



Exploring Opportunities to Improve Resilience Metrics in Green Development Standards

We will get started at 3 pm



Clean Air Partnership



About this Webinar

- **INTACT Centre *Under One Umbrella: Practical Approaches for Reducing Flood Risks in Canada***
- **Natalia Moudrak from INTACT Centre**
- **We will be recording and sharing the presentation, recording and report following webinar**
- **Please share the proceedings with others you think may be interested**

What are Green Development Standards (GDS)?

- **Voluntary or mandatory measures implemented by municipalities to encourage sustainable community design**
- **Metrics to guide development at a level of planning and design that focuses on the community as a whole**
- **Goals:**
 - i. Minimize GHG emissions
 - ii. Preserve the natural environment
 - iii. Create thriving, connected communities
 - iv. Improve public health
 - v. Increase resilience re extreme weather impacts



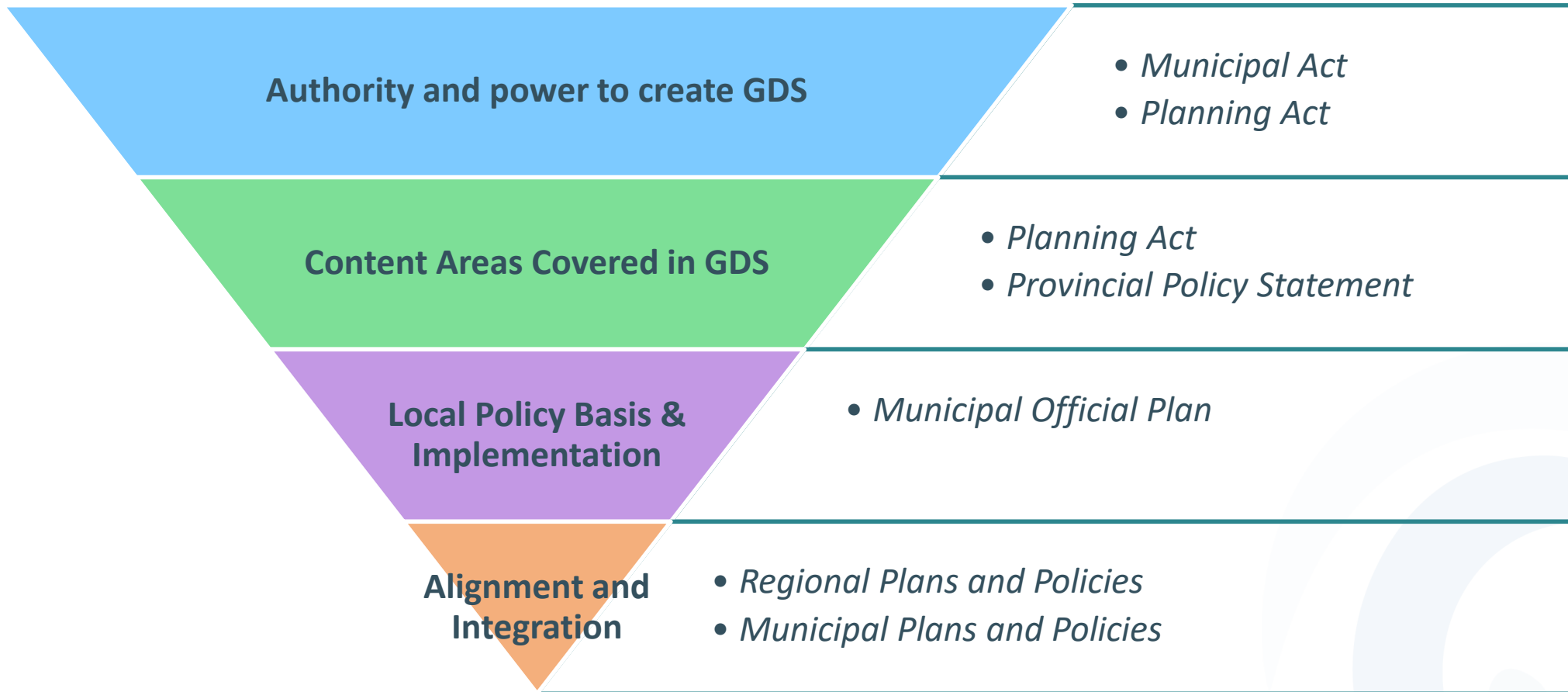
Why Green Development Standards?

- **Ontario's population is projected to grow by 30.2 per cent (4.3 million) between 2017 to 2041.**
- **In order to increase resilience to extreme weather and reach GHG targets, new buildings need to be built to minimize GHG emissions (net zero) and increase flood protection measures**
 - This is easier and cheaper to do at time of construction rather than retrofitting them later
- **Opportunity for municipality to ensure that new development considers public health, climate change mitigation and resilience, energy, and resource use.**

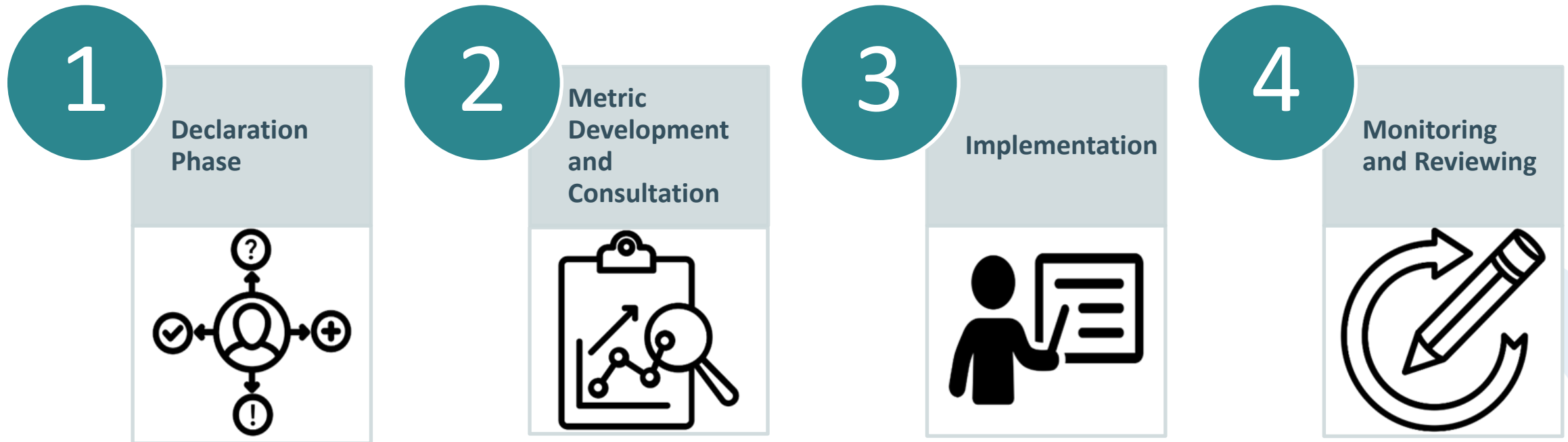
What are the benefits of Green Development Standards?

- **Building better quality buildings**
- **Reducing operating costs through decreased need for heating and cooling**
- **Increasing resilience to extreme weather and power disruptions**
- **Reduce GHG emissions**
- **Improve air quality and reduce the urban heat island effect**
- **Reduce storm water runoff and potable water consumption while improving the quality of storm water draining to water bodies**
- **Protect and enhance ecological functions, integrate landscapes and habitats and decrease building-related bird collisions and mortalities**
- **Divert household and construction waste from going to landfill sites.**

Legislative Framework

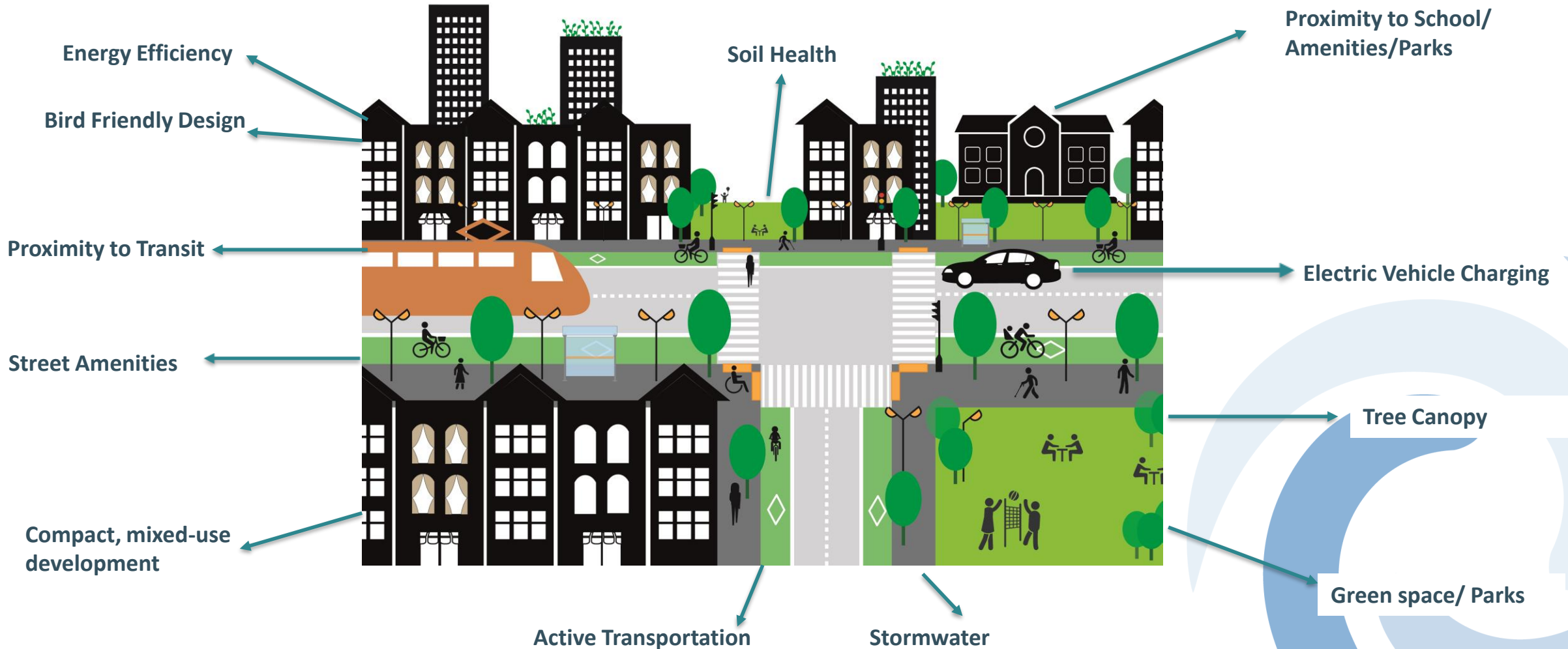


GDS Milestone Framework



Part of Clean Air Partnership's Climate Action Support Centre project

What do Green Development Standards cover?



Resilience in National Model Building Code and Ontario Building Code

- **Sump Pumps (but not backups, back up power and failure alarms)**
- **Backflow Protection (I am confused by requirements in OBC – help?!)**
- “where a building drain or a branch may be subject to backflow....” – seems to be interpretation differences across municipalities
- **Resilience of Roofs to Wind (2020 - NMBC)**
- **Guidelines for climate resilience for existing stormwater systems (2021 – NMBC)**
- **Structural design rules for buildings coming for 2025 NMBC**
- **There is a gap that we want to try and address and also the need to drive the metrics that make the most sense (collective work on this makes sense)**
- **These are tentative timeframes (likely to take longer) are just model standards still need a mechanism to apply them which is Building Code or Green Standards, Stormwater standards, etc....**
- **The need to up flood resilience (retrofits aren’t cheap, at time of construction provides the best ROI)**

Tiered Approach to GDS (Toronto Green Standard)

Example metrics from Toronto Green Standard version 3 for Low Rise Residential

Increasing environmental performance



Development Feature	Water Balance (Stormwater Retention): Capture and manage rainfall to improve water quality and aquatic ecosystem health while enhancing the resilience of infrastructure to extreme rainfall events.
TIER 1	WQ 2.1 Stormwater Retention & Reuse Retain runoff generated from a minimum of 5 mm depth of rainfall from all site surfaces through infiltration, evapotranspiration and water harvesting and reuse.
TIER 2	WQ 2.2 Advanced Stormwater Retention & Reuse (Core) Retain runoff generated from a minimum of 10 mm depth of rainfall from all site surfaces through infiltration, evapotranspiration and water harvesting and reuse.
TIER 3	WQ 2.3 High Performance Stormwater Retention & Reuse (Core) Retain runoff generated from a minimum of 25 mm depth of rainfall from all site surfaces through infiltration, evapotranspiration and water harvesting and reuse.

Resilience Metrics

TREE CANOPY — WITHIN PROXIMITY TO BUILDING/PEDESTRIAN INFRASTRUCTURE

METRIC	Tree Canopy — within proximity to building/pedestrian infrastructure.
APPLIES TO	Site Plan
MANDATORY	<ul style="list-style-type: none">» Provide shade within 10 years for at least 50% of the walkways/sidewalk lengths. All trees should be selected from the applicable municipal tree list.» PARKING LOTS: If surface parking is permitted and provided, plant large growing shade trees throughout the parking lot interior at a minimum ratio of one tree planted for every five (5) parking spaces supplied.» WATERING PROGRAM: Provide a watering program for trees for at least the first 2 years after planting.
VOLUNTARY	<ul style="list-style-type: none">» Provide shade within 10 years for at least 75% of the walkways/sidewalk lengths. All trees should be selected from the applicable municipal list.» PARKING LOTS: If surface parking is permitted and provided, plant large growing shade trees throughout the parking lot interior at a minimum ratio of one tree planted for every three (3) parking spaces supplied.» WATERING PROGRAM: Provide a watering program for trees for at least the first 2 years after planting.



Resilience Metrics

TREE CANOPY — MAINTAINING EXISTING TREES

METRIC	Tree Canopy — Maintaining existing trees and Soil Fertility
APPLIES TO	Draft and Site Plans
MANDATORY	<ul style="list-style-type: none">» Arborist Report provided that identifies and evaluates where on site healthy mature trees will be protected (in-situ or moved) or removed.» Where healthy mature trees must be removed, new trees (not including street trees) are provided on site or as determined by the municipality to mitigate the lost canopy coverage of the trees removed.
VOLUNTARY	75% of healthy mature trees greater than 20cm. DBH are preserved in situ on site.
HOW IT IS DEMONSTRATED	Arborist Report that clearly reports total number of trees removed, to be protected, and to be moved. Also include percentages of tree health.
WHO IS RESPONSIBLE FOR REVIEWING	Parks/Natural Heritage Planning
RATIONALE	As part of the urban forest, street trees provide a range of ecosystem services including: cleaning air; intercepting rainfall that helps to mediate storm flows; evaporative cooling and summer shade to reduce building cooling loads; wind breaks; and carbon sequestration. As community amenities, street trees promote active transportation by providing a more walkable pedestrian environment.

Resilience Metrics

SOIL QUANTITY AND QUALITY

METRIC	Soil Quantity, Quality and Fertility
APPLIES TO	Draft and Site Plans
MANDATORY	<ul style="list-style-type: none">» Pits, trenches or planting beds should have a topsoil layer with an organic matter content of 10 to 15 % by dry weight and a pH of 6.0 to 8.0. The topsoil layer should have a minimum depth of 60cm. The subsoil should have a total uncompacted soil depth of 90cm. Minimum soil volume of 30 cubic meters per tree.» Undertake a Topsoil Fertility Test for the entire site and implement its recommendations.» Avoid development on highly permeable soils following TRCA and CVC Low Impact Development Stormwater Management Planning and Design Guide (or other local LID SWMP guides).
VOLUNTARY	<ul style="list-style-type: none">» Minimum 200mm of top soil is provided across the entire site (2 POINTS).» Minimum 30 cubic metres of soil per tree is provided (1 POINT).» Provide 25% more soil volume than the 30 cubic metres per tree (1 POINT).



Resilience Metrics

STORMWATER QUANTITY

METRIC	Stormwater quantity
MANDATORY	Retain runoff volume from the 10mm fall event on site (or current minimum stormwater engineering requirement).
VOLUNTARY	Retain runoff volume from the 15mm rainfall event on site.
HOW IT IS DEMONSTRATED	<p>Included in the Site Plan Drawings or Stormwater Management Plan (Site Plans) and Functional Servicing Report or Stormwater Management Plan (Block and Draft Plans).</p> <p>SUBMISSION REQUIREMENTS:</p> <ul style="list-style-type: none">» List and describe the design measures used to retain stormwater runoff on site. Measures could include (but not limited to):<ul style="list-style-type: none">↳ Low impact development measures↳ Stormwater ponds↳ Bioswales» Highlight the location of design measures (if any) on a plan.» Confirm that the quantity and flood controls are in accordance with applicable Municipal and conservation authority requirements.» Calculations and signoff by a professional quantifying the amount of runoff that will be retained on site.



Upping Resilience of Green Standards

- **Durham Region Climate Resilient Standard**
- **Prepared in 2017 for Durham by ICLR**
- **3 Technical Committees involving Canadian and US experts from universities, research organizations, municipalities, building officials, consultants, insurance companies.**
- **Three sections: Basement Flood Protection: 22 measures**
- **Extreme Wind/Tornado Protection: 10 measures**
- **Extreme Heat Protection: 10 measures**

 Institute for Catastrophic Loss Reduction
Institut de Prévention des Sinistres Catastrophiques



**DURHAM REGION
CLIMATE RESILIENCE STANDARD FOR NEW HOUSES**

February 2018
Draft for consultation

Municipal Feedback to Needs/Challenges

- Which are the most important metrics question
- Costing out metrics
- Unintended consequences
- Wanting peer review to guide decision making
- 3rd party verification of standards
- Maintenance and operational costs burden on municipalities
- Savings to stormwater systems as a whole



INTACT CENTRE ON CLIMATE ADAPTATION

- Applied research centre at the University of Waterloo focused on helping Canadians adapt to extreme weather challenges (FLOOD, WILDFIRE, EXTREME HEAT, ETC.)
- Worked with National Research Council of Canada, Standards Council of Canada and CSA Group to develop FLOOD resilience standards for homes, new and existing communities in Canada
- Thank you to INTACT CENTRE for taking on that thankless job
- Natalia will speak to the process and the outcomes of that effort
- Question: what makes sense to bring into Green Standards and what is the collective process that may work to reduce burden on individual municipalities re incorporation of FLOOD resilience standards into municipal requirements?