

Appendix 'A'

Response to Environmental Registry Number 012-9080 Low Impact Development Stormwater Management Guidance Manual Comment Period – June 15, 2017 to July 15, 2017

Document 1 - Jurisdictional Scan of Canadian, US and International Stormwater Management Volume Control Criteria, Draft Final Report, Aquafor Beech Ltd, February 17, 2016

The jurisdictional review sets the framework for the establishment of a runoff control volume target (RCV_T) for Ontario by completing a review of volume control criteria implemented in other jurisdictions. Five jurisdictions whose motivation and intention for LID is aligned with Ontario were then short listed for detailed review to form the basis for the development of an RCV_T for Ontario.

- An overall objective for implementation of a RCV_T in Ontario should be provided.
- The adoption of an RCV_T value should be based on scientific evidence, observations and lessons learned. The jurisdictional review must ensure Ontario is building on the existing collective knowledge surrounding volume retention / reduction criteria.
- **Section 3.3** – Selection of Jurisdictional 'Short-List'. One of the rationale for further examining a jurisdiction's SWM targets were that the jurisdiction had larger volume based targets (14-24 mm or >25mm). In examining larger targets, the potential merits of a smaller but proven/justified targets are being overlooked.

Document 2 - Runoff Volume Control Targets for Ontario, Final Report, Aquafor Beech, October 27, 2016

Provincial stormwater standards need to be updated to include low impact develop targets. The proposed provincial low impact development guidelines would implement a runoff control volume target (RVC_T) to reduce runoff volumes by maintaining water balance conditions via increased infiltration, evapotranspiration and reuse.

- Generally, the adoption of the RVC_T as the 90th rainfall percentile is based on:
 1. Previous evidence that capturing the 90th percentile of rainfall provides water quality control; and
 2. The premise that *"At 10% total watershed imperviousness of watersheds with traditional ditch and pipe systems, about 10% of the total rainfall volume becomes runoff that enters receiving waters; this runoff volume is the root cause of aquatic habitat degradation. As such an appropriate performance target for managing runoff volume is to limit total runoff volume to 10% (or less) of the total rainfall volume. This means that 90% of rainfall volume must be controlled and returned to natural hydrologic pathways, through infiltration, evapotranspiration or re-use"*
 - Requiring 90% of annual rainfall to be infiltrated, reused or evapotranspired would provide less runoff than mature forests with clay soils as per Table 3.1 from the MOECC 2003, Stormwater Management Planning and Design Manual, where annual runoff represent 21% of the annual rainfall volume (196 mm of runoff, 940 mm of annual precipitation).
 - Please provide definition and ensure the following terms are used correctly and consistently in the document:
 - 90th percentile storm;
 - 90% of mean annual rainfall event volume;
 - 90% rainfall volume; and

- 90% of runoff producing events.
 - Controlling the 90th percentile of individual rainfall events does not equate to controlling 90% of annual rainfall volume. The RVC_T representing the 90th percentile storm event would also control the initial portion of all larger events, up to the control volume. Resulting in greater than 90% infiltration of annual rainfall.
 - Water quality and quantity control are separate issues. It may be appropriate to provide targets individually to ensure proper control.
- **Section 3** – If a geographically based RVC_T is accepted, an online lookup tool (similar to MTO’s IDF look up curve) should be implemented.
- **Section 4** – Recommended Volume Targets for Ontario
 - A flow chart outlining the RVC_T mandatory control hierarchy, exemptions, and approval process should be provided.
 - Section 4.1 includes “*The RCV_T for Ontario be founded upon the principles of maintaining the predevelopment water balance and returning precipitation to the natural pathways....As such, the appropriate portion of the RVC_T must be returned to natural pathways of the predevelopment water balance*”. The RVC_T is to maintain the predevelopment water balance. The MOECC should be prepared to provide guidance on determining pre-development water balance conditions and the associated runoff portion to be infiltrated and/or evapotranspiration/reused for each LID site. It cannot be assumed that infiltrating up to 90% of the rainfall volume will meet predevelopment conditions and will not have an adverse impact on the natural environment. Conversely, minimum infiltration targets should be provided to ensure water balance needs are met and prevent total reuse of runoff volume (and thereby discharge to the municipal sewer network).
 - **Section 4.1** - The guidance document should highlight accepted methods for proponents to justify implementing lower RVC_T based on local site conditions or continuous modeling.
 - **Section 4.1** - To meet RVC_T control hierarchy priority 1 (Retention), the RVC_T is infiltrated, evapotranspired or re-used. Is it recognized that although systems may be designed to infiltrate/store the 90th percentile event, the system may not have capacity to receive succeeding events based on soil conductivity or antecedent conditions. Designs should demonstrate hierarchy priority 1 is met based on daily rainfall and temperature records available across the province. The manual should identify appropriate daily weather datasets to represent typical annual rainfall conditions.
 - **Section 4.1** – The proposed RVC_T could result in greater infiltration than predevelopment conditions. There should be further consideration of the RVC_T’s potential impact to groundwater systems (e.g. quantity, levels, quality, and thermal).
 - **Section 4.2** - Pre-development definition. A maximum runoff coefficient will correspond to 0.15 for new development and 0.3 for redevelopment. These maximum runoff coefficients may be more conservative than forested or cultivated land predevelopment site conditions based on slope and soil type.
 - **Section 4.2** - The term “Maximum Extent Possible” (MEP) should be listed as Key Terminology. It is unclear in the document if this refers to a volume beyond the RVC_T or a volume up to a maximum of the RVC_T value.
 - **Section 4.3.1.1**- “*The site shall be required to maintain the pre-development water balance*”. Therefore, guidance to establish pre-development water balance conditions (portions to be infiltrated vs. evapotranspiration/reused) should be provided by the MOECC.

- **Section 4.3.1.2** – For all redevelopment, reurbanization and intensification, post-construction runoff volumes for the **entire site** are to maintain pre-development water balance conditions. Please clarify if this applies to the increase in impervious area or the entire site. It is not reasonable to require controls for the entire site as some site sites (e.g. institutional, commercial and industrial) are very large.
- **Section 4.3.1.3** - Linear Development Volume Control. It may not be practical to require linear reconstruction projects with a rural cross section and ditching to control per the mandatory control hierarchy. Specifically if the impervious area is not directly discharging to a watercourse.
- **Section 4.3.1.3 and 4.3.1.5.2** – *“Excessive costs alone shall not be considered an acceptable constraint”*, it may be reasonable to require a lifecycle cost-benefit analysis must be completed to demonstrate prohibitive costs.
- **Section 4.3.1.5** – Flexible Treatment Options for Sites with Restrictions. For sites that achieve volume control to the Maximum Extent Possible, further water quality control targets should be considered.
- **Section 4.3.1.6** – Direct Discharge of Stormwater to Watercourses and Wetlands. *“For sites that discharge via private or municipal conveyance system directly to a watercourse or wetland that is within 500 m of the site boundary, the proponent will ensure the site achieves complete volume control of runoff that is generated from the geographically specific 90th percentile rainfall event from all surfaces on the entire site. Alternative #1 and #2 will not be considered”*. This is a blanket statement that could have significant financial impacts and development constraint. There should be opportunity for pre-consultation with MOECC or local agencies to identify an appropriate level of control, if the volume control target cannot be met.