

Toronto Green Standard v4 Sustainability Standards Crosswalk



Summary Comparison

Version 4.0 Toronto Green Standard (TGS)
for City Agency, Corporations &
Division-Owned Facilities

LEED® Version 4.0/v4.1
Building Design and Construction
(BD+C) Rating System

Zero Carbon Building Design Standard 3.0
Framework for Designing and Retrofitting
Buildings to Achieve Zero Carbon

&

Passive House
Standard in Energy-Efficient Construction

2023

Purpose

This document is designed to be used in conjunction with the LEED (Leadership in Energy and Environmental Design) v4 Building Design and Construction (BD+C) Rating System, the Zero Carbon Building – Design (ZCB-Design) Standard v3 and the Passive House (PH) Standard. It provides information on the Toronto Green Standard (TGS) Version 4 (v4) requirements that came into effect on May 1, 2022.

The purpose of the Crosswalk is to provide a high level comparison between the third party rating systems and standards referenced or allowed as equivalents within the Toronto Green Standard in order to:

- Identify those cases of selected sustainable design elements where the TGS minimum requirements contribute to LEED credits or achievement of ZCB or PH certification;
- Inform the design community who are familiar with LEED, ZCB or PH, or who are interested in pursuing certification, of the areas of similar intent between LEED v4 BD+C, ZCB-Design and PH and the TGS v4, and;
- Identify where LEED, ZCB or PH documentation exchange will be accepted for TGS verification and compliance.

This Crosswalk applies to new development and construction projects covered by the Toronto Green Standard v4 for new TGS City Agency, Corporation & Division-Owned Facilities.

Toronto Green Standard v4 for City Agency, Corporation & Division-Owned Facilities

The Toronto Green Standard is a set of performance measures for sustainable development that address the City of Toronto's environmental pressures and priorities in effect since 2010. The Toronto Green Standard was originally adopted by City Council in 2009 and came into effect January 2010. The standard has been updated in 2014 (v2), in 2018 (v3), and again in 2022 (v4). The current Version 4 contains three (3) tiers of environmental performance including stepped energy performance and greenhouse gas targets. The basis for the TGS is the Climate Change Action Plan – an aggressive environmental framework aimed at reducing Toronto's greenhouse gas emissions and the Toronto Official Plan which guides land use planning decisions. In 2021 the TransformTO Net Zero Strategy was approved, with interim goals for 2025 and 2030, leading to net zero community-wide greenhouse gas (GHG) emissions by 2040. This updated strategy will reach net zero 10 years earlier than initial proposed, making it one of the most ambitious targets in North America.

City Council has directed that new City-owned facilities are designed and built to the highest environmental standards to demonstrate leadership and address the Net Zero 2040 Strategy. The Toronto Green Standard for new City-owned facilities applies to any new building that is greater than 100m² in gross floor area and includes performance requirements equivalent to Tier 2 level or higher as compared to the requirements for private developments. All new City-owned facilities are required to be designed and constructed as net zero emissions and to be third party verified during construction.

The Toronto Green Standard (TGS) is organized according to the City of Toronto's top five Environmental Drivers (pressures); then divided into a set of Performance Measures (e.g. Urban

Heat Island Reduction, Water Efficiency). The short form of each Environmental Driver is used in naming the performance measure. For example, SW1.1 Waste Collection. The Environmental Drivers are:

- Air Quality (AQ)
- Buildings Energy, Emissions & Resilience (GHG)
- Water Quality & Efficiency (WQ)
- Ecology & Biodiversity (EC)
- Waste and the Circular Economy (SW)

LEED v4 Building Design and Construction Rating System

LEED v4 BD+C is an international, voluntary rating system for new construction and major renovations of commercial, industrial and institutional buildings. It is an initiative of the US Green Building Council. In Canada, LEED is administered by the Canada Green Building Council (CaGBC). Other LEED rating systems address other building sectors (such as homes, commercial interiors, and existing buildings). Details of the rating system are available [here](#).

The rating system is structured into a set of prerequisites and credits. Points are awarded for meeting the requirements of the credits, and the total of the points earned determines the overall certification level achieved (Certified, Silver, Gold, or Platinum). LEED credits are similar in function to TGS Performance Measures; however, the LEED rating system covers a wider range of possible credits. LEED credits and prerequisites are organized into 9 groups. The short form of each is used in naming the prerequisites (P) and credits (C). For example, *MRp1 Storage and Collection of Recyclables*. The groups are:

- Integrative Process (IP)
- Location and Transportation (LT)
- Sustainable Sites (SS)
- Water Efficiency (WE)
- Energy and Atmosphere (EA)
- Materials and Resources (MR)
- Indoor Environmental Quality (IEQ)

The remaining 2 groups provide the opportunity to achieve credits for exceptional performance above the requirements set by LEED, and help project teams focus on their environmental, social equity, and public health priorities. These groups include:

- Innovation in Design (ID)
- Regional Priority (RP)

Note that for the purposes of this document LEED v4.0 and LEED v4.1 (as of the July 2022) have been considered.

Zero Carbon Building Standard

The CAGBC's Zero Carbon Building – Design (ZCB-Design) Standard is a voluntary certification for new construction, major renovations, and existing buildings. The Zero Carbon Building – Design (ZCB-Design) Standard is a made-in-Canada framework for designing and retrofitting buildings to achieve zero carbon. The key components of the ZCB-Design Standard are:

- Zero Carbon Balance
- Low Embodied Carbon
- Limits On Combustion
- Energy Efficiency.

New construction and major renovation projects can earn a ZCB-Design certification by modelling a zero carbon balance, demonstrating low embodied carbon, limiting or eliminating onsite combustion, and meeting requirements for highly energy efficient design including high-performance envelope and ventilation systems. Occupied buildings can achieve a ZCB-Performance certification by demonstrating a zero carbon balance over a 12-month operating period. Details of the ZCB-Performance program are available [here](#). The second iteration, Version 2 (v2) of the ZCB-Design Standard, introduces greater rigour while increasing flexibility, to support the goal of transforming all buildings to become zero carbon. ZCB-Design v3 was released in 2022, and represents a response to the changes in the Canadian design and construction market since the launch of ZCB-Design v2 in 2020. Important updates include restrictions on onsite combustion and a maximum limit on embodied carbon.

Passive House Standard

Passive House high-performance building standard is the internationally recognized building certification system, providing third-party verification and a stamp of quality assurance that a building meets the high performance and comfort levels of the Passive House Standard.

Developed by the Passive House Institute (PHI), the Passive House concept follows five principles:

1. Super insulated envelopes
2. Airtight construction
3. High-performance glazing
4. Thermal-bridge-free detailing
5. Heat recovery ventilation.

Passive House buildings combine superior thermal comfort with minimum energy consumption. Passive Houses are classified as either Classic, Plus or Premium depending on their renewable primary energy (PER) demand and renewable energy generation.

OVERVIEW OF SIMILARITIES AND DIFFERENCES

The following sections detail the similarities and differences between TGS v4 and LEED, ZCB and PH. High-level tables have been prepared to indicate where requirements of the TGS v4 overlap with one of the certifications.

LEED v4 BD+C Certification

The LEED v4 BD+C rating system and the TGS v4 are complementary and share many objectives. A number of TGS performance measures and LEED v4 credits and prerequisites overlap in design intent. Table 1 below is a comparison of all TGS City Agency, Corporation & Division-Owned Facilities performance measure requirements and corresponding LEED v4 BD+C credits and prerequisites.

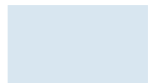
The following terminology is used to classify the relation between TGS v4 and LEED v4 BD+C.



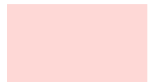
LEED Additional Requirement: The corresponding TGS performance measure feature does not entirely meet the requirements of the LEED v4 BD+C credit or prerequisite.



TGS Additional Requirement: The corresponding LEED v4 BD+C credit or prerequisite does not entirely meet the requirements of the TGS performance measure.



Exclusive to TGS: There is no corresponding LEED v4 BD+C credit or prerequisite.



LEED Documentation Accepted for TGS Submission: TGS performance measure and corresponding LEED v4 BD+C credit requirements and documentation are very similar, allowing an exchange of LEED submittals¹. Cells that have been checked off indicate LEED Documentation is accepted for TGS submission, otherwise, it is not accepted.

¹ Refer to the City of Toronto TGS v4 website for further details on accepted LEED BD+C v4 documentation.

TABLE 1: Comparison of LEED v4/v4.1 BD+C Credits and TGS City Agency, Corporation & Division-Owned Facilities Performance Measures

TGS v4 Performance Measure	LEED v4/v4.1 Credit	Exclusive to TGS	TGS Additional Requirement	LEED Additional Requirement	LEED Documentation Accepted for TGS Submission
AQ 1.1 Single-Occupant Vehicle Trips	LT Access to Quality Transit, LT Bicycle Facilities, LT Reduced Parking Footprint		√	√	
AQ 1.2 Electric Vehicle Infrastructure	LT Electric Vehicles		√	√	
AQ 2.1 Bicycle Parking Rates	LT Bicycle Facilities		√	√	
AQ 2.2 Long-term Bicycle Parking Location	LT Bicycle Facilities		√	√	
AQ 2.3 Short-term Bicycle Parking Location	LT Bicycle Facilities		√	√	
AQ 2.4 Electric Bicycle Infrastructure		√			
AQ 2.5 Shower and Change Facilities	LT Bicycle Facilities		√	√	
AQ 2.6 Publicly Accessible Bicycle Parking		√			
AQ 3.1 Connectivity		√			
AQ 3.2 Sidewalk Space		√			

TGS v4 Performance Measure	LEED v4/v4.1 Credit	Exclusive to TGS	TGS Additional Requirement	LEED Additional Requirement	LEED Documentation Accepted for TGS Submission
AQ 3.3 Weather Protection		√			
AQ 3.4 Pedestrian Specific Lighting		√			
GHG 1.1 Energy Use and Greenhouse Gas Emissions Limits	EA Optimize Energy Performance: Option 1		√	√	
GHG 1.2 Refuge Area and Back-Up Power Generation	Pilot Credit: Passive Survivability and Back-up Power During Disruptions: Option 2 ²		√	√	
GHG 2.1 Material Emissions Assessment	MR Building Life-cycle Impact Reduction: Option 2 (LEED v4.1), Pilot Credit: MR Procurement of Low Carbon ³ Construction Materials		√	√	
GHG 2.2 Whole Building Life Cycle Assessment	MR Building Life-cycle Impact Reduction: Option 2 (LEED v4.1)		√	√	
GHG 3.1 Benchmarking & Reporting	EA Building-Level Energy Metering		√	√	
GHG 3.2 Enhanced Commissioning	EA Fundamental & Enhanced Commissioning and Verification (LEED v4.1)				√
GHG 3.3 Whole Building Air Leakage Testing (WBALT)		√			

² Note: pilot credits are subject to change and being closed without notice. Please refer to the USGBC website.

³ Note: pilot credits are subject to change and being closed without notice. Please refer to the USGBC website.

TGS v4 Performance Measure	LEED v4/v4.1 Credit	Exclusive to TGS	TGS Additional Requirement	LEED Additional Requirement	LEED Documentation Accepted for TGS Submission
WQ 1.1 Water Balance, Quality Control & Quantity Control	SS Rainwater Management		√	√	
WQ 1.2 Green Streets	SS Rainwater Management		√	√	
WQ 1.3 On-site Green Infrastructure	SS Site Development - Protect or Restore Habitat: Option 1, SS Rainwater Management		√	√	
WQ 2.1 Water-Efficient Fixtures	WE Indoor Water Use Reduction (40% reduction)				√
WQ 2.2 Efficient Irrigation	WE Outdoor Water Use Reduction (Option 2, 100% reduction)		√	√	√
EC 1.1 Tree Planting Areas and Soil Volume		√			
EC 1.2 Trees Along Street Frontages		√			
EC 1.3 Parking Lots		√			
EC 1.4 Watering Program		√			
EC 2.1 Green & Cool Paving	SS Heat Island Reduction: Option 1		√	√	

TGS v4 Performance Measure	LEED v4/v4.1 Credit	Exclusive to TGS	TGS Additional Requirement	LEED Additional Requirement	LEED Documentation Accepted for TGS Submission
EC 2.2 On-site Landscaping	SS Site Development - Protect or Restore Habitat: Option 1, WE Outdoor Water Use Reduction		√	√	
EC 2.3 Green and Cool Roofs	SS Heat Island Reduction: Option 1		√	√	
EC 3.1 Ravine & Natural Feature Protected Area Stewardship		√			
EC 3.2 Ravine & Natural Feature Protected Area and Natural Heritage System (NHS)		√			
EC 4.1 Climate Positive Landscape Design		√			
EC 5.1 Bird-Friendly Glazing	IN Bird Collision Deterrence		√	√	
EC 5.2 Rooftop Vegetation	IN Bird Collision Deterrence		√	√	
EC 5.3 Grate Porosity		√			
EC 5.4 Exterior Lighting	SS Light Pollution Reduction		√	√	
SW 1.1 Waste Collection	MR Storage and Collection of Recyclables		√	√	

TGS v4 Performance Measure	LEED v4/v4.1 Credit	Exclusive to TGS	TGS Additional Requirement	LEED Additional Requirement	LEED Documentation Accepted for TGS Submission
SW 1.2 Waste Storage Space	MR Storage and Collection of Recyclables		√	√	
SW 1.3 Bulky Waste		√			
SW 1.4 Compaction		√			
SW 1.5 Household Hazardous Waste	MR Storage and Collection of Recyclables		√		
SW 2.1 Building and Material Reuse	MR Building Life Cycle Impact Reduction: Option 1 (LEED v4.1)				√
SW 3.1 Sourcing of Raw Materials	MR Sourcing of Raw Materials		√		√
SW 4.1 Construction Waste Management	Construction and Demolition Waste Management: Option 1			√	
SW 4.2 Construction Waste Diversion	Construction and Demolition Waste Management: Option 1 & Option 2				√

Zero Carbon Building - Design Certification

The TGS v4’s Energy Use and Greenhouse Gas Emissions and Embodied Emissions in Materials development features have been aligned with the ZCB-Design requirements related to operational and embodied carbon. The complementary objectives are highlighted in Table 2 below, identifying where the performance requirements of the TGS City Agency, Corporation & Division-Owned Facility projects achieve ZCB-Design certification. Refer to the [ZCB Design v3 Standard](#) for details, including a detailed description on the Flexible, Renewable and Passive Design Approach, and up to date requirements.

Additionally, the ZCB-Design certification is accepted as an alternative pathway to TGS v4 GHG1.1 Energy Use and Greenhouse Gas Emissions Limits.

TABLE 2: Comparison of ZCB-Design v3 Standard and Related TGS v4 Performance Measures

Performance Metric	TGS v4	ZCB Design v3
Zero Carbon Balance⁴	YES	YES
Thermal Energy Demand Intensity (TEDI)	$\leq 30 \text{ kWh/m}^2/\text{yr}$ OR 50% better than OBC SB-10 2017	No On-Site Combustion ⁵ (Report TEDI only) OR $\leq 32 \text{ kWh/m}^2/\text{yr}$ (Flexible or Renewable Energy Approach) OR $\leq 22 \text{ kWh/m}^2/\text{yr}$ (Passive Design Approach)
Total Energy Use Intensity (TEUI)	$\leq 100 \text{ eKWh/m}^2/\text{yr}$ OR 50% better than OBC SB-10 2017	$\leq 90\text{-}110 \text{ eKWh/m}^2/\text{yr}$ OR 25% better NECB 2017
Embodied Carbon	20% reduction OR $\leq 350 \text{ kg CO}_2\text{e/m}^2$	10% reduction OR $\leq 500 \text{ kg CO}_2\text{e/m}^2$ AND 20-40% reduction OR $\leq 240\text{-}350 \text{ kg CO}_2\text{e/m}^2$ (Optional Impact and Innovation)

⁴ A net-zero emissions building is one that is highly energy-efficient and produces on-site, or procures, carbon-free and or renewable energy in an amount sufficient to offset the annual carbon emissions associated with its operations or simply eliminates carbon emissions altogether.

⁵ And demonstrate an equipment seasonal coefficient of performance (COP) ≥ 2

Passive House Certification

Passive House certification is focused on providing a high-performing building enclosure to reduce operational energy use in buildings. Higher certification categories (Passive House Plus, Passive House Premium) are available by further limiting energy use and encouraging renewable energy generation. The Passive House objectives align in intent with TGS v4’s Energy Use and Greenhouse Gas Emissions and Whole Building Air Leakage Testing. Refer to the [Passive House Standard](#) for details and the up to date requirements.

Additionally, Passive House certification is accepted as an alternative pathway to TGS v4 GHG1.1 Energy Use and Greenhouse Gas Emissions Limits. Note that the Greenhouse Gas Intensity target of 0 must first be met before the alternative pathway can be pursued.

TABLE 3: Comparison of Passive House and TGS v4 Performance Measures

Performance Metric	TGS v4	Passive House Classic
Zero Carbon Balance	YES	NO
Thermal Energy Demand Intensity (TEDI)⁶	30 kWh/m ² /yr OR 50% better than OBC SB-10 2017	Heating Demand 15 kWh/m ² /yr
Total Energy Use Intensity (TEUI)⁶	TEUI - 100 eKWh/m ² /yr OR 50% better than OBC SB-10 2017	Renewable Primary Energy ⁷ 60 eKWh/m ² /yr
Air Tightness/Infiltration Testing	2 L/s/m ² (at 75 Pa)	0.6 ACH (at 50 Pa) <i>~0.89 L/s/m² (at 75 Pa)</i>

⁶ Applicable floor area in Passive House differs from TGS v4.

⁷ Renewable primary energy (PER) is the unit of energy generated from renewable resources (e.g. electricity produced by a photovoltaic system). PER-factors reflect the primary renewable resources needed to cover the final energy demand of a building, including distribution and storage losses. PER may have a higher project-specific target for residential and office/administrative buildings with a high occupancy density; buildings with high required ventilation rates, such as hospitals or laboratories; or buildings with a high energy intensity, such as indoor pools or data centers.

Created By

WSP Canada Inc. developed this document in consultation with the City Planning Division at the City of Toronto and the Canada Green Building Council, with input from the CaGBC and Passive House Canada.

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