. parking beside building, away from street corner
b. parking lot access with minimum disruption to streetscape
c. main drive aisle clear of parking spaces
d. clearly marked pedestrian crossing
e. direct/connected pedestrian route
f. minimum 3m wide landscaped area (shade trees, plantings, decorative screening) coordinated with streetscape
g. minimum 3m wide landscaped median with shade trees (bio-retention opportunity)
h. designated internal pedestrian pathway with shade trees
i. sheltered bicycle parking near main entrance
j. parking row (20-23 continuous spaces maximum) with landscaped breaks
k. bio-retention area
l. consolidated landscape area (snow storage/bio-retention opportunity)
m. coordinated lighting scheme
n. permeable surface (when feasible)

5.1.3 Large Site with Multiple Buildings



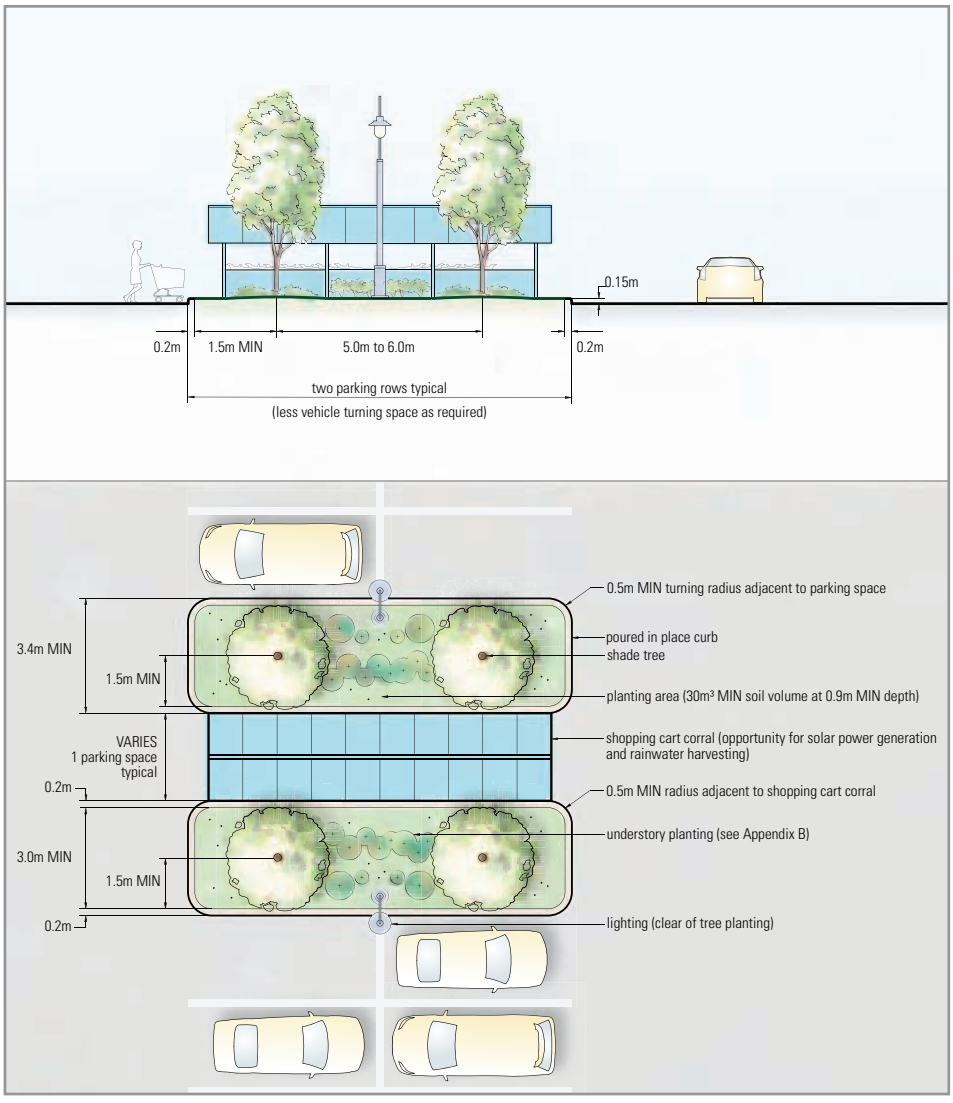
LEGEND

a. parking concealed behind street-fronting buildings and landscaped open space
b. parking lot access driveway shared between multiple destinations
c. main drive aisle clear of parking spaces
d. large parking area divided into smaller parking courts
e. direct and continuous pedestrian network
f. clearly marked pedestrian crossing
g. designated internal pedestrian pathway with shade trees
h. minimum 3m wide landscaped median with shade trees (bio-retention opportunity)
i. minimum 3m wide landscaped area with shade trees and low plantings for screening
j. parking row (20-23 continuous spaces maximum) with landscaped breaks
k. end of row island with shade trees (minimum 30m^3 soil volume)
l. consolidated landscape area (bio-retention opportunity)
m. coordinated lighting scheme
n. bio-retention area/rain garden
o. permeable surface (when feasible)

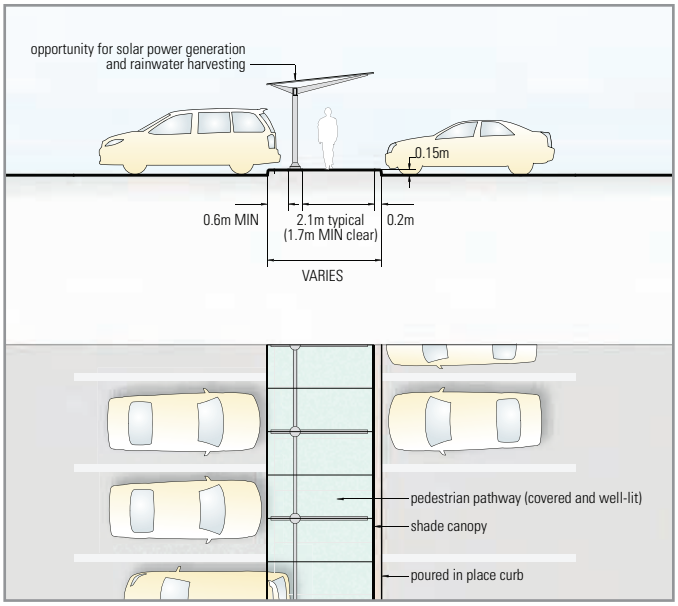
5.2 ADDITIONAL DIAGRAMS

The following diagrams represent further options to consider when designing various parking lot features.

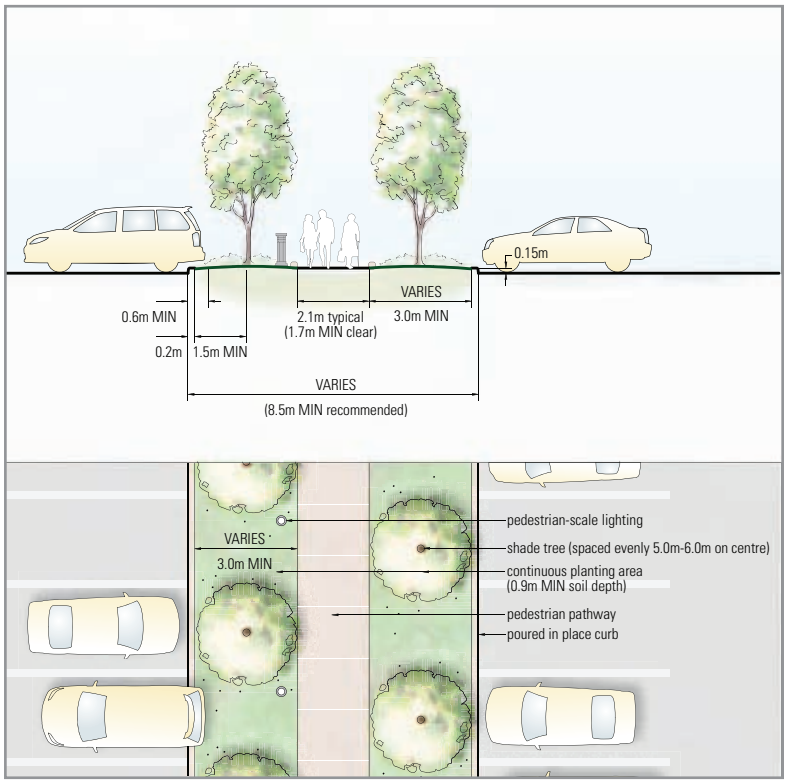
The diagrams are for illustration and discussion purposes only. Design variations and site-specific solutions that meet the intent of the Guidelines are strongly encouraged.



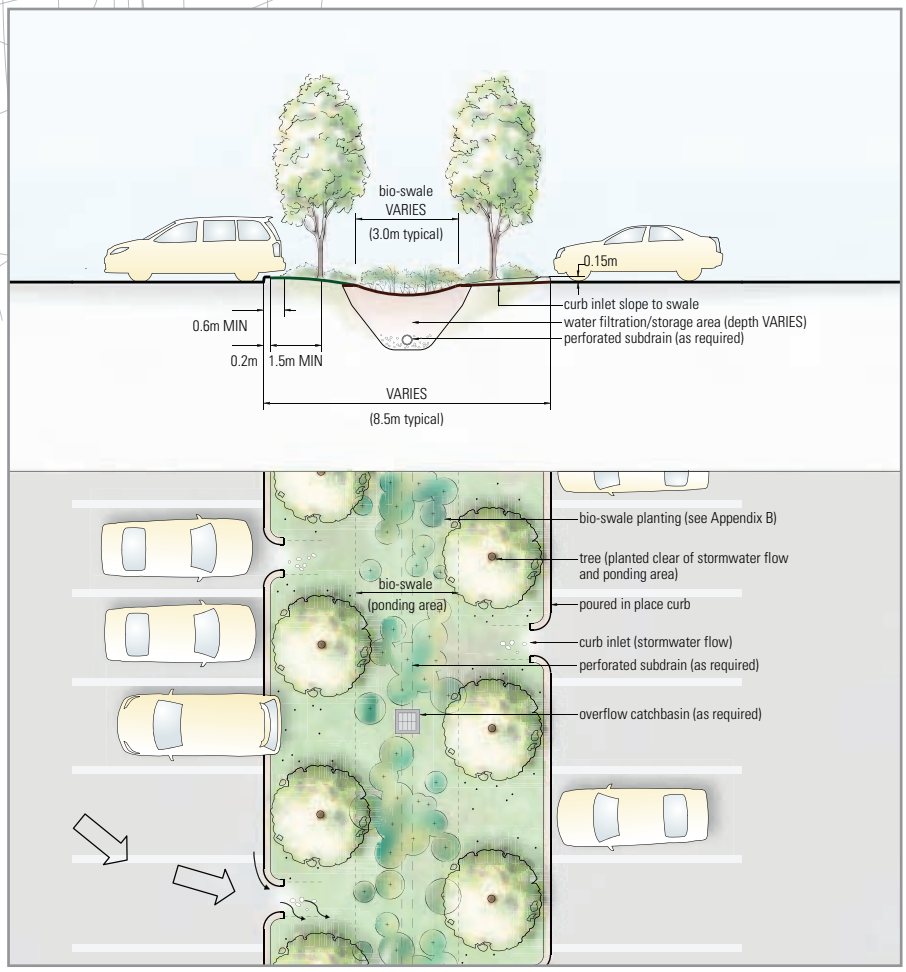
Design concept for mid-row landscaped islands and shopping cart corral (See 4.1.4 Other Site Elements and 4.4.3 Internal Landscaping)



Design concept for pedestrian pathway with shade structure
(See 4.3 Pedestrian Access and Circulation)



Design concept for pedestrian pathway with double row of shade trees
(See 4.3 Pedestrian Access and Circulation)



Design concept for bio-retention swale with double row of trees (See 4.5 Stormwater Management)

APPENDIX A

OFFICIAL PLAN POLICIES RELEVANT TO SURFACE PARKING LOTS

3.1 THE BUILT ENVIRONMENT

3.1.1 THE PUBLIC REALM

POLICY 12

"Design measures which promote pedestrian safety and security will be applied to streetscapes, parks, other public and private open spaces, and all new and renovated buildings"

3.1.2 BUILT FORM

POLICY 2

"New development will locate and organize vehicle parking, vehicular access, service areas and utilities to minimize their impact on the property and on surrounding properties and to improve the safety and attractiveness of adjacent streets, parks and open spaces by:

a) using shared service areas where possible within development block(s) including public and private lanes, driveways and service courts;

b) consolidating and minimizing the width of driveways and curb cuts across the public sidewalk;

d) providing underground parking where appropriate;

e) limiting surface parking between the front face of a building and the public street or sidewalk; and

f) integrating above-ground parking structures, where permitted or appropriate, with building design, and have usable building space at grade facing adjacent streets, parks and open spaces"

POLICY 5

"New development will provide amenity for adjacent streets and open spaces to make these areas attractive, interesting, comfortable and functional for pedestrians by providing:

a) improvements adjacent to the boulevards and sidewalks, including street trees, lighting and other street furniture

b) co-ordinated landscape improvements in setbacks to create attractive transitions from the private to public realms;

c) weather protection such as canopies and awnings;

d) landscaped open space within the development site;

e) landscaped edges of surface parking lots along streets, parks and open spaces to define the street edge and visually screen the parked autos;

f) safe pedestrian routes and tree plantings within surface parking lots; and

g) public art, where the developer agrees to provide this, to make the building and its open spaces more attractive and interesting."

3.4 THE NATURAL ENVIRONMENT

POLICY 1

"To support strong communities, a competitive economy and a high quality of life, public and private city-building activities and changes to the built environment including public works, will be environmentally friendly, based on:

a) protecting and improving the health of the natural ecosystem, by:

i) minimizing air, soil and water pollution;

iii) managing the quantity and improving the quality of stormwater and groundwater infiltration and flows;

d) preserving and enhancing the urban forest by:

i) providing suitable growing environments for trees;

ii) increasing tree canopy coverage and diversity, especially of long-lived native and large shade trees; and

iii) regulating the injury and destruction of trees

f) reducing the adverse effects of stormwater and snow melt based on a hierarchy of watershed-based wet weather flow practices which recognize that wet weather flow is most effectively managed where it falls, supplemented by conveyance, then end-of-pipe solutions"

POLICY 2

"New development will include stormwater management in accordance with best management practices. This should include source control and on-site facilities to manage stormwater where rain and snow fall, and to ensure it does not produce a net increase in stormwater flows or degrade stormwater quality. On-site facilities are not always feasible, in which case alternative management solutions will be considered"

POLICY 18

"Innovative energy producing options, green industry and green building designs and construction practices will be supported and encouraged in building renovation and redevelopment through:

a) innovative methods of reducing stormwater flows;

b) advanced water conservation and efficiency measures;

d) establishing and extending district heating and cooling facilities, wind and solar power installations and other renewable energy systems;

f) the development of innovative green spaces such as green roofs, and designs that will reduce the urban heat island effect"

2.4 BRINGING THE CITY TOGETHER: A PROGRESSIVE AGENDA FOR TRANSPORTATION CHANGE

POLICY 7

"Policies, programs and infrastructure will be introduced to create a safe, comfortable and bicycle friendly environment that encourages people of all ages to cycle for everyday transportation and enjoyment including:

b) provision of bicycle parking facilities in new developments"

POLICY 8

"An urban environment and infrastructure will be created that encourages and supports walking throughout the City through policies and practices that ensure safe, direct, comfortable, attractive and convenient pedestrian conditions, including safe walking routes to schools, recreation areas and transit"

4.6 EMPLOYMENT AREAS

POLICY 6

"Development will contribute to the creation of competitive, attractive, highly-functional Employment Areas by:

g) providing landscaping on the front and any flanking yard and adjacent to any public parks and open space to create an attractive streetscape and screening parking, loading and service areas."

APPENDIX B

PLANTING GUIDE

The reference material provided in Appendix B is intended to assist with the planting and selection of tree and plant species within and adjacent to surface parking lots. The Planting Guide provides general recommendations only. Applicants are encouraged to generate site-specific solutions that enhance the site conditions and are consistent with the surrounding context.

B1. GENERAL PLANT SPECIFICATIONS

Install plant material that meets or exceeds the following minimum sizes:

- deciduous street tree 70mm caliper
- deciduous trees 60mm caliper
- small deciduous trees 50mm caliper
- coniferous trees 1500mm ht.
- deciduous shrubs 600mm ht.
- coniferous shrubs 600mm ht. or spread
- perennials 2 years container grown

B2. SOIL QUALITY SPECIFICATIONS

Good quality soil shall consist of a minimum 0.9m* depth, over and above any required drainage system and/or granular material, of sandy loam soil with the following composition:

Sand (50%-60%)
Silt (20%-40%)
Clay (6%-10%)
Organic (2%-5%)
pH = 7.5 or less

*Note: In landscaped areas without tree planting, the minimum depth for good quality soil can be reduced to 0.6m.

B3. NATIVE SPECIES PLANTING LIST

The Native Species Planting List provides a catalogue of species native to the Toronto area that should be considered for use in a parking lot environment. The List includes Native Trees, Shrubs, Grasses, Ferns and Wildflowers. The List also recommends which plants are suited to the growing conditions of the various parking lot features defined below:

Street Perimeter – refers to the planting area flanking the street facing portion of a site. If appropriate, perimeter planting areas facing parks and other public open space should be treated in a similar manner to a street perimeter.

Non-street Perimeter – refers to the planting area along parking lot edges not adjacent to a street.

Island – refers to a landscaped area within a parking lot, typically used to define driveways and ends of parking rows.

Median – refers to a linear landscaped area within a parking lot, typically used to define driveways, separate parking rows and provide pedestrian connections.

Bio-retention Area – refers to a landscaped area that is designed to collect, retain, filter, infiltrate, evapotranspire and/or treat stormwater and snowmelt.

The Native Species Planting List (see following pages) is intended to promote the use of native species and broaden plant diversity within a parking lot. It is not intended to be absolute or restrictive. Where appropriate, the use of suitable non-natives is also encouraged.

Native Trees							Parking Lot Features*				
Common Name	Species	Attributes	Light	Soil	Moisture	Height	Street Perimeter	Non-street Perimeter	Island	Median	Bio-retention Area
Red Maple	*Acer rubrum*	orange to bright red fall colour	☼◐	sand, loam	moist-wet	25m	✓	✓			✓
Silver Maple	*Acer saccharinum*	fast growing, tolerant	☼◐	sand, loam, clay	moist-wet	35m	✓	✓			✓
Blue Beech	*Carpinus caroliniana*	Interesting thin, smooth, slate grey bark	◐●	loam, sandy-loam	moist	8m		✓		✓	✓
Bitternut Hickory	*Carya cordiformis*	fast growing	☼◐	sand, loam	moist	20m		✓		✓	✓
Hackberry	*Celtis occidentalis*	fast growing, tolerant	☼◐	loam, clay	dry-wet	15m	✓	✓	✓	✓	✓
Red Cedar	*Juniperus virginiana*	provides food & shelter for wildlife, tolerant	☼	sand, loam	dry-moist	4m		✓			✓
Tulip Tree	*Liriodendron tulipifera*	Golden yellow fall colour	☼	loam	moist	25m		✓			
Black Tupelo	*Nyssa sylvatica*	Salt tolerance, dark red fall colour	☼	loam	dry-wet	15m	✓	✓		✓	✓
White Spruce	*Picea glauca*	provides wildlife habitat, salt tolerance, year-round screening	☼◐	sand, loam, clay	moist	25m		✓			
Sycamore	*Platanus occidentalis*	interesting, peeling bark	☼◐	sand, loam, clay	moist-wet	30m					✓
Trembling Aspen	*Populus tremuloides*	leaves flutter in wind, fast growing, tolerant	☼	sand, loam, clay	moist	25m					✓
Bur Oak	*Quercus macrocarpa*	provides food & shelter for wildlife	☼◐	loam, clay	dry-wet	15m	✓	✓	✓	✓	✓
Red Oak	*Quercus rubra*	fast growing, wildlife value	☼◐	sand to loamy-clay	dry-moist	25m	✓	✓		✓	✓
White Cedar	*Thuja occidentalis*	provides wildlife habitat	☼◐	sand, loam, clay	dry-wet	15m					✓

*Note: All landscaped areas with tree planting must be continuous with at least $30m^3$ of good quality soil at 0.9m depth. The use of structural soil or other installation is encouraged to extend rooting zones under adjacent hard surfaces.

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Native Shrubs							Parking Lot Features*				
Common Name	Species	Attributes	Light	Soil	Moisture	Height	Street Perimeter	Non-street Perimeter	Island	Median	Bio-retention Area
Downy Serviceberry	*Amelanchier arborea*	white flowers, berries attract birds	☼◐	sand-silt-clay	dry-moist	10m	✓	✓	✓	✓	✓
Smooth Serviceberry	*Amelanchier laevis*	white flowers, berries attract birds	☼◐	sand-silt-clay	dry-moist	10m	✓	✓	✓	✓	✓
Buttonbush	*Cephalanthus occidentalis*	fragrant flowers attract bees	☼	sand-silt-clay	moist-wet	3m					✓
Red-osier Dogwood	*Cornus stolonifera*	white flower, tolerant, attractive red colour in fall	☼	sand-silt-clay	moist-wet	3m					✓
Bush Honeysuckle	*Diervilla lonicera*	fast growing, tolerant, small yellow flowers	☼◐	sand-silt-loam	dry	1m	✓	✓	✓	✓	
Witch-hazel	*Hamamelis virginiana*	yellow star shaped flowers in fall	◐●	sand-silt-loam	moist	6m		✓			✓
Winterberry	*Illex verticillata*	attractive red fruit in winter	☼◐	peat-muck-silt	moist-wet	4m					✓
Sweet Gale	*Myrica gale*	conelike flower clusters, scented leaf	☼	sand-silt-loam	moist-wet	1m					✓
Ninebark	*Physocarpus opulifolius*	showy white flowers	☼	sand	dry-moist	3m	✓	✓	✓	✓	✓
Fragrant Sumac	*Rhus aromatica*	scented leaves	☼	sand	dry	2m		✓			✓
Staghorn Sumac	*Rhus typhina*	brilliant fall colour	☼	sand-silt-clay	dry-moist	6m		✓			✓
Pasture Rose	*Rosa carolina*	rose hips persist into winter	☼◐	sand-silt-loam	dry	1m			✓	✓	✓
Swamp Rose	*Rosa palustris*	attractive pink flowers	☼	sand-silt-clay	moist-wet	2m					✓
Purple-flowering Raspberry	*Rubus odoratus*	showy purple flowers	☼◐●	silt-loam	dry-moist	2m		✓			✓
Maple-leaf Viburnum	*Viburnum acerifolium*	black berries	◐●	sand-silt-clay	dry-moist	2m	✓	✓	✓	✓	✓
Nannyberry	*Viburnum lentago*	white flowers, brilliant fall colour	☼	sand-silt-clay	moist-wet	6m	✓	✓	✓	✓	✓
Highbush Cranberry	*Viburnum trilobum*	red berries attract birds	☼◐	sand-silt-clay	moist-wet	4m					✓

*Note: All landscaped areas with tree planting must be continuous with at least 30m^3 of good quality soil at 0.9m depth. The use of structural soil or other installation is encouraged to extend rooting zones under adjacent hard surfaces.

Native Ferns, Grasses and Wildflowers					Parking Lot Features*				
Common Name	Species	Attributes	Light	Moisture	Street Perimeter	Non-street Perimeter	Island	Median	Bio-retention Area
Big Bluestem	*Andropogon gerardii*	turkey foot seed head, very tall	☼	Dry	✓	✓	✓	✓	✓
Wild Columbine	*Aquilegia Canadensis*	attracts hummingbirds, self-seeds	☼ ◐ ●	Dry-Moist	✓	✓	✓	✓	✓
Wild Ginger	*Asarum canadense*	spreads by creeping rhizomes	◐ ●	Moist					✓
White Wood Aster	*Aster divaricatus*	heart shaped leaves, spreads	◐ ●	Dry-Moist	✓	✓	✓	✓	✓
Fringed Sedge	*Carex crinita*	attracts butterlies	◐	Moist-Wet					✓
Turtlehead	*Chelone glabra*	attracts butterflies	☼ ◐	Moist-Wet					✓
Dutchman's Breeches	*Dicentra cucullaria*	grows under Sugar Maples	◐ ●	Moist					✓
Riverbank Wild Rye	*Elymus riparius*	stabilizes soil	◐	Moist					✓
Bottle Gentian	*Gentiana andrewsii*	spreads from root crowns	☼ ◐	Moist					✓
Wild Geranium	*Geranium maculatum*	deciduous woods	☼ ◐	Dry-Moist					✓
Thin-leaved Sunflower	*Helianthus decapetalus*	attracts butterflies	☼ ◐	Moist					✓
Dense Blazing-star	*Liatris spicata*	moist prairie/meadow	☼ ◐	Dry-Moist					✓
Great Blue Lobelia	*Lobelia siphilitica*	attracts hummingbirds	☼ ◐	Moist-Wet					✓
Evening Primrose	*Oenathera biennis*	tall, tolerates disturbed sites	☼	Dry-Moist	✓	✓	✓	✓	✓
Sensitive Fern	*Onoclea sensibilis*	wet woods, rapid spreader	☼ ◐	Moist					✓
Foxglove Beardtongue	*Penstemon digitalis*	open woods, best in groupings	☼ ◐	Dry					✓
Christmas Fern	*Polystichum arostichoides*	compact, woods/streams, evergreen	◐ ●	Dry-Moist					✓
Green-headed Coneflower	*Rudbeckia laciniata*	moist meadows, very hardy	◐	Moist					✓
Rough-leaved Goldenrod	*Solidago patula*	swamps, wet meadows	☼ ◐	Moist					✓
Indian Grass	*Sorghastrum nutans*	large seed head, prairie/savannah	☼ ◐	Dry	✓	✓	✓	✓	✓
Foamflower	*Tiarella cordifolia*	spreads by stolons, groundcover	◐ ●	Moist					✓

*Note: All landscaped areas with tree planting must be continuous with at least 30m^3 of good quality soil at 0.9m depth. The use of structural soil or other installation is encouraged to extend rooting zones under adjacent hard surfaces.

APPENDIX C

REFERENCES

Listed below is the selection of City of Toronto policy, standard or guideline documents referenced within the Design Guidelines for 'Greening' Surface Parking Lots.

- Toronto Official Plan
- Zoning By-laws
- Secondary Plans
- Toronto Green Development Standard
- Wet Weather Flow Management Guidelines
- Toronto Urban Design Streetscape Manual
- Access Management Guidelines
- City of Toronto Accessibility Design Guidelines
- City of Toronto Bike Plan

