Attachment 8: TRCA Submission on ERO_019-4971

March 28, 2022

BY E-MAIL ONLY (John.Antoszek@ontario.ca)

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Water Standards
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Re: Low Impact Development Stormwater Management Guidance Manual (ERO #019-4971)

Thank you for the opportunity to comment on the proposed Low Impact Development (LID) Stormwater Management (SWM) Guidance Manual (herein referred to as "the proposed Manual") posted to the Environmental Registry of Ontario by the Ministry of Environment, Conservation and Parks (MECP).

Toronto and Region Conservation Authority (TRCA) conducts itself in accordance with the objects, powers, roles, and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* (CA Act) and the Ministry of Natural Resources and Forestry's Procedural Manual chapter on CA policies and procedures for plan review and permitting activities. TRCA is:

- A public body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement (PPS);
- A regulatory authority under Section 28 of the CA Act;
- A service provider to municipal partners and other public agencies;
- A Source Protection Authority under the *Clean Water Act*;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

In these roles, and as stated in MECP's "A Made-In-Ontario Environment Plan," CAs work in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, to conserve natural resources.

GOVERNMENT PROPOSAL

The purpose of the proposal is to consult on a new guidance manual that provides information and guidance on innovative stormwater management practices, including green infrastructure (also known as low impact development (LID)). We understand that the proposed Manual does not contain mandatory requirements but rather provides information for municipalities, developers, consultants, agencies, and others on the benefits of LID SWM, including flexible guidance to assist with implementation of a holistic treatment train approach to SWM using the full spectrum of source, conveyance, and end-of-pipe controls. The proposed Manual is intended to be read in conjunction with the 2003 Stormwater Management Planning and Design Manual and the 2008 Design Guidelines for Sewage Works. We further understand that while these existing documents remain applicable, the proposed LID Manual updates and replaces certain infiltration and filtration guidance, including climate change considerations.

GENERAL COMMENTS

Focusing on Climate Change

TRCA welcomes the focus on climate change and its impact on stormwater infrastructure. However, this chapter includes a lengthy general discussion that could be significantly reduced through more concise messaging by referencing other documents, including recent reports by Environment and Climate Change Canada (e.g., Canada's Changing Climate Report, 2019, and Canada in a Changing Climate National Issues Report, 2021). Accordingly, we recommend condensing the climate change section to focus on how climate change will directly affect the design of SWM facilities, and how to establish climate change parameters to adjust rainfall volumes and intensities in the design of the SWM/LID best management practices (BMPs).

Setting Direct Targets for Greater Certainty

We acknowledge that the proposed Manual is intended as guidance and does not include mandatory requirements. However, the predominance of encouraging language like "should" and "may" makes it difficult to understand the exact design criteria necessary to obtain a provincial permit and what must be undertaken to achieve a proper SWM strategy. TRCA staff recommend that the document explicitly state what is required in the Manual's Hierarchical Approach in achieving a Runoff Volume Control Target while moving from Priority #1 to #2 and then to #3. In addition, the Manual should provide clear direction to municipalities and CAs regarding exactly what must be undertaken to achieve a practical design.

DETAILED COMMENTS

In our detailed comments below, we provide examples of CA and municipal work completed in relation to the matters above and others and make recommendations for how they could be incorporated in the proposed Manual. The comments often refer to TRCA's previous comments on the May 2020 draft document, as several of them are still applicable.

1.0 Introduction	
1.2 Role of Ministry Guidance Documents	This section references the 2003 Manual stating that the document inaccurately presupposes that lot level and conveyance controls will not, on their own, satisfy all of the stormwater management criteria, and that in all cases end-of-pipe facilities will be required. The proposed Manual goes on to explain that this is inaccurate because it has been demonstrated that LID installations, when properly sited, designed and maintained, have met all of the performance requirements for SWM. This statement shows that there is a possibility that LID facilities can be used to achieve quantity (flood) control criteria. The statement should also acknowledge that there are challenges to ensuring the proper perpetual function of LID measures installed on private property, and recognize that not all cases of LID installed on private property will receive credit for quantity (flood) control criteria.
1.2 Role of Ministry Guidance Documents	In relation to the 2003 Manual, the text reads: "*Aside from the minimum infiltration rates, the design guidance for lot level and conveyance controls in the 2003 Stormwater manual remains valid."* There are other elements of the Guide that also require updating (e.g., equations 4.2 and 4.3 are incorrect). Consider including a statement that acknowledges the age of the manual and the evolution of design guidance over time. It would be reasonable to direct readers to more up to date sources of information for design guidance, such as

	the LID Stormwater Management Planning and Design Guide wiki page. The TRCA/CVC 2010 hard copy guide with the same name is no longer the most current guidance.
1.2 Role of Ministry Guidance Documents	Table 1.1 – Both the table and this section suggest that design guidance provided in the 2003 Manual is sufficient. We suggest strengthening this section by referencing later sections in the manual that present other LID resources.
1.8 Introduction to Green Infrastructure and Low Impact Development	Table 1.2 - Consider including Wetlands in the "Natural" column.
1.8.7 Bioretention (Rain Gardens)	This sub-section could include additional information regarding substrate layers used and optional underdrains. We suggest including a link to the LID Stormwater Management Planning and Design Guide wiki page for further details.
1.8.1.9 Permeable Pavements	Fourth Photo (Permeable Plastic Grid System) – We caution that this photo does not appear to represent good design practice and should be updated.
1.9 Supporting Resources	LID Resources for Planning Design – We suggest including the LID Treatment Train Tool in this section as it is a useful tool for LID site planning and design, especially to evaluate whether SWM criteria are being met.
1.9 Supporting Resources	We suggest rewording the third paragraph (page 31) as follows: "*The CVC/TRCA LID Stormwater Management Planning and Design Guide has been transitioned to a curated website (www.wiki.sustainabltechnologies.ca) that encourages feedback from users and is regularly updated as new information becomes available. Guidance provided on the website supersedes guidance provided in the 2010 LID Planning and Design Guide in instances where the same topic is addressed.*" In addition, we suggest changing the picture from the 2010 guide to the website since the latter contains more up-to-date guidance.
1.9 Supporting Resources	LID Planning and Design (retrofits) - It could be misleading to suggest that the CVC retrofit guides are the only source of design guidance for retrofit projects. The 2010 LID Planning and Design Guide provides design guidance both for new and retrofit projects. It is our intent to consolidate relevant supplementary information relating specifically to retrofit projects (from the retrofit guides) into the main wiki guide to help satisfy repeated industry requests to have all information provided through a single source. We suggest clarifying that the 2010 and wiki guidance applies both to new and retrofit projects. Any updates provided through the wiki guide should also be regarded as superseding older information provided in earlier formats, including from the retrofit guides (this is important to acknowledge as the information is otherwise contradictory).

	Consider compiling retrofit guide descriptions into a single section as they have the same theme and there is considerable overlap in process and guidance across land use types. Alternatively, the section could be shortened by only referencing the design guide, construction guide, and inspection & maintenance guide with a note directing readers to the wiki website for other resources. The Sustainable Technologies Evaluation Program (STEP) is currently adding significant content to the wiki related to LID inspection and maintenance, LID construction, plan review checklists and other topics through an MECP grant with a final delivery date of September 2022. New LID fact sheets that supersede those provided in the earlier 2010 guide are now available on the wiki.
1.9 Supporting Resources	LID Resources for Construction, Maintenance, Assumption and Lifecycle Activities – Please include a link to the Life Cycle Costing Tool, which underwent a significant update in 2019 and again in 2021. The tool includes planning level estimates of LID practice capital, maintenance, and rehabilitation costs with user editable fields to tailor costs to specific site contexts.
2.0 Environmental Planning Process	
2.2. Planning for Stormwater in a Watershed Context	It is understood why local study and target development are a desirable approach, however, this section allows too much flexibility in target setting. The objectives that this approach is required to achieve (Section 1.3) do not provide clear requirements or intent. "*Reduction in occurrences of undesirable geomorphic change*" or "*protecting ecosystems to the extent possible*" does not provide firm direction to feed into watershed and subwatershed plans, stormwater master plans, environmental management plans or master environmental servicing plans. There is a significant risk that these plans will result in reduced targets from the 90th percentile. We suggest that this section require target setting for watershed and subwatershed plans, stormwater master plans, environmental management plans or master environmental servicing plans using the process provided in Chapter 3. It should be noted that given provincial direction and municipal standards, most new large-scale development will take place through the development of at least one of these plans.
2.2 Planning for Stormwater in a Watershed Context and 2.3 Environmental Assessment	SWM considerations need to be promoted at the earliest stages of the planning process, as SWM facilities and LID BMPs require adequate property allowances, proper siting, and accessibility by maintenance crews to be successful. This can only happen if the SWM/LID BMP consideration is brought forward as early as possible, during conceptual lot layout. The concern here is that the Province has typically not been involved during early stages to date, and there are inconsistent approaches by municipalities leaving CAs to try and achieve water balance through LID BMP usage through planning/permit approvals. Further to the comment above regarding direction for studies in the early planning stages, we recommend that provincial direction/influence be

	established at the planning approval stage to ensure successful implementation of LID BMPs. Waiting until construction drawings are produced and property allowances are already established as part of an ECA permit application, is often too late to make implementation feasible. Existing conditions needs to consider the receiving system, whether watercourse, wetland or other feature, and an extensive analysis on the function and capacity of the receiving system.
3.0 Stormwater Design Criteria: Runoff Volume Control Target	
3.1.1 Watershed Impervious Area	As TRCA has commented in prior versions, the establishment of the 10% impervious/90% control target is based on a watershed level analysis, which is not appropriate in all situations. Using this as a blanket establishment could potentially result in a risk to the receiving system, as it does not consider the hydrologic needs of the receiving system, nor the capability of the soils to continuously take increased runoff volumes associated with development. There needs to be further recognition that the receiving system (and surrounding features) needs to be considered in an extensive existing conditions site assessment and water balance, rather than a blanket approach that could ultimately be more harmful to receiving systems.
3.1.1 Watershed Impervious Area	Third bullet – This statement conflicts with Figure 3.1 that illustrates 10% runoff occurring from 100% natural cover and 10-20% impervious cover producing 20% runoff.
3.1.2 Background of the 90th Percentile of Precipitation Event	Based on studies cited, there is no evidence that controlling for the 90th percentile event (rainfall depth ranking) can control 90% of average annual rainfall. Most of the studies indicated that controlling for the 1.25- or 1-inch rainfall depth captures 90% of average annual rainfall, but they didn't connect the depth to a rainfall depth percentile (rank). Only the first study mentions a rainfall depth percentile, but the context is related to water quality treatment not annual rainfall capture. Essentially the target is to have only 10% of the annual water balance be runoff to mimic the water balance of a natural area. It is not evident from the case studies presented that this can always be achieved by controlling the 90th percentile storm event.
3.2 Runoff Volume Control Target for Ontario	We are happy to see that the assumption of "stationarity" is appropriately acknowledged as being no longer valid in Chapter 6.0 (Climate Change). However, the Runoff Volume Control Target (RVCT) for Ontario described in section 3.2 is entirely based on historical rainfall patterns (1970-2005) and recommends rainfall depth ranging from 23 mm to 32 mm across Ontario. There seems to be a gap between the critique of the assumption of stationarity and the proposed RVCT. For example, how does the current rainfall depth range of 23 to 32 mm compare with future climate change projections for the province? Can the 90th percentile precipitation event be managed by this rainfall depth range in the future under changing climate conditions? At a minimum, consider providing the rationale for not including consideration of future climate in development of the RVCT.

	There also seems to be a disconnect between Chapters 3.0 and 6.0. Chapter 6.0 suggests various ways to assess climate change risks and impacts and integrate climate change considerations into SWM design and planning. However, there appears to be no mention of the RVCT and how that should be implemented along with other climate change considerations.
3.2.2 Runoff Volume Control Target for Development	Please provide examples as to what would restrict a development, redevelopment, or linear development site from feasibly providing Control Hierarchy Priority #1 or #2. The concern is that consultants, developers, and municipalities could manipulate the list in Section 3.2.5 to bypass water balance LID BMPs in favour of Priority #3, or conventional practices, as it is easiest and currently understood by them. Moreover, the Province should provide guidance on how it will ensure the practices discussed as Priority #1 and #2 will be adequately used, as CAs have been requesting these for a long time with minimal headway being made, and municipalities continue being one of the strongest to resist for the reasons of maintenance and ROW constraints. Further, please clarify if the remaining rainfall is automatically treated using Priority #3 if it is determined that the water balance requirement for the site is less than the 90th percentile rainfall.
3.2.4 Additional Considerations for Linear Structure	The proposed Manual discusses the impacts of converting a rural cross-section to an urban curb and gutter but does not provide a strong requirement. In TRCA staff's experience, municipalities and/or consultants try to state that the existing asphalt is already "considered" in the downstream system, and only the new pavement needs to be treated. It would be helpful for approval agencies if the Province provided a clear, absolute statement clarifying that, for rural cross-section conversions where grassed ditching (aka, bio-swales) are removed, the entire roadway needs to now be treated given that the existing form of treatment (ditches) are being removed and need to be replaced.
3.2.5 Flexible Treatment Options	Please clarify the following: 1. The proposed Manual specifies that High Groundwater suggests that water table levels be greater than 1m separated from the LID. However, TRCA staff have found this to be highly prescriptive given the fluctuation in seasonal groundwater levels. TRCA staff have allowed numerous LIDs with less than 1m freeboard to the water table based on detailed studies confirming appropriateness. Consider adjusting the wording to remove the 1m suggestion and establish the freeboard between water table and LID based on hydrogeologic study. In our experience, proponents tend to see the "1m" and use this as a firm rule that may be used as justification to bypass using LIDs. 2. Please clarify whether areas with contaminated soils that have been rehabilitated can be used for infiltration and if there are steps that need to be taken to confirm soil remediation is successful. 3. Item j) needs to be clear that a feature's requirements need to be determined based on a separate feature-based water balance, and the remainder of the site can adhere to the requirements of this document. Further, features should only be fed using "clean" runoff (rooftop, rear-yard,

	parkland, etc.), and contaminated storm runoff directed away from the feature unless volume requirements are too restrictive. 4. The options provided in the document are sensible. However, CA staff commonly see reluctance and refusal from municipalities on the use of LIDs, often for far less restrictive reasons, such as maintenance staff's inexperience in dealing with LIDs. It would be helpful for the Manual to address these issues and break these barriers for CAs and municipal partners to ensure that Priorities 1 and 2 are achieved.
3.2.5 Flexible Treatment Options	Table 3.2 – Bullet (l) does not provide clear exemption criteria. We suggest its addition for further clarity.
3.2.6 Direct Discharge to Waterbodies, Watercourses or Wetlands	Please note that direct discharges to wetlands may also have specific requirements to maintain the feature-specific hydrological balance.
3.3 Water Quality Expectation	For sites that use Priority 1 or 2 BMPs as part of a treatment train in series (i.e., a bioswale that discharges to an infiltration chamber), please provide a method for determining the combined total suspended solids (TSS) removal of the combined BMPs. Further, several suggested LIDs have limited to no information on how to determine a TSS removal rate, or design parameters required to confirm LID size (i.e., bio-swale length and size to provide 80% TSS filtration). Please clarify if this information will be provided in a subsequent document or if there are references that can be used.
3.3 Water Quality Expectation	Last paragraph after the bulleted list - If rainfall intensity is to be used as a design parameter, further guidance is needed to help practitioners select rainfall intensities that factor in future climate conditions. While tools are proposed (e.g., MTO's IDF Curve Lookup, IDF curves from the Ontario Climate Change Data Portal, and University of Western Ontario's IDF CC Tool), there is a need for more systematic analysis of the similarities and differences of these tools and a more consistent approach to selecting future rainfall intensity. Furthermore, as noted in Chapter 6, many municipalities have started assessing how existing stormwater infrastructure will respond to predicted climate change impacts by running computer simulations that take into consideration updated peak rainfall estimates (from revised IDF curves) or percentage-based increases to rainfall depth. We advise on formulating guidance and recommendation of a province-wide approach that would support and help guide local activities to avoid many disparate approaches being adopted across different jurisdictions.
3.3 Water Quality Expectation	Last paragraph after the bulleted list - Rainfall intensity is not an important design parameter for LID because storage-based facilities are typically designed to fully contain the runoff volume control target on the surface (e.g., bioretention) or underground (e.g., chambers) without overflow. Hence, the caution regarding rainfall intensity and overflows may not be necessary. TRCA's current sizing guidelines for bioretention on the wiki page allow for consideration of the volume infiltrated into the filter media over the course of the event, which would normally be conservatively set at 1 hour (to account

	for climate change). Is there a recommended duration associated with the design event? In the 2003 Manual the 15 mm 4-hour event is suggested as a design event for infiltration sizing. Since the 90th percentile event is larger, the size is no longer valid, but what about the duration? Are design events to be used in LID sizing, and if so, is there guidance on which ones? It seems like the proposed Manual leaves this to others to decide based on local codes or historical precipitation records.
4.0 Groundwater	
4.2 Groundwater Risks from LID BMPs	First paragraph (page 89) – Please note that TRCA's 2008 study did not measure chloride. We recommend revising the third sentence to read as follows: "*With the exception of chloride, which was not measured, contaminant levels were generally below Ontario soil 'background' concentrations for non-agricultural land uses.*" In addition, please note that Young and Van Seters, 2009 also covered this topic in detail with reference to the TRCA, 2008 data as well as other data on soil quality in highway ditches and infiltration basins (soil quality in these high loading areas has been impacted, but primarily within the upper soil horizons).
4.2 Groundwater Risks from LID BMPs	Figure 4.2 - The figure and text above show the issues related to chlorides and infrastructure. The document only provides observations from the material and a conclusion or recommendation is not brought forward. Please confirm if using LID BMPs receiving salt-laden runoff (from a municipal right of way [ROW]) is provincially acceptable, where the groundwater systems are not sensitive to salt. This is necessary to understand to establish boundaries for infiltration practices with ROW infrastructure.
4.2.3 Groundwater / Surface Water Interaction and Water Quantity Risk	We suggest including under this section that certain agencies have requirements for the protection of sensitive natural features, such as TRCA's Feature-based Wetland Water Balance criteria and associated guidelines. Please see TRCA's technical guidelines webpage, specifically, the guidance documents listed under "Stormwater Management Guidelines".
5.0 LID Modelling Approaches	
Entire Chapter	We appreciate the useful tips included in this chapter regarding water balance modelling. However, there is little information practitioners can use when quantifying the water budget. The 2003 Manual provides practitioners information that is more useful for design in a concise manner. We suggest both Chapter 5 and Appendix 5 be paired down to only practical information useful for practitioners, and possibly include a compendium document that gives the details provided in the current document for when it is necessary.
5.3.2 Pre-Development Site Conditions	Please clarify if the 90th percentile retention expectation would still be required if pre-development site conditions showed a much higher than 10% runoff from the site. It should also be clarified how pre-development site conditions and targets are integrated with the 90th percentile storm expectations. We suggest addressing this topic earlier on in Chapter 3 (target hierarchy) rather than on Chapter 5.

6.0 Climate Change	
6.5 Roles in Addressing Climate Change	Third bullet under the CAs sub-section (page 140) – We suggest revising, "*Enforce development regulations in light of climate change risks*" to "*Assess risks associated with natural hazards including impacts of climate change, and administer development regulations in light of these risks.*"
6.6.2 Assessing Climate Change at the Watershed Scale	We recommend including a statement recognizing that some CAs provide a watershed level analysis of quantity control requirements, providing release rate targets to maintain existing flood levels and not increase flood impacts throughout the watershed and across municipal borders. Further, CAs provide extensive leadership and guidance related to water balance and LID BMPs, especially towards feature protection and maintenance of hydrologic integrity. The Province has not given direction as to how climate change is to be considered in flood plain mapping, as the technical basis for flood plain mapping is based on a series of Regulations/Technical Guides that the Province (MNDMNRF) has established around either actual hurricane level events (Hazel, Timmins) or the 100-year event. Until further direction is given through an update to the MNRF 2003 flood plain mapping guidance documents, climate change cannot be considered with flood plain mapping.
6.8.1 STEP 1 – Identifying Climate Change Considerations	Consider adding temperature extremes to the list of "Key observed and predicted climate change parameters" (page 146), including extreme heat and extreme cold.
7.0 Erosion and Sediment Control During Construction	
General	The STEP/TRCA 2019 ESC Guide provides specific guidance on measures recommended on construction sites for erosion and sediment control. We suggest referencing the guide within this section rather than reiterating this information.
8.0 Operation and Maintenance	
General	The STEP/TRCA document linked here provides specific guidance on inspection and maintenance of LID BMPs integrated into SWM systems. We suggest referencing the STEP guidance within this section rather than reiterating this information.
Appendix 1 – Glossary of Terms	
General	We suggest adding the following terms to the list, all of which are terms used in the main document: • Ecologically Significant Groundwater Recharge Area (ESGRA) • Significant Groundwater Recharge Area (SGRA) • Vulnerable Areas as defined under the *Clean Water Act* • Wellhead Protection Area (WHPA)

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Thank you once again for the opportunity to provide comments on this proposal. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6920 or at john.mackenzie@trca.ca.

Sincerely,

<Original signed by>
John MacKenzie, M.Sc.(PI) MCIP, RPP
Chief Executive Officer

BY E-MAIL

cc:
TRCA: Sameer Dhalla, Director, Development and Engineering Services
Laurie Nelson, Director, Policy Planning
Darryl Gray, Director, Education and Training