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



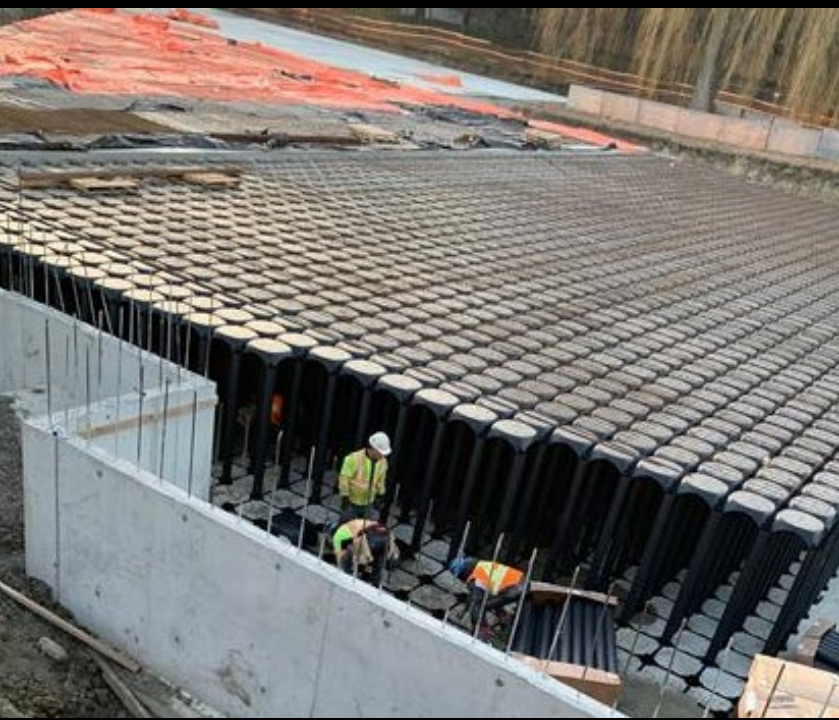
Presentation Agenda

- ◇ Project Objectives
- ◇ Deliverable Overview
- ◇ Financial Assessment
- ◇ Key Design Considerations
- ◇ Lessons Learned & Recommendations
- ◇ 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

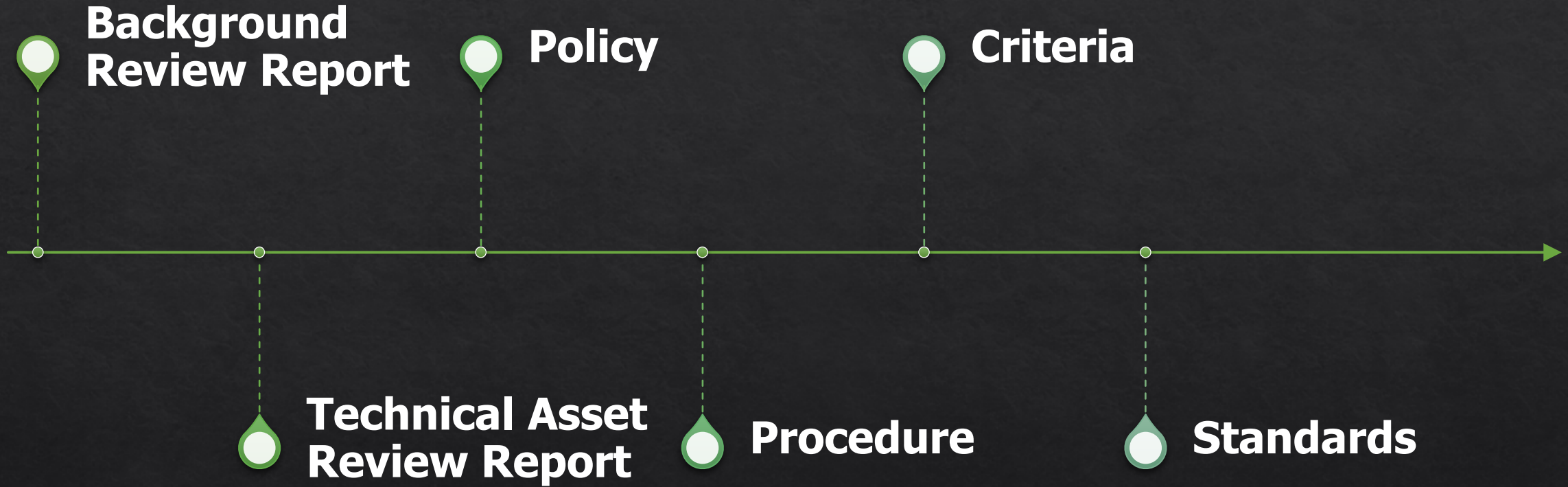


Project Objectives

- ◇ 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 16 Non-conventional approved and or constructed facilities
- ◆ Emphasis on O&M Requirements and costs
- ◆ Provide an overall summary of the existing facilities





Policy

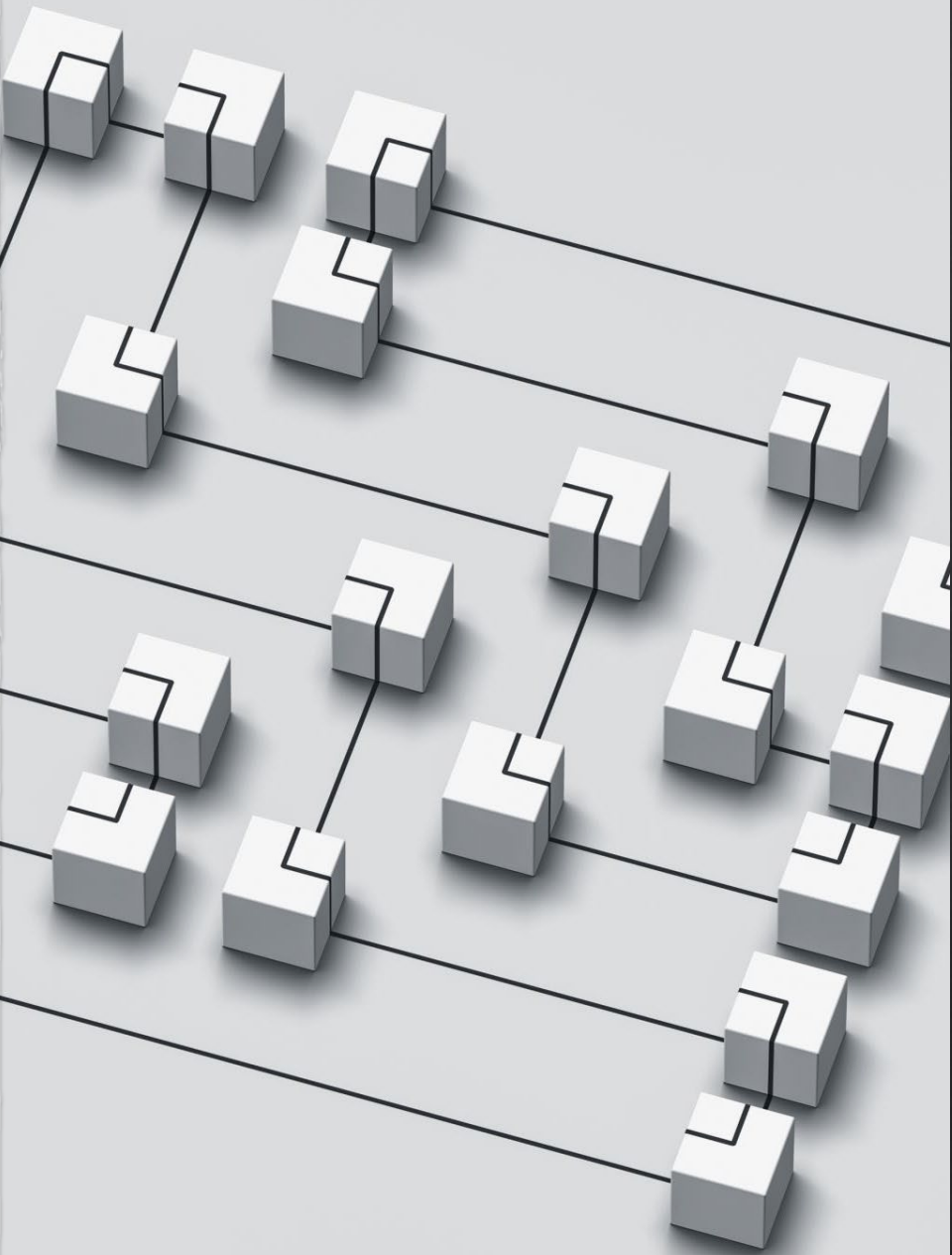
Guiding Principles

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



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



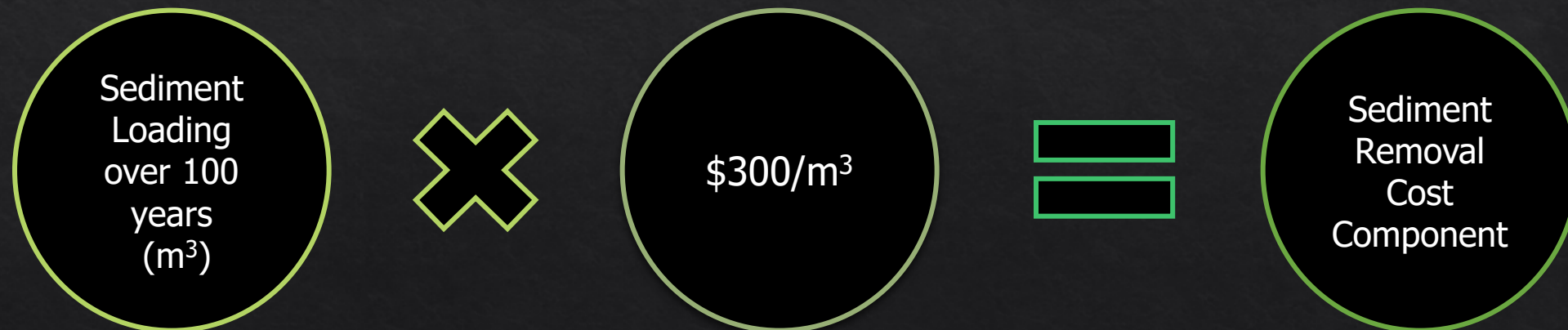
Requires more involved
inspections
(\$2000/inspection/SWMF)

Financial Assessment – Sediment Removal

◇ Sediment loading per MECP

◇ 100-year lifecycle

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



Financial Assessment – Life Cycle

- ◆ Rehabilitation/replacement costs over 100 years.
- ◆ Criteria systematized unitary prices (CAD 2023) and frequency:

Item	Frequency	Cost
Replacements		
Inlet/Outlet	50-years	Product dependent
OGS Component	25-years	Product dependent
Plastic SWMF	50-years	\$500 - \$600 /m ³
Inspections		
Confined Space	20-years	\$5,000 / day
Concrete Rehab	30% area – first 25 years 10% area – 25-year interval	\$2,600 / m ²



Key Design Considerations

Open vs. closed bottom

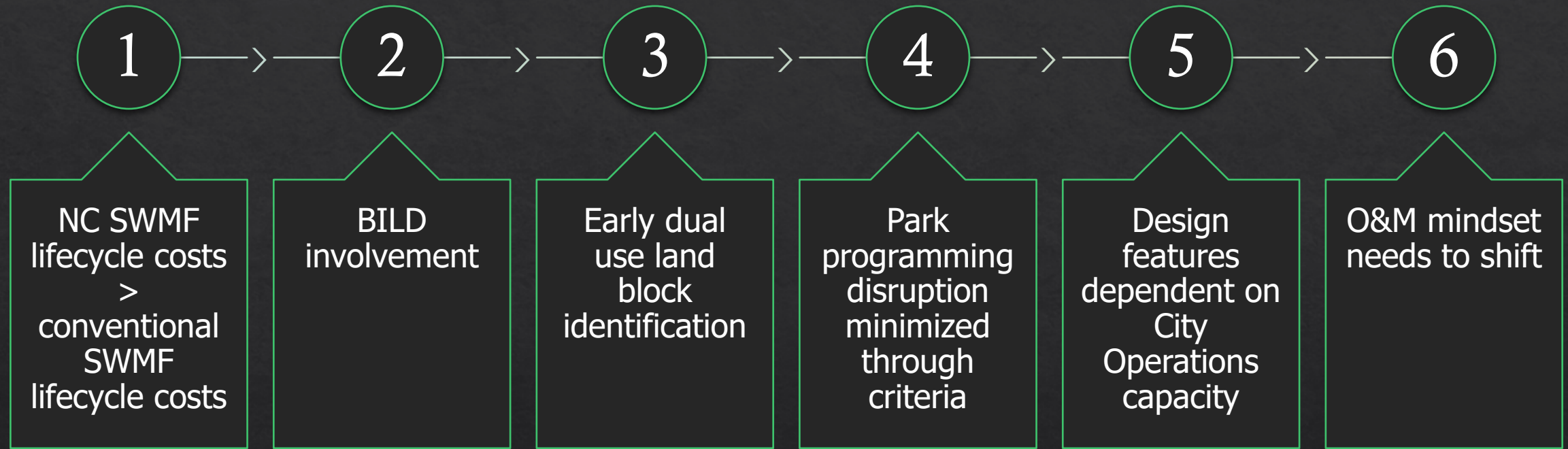
Facility material

Quality control, extended detention

O&M requirements

Dual-use programming

Lessons Learned through Policy Development



Key Recommendations



**Collection of an Offset Fee
for the lifecycle of the
facility**



**Parks / Urban Design
Early Involvement**



PEO Record Drawings

What's the Future?

- ◇ Policy is currently undergoing review and approval process by City Council
- ◇ NC SWMFs are coming – Municipalities need to prepare themselves.



Thank You

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