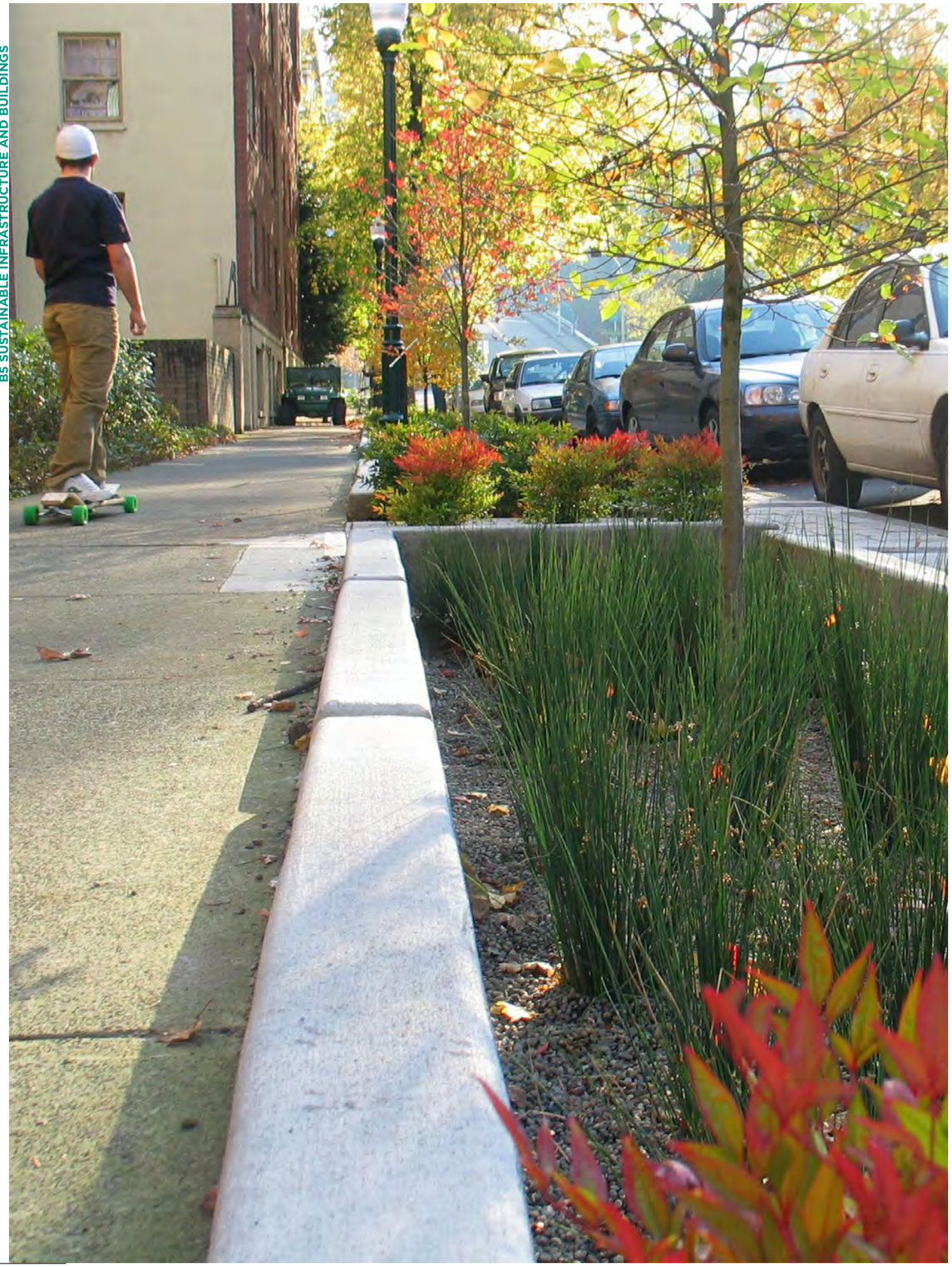


B5 SUSTAINABLE INFRASTRUCTURE AND BUILDINGS

Brampton Plan promotes sustainability in all its facets. Green infrastructure is important to ensuring that energy conservation is maximized and the strain on non-renewable resources is minimized. New buildings and communities should be designed with a focus on reducing water, waste, and energy use. Since human activity is the principal cause of elevated levels of greenhouse gases and demands on energy, water, and waste systems, the guidelines focus on means of remediating this impact on both the built and natural environments.

The SNCP and the Guidelines provide guidance towards these goals.

While sustainability programs use different performance measures to satisfy their goals, the end goals of reduced greenhouse gases, carbon fuel reliance, energy conservation, and climate resilience should be common. Other associated benefits relating to urban design that help to implement the above can include improved public health, social/cultural initiatives, and fiscal management.

The following guidelines should be applied alongside the City's SNCP and Community Energy and Emissions Reduction Plan (CEERP).

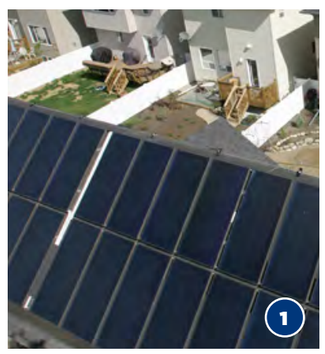
B5.1 ENERGY EFFICIENCY AND CLIMATE RESILIENCE

Energy efficiency refers to minimizing energy consumption by generating or using less energy. It can also play a significant role of lessening the impacts of climate change by replacing non-renewable resources with renewable energy.

Climate resilience is the ability of communities, ecosystems, and infrastructure to anticipate, prepare for, and recover from the adverse effects of climate change. It is important to ensure that our communities are protected against future climate impacts, such as extreme heat, flooding, and severe weather events like windstorms.

Through the lens of 'Green City', climate resilience is an important aspect of the built environment and should be considered when planning communities.

1 Reduce demand for energy from the grid and encourage renewable energy production. Renewable energy sources that could be employed may include but are not limited to the use of solar thermal and photovoltaic equipment, geo-exchange technologies, and/or wind power.



2 Encourage passive solar design to improve energy efficiency by supporting optimal conditions for both passive and active solar strategies. Orient buildings to maximize sunlight exposure and natural ventilation, enhancing the integration of passive building systems.

3 Where feasible, align streets and blocks within 15 degrees of true east-west to optimize passive solar gain through front and rear windows.

4 Where feasible, provide alternative community energy systems such as district energy, geo-exchange, sewer heat recovery, and/or inter-seasonal thermal energy.

5 Consider constructing all low and medium density residential buildings to be Solar Ready (i.e. built with all the necessary piping and equipment that would be needed to install a solar power system).

6 Reduce heat absorption through the use of cool roofs that are designed to reflect more sunlight and absorb less heat than a standard roof. Cool roofs can be made of a highly reflective type of paint, a sheet covering, or highly reflective tiles or shingles.

7 Consider cool roofing material with a minimum initial solar reflectance of 0.65 and minimum thermal emittance of 0.90.

8 For a low sloped roof, typical of commercial and institutional buildings, the cool roof Solar Reflectance Index (SRI) value should be 64 and for steep sloped roofs, typical of residential, the SRI value should be 15.

9 Green roofs are encouraged for high-rise residential, office buildings, as well as, public institutional buildings to minimize surface runoff, reduce urban heat island effects, provide noise insulation, and improve local air quality.

10 Mitigate urban heat island effects through the installation of light-coloured paving materials including white concrete, grey concrete, open pavers, and any material with a solar reflectance index of at least 28. Consider light-coloured materials for development with hardscape or paved surfaces in the Urban Centres, Town Centres, Urban Boulevards and Corridors.

11 Encourage electric vehicle (EV) charging stations.

a. Provide EV charging stations in parking areas of mixed-use, office, institutional, employment uses, and residential developments, where feasible.

b. Locate EV parking in highly visible and accessible areas, preferably near building entrances or in premium parking zones.

c. Provide clear signage to direct EV users to EV designated parking spots.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12 In surface parking lots, consider using photovoltaic (PV) canopies. PV canopies in parking lots optimally utilize unused space to generate sustainable electricity, allow for the ideal tilt angle of the PV array, provide weather-protected parking and pedestrian walkways, offer a recharging system for electric vehicles underneath, and feature bi-facial/transparent PV modules that allow ambient light below the canopy

13 Consider PV canopies in parks and open spaces and in institutional settings to provide covered/shaded sitting areas and gathering spaces.

14 Preserve and expand existing tree cover to connect and buffer protected woodlands and other natural areas and to mitigate urban heat island impacts.

15 Implement the strategic use of deciduous trees or preserve existing trees to help with evapotranspiration and the shading of sidewalks and hard surface areas in the summer and solar access in the winter.


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B5.2
WATER USE (W)

The City's potable water comes from Lake Ontario as part of the Region's Lake-Based System. This system is sustained by the rivers and creeks that flow through Brampton and Mississauga.

Stormwater management, when appropriately treated, can benefit the community including contributing to potable water, aquifer recharge, and urban park development.

1 In order to promote water conservation, all new developments are encouraged to:

a. Achieve greater water efficiency than the Ontario Building Code;

b. Restrict the use of potable water for outdoor watering;

c. Consider the use of water efficient and drought resistant plant materials in parks, along streetscapes, and in public and private landscaping;

d. Avoid use of turf grass areas, and when required, install drought resistant sod;

e. Increase topsoil depths and provide soil scarification;

f. Consider xeriscape landscaping using native, drought-tolerant plants, a cost-effective landscape method to conserve water and other resources on a residential and community-wide level; and,


W1f

g. Reduce the impact caused by new development on the natural hydrological cycle by installing permeable or porous driveway and parking lot surfaces.

2 Encourage the implementation of Low Impact Development Standards that emphasize the use of bio-swales, innovative stormwater practices, constructed wetlands, at-source infiltration, greywater re-use system and alternative filtration systems such as treatment trains and water conservation measures.

3 Consider a rainwater harvesting program to provide the passive irrigation of public and private green space, including absorbent landscaping, cisterns, rain barrels, underground storage tanks, infiltration trenches, etc.

B5.3
STORMWATER MANAGEMENT (S)

1 Consider strategies for stormwater retention and runoff, such as:

a. Retain stormwater on-site through rainwater harvesting, on-site infiltration, and evapotranspiration.

b. Direct flow to landscaped areas and minimize the use of hard surfaces to reduce the volume of runoff into the storm drainage system.

c. Store snow piles away from drainage courses, storm drain inlets, and planted areas.

d. Use infiltration trenches, dry swales, dry ponds, and naturalized bioswales adjacent to parking areas and other large paved areas to improve on-site infiltration.

2 Consider the inclusion of third pipe greywater systems and rain water harvesting for watering lawns, gardening, to reduce demand on potable water use.

3 Introduce green infrastructure, such as bioswales, within the public right-of-way to enhance ground water infiltration and improve water quality as part of a comprehensive water management plan.

4 Consider using porous or permeable pavement instead of standard asphalt or concrete for walkways, driveways, parking areas, and other suitable roads to manage stormwater runoff. Where appropriate, use grass pavers that support vehicle weight while allowing grass to grow, further reducing surface runoff.

5 Consider the installation of subsurface basins below parking lots to enable stormwater to be stored and absorbed slowly into surrounding soils.

6 Where feasible, implement curb cuts along sidewalks and driveways to allow water to flow onto planted zones or infiltration basins.

B5.4
LOW IMPACT DEVELOPMENT (L)

A number of low impact development (LID) and green infrastructure options can be implemented to increase stormwater infiltration into the soil, and support evapotranspiration, and filtration. LIDs deal with stormwater runoff to prevent issues such as floods, erosion, sedimentation, and pollution.

1 Encourage the implementation of Low Impact Development standards that emphasize the use of bioswales, innovative stormwater practices, constructed wetlands, at-source infiltration, greywater re-use systems, and alternative filtration systems such as treatment trains.

A. PERMEABLE PAVEMENT/POROUS CONCRETE OR ASPHALT (A)

2 Utilize permeable or porous paving materials, such as open-joint pavers, porous concrete or asphalt, and precast turf-grid products, for low-traffic roads, driveways, parking areas, trails, and walkways. Preference shall be given to these materials when selecting paving options.

3 Encourage paved areas used for snow storage to integrate permeable paving to absorb snow melt on site.

B. BIORETENTION (B)

Bioretention is a versatile stormwater management approach that involves creating vegetated areas to temporarily store runoff from roofs and pavements.

4 Consider bioretention areas along roads and in large parking lots to treat runoff from roofs, roads, parking lots, or other paved areas. Runoff from these impervious surfaces is directed into the bioretention area, where it ponds and slowly infiltrates. There can be multiple cells throughout a neighbourhood or in a parking lot.

C. BIOSWALES (C)

Bioswales are vegetated, open trapezoidal channels designed to manage stormwater by conveying, treating, infiltrating, and attenuating runoff.

5 Consider bioswales within the ROW located within the boulevard and connected to the catch basins within the paved portion of the ROW allowing the system to discharge to the storm sewer if the volume of runoff directed to the bioswales exceed the design volume.

6 Use enhanced grass swales as an alternative to curb and gutter systems if site conditions permit.

D. GREEN ROOFS (D)

Green roofs have multiple environmental benefits, as they improve energy efficiency, reduce urban heat island effects, create green space, and have water quality, water balance, and peak flow control benefits.

7 Encourage green roofs for mid-rise and high-rise residential, office buildings, as well as, public institutional buildings to minimize surface runoff, reduce urban heat island effects, provide noise insulation, and improve local air quality.

8 Encourage community and public buildings to install green roofs with 50% coverage with the remainder of the roof covered with light coloured material.

B5.5 MATERIAL RESOURCES AND SOLID WASTE

Sustainable communities shall incorporate strategies to reduce natural resources consumption, and minimize waste, by salvaging on-site materials, and reusing, recycling, and recovering materials from residential waste.

In addition to Brampton Plan policies, the following should apply:

1 Consider the use of recycled/reclaimed materials for new infrastructure including roadways, parking lots, sidewalks, unit pavings, curbs, water retention tanks and vaults, stormwater management facilities, sanitary sewers, and/or water pipes.

2 Provide on-site recycling facilities for the handling, storage, and separation of recyclables, with a focus on resource recovery, in large developments such as multi-unit residential buildings, office and employment buildings, and institutional or public buildings.

3 Prepare a construction waste management plan that includes:

a. A summary of the main types of waste that are expected to be generated on-site.

b. A description of the waste sorting plans, including rough quantities (if available).

c. A list of the recycling facilities that waste will be taken to for diversion.

d. Reuse strategies (if applicable).

4 Encourage recycling and/or salvaging at least 50% of nonhazardous construction and demolition debris and locate a designated area on site during construction for recyclable materials.

B5.6 URBAN AGRICULTURE (U)

Urban Agriculture, such as community gardens and traditional farm areas at community peripheries, provides the opportunity for an alternative use of green space and can act as a transition between land uses.

The alternative use of green spaces as transitions in land uses while facilitating access to locally grown food should be encouraged.

In addition to Brampton Plan policies, the following should be considered:

1 Inclusion of a reasonable cluster of key services to residences based on walking distances; for instance, encourage community gardens that are located within 800m of the proposed dwelling units.

2 Initiatives such as sustainable food production practices as a component of a new development. Development plans and building design shall incorporate opportunities for local food production through:

a. Community gardens;

b. Edible landscapes;

c. Small-scale food processing, such as community kitchens, food co-ops and community food centres;

d. Food-related home occupations / industries;

e. Small- and medium-scaled food retailers; and,

f. Local market space (i.e. farmers' markets).

3 Opportunities for urban agriculture in neighbourhoods, and Parks and Open Space which also act as a transitional use between natural and built environments.

4 More intense forms of urban agriculture within existing industrial/ Employment Areas which can impact food security, employment issues and the larger social, economic, and ecological sustainability of growing food locally.

5 Providing space for community gardens and/ or allotment gardens in open space areas.

6 Opportunities to create edible landscapes through conservation of existing orchard trees, or by providing orchard trees as part of proposed landscaping strategies in public parks, other municipal lands or POPS.

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