

# Toronto Green Standard

*Making a Sustainable City Happen*



For

## New Low-Rise Residential Development

(5 dwelling units or more)

**Version 2.1**



# TORONTO GREEN STANDARD VERSION 2.0



## For New Low-Rise Residential Development

The Toronto Green Standard (TGS) is a two-tier set of performance measures, with supporting guidelines for new development. Its purpose is to promote sustainable site and building designs that address Toronto's urban environmental pressures: air quality, climate change and energy efficiency, water quality and efficiency, ecology and solid waste.

The Toronto Green Standard sets the Official Plan's vision of sustainability into action, and is a key strategy to achieve the City's Climate Change Action Plan, an aggressive environmental framework aimed at reducing Toronto's greenhouse gas emissions by 80 per cent by 2050. Achieving the TGS performance measures will help meet this goal, while building a greener, sustainable City.

There are two versions of the Toronto Green Standard, each relating to different development types:

- "Low-Rise Residential" applies to row and townhouses, up to 4 storeys (under Part 9 of the Ontario Building Code) with a minimum of 5 dwelling units.
- "Mid to High-Rise Residential and Non-Residential" applies to residential apartment buildings 4 storeys and higher and all Industrial, Commercial and Institutional (ICI) development.

Each version contains the Tier 1 (**mandatory**) and Tier 2 (**voluntary**) performance measures; detailed Specifications, Definitions, and Resources links; and examples of Strategies to implement the proposed Standard. The performance metrics and supporting specifications column should be read together. Tier 1 is required through development approvals implemented by City Planning and Tier 2 is the higher, voluntary standard implemented through a third party review.

Verified Tier 2 projects may be eligible for a refund of development charges equivalent to 20% of the 2014 rate. See: [toronto.ca/greendevlopment](https://toronto.ca/greendevlopment)

## Applying the Toronto Green Standard

New planning applications, including Zoning Bylaw amendment, Site Plan Control and Plan of Subdivision approval, are required to meet Tier 1 of the environmental performance measures. Developers may also choose to meet Tier 2, the voluntary, higher level of environmental performance. Achieving the requirements of the TGS contributes towards LEED certification. See [toronto.ca/greendevlopment](https://toronto.ca/greendevlopment) for more information.

Planning submissions must include:

1. **TGS Checklist:** The Checklist is required as part of a complete planning application and is submitted with each planning submission. The Checklist must contain information provided by the applicant indicating how the design meets the Toronto Green Standard and where sufficient verification details are demonstrated on plans, drawings and in reports. The Checklist is a form provided to the City of Toronto and must be read and completed in conjunction with the full Toronto Green Standard. See: [toronto.ca/greendevlopment](https://toronto.ca/greendevlopment)
2. **TGS Statistics Template:** For Site Plan Control applications, complete the full Statistics Template and copy it directly onto the Site Plan or Statistics Plan submitted with the development application. For Zoning Bylaw Amendments or Plan of Subdivision applications, only the sections marked by an \* are completed. The TGS Statistics Template can be found at: [toronto.ca/greendevlopment](https://toronto.ca/greendevlopment)
3. **Energy Report:** The TGS includes energy performance measures for new development that are higher than the Ontario Building Code. In order to meet these targets, a Design Development Stage Energy Report is required to be submitted prior to Site Plan Approval. Follow the City's [Terms of Reference](#) available from [Building Toronto Together: A Development Guide](#).
4. **TGS Documentation:** Include clear notations, illustrations and legends on relevant plans and drawings and in reports submitted to City Planning indicating compliance with Tier 1, TGS performance measures. All documentation should be identified in the TGS Checklist. Refer to [Building Toronto Together: A Development Guide](#) for planning submission instructions by application type.
5. **Tier 2, Development Charge Refund:** Applicants interested in enrolling in the program should view the TGS website [toronto.ca/greendevlopment](https://toronto.ca/greendevlopment). **Tier 2 performance levels should be targeted early in the design process.** Contact the Environmental Planning office at 416-392-8343 for more information.





## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources and Documentation	Potential Strategies
<b>Pedestrian Infrastructure</b> Encourage walking as a clean air alternative for all ages and abilities	<p><b>AQ 1.1 Connectivity</b>  Provide safe, direct, universally accessible pedestrian routes, including crosswalks and midblock crossings, that connect the buildings on-site to the off-site pedestrian network and priority destinations.<sup>1</sup></p> <p><b>AQ 1.2 Sidewalk space</b>  Provide a pedestrian clearway at least 2.1 m wide,* to safely and comfortably accommodate pedestrian flow.<sup>2,3</sup></p> <p><b>AQ 1.3 Pedestrian specific lighting</b>  Provide pedestrian-scale lighting that is evenly-spaced, continuous and directed onto sidewalks, pathways, entrances, outdoor waiting areas and public spaces.<sup>4</sup></p>		<ol style="list-style-type: none"> <li>Off-site pedestrian networks and priority destinations include: sidewalks, transit stops/stations, parking areas (bikes and cars), surrounding parks and open space, mid-block walkways, underground concourses, primary building entrances or other key pedestrian access points and routes.</li> <li>The pedestrian clearway is the universally accessible, unobstructed, direct and continuous path of travel within the sidewalk zone.   *A clearway greater than 2.1 m wide may be required at corners, transit nodes or other locations with high pedestrian volumes or pedestrian activity (e.g., at grade patios and retail uses):  <a href="#">City of Toronto Accessibility Design Guidelines</a>.</li> <li>A sidewalk zone at least 6.0 m wide, measured from curb to buildings face, is recommended to support a variety of streetscape elements including the pedestrian clearway, trees, furniture, lighting, utilities, cafés, etc. that contribute to a vibrant and complete street.   <a href="#">Vibrant Streets</a>   <a href="#">Toronto Urban Design Streetscape Manual</a>   <a href="#">Avenues &amp; Mid-Rise Buildings Study (Performance Standard #7A: Minimum Sidewalk Zones)</a></li> <li>Pedestrian scale lighting must be full cutoff in accordance with EC 5.1, directed downward and includes fixtures such as bollards or lower-scale pole fixtures along pedestrian routes. For details on pedestrian scale exterior lighting design strategies that minimize light pollution refer to the <a href="#">Best Practices for Effective Lighting</a>.</li> </ol>	<p>Pedestrian oriented landscaping, lighting and signage</p> <p>Building setbacks to accommodate sidewalk space and trees</p> <p>Building orientation to facilitate transit access</p>

<sup>1</sup> Apply this standard to: Residential development under Part 9 of the Ontario Building Code where the project contains 5 dwelling units or more



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources and Documentation	Potential Strategies
<b>Urban Heat Island Reduction: At Grade</b> Reduce ambient surface temperatures, and provide shade for human health and comfort	<b>AQ 2.1 UHI, Non-roof hardscape</b> Use a combination of the following strategies to treat at least 50% of the site's non-roof hardscape (including driveways, walkways, courtyards, surface parking areas, artificial turf and other on-site hard surfaces): <ul style="list-style-type: none"> <li>• High-albedo surface materials with an initial reflectance of at least 0.3 or SRI of 29<sup>1</sup></li> <li>• Open grid pavement with at least 50% perviousness<sup>2</sup></li> <li>• Shade from existing tree canopy or within 5 years of landscape installation<sup>3,4</sup></li> <li>• Shade from structures covered by solar panels.<sup>5</sup></li> </ul>	<b>AQ 2.2 (Core) Enhanced UHI, Non-roof hardscape</b> Use any combination of the following strategies to treat at least 75% of the site's non-roof hardscape (including driveways, walkways, courtyards, parking areas, artificial turf and other on-site hard surfaces): <ul style="list-style-type: none"> <li>• High-albedo surface materials with an initial reflectance of at least 0.3 or SRI of 29<sup>1</sup></li> <li>• Open grid pavement with at least 50% perviousness<sup>2</sup></li> <li>• Shade from existing tree canopy or within 5 years of landscape installation<sup>3,4</sup></li> <li>• Shade from structures covered by solar panels.<sup>5</sup></li> </ul>	<ol style="list-style-type: none"> <li>1. Solar Reflectance Index (SRI) is a measure of a surface's ability to reflect solar heat. The SRI for a given material is calculated using both the reflectance value and emittance value of the material. Black asphalt has an SRI of 0, while new white Portland cement concrete has an SRI of 86. Other pavement types range between these values, with a SRI of 35 for gray concrete.</li> <li>2. Open grid pavement consists of concrete or hard plastic grid systems with large pore spaces filled with a planted growing medium or light coloured aggregate.</li> <li>3. Shade is measured at solar noon at the summer solstice (approximately June 21) and may be provided by existing tree canopy, new shade trees or shade structures. For examples of native shade trees, refer to <a href="#">Forestry Facts &amp; Native Plant Lists</a>.</li> <li>4. Refer to EC2.1 - 2.5 for the applicable tree planting standards.</li> <li>5. Refer to <a href="#">LEED® Canada NC 2009 Rating System</a>, Credit SS 7.1 Case 1. Shade cast by buildings is not an eligible strategy.</li> </ol>	High-albedo materials include: grey or white concrete, lightcoloured asphalt, selected interlocking concrete pavers and other light coloured pavers  Soft landscaping  High-branching deciduous shade trees  Design site to reduce the size of hardscaped area (i.e. smaller parking lots, shorter driveways and below grade parking)  Position photovoltaic cells to shade the hardscape



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources and Documentation	Potential Strategies
<b>Urban Heat Island Reduction: Roof</b> Reduce ambient surface temperatures on or from rooftops	<b>AQ 3.1 Green &amp; cool roofs</b> Use cool roofing materials for 100% of the Available Roof Space. <sup>3</sup>  <b>OR</b>  Use a combination of a Green Roof and cool roofing materials for 100% of the Available Roof Space. <sup>1,2,3,4</sup>		<ol style="list-style-type: none"> <li>1. Cool roof materials must have a minimum initial reflectance of 0.65 and minimum emittance of 0.90; or an SRI value of 78 for a low-sloped roof and 29 for a steep-sloped roof. Low sloped roofs have a surface slope of less than 2:12 (9.5 degrees) and steep sloped roofs have a surface slope greater than 2:12 (9.5 degrees). Ballasted roofs with a minimum stone ballast of 83 kg/m<sup>2</sup> (17 lb/ft<sup>2</sup>) or pavers of 117 kg/m<sup>2</sup> (23 lb/ft<sup>2</sup>) will also be accepted.</li> <li>2. A Green Roof is an extension of an above grade roof, built on top of a human-made structure, that allows vegetation to grow in a growing medium and which is designed, constructed and maintained in accordance with the Toronto Green Roof Construction Standard. A green roof system typically includes: vegetation, growing medium, filter layer, drainage layer, root resistance layer and waterproof membrane.</li> <li>3. Available Roof Space is defined as the total roof area of the building excluding areas designated for renewable energy devices, residential private terraces and required residential outdoor amenity space to a maximum of 2m<sup>2</sup> per residential unit.</li> <li>4. Where a green roof is to be constructed in or abutting the Natural Heritage System (Map 9, Official Plan), consider designing the green roof to promote biodiversity. Refer to the City of Toronto <a href="#">Guidelines for Designing for Biodiversity on Green Roofs</a>.</li> </ol>	Cool Roof Rating Council (CRRC) rated cool roofing such as reflective tiles and metal roofs for steep sloped applications  Green roof types include: complete systems, modular systems and precultivated vegetation blankets

# GREENHOUSE GAS EMISSIONS/ENERGY EFFICIENCY



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Minimum Energy Performance</b> Minimize energy consumption through efficient building design	<b>GHG 1.1 Energy efficiency</b> Design the building(s) to achieve Supplementary Standard SB-12 as referenced in the 2017 Ontario Building Code. <sup>1</sup>	<b>GHG 1.2 (Core) Enhanced energy efficiency</b> Design and construct the building(s) to achieve at least ENERGY STAR® or R2000® requirements. <sup>2,3,4</sup>  <b>GHG 1.3 (Core) Energy efficient appliances</b> Where supplied, for each unit, provide ENERGY STAR® labeled refrigerators, clothes washers and dishwashers. <sup>5</sup>	<ol style="list-style-type: none"> <li>1. Complete the <a href="#">Energy Efficiency Design Summary</a> for Part 9 residential housing.</li> <li>2. An ENERGY STAR® for New Homes (Version 12.6 or later) label or proof of compliance with NRCan 2012 R2000® Standard (or later) is required as proof of compliance for Tier 2 projects.</li> <li>3. Service Organizations are licensed by NRCan to deliver ENERGY STAR® qualified home labels or R2000® certification. For a list of authorized service organizations see <a href="#">Natural Resources Canada</a>. EnerGuide Rating System evaluations are conducted by Certified Energy Advisors using the OBC referenced version of the <a href="#">HOT2000 software v. 10.51</a>.</li> </ol> <p>For Part 9, Multi Unit Residential Buildings (MURBs), defined as a building with a minimum of two stacked units and a minimum of two storeys above grade, projects will follow NRCan's Evaluation Procedures for Low-Rise Multi-Unit Residential and Mixed-Use Buildings using HOT 2000 v.10.51.</p> <p>ENERGY STAR® evaluations are conducted using the BOP (Builder Option Package). Certified Energy Advisors are independent contractors who perform the testing and final inspection and report. They submit their report to the NRCan Authorized Service Organization.</p> <p>For more information regarding <a href="#">ENERGY STAR®</a> or <a href="#">R2000®</a>.</p> <ol style="list-style-type: none"> <li>4. The efficiency improvement may include energy savings from ENERGY STAR® and water efficient fixtures.</li> <li>5. ENERGY STAR® labeled dishwashers must use less than 16.09 Litres of water per cycle (4.25 gallons per cycle).</li> </ol> <p>The ENERGY STAR® trade mark is administered and promoted in Canada by Natural Resources Canada and is used with permission.</p> <p>R2000® is an official trademark of Natural Resources Canada and is used with permission.</p>	<p>Lower window to wall ratios</p> <p>Drain water heat recovery</p> <p>Improved quality of frames and glazing</p> <p>Low-flow hot water fixtures and appliances</p> <p>Heat Recovery Ventilation</p> <p>Reduce vaulted to flat roof ratio Improve foundation insulation</p> <p>Use exterior insulated sheathing</p> <p>Increase r-value of wall and ceiling assemblies</p> <p>ENERGY STAR HVAC and appliances</p> <p>Improved building envelope performance (air tightness)</p> <p>Deciduous shade trees for summer cooling, and allowing solar heating in the winter</p>

# GREENHOUSE GAS EMISSIONS/ENERGY EFFICIENCY



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Renewable Energy</b> Reduce demand for non-renewable energy by encouraging local renewable energy production		<b>GHG2.1 (Optional) On-site renewable energy</b> Design and install on-site renewable energy systems to supply at least 1% of the building's total energy load from one or a combination of solar PV, solar thermal or wind energy sources.  <b>OR</b>  Design and install on-site renewable energy systems to supply at least 20% of the building's total energy load from geo-exchange (geothermal or ground source heat pumps). <sup>1,2</sup>	<ol style="list-style-type: none"> <li>1. Savings must be demonstrated by third-party non-commercial energy modeling tools such as RETScreen and/or whole-building modeling software utilized for GHG 1.1.</li> <li>2. Renewable energy includes energy generated by: solar photovoltaic, solar thermal, wind or geothermal (heating and cooling).</li> </ol> <p>Solar photovoltaics – use of composite panels to convert solar energy into electricity, to be used within in the building or exported to the grid.</p> <p>Solar thermal – use of solar thermal collectors to directly convert solar energy into heating air or water for use in the building.</p> <p>Geoexchange – Use of electric heat pumps coupled with horizontal or vertical ground loop piping systems to provide heating and cooling energy; or use of direct ground contact systems.</p>	Solar Photovoltaic Solar thermal water and space heating Solar air collection system for ventilation ENERGY STAR qualified Geothermal heat pump

# WATER QUALITY, QUANTITY AND EFFICIENCY



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Construction Activity</b> Ensure protection of water quality during construction and demolition	<b>WQ 1.1 Erosion &amp; sediment control</b> Follow the Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Conservation Authorities, December 2006) during construction and demolition activities. <sup>1</sup>		1. Refer to the <a href="#">Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guideline for Urban Construction</a> .	Erosion and sediment control plan  Silt fencing, sediment traps, sediment basins
<b>Stormwater Retention (Water Balance)</b> Minimize stormwater that leaves the site	<b>WQ 2.1 Stormwater balance</b> Retain stormwater on-site to the same level of annual volume of overland runoff allowable under pre-development conditions. <sup>1</sup>  <b>WQ 2.2 Stormwater retention &amp; reuse</b> Retain at least the first 5 mm from each rainfall through rainwater reuse, on-site infiltration and evapotranspiration. <sup>1,2</sup>  <b>OR</b>  Ensure that the maximum allowable annual runoff volume from the development site is no more than 50% of the total average annual rainfall depth.	<b>WQ 2.3 (Optional) Enhanced stormwater retention &amp; reuse</b> Retain 10 mm of each 24 hour rainfall event, or 70% of total average annual rainfall depth, for rainwater reuse, on-site infiltration and/or evapotranspiration. <sup>3</sup>	1. These measures come from the <a href="#">Wet Weather Flow Management Guidelines</a> . The guidelines provide stormwater practices so that source control is undertaken as a priority to the extent physical factors allow. When source control practices are exhausted, the WWFM Guidelines provide conveyance and end of pipe practices. Strategies for TSS removal include green streets, stormwater ponds, oil-grit separators, bioswales, filters and others.  See the <a href="#">Wet Weather Flow Management Guidelines Table 7</a> for summary of required stormwater management targets.  2. Use tree and shrub planting, green roofs and other landscaping to increase evapotranspiration from the site, and to increase the amount of permeable surfacing on site.  3. Any storage system must be capable of storing the water collected for later use with over-flows that only release water over and above the 10 mm of rainfall.	Green roofs Rain water harvesting Permeable pavers, permeable asphalt, permeable concrete for hard surfaces Stormwater Management ponds Bioswales Downspout disconnection Infiltration trenches Rain gardens/ absorbent landscaping



# WATER QUALITY, QUANTITY AND EFFICIENCY



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Stormwater Run-Off</b> Manage and clean stormwater that leaves the site	<b>WQ 3.1 Total suspended solids (TSS)</b> Remove 80% of total suspended solids (TSS) on an annual loading basis from all runoff leaving the site based on the postdevelopment level of imperviousness. <sup>1</sup>  <b>WQ 3.2 E. Coli reduction</b> Control the amount of E. Coli directly entering Lake Ontario and waterfront areas as identified in the Wet Weather Flow Management Guidelines. <sup>2</sup>		<ol style="list-style-type: none"> <li>These measures come from the <a href="#">Wet Weather Flow Management Guidelines</a>. The guidelines provide stormwater practices so that source control is undertaken as a priority to the extent physical factors allow. When source control practices are exhausted, the WWFM Guidelines provide conveyance and end of pipe practices. Strategies for TSS removal include green streets, stormwater ponds, oil-grit separators, bioswales, filters and others.</li> <li>Refer to the Water Quality Targets for E.Coli in the <a href="#">Wet Weather Flow Management Guidelines</a>.</li> </ol>	Mechanical or natural treatment systems such as: vegetated filter strips bio-swales sediment traps oil/grit separators
<b>Water Efficiency</b> Reduce demand for potable water	<b>WQ 4.1 Drought-tolerant landscapes</b> Provide drought tolerant plants for at least 50% of the landscaped site area (including at-grade landscapes, vegetated roofs and walls). <sup>1,2</sup>	<b>WQ 4.2 (Core) Water efficient fixtures</b> Install high efficiency (low flow) fixtures and fittings to meet or exceed the following standards: <ul style="list-style-type: none"> <li>Average flow rate for all lavatory faucets 7.5 LPM</li> <li>Average flow rate for all showerheads 7.5 LPM</li> <li>Average flow rate for all toilets, including dual flush toilets 4.9 LPM.<sup>3</sup></li> </ul> <b>WQ 4.3 (Core) Irrigation</b> Design the landscape and irrigation system to reduce the overall irrigation demand by 50%. <sup>4</sup>	<ol style="list-style-type: none"> <li>Drought tolerant landscapes and species are provided In accordance with the following City of Toronto guideline document: <a href="#">Drought Tolerant Landscaping: A Resource for Development</a>.</li> <li>In choosing tree species, preference should always be given to those native to the area. Where it can be clearly demonstrated that the planting of native tree species would not be appropriate due to site constraints often encountered in urban settings, Urban Forestry may accept non-native, non-invasive species better suited to the particular site.</li> <li>Refer to <a href="#">LEED® Canada for Homes 2009</a>, Credit 3.2, Indoor Water Use, for further details on how to achieve this requirement.</li> <li>Refer to <a href="#">LEED® Canada for Homes 2009</a>, Credit WE 2 Irrigation, for the method for calculating Irrigation demand.   *Greywater may be used for subsurface irrigation if treated as per the requirements of the Ontario Building Code and CAN/CSA-B128.1</li> </ol>	Dual flush toilets Drought tolerant native species Water efficient plants/ landscaping Rain sensors for irrigation systems Rainwater reuse Below ground rainwater collection system *Grey water irrigation



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Urban Forest: Tree Protection</b> Preserve the existing urban forest	<p><b>EC 1.1 Tree protection</b>            Adhere to the Tree Protection Policy and Specifications for Construction Near Trees for tree protection and barriers during construction.<sup>1</sup></p> <p><b>EC 1.2 Preservation of mature trees</b>            Protect and retain all trees that are 30 cm or more DBH (diameter at breast height) from injury or removal.<sup>2</sup></p> <p><b>EC 1.3 Ravine protection</b>            Within the Ravine Protected Area, protect and retain trees of all diameters from injury or removal.<sup>3</sup></p> <p><b>EC 1.4 Street tree retention</b>            Protect and retain trees of all diameters adjacent to City of Toronto streets and roadways and City-owned Parkland.<sup>4, 5</sup></p>		<ol style="list-style-type: none"> <li>1. Refer to the City of Toronto <a href="#">Tree Protection Policy and Specifications for Construction Near Trees</a>.</li> <li>2. Tree injury or removal of trees measuring 30cm in diameter or larger, is prohibited on private property, except where a permit is issued, in accordance with the City of Toronto <a href="#">Municipal Code Chapter 813, Private Tree Protection</a>.</li> <li>3. Tree injury or removal of trees of all diameters within a Ravine Protection Bylaw Area property is prohibited, except where a permit is issued, in accordance with the City of Toronto <a href="#">Municipal Code Chapter 658, Ravine and Natural Feature Protection</a>.</li> <li>4. Trees of all diameters on City property adjacent to City of Toronto streets and roadways are protected under the City of Toronto <a href="#">Municipal Code Chapter 813, Trees on City Streets</a>.</li> <li>5. Trees of all diameters on City-owned Parkland are protected under the City of Toronto <a href="#">Municipal Code Chapter 608, Parks</a>.</li> </ol> <ul style="list-style-type: none"> <li>• Privately-owned trees that were planted as a condition of site plan approval and incorporated into a site plan agreement registered on title, that do not qualify for protection under the private tree or the Ravine and Natural Feature Protection Bylaw are required to be maintained substantially in conformity with the approved drawings.</li> </ul>	<p>Construction management plan to avoid site disturbance</p> <p>Relocate trees on-site</p> <p>Establish tree protection zones during construction</p>



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Urban Forest: Increase Tree Canopy</b> Make space for trees, enhance the urban forest	<p><b>EC 2.1 Tree Planting</b>            Provide tree canopy cover distributed across the site area and the public boulevard at a minimum rate of : 1 tree for every 66 m<sup>2</sup> of 40% of the site area.<sup>1,2</sup></p> <p><b>EC 2.2 Soil volumes</b>            Provide all trees planted with a minimum volume of 30 m<sup>3</sup> of high quality soil per tree. The minimum soil volume can be 20 m<sup>3</sup> per tree where the soil volume is shared.<sup>3</sup></p> <p><b>EC 2.3 Trees along street frontages</b>            Plant large growing shade trees at the equivalent of 8 to 10 m intervals along all street frontages, including along private streets and in the public boulevard.<sup>4</sup></p> <p><b>EC 2.4 Trees in parking lots</b>            If surface parking is permitted and provided, plant shade trees throughout the parking lot interior at a minimum ratio of one tree planted for every five parking spaces supplied.<sup>5</sup></p> <p><b>EC 2.5 Watering program</b>            Provide a watering program for trees for at least the first 2 years after planting.</p>	<p><b>EC 2.6 (Optional) Enhanced trees in parking lots</b>            If surface parking is provided, plant internal shade trees at a minimum ratio of one tree planted for every three parking spaces supplied.<sup>5</sup></p> <p><b>EC 2.7 (Optional) Enhanced tree planting</b>            Provide additional tree planting beyond the development site and the associated public boulevard at a minimum rate of:            1 tree for every 200 m<sup>2</sup> of 40% of the total site area.<sup>6</sup></p>	<ol style="list-style-type: none"> <li>1. The “site area” is the privately-owned portion of the property affected by the development. The “public boulevard” is the City-owned portion. Calculate 40% of the site area and provide 1 tree for every 66 m<sup>2</sup>. For these purposes, the site area may exclude areas dedicated for active recreation or local food production and utility corridors or easements. The required number of trees may be distributed across both the site area and the public boulevard.</li> <li>2. The number of trees, species selection, size and distribution will vary by project provided that adequate soil volumes for healthy trees are provided. Large growing trees are preferred, however small or medium sized trees may be accepted at or above-grade. For species selection see <a href="#">Forestry Facts &amp; Native Plant Lists</a>.</li> <li>3. The soil volume of 30 m<sup>3</sup> is based on a minimum soil depth of 0.8 m and a maximum of 1.2 m of high quality soil above a well drained sub-soil or drainage layer. Groups of trees should be planted so that they can share soil volume. Soil volumes for groups of trees may overlap by as much as 33%.            Where trees are planted under hardscape, a continuous soil trench provides structural support for the hardscape while also ensuring adequate soil volumes and protecting roots from compaction. Soil cells, which are subsurface modular structures designed specifically for tree trenches, are recommended. Other approaches must be approved by City of Toronto Urban Forestry Department. For further information refer to: <a href="#">Toronto Urban Design Streetscape Manual</a>.</li> <li>4. Trees planted along street frontages in the public boulevard are included in the number of trees required under EC 2.1. Tree spacing will vary depending on the species selected. See: <a href="#">Toronto Street Trees: A Guide to Standard Planting Options</a> and links to City of Toronto <a href="#">Urban Forestry website</a> for tree planting details.</li> <li>5. Distribute internal shade tree planting such that no parking space is more than 30 m from a tree. On small or narrow sites, shade trees provided in non-street facing perimeter planting areas can be counted towards the internal tree requirement, provided that the maximum distance from a parking space (30 m) is met. Refer to the <a href="#">Design Guidelines for ‘Greening’ Surface Parking Lots</a>.</li> <li>6. Locations must be identified and approved by the City of Toronto Urban Forestry Department.</li> </ol>	Soil cells Continuous soil trench Silva Cells Raised beds Open planters Rainwater harvesting irrigation system



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Natural Heritage: Site</b> Protect, restore and enhance the natural environment and increase biodiversity	<p><b>EC 3.1 Biodiversity in landscapes</b>            Plant the landscaped site area using a minimum of 50% native species (including trees, shrubs and herbaceous plants).<sup>1</sup></p> <p><b>EC 2.3 Ravines and natural areas buffers</b>            Where a setback from top-of-bank is required, plant the landscaped area of the setback with native species.<sup>1,2,3,4,6</sup></p> <p><b>EC 3.3 Invasive species</b>            Do not plant any invasive species on properties along streets abutting ravines and natural areas.<sup>5,6</sup></p>	<p><b>EC 3.4 (Optional) Enhanced landscaping</b>            Restore or protect a minimum 50% of the site area (excluding the building footprint) or 20% of the total site area (including building footprint), whichever is greater, with native or drought-tolerant vegetation.<sup>1,7</sup></p>	<ol style="list-style-type: none"> <li>Native plant species are defined as plants that live or grow naturally in a region without direct or indirect human intervention. For examples of species native to the Toronto area refer to: <a href="#">Native Plants for Naturalization</a>.  <a href="#">Drought Tolerant Landscaping: A Resource for Development</a></li> <li>A development setback is defined in Section 3.4.8a) of the City of Toronto's Official Plan as 10 m from the top-of-bank of a valley, ravine or bluff. Buffer areas are addressed under Section 3.4.12d). Where the top-of-bank is unstable, minimum setbacks may be greater than 10 m. Minimum buffer widths may be greater than 10 m for significant features such as Provincially Significant Wetlands, Life Science Areas of Natural and Scientific Interest (ANSI) and Environmentally Sensitive Areas (ESA).</li> <li>Naturalized setbacks and buffers should provide species and structural diversity with native trees (both small and large growing trees), shrubs and herbaceous ground layer species. Non planted surfaces such as walkways must be permeable.</li> <li>Topsoil for landscape planting shall be uncontaminated, fertile, friable natural loam having an acidity range and organic matter capable of sustaining vigorous plant growth, and be free of construction debris or any admixture of subsoil, lumps, stones and roots over 25 mm in diameter and other extraneous matter.</li> <li>Invasive species are species that reproduce aggressively and become established in a natural area by displacing native species. For examples of invasive species in Southern Ontario see the <a href="#">Ontario Society for Ecological Restoration</a>.</li> <li>Ravine and natural areas are defined in accordance with the City of Toronto <a href="#">Ravine and Natural Feature Protection Bylaw</a>.</li> <li>Refer to <a href="#">LEED® Canada for New Construction and Major Renovations 2009</a>: Credit SS5.1 Protect and Restore Habitat Case 2, for further details on how to achieve this requirement.             Green Roof Area may be included if the green roof is designed to promote biodiversity and habitat and plants are native or drought tolerant. Refer to the City of Toronto <a href="#">Guidelines for Designing for Biodiversity on Green Roofs</a>.             Exterior, vertical living/green walls planted with native or drought tolerant plants may be included in the calculation. A living wall should incorporate growing media and be constructed to be low maintenance and chemical free.</li> </ol>	<p>Enhance the City's natural heritage system</p> <p>Identify habitats that could be sustained and enhanced on-site</p> <p>Plant a diversity of species and habitats</p> <p>Contiguous vegetated features to minimize habitat fragmentation</p>





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Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Bird Collision Deterrence</b> Design buildings to reduce bird collisions and mortality	<b>EC 4.1 Bird friendly glazing</b> Where abutting ravines or natural areas, treat the exterior glazing using a combination of the following strategies: <sup>1,2</sup> <ul style="list-style-type: none"> <li>Visual markers provided with a spacing of between 100 and 280 mm apart.<sup>3</sup></li> <li>Building-integrated structures to mute reflections on glass surfaces<sup>4</sup></li> <li>Treat all glass railings with visual markers provided with spacing of no greater than 100 mm x 100 mm.<sup>5</sup></li> </ul> <b>EC 4.2 Grate porosity</b> Ensure ground level ventilation grates have a porosity of less than 20 mm X 20 mm (or 40 mm x 10 mm).	<b>EC 4.3 (Optional) Enhanced bird friendly glazing</b> Treat the exterior glazing using a combination of the following strategies: <sup>1,2,6</sup> <ul style="list-style-type: none"> <li>Visual markers provided with a spacing of between 100 and 280 mm apart<sup>3</sup>.</li> <li>Building- integrated structures to mute reflections on glass surfaces.<sup>4</sup></li> <li>Treat all glass railings with visual markers provided with spacing of no greater than 100 mm x 100 mm.<sup>5</sup></li> </ul>	<ol style="list-style-type: none"> <li>Bird friendly design aims to reduce bird collisions and mortalities caused by reflective glazing by: making glazed areas visually distinct to birds and by reducing images of trees or sky reflected in glass through shading/muting reflections. The most critical zone for bird collisions is 12 m minimum above grade (mature tree height).</li> <li>If the site is adjacent to a natural area feature, glass must be treated to the first 12 m of the building or to the height of the top of the surrounding tree canopy at maturity, whichever is greater.</li> <li>Visual markers perceivable to birds consist of opaque contrasting points or patterns etched into or applied onto the exterior or interior surfaces of glass and must have a minimum diameter of 5 mm and a maximum spacing of between 100 and 280 mm apart. Patterns applied closer to the first (exterior) surface, in combination with low reflectance glass, are most visible and effective. Examples include frit, frost or films.</li> <li>Building integrated structures include: opaque awnings, sunshades, exterior screens, shutters, grilles and overhangs or balconies that provide shading below a projection (assume 1:1 ratio of treatment below a projection) to mute reflections. Shade cast by the building or adjacent buildings cannot be included as a bird collision deterrence strategy.</li> <li>Glass railings include balcony railings or any parallel glass at a distance of 5 m or less such as a clear glass corridor or bridge. Glass behind treated balcony railings is considered to be treated.</li> <li>Glass behind treated balcony railings is considered to be treated. Tier 2 applies to all new developments not abutting near ravine or natural features in cases where Tier 1 was not applicable.</li> </ol> For more information see the <a href="#">City of Toronto Bird-Friendly Development Guidelines</a> .	Visual markers: Etched glass Fritted glass Films Decals Mullions  Exterior screens, shutters, grilles and louvres to shield glass surfaces  Shadows from opaque overhangs, awnings, exterior sunshades



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Light Pollution</b> Reduce nighttime glare and light trespass	<b>EC 5.1 Exterior lighting</b> Shield all exterior light fixtures to meet the IESNA Full Cutoff Classification or an Uplight rating of 0, to prevent glare and/or light trespass onto any neighbouring properties. <sup>1,2,3,4,5</sup>		<ol style="list-style-type: none"> <li>1. Refer to the Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual: Lighting for Exterior Environments for requirements for the Full Cutoff IESNA Classification: <a href="http://iesna.org">iesna.org</a> or the <b>BUG (Backlight, Uplight and Glare) rating system</b>.</li> <li>2. All exterior light fixtures should be efficient while providing minimum illumination levels sufficient for personal safety and security. Efficient exterior lighting is defined as 60 lumens/watt minimum system efficiency. Safety and security lighting should minimize glare and/or light trespass.</li> <li>3. Architectural illumination including uplighting may be permitted through a heritage designation provided lighting is turned off year-round between 11:00pm and 6:00am by an automatic device. Excessive lighting that contributes to light pollution including flood lighting, search lights or sky canons, is not permitted.</li> <li>4. Glare is the physical sensation caused by artificial light that is brighter than one's adapted surroundings. Glare is produced by a bare light shining directly into the eyes of the observer.</li> <li>5. Light trespass is unwanted stray light shining across property boundaries. Any light fixture installed on a property must direct and shield light coming from the fixture so that the light source is not directly visible from any adjacent property. Lighting must focus downward, eliminating direct upward light and reducing spill light.</li> </ol>	Fixtures that effectively project light downwards  Occupancy sensors in parking structures  Motion sensor lighting  Occupancy sensors/ timers for exterior lighting

# SOLID WASTE



## For New Low-Rise Residential Development

Development Feature	Required Tier 1	Voluntary Tier 2	Specifications, Definitions and Resources	Potential Strategies
<b>Storage and Collection of Recycling and Organic Waste</b> Facilitate waste sorting and reduction	<b>SW 1.1 Waste collection and storage</b> Provide an easily accessible dedicated area or areas for the collection and storage of materials for recycling for each dwelling unit. Materials must be consistent with the City of Toronto waste diversion programs. <sup>1</sup>	<b>SW 1.2 (Optional) Enhanced waste collection &amp; storage</b> Provide separated cabinet space in all kitchen suites for segregated collection of: <ul style="list-style-type: none"> <li>Recyclables</li> <li>Organics</li> <li>Waste</li> </ul>	<ol style="list-style-type: none"> <li>For guidance on storage area requirements, refer to the City of Toronto <a href="#">Requirements for Garbage, Recycling and Organics Collection Services for New Development</a>.</li> </ol>	Dedicated collection areas and signage
<b>Construction Waste Management</b> Recycle and/or salvage non-hazardous construction and demolition debris		<b>SW 2.1 (Optional) Construction waste</b> Recycle at least 75% of non-hazardous construction and demolition debris. <sup>1,2,3,4</sup>	<ol style="list-style-type: none"> <li>Refer to <a href="#">LEED® Canada for New Construction and Major Renovations 2009</a>: MR Credit 2 Construction Waste Management, for further details on how to achieve this requirement.</li> <li>Adopt a construction waste management plan to achieve these goals. Consider recycling cardboard, metal, brick, mineral fibre panel, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation.</li> <li>Construction debris processed into a recycled content commodity which has an open market value (e.g. wood derived fuel [WDF], compost or mulch, etc.) may be applied to the construction waste calculation.</li> <li>Calculations can be done by weight or volume, but must be consistent throughout.</li> </ol>	Construction waste management plan Designated area on site for recyclable materials Recycle trees removed from the site through tree salvage companies
<b>Regional Materials</b> Increase demand for building materials and products extracted, processed and manufactured in the region		<b>SW 3.1 (Optional) Regional materials</b> Ensure that at least 20% of a project's building materials or products have been extracted, harvested, recovered or processed within 800 km (2400 km if moved by rail or water) of the final project site. <sup>1,2</sup>	<ol style="list-style-type: none"> <li>Refer to <a href="#">LEED® Canada for New Construction and Major Renovations 2009</a>: MR Credit 4 Recycled Content, for further details on how to achieve this requirement.</li> <li>Demonstrate that the final manufacturing site is within 800 km (500 miles) (2,400 km if shipped by rail or water) of the project site for these products. If only a fraction of a product or material is extracted, harvested, recovered, processed and manufactured locally, then only that percentage (by weight) must contribute to the regional value.</li> </ol>	Specify materials, material suppliers and manufacturers that meet the regional criteria