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Credit Valley Conservation inspired by nature

LID-TTT MODEL FOR STORMWATER MANAGEMENT PLANNING

HESHAM FOULI & SAMANTHA PELAYO CÁZARES
Source to Stream | March 2025

Outline

1) Maslow’s Hammer: Leverage the Limits of Tools

2) LID-TTT Overview

3) Main Advantages

4) Sample Application

5) Conclusions and Recommendations

1) MASLOW'S HAMMER:

LEVERAGE THE LIMITS OF TOOLS

© 1995 David Sailors

Abraham Maslow wrote in 1966, "it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail."

Our tools can limit our thinking

Repetitive use of the same tool leads to unconscious bias buildup

Programmers live and die by the very limited screen real estate, to work with for inputs and outputs

Constant struggle to show upfront what functions as most important, and hide what malfunctions further back

1) Maslow's Hammer: Leverage the Limits of Tools

The way out for a better solution

Programmers talk to engineers

Engineers talk to scientists

Continuous consultation with all stakeholders (including the beneficiary agencies) until we figure out a better solution

2) LOW IMPACT DEVELOPMENT TREATMENT TRAIN TOOL

(LID-TTT)

Overview

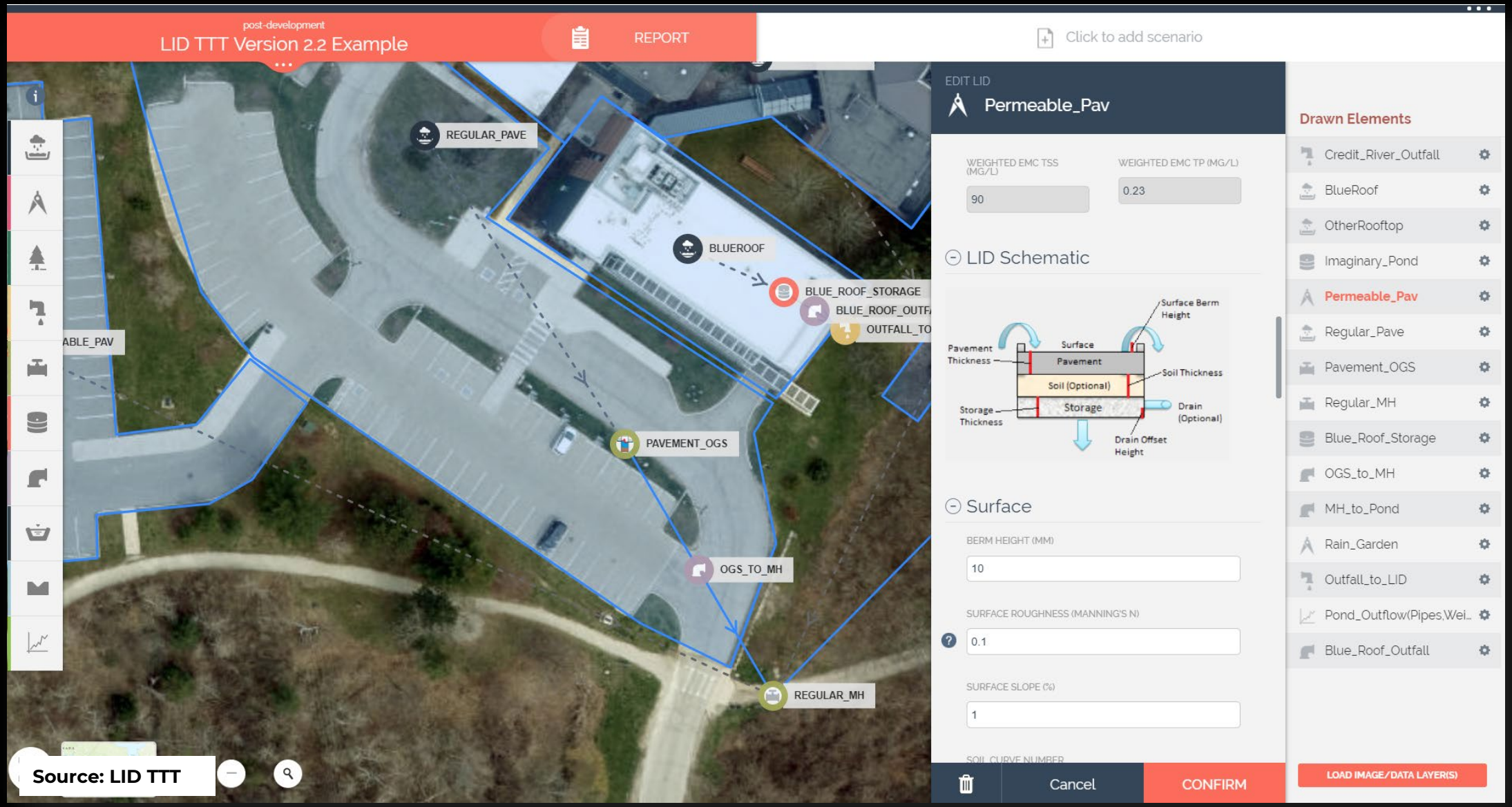
- Golder (now WSP) developed it for CVC, LSRCA and TRCA during 2016 – 2019

- Its backend engine: SWMM5 of the US EPA

- Free tool like SWMM5

  A simpler user-friendly tool that promotes dig-deep features in SWMM; e.g.:

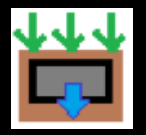
  - water quality,
  - water balance and phosphorous mass balance,
  - still considering peak flows



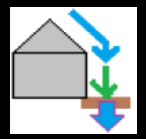
Source: LID TTT

Bioretention

Permeable Pavement



Infiltration/Exfiltration



Filter Strip

Enhanced Swale

Treed Areas

Ponds/Storage

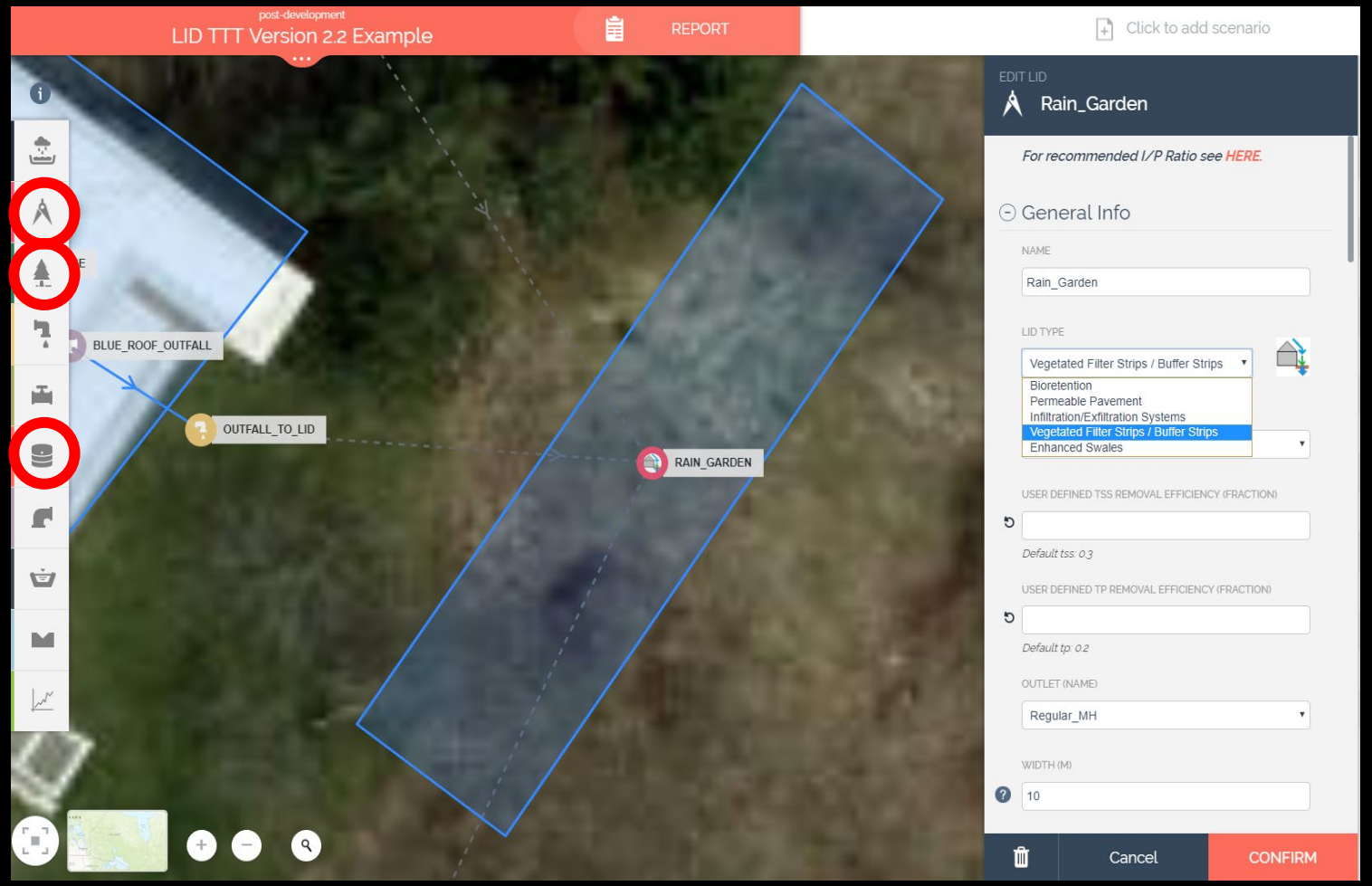


Photo Credit: Credit Valley Conservation Authority (CVC), Belfountain Rain Garden – Students for Stormwater

Photo Credit: Sustainable Technologies Evaluation Program (STEP), Central Parkway in Mississauga

3) MAIN ADVANTAGES

- Easy-to-use tool, supporting site planning approvals for stormwater management works on development sites

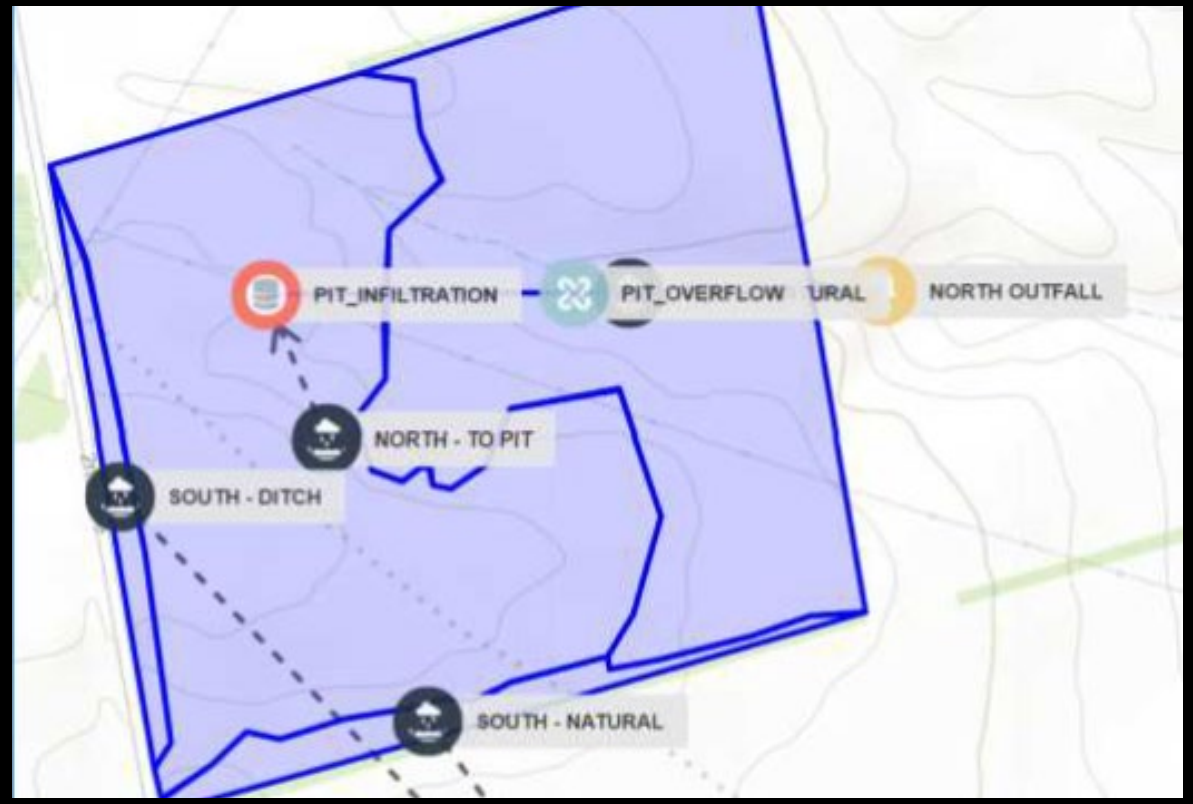
- Source-to-stream treatment through assessing LID features for improving TSS and phosphorous concentrations, to comply with the guidelines at the site outlet

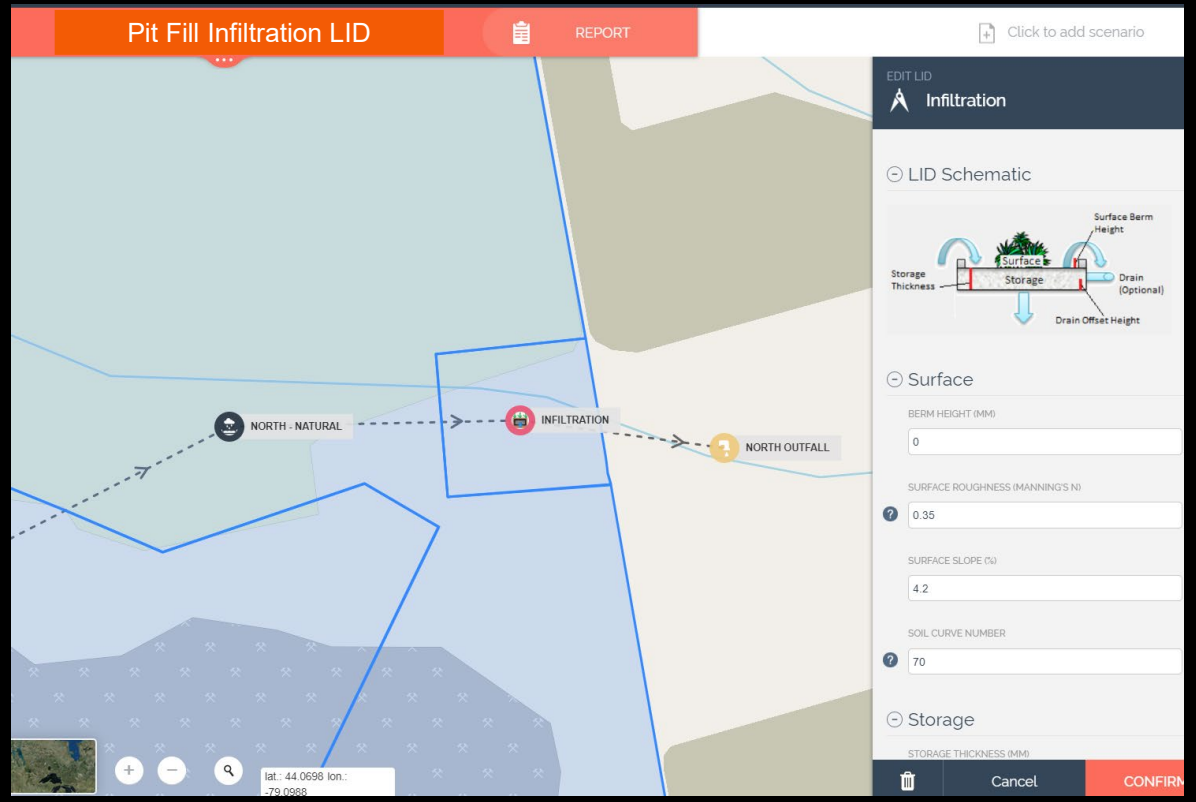
- Site-specific pre-defined rainfall time-series

- Mean annual and event-based precipitation assessments
- Default water storage and infiltration based on soil type and land cover, and contaminant removal efficiencies for each LID feature
- Easy reporting and dual-screen comparisons between pre- and post-development results

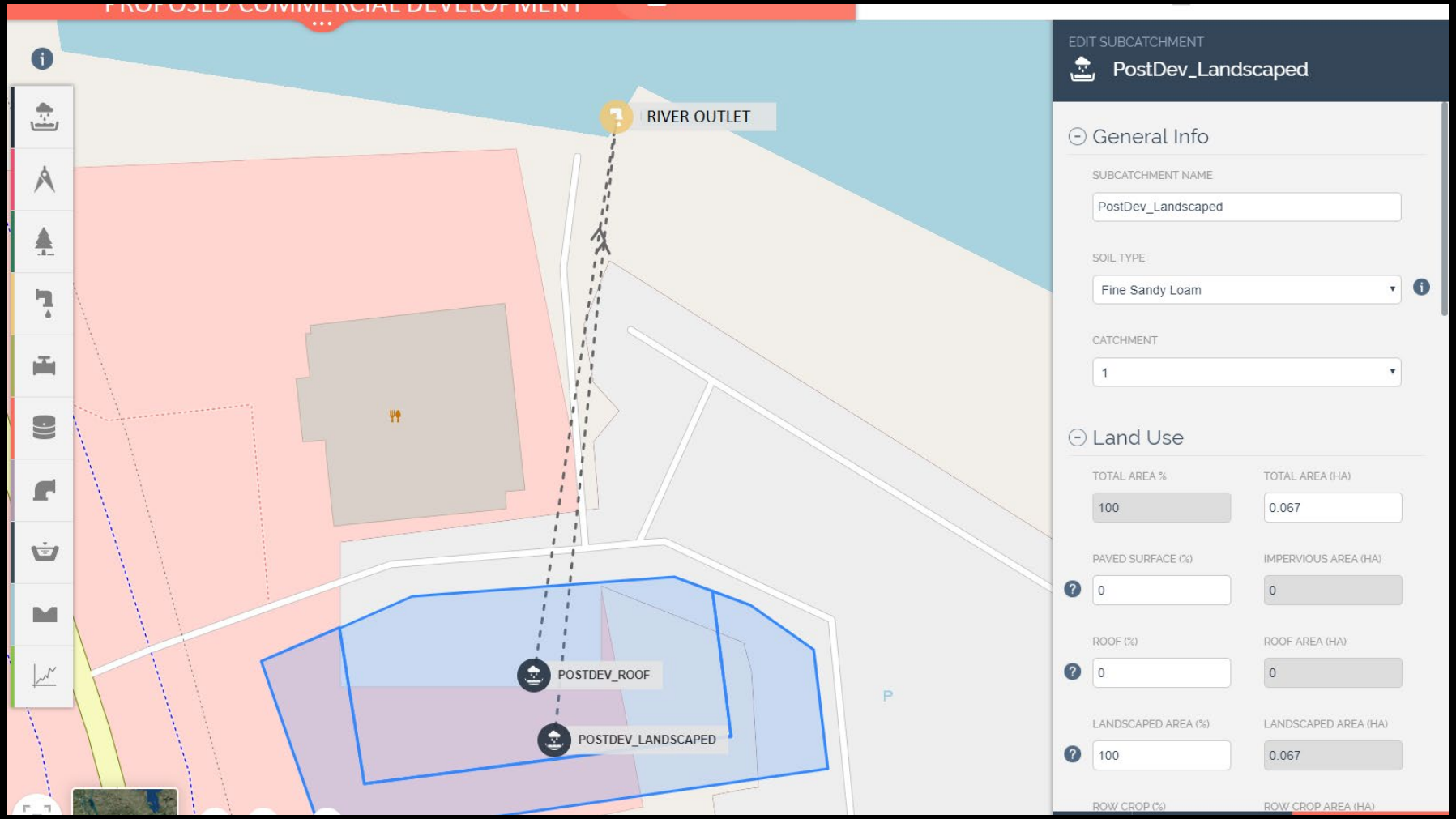
4) SAMPLE APPLICATIONS

Project 1: Pit Infiltration Source Protection

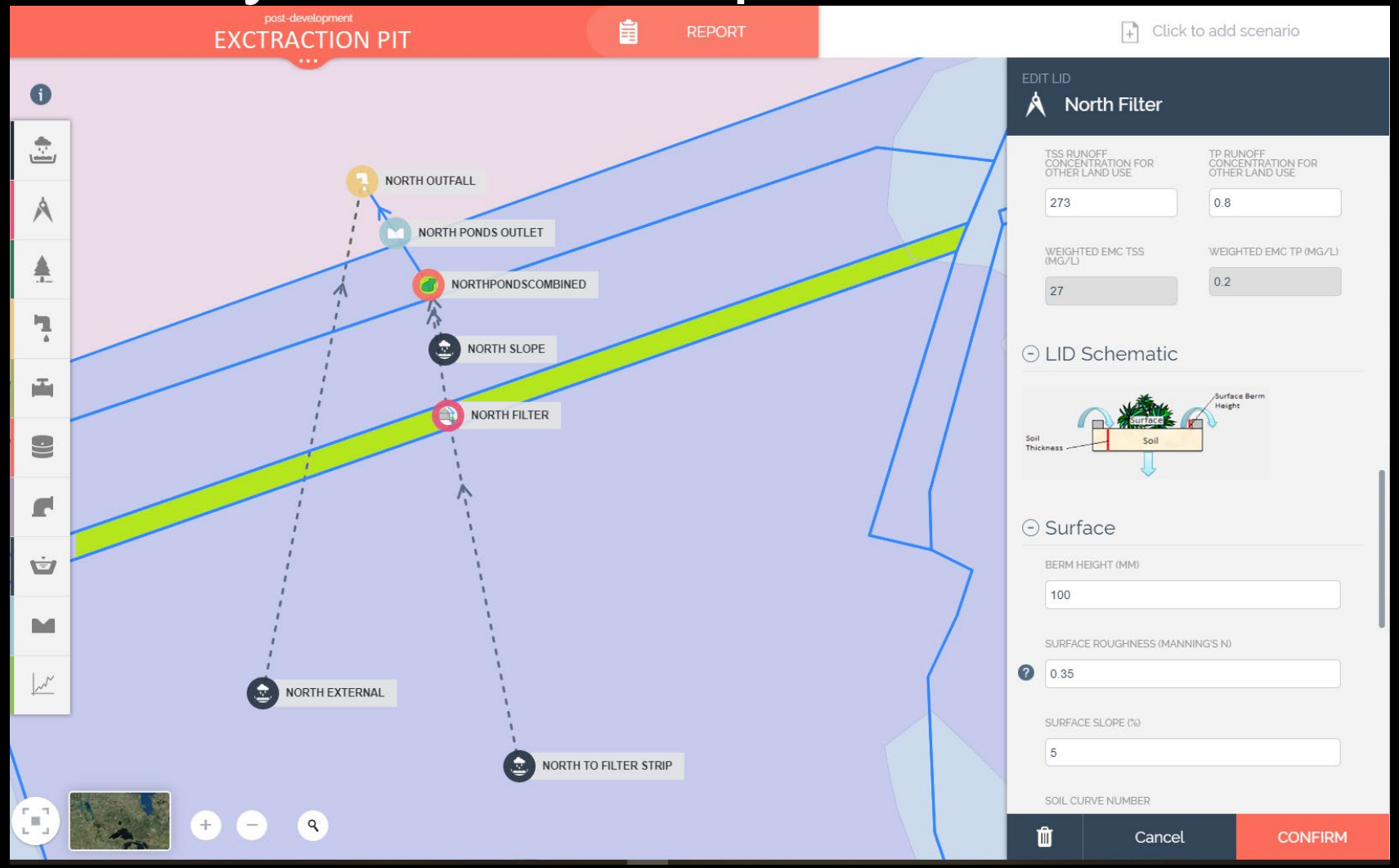




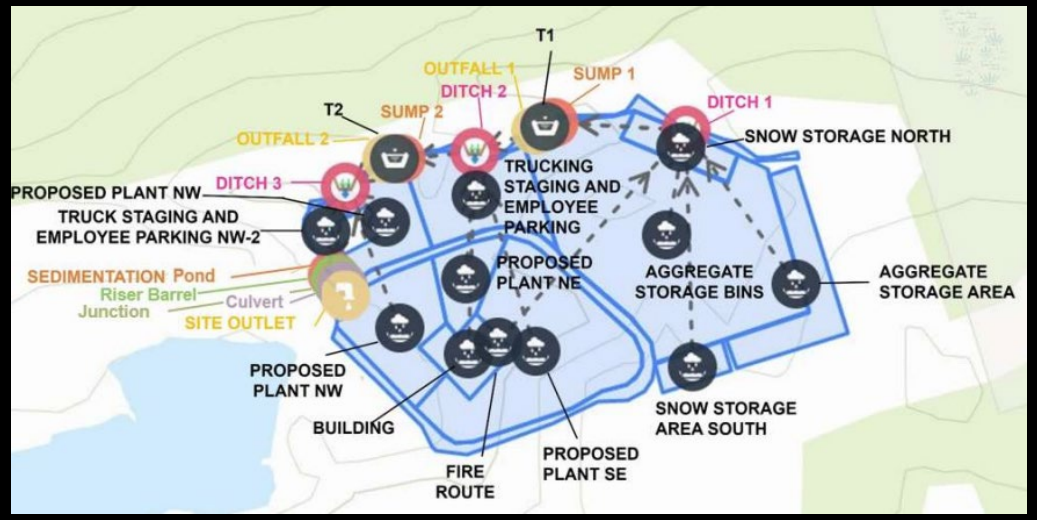
Project 2: Small Commercial Site

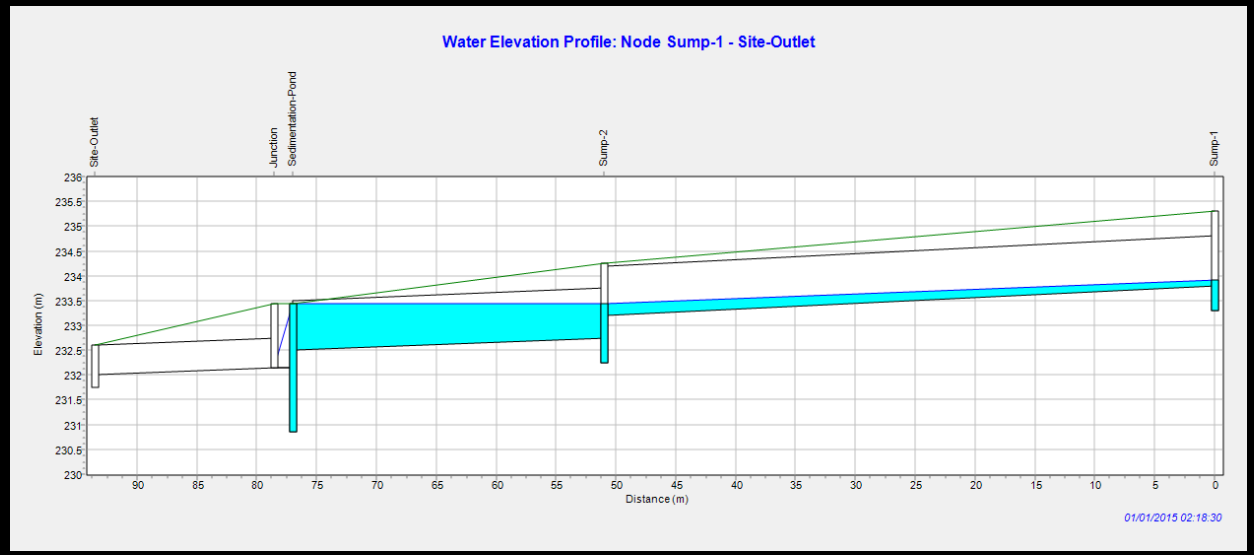


Project 3: Quarry Runoff Phosphorus Treatment



Project 4: Concrete Ready-mix Plant





SWMM5 Drainage System Hydraulic Performance Profile

5) CONCLUSIONS & RECOMMENDATIONS

- Consider exploring a few modeling software based on the project needs and requirements, and be open to using new ones (planning phase)
- LID-TTT is a free user-friendly software suitable for assessing different LID features, to improve the site water quality from source to outlet
- Parallel use of LID-TTT and SWMM5 is sometimes needed for a better understanding of the drainage system hydraulic performance
- It is recommended to upgrade LID-TTT, to simulate some design aspects, for example, process water recycling, more outfall structures design, and bio-treatment features such as biosand filters (BSF)
- https://sustainabletechnologies.ca/lid-ttt/

Audience Participation and Feedback / Q&A

Contact Information

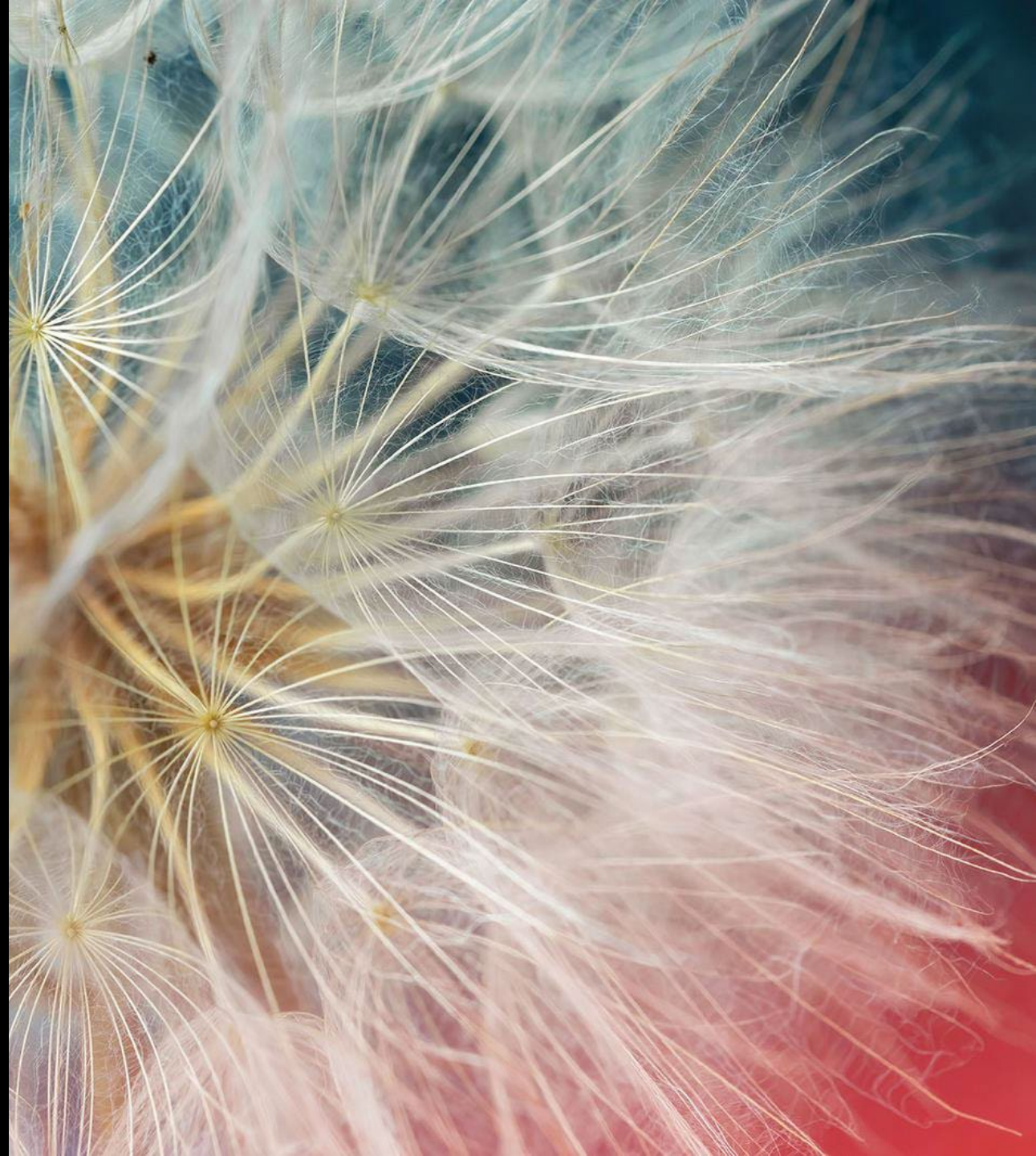
Hesham Fouli, PhD, PEng

- Water Resources Engineer, WSP Canada, Toronto
- E: hesham.fouli@wsp.com
- LinkedIn: https://www.linkedin.com/in/hesham-fouli/

Samantha Pelayo, MASc, EIT

- Water Resources Specialist, WSP Canada, Mississauga
- E: samantha.pelayocazares@wsp.com
- LinkedIn: https://www.linkedin.com/in/samantha-pelayo

THANK YOU



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