



Resilient



Underground Stormwater Management: Lessons Learned Through the Development of Policy, Procedure, Criteria and Standards for Non-Conventional Municipally Assumed Stormwater Management Facilities (NCSWMMFs)

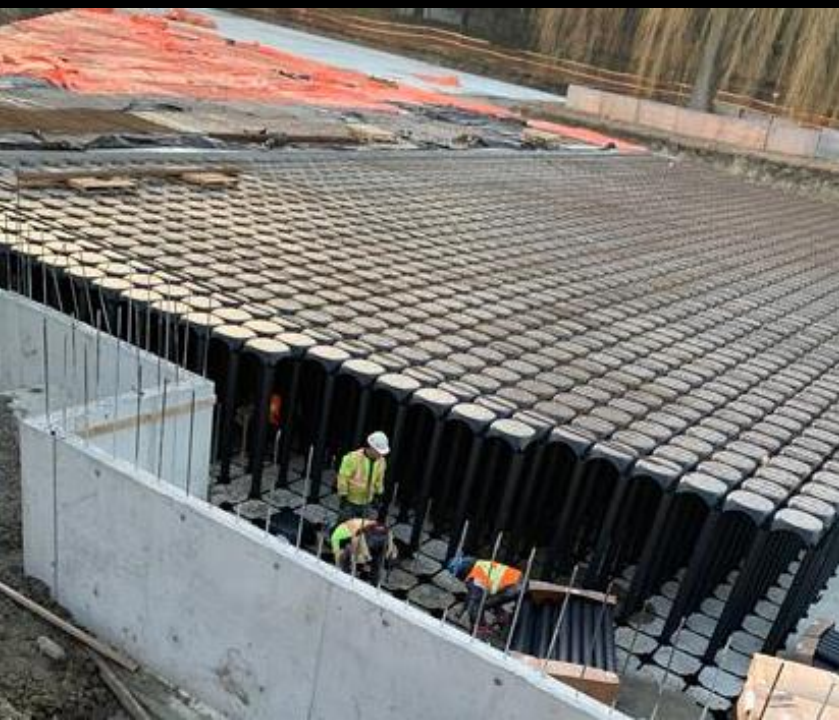
Presentation Agenda

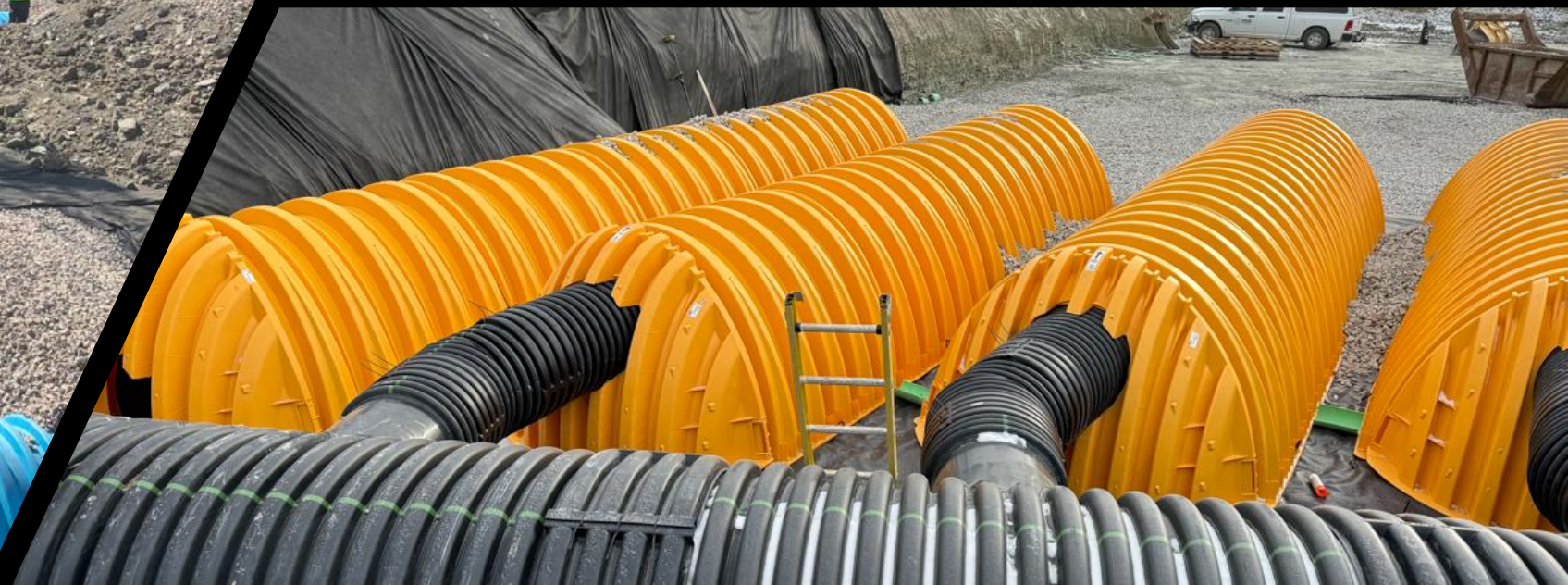
- ◇ Project Background
- ◇ Project Objectives
- ◇ Deliverable Overview
- ◇ Financial Assessment
- ◇ Key Discussion Points
- ◇ Lessons Learned
- ◇ What's the Future?



Key Terms

- ◆ Conventional SWMF: typical stormwater management pond.
- ◆ Non-Conventional SWMF ('NCSWMF'): underground stormwater management tanks or superpipe facilities
- ◆ Greenfield Development: the development of an undeveloped parcel of land in an urban or rural area.
- ◆ Infill Development: development or re-development of a parcel of land in an already developed area.







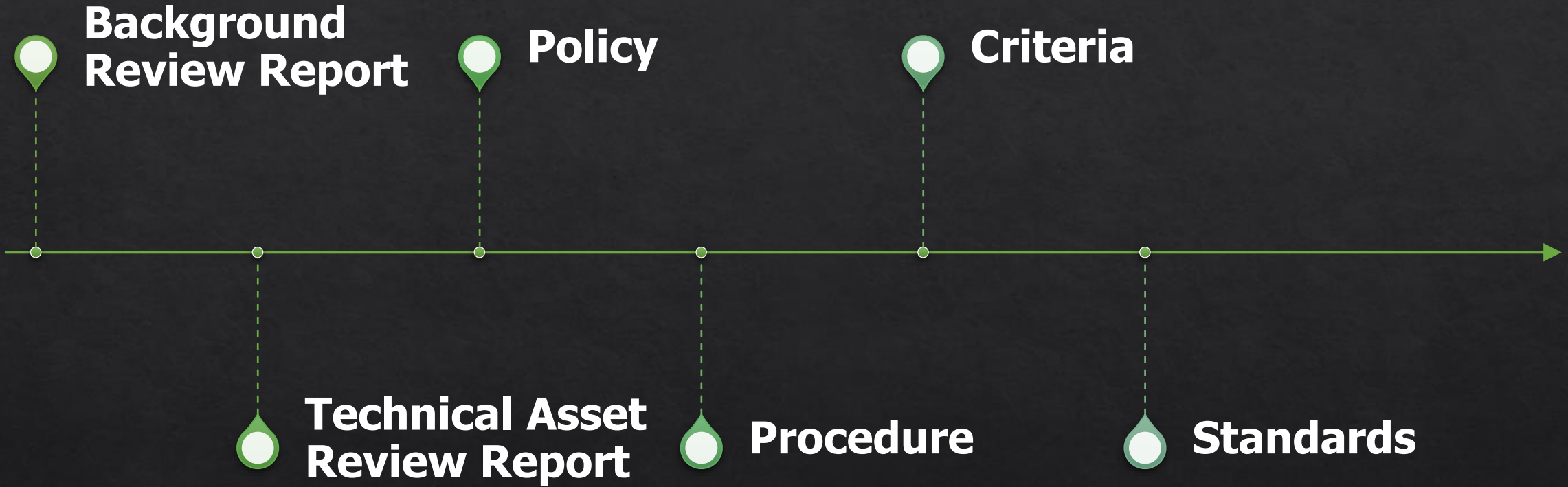
Project Background

- ◇ More Homes Built Faster Act in 2022
- ◇ Dual-purpose park blocks with stormwater management blocks
- ◇ In June 2022, the City of Vaughan developed an Interim Policy
- ◇ Key - municipally assumed, end-of-pipe facilities

Project Objectives

- ◇ Develop a decision framework to determine where new NCSWMFs may be accepted;
- ◇ To provide a list of allowable SWM technologies/facilities;
- ◇ To examine financial implications and lifecycle costs;
- ◇ Develop a cost recovery mechanisms for NCSWMFs; and,
- ◇ Prepare design criteria and standard drawings.

Project Deliverables



Background Report



- ◆ Review of existing policy, by-law, criteria etc.
- ◆ Industry scan
- ◆ Review of available technologies

Technical Asset Review Report

- ◆ Review of the available documentation for the City's 17 Non-conventional approved and or constructed facilities
- ◆ Emphasis on O&M Requirements and costs
- ◆ Provide an overall summary of the existing facilities



Policy

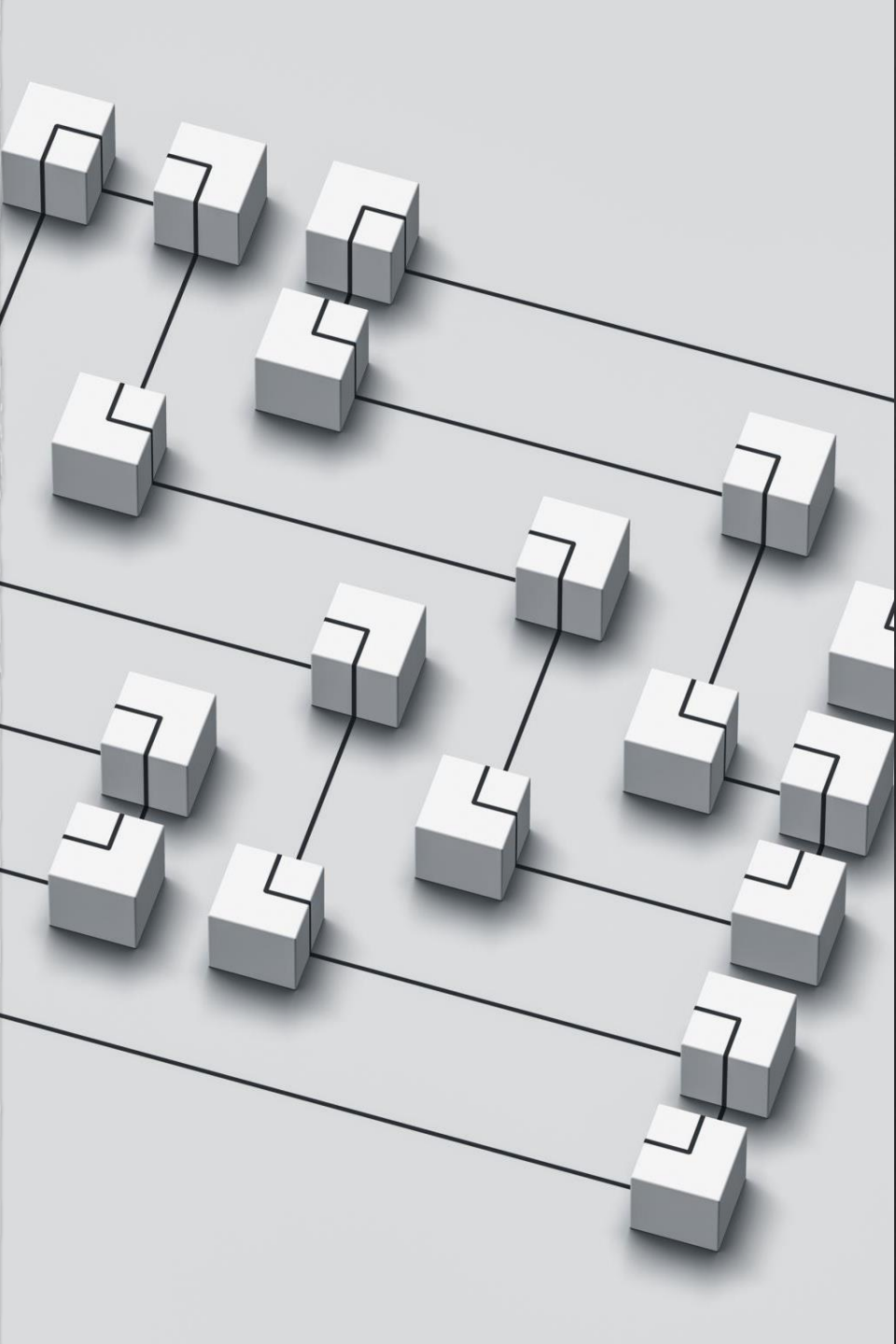
Guiding Principles

Where NC SWMFs will be accepted

Land Use Coordination Above Facilities

Technical Requirements

O&M Requirements and Cost Impact



Procedure

- ◇ Detailed process for development
- ◇ Justification Report
- ◇ Draft Plan / Functional Servicing
- ◇ Detailed Design
- ◇ Assumption

Criteria and Standards

- ◇ List of approved technologies
- ◇ Technical requirements – Maximum depth
- ◇ Land use considerations – Parks vs. ROW
- ◇ O&M Requirements – Access and frequency
- ◇ Standard details – Footings
- ◇ Financial Assessment Details

Financial Impact Assessment

- ◇ Costs are the difference from conventional SWMF
- ◇ Costs assessed over 50-year period, in present value



Financial Assessment – Inspection



NCSWMFs



Can have larger area to inspect
(i.e. upstream OGS)



Components require more
frequent inspection



Surface Inspections less costly
(\$500/inspection/component)

Conventional SWMFs



Centralized area to inspect



Less frequent inspection required



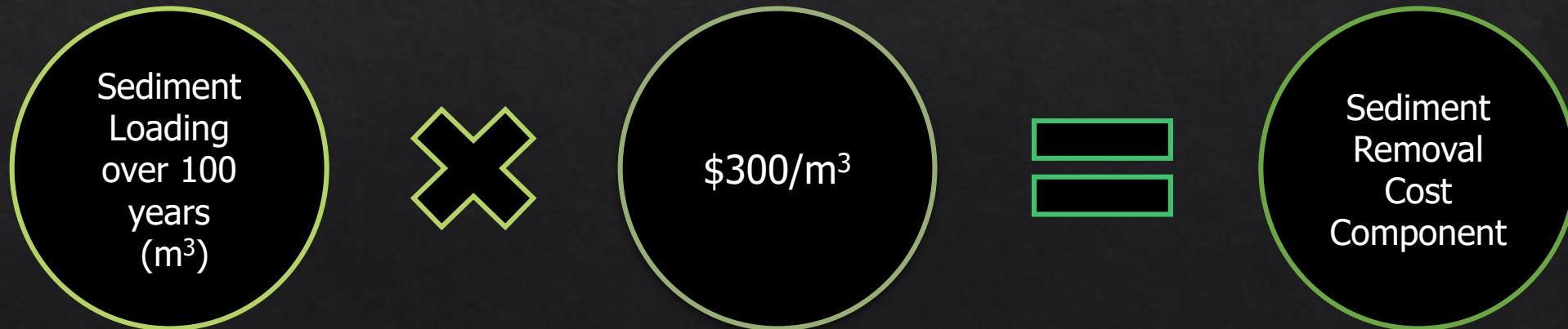
Requires more involved
inspections
(\$2000/inspection/SWMF)

Financial Assessment – Sediment Removal

◇ Sediment loading per MECP

◇ 50-year lifecycle

Conventional	Non-Conventional	Difference
\$ 200 / m ³	\$ 500 / m ³	\$ 300 / m ³



Financial Assessment

- ◆ Rehabilitation/replacement costs may apply if an extended warranty from the supplier is not provided / accepted;
- ◆ Benchmarking exercise to establish unit rates;
- ◆ Criteria document outlines unit rates and frequencies;

Item	Frequency	Cost
Inlet/Outlet Replacement	50-years	Product dependent
OGS Component Replacement	25-years	Product dependent
Plastic SWMF Replacement	50-years	\$500 - \$600 / m ³
Confined Space	10-years	\$5,000 / day
Concrete Rehabilitation	50-years	\$2,600 / m ²

Municipal Key Discussions

Open vs. closed bottom

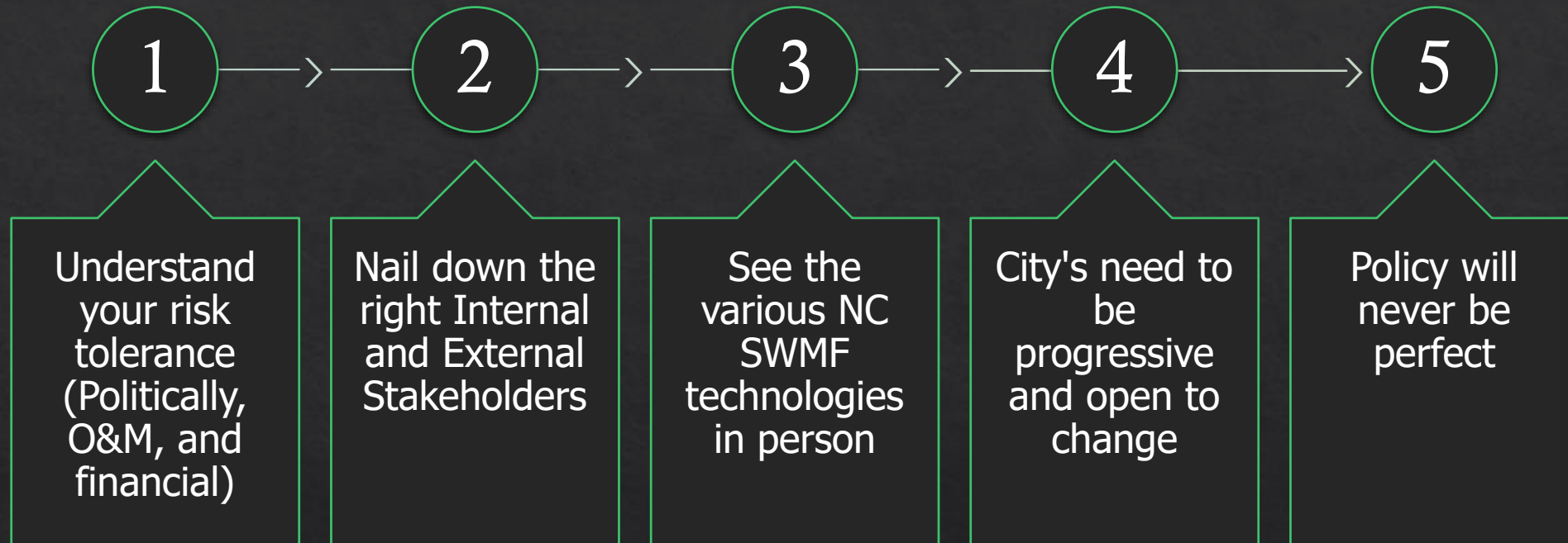
Facility material

Quality control, extended detention

O&M requirements

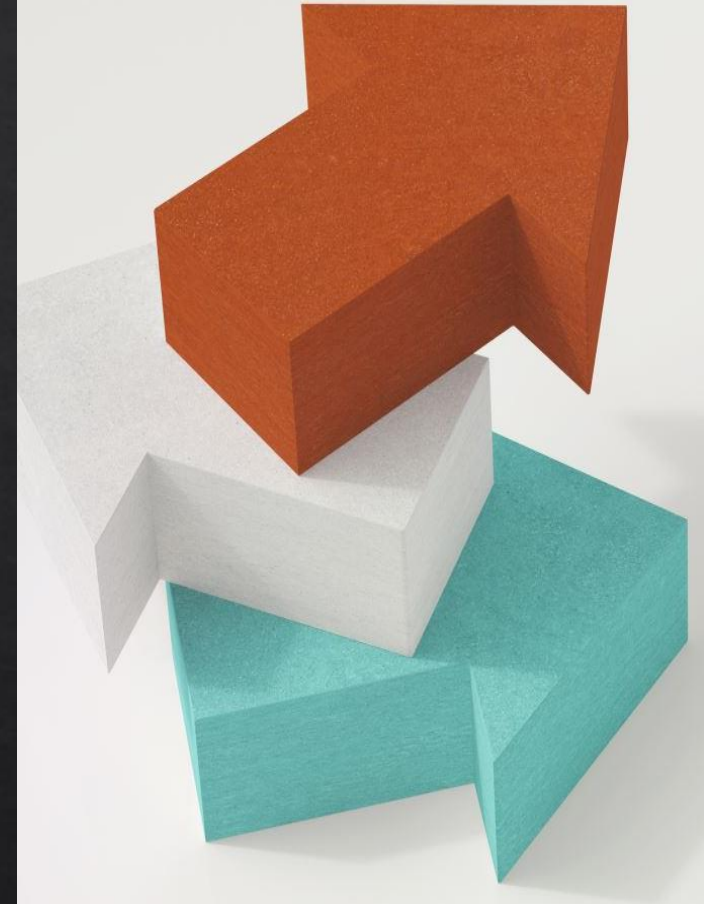
Dual-use programming

Municipal Lessons Learned



What's the Future?

- ◇ Policy was approved by Vaughan Council in June 2024.
- ◇ NC SWMFs are coming – Municipalities need to prepare themselves.



Thank You



LinkedIn

<https://www.linkedin.com/company/resilient-consulting-corporation>



Instagram

@Resilientccorp



Email

info@resilientconsulting.ca

Resilient

rturbitt@resilientconsulting.ca



ACCESS TO VAUGHAN
DOCUMENTS



developmentengineering@vaughan.ca