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Credit Valley Conservation inspired by nature

Evaluating the role of Catch Basin Inserts in Stormwater Maintenance Strategies

Source to Stream

March 31st 2026

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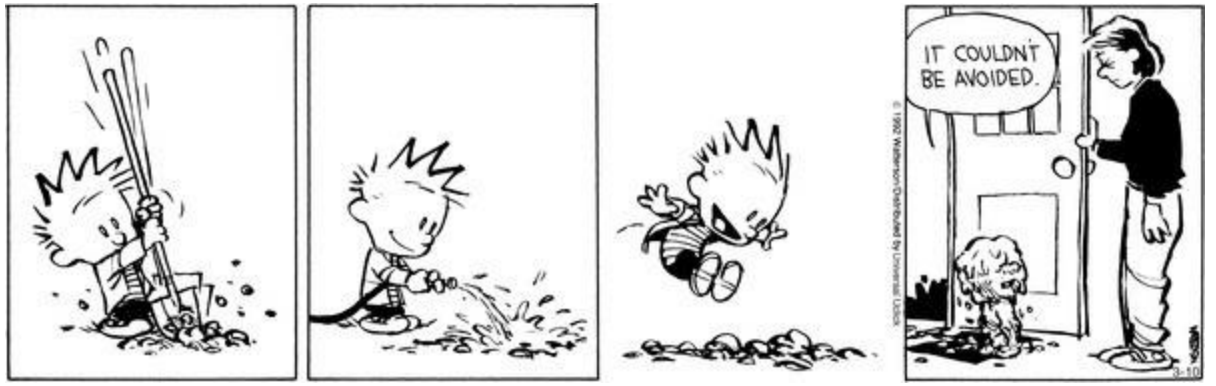
Lake Simcoe Region conservation authority

1951 2026

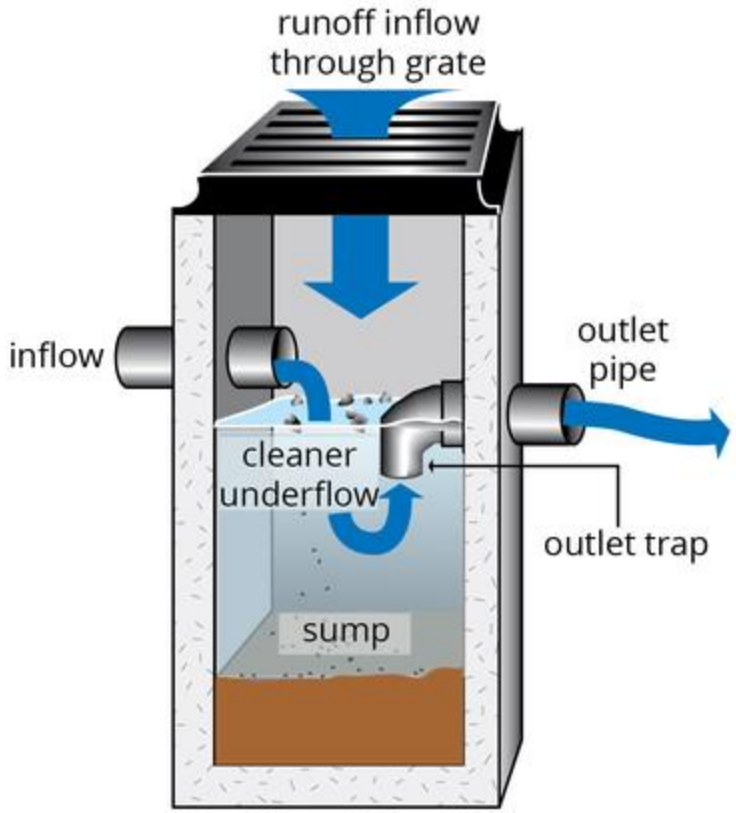
Maintenance is…



- Sediment management is an unavoidable component of stormwater management
- Conventional stormwater components:
  - Conveyance – catch basins and pipes
  - End of pipe -stormwater ponds
- How can we leverage the existing systems to provide the best cost and environmental benefit to remove material from the system?

The job of a Catch Basin (why catch basin inserts)

- Convey stormwater runoff and capture debris and sediment.
- Conventional 0.60m sump design capacity = 0.216m^3
- Sump clean outs are typically already part of operations
- Problems with conventional design:
  - Scour, floatable, leaves
- Catch basin inserts can improve catch basin performance.



Four In Field CB Insert Performance Studies

- CB Shield™ study for 33 months in Town of Newmarket (7 units and 7 control CBs)
- LittaTrap® content capture study in Barrie (2 years and 30 units)
- LittaTrap® content study in BWG (1 year 30 units)
- LittaTrap® content study in Georgina (22 months 7 units and 7 control CBs)
- 2 Environmental Technology Verification Studies
  - CB Shield® Stormwater Quality Device
  - LittaTrap™ Catch Basin System (Envirobasin = pre-cast catch basin including energy dissipation component)

CB Shield® Study

- Primary purpose is to prevent scour and hold material in the sump
- Trash Rack for litter and organics

Notable Results

- ETV found CB Shield effective at reducing scour and retaining material in sump

Field Studies Found:

- Confirmed CB Shields efficacy at reducing scour and retaining material in sump
- More material in sumps with CB Shields than control
- Scour more common in control CBs after sump >50% full
- Maximum scour measured = 21cm in control CB
- Use of winter sand greatly accelerated sump accumulation

LittaTrap™ Studies

- Primary purpose is to capture litter, debris and plastic
- Prevent scour in CB sump

Notable Results

- ETV Study found reduction in scour in CB sump

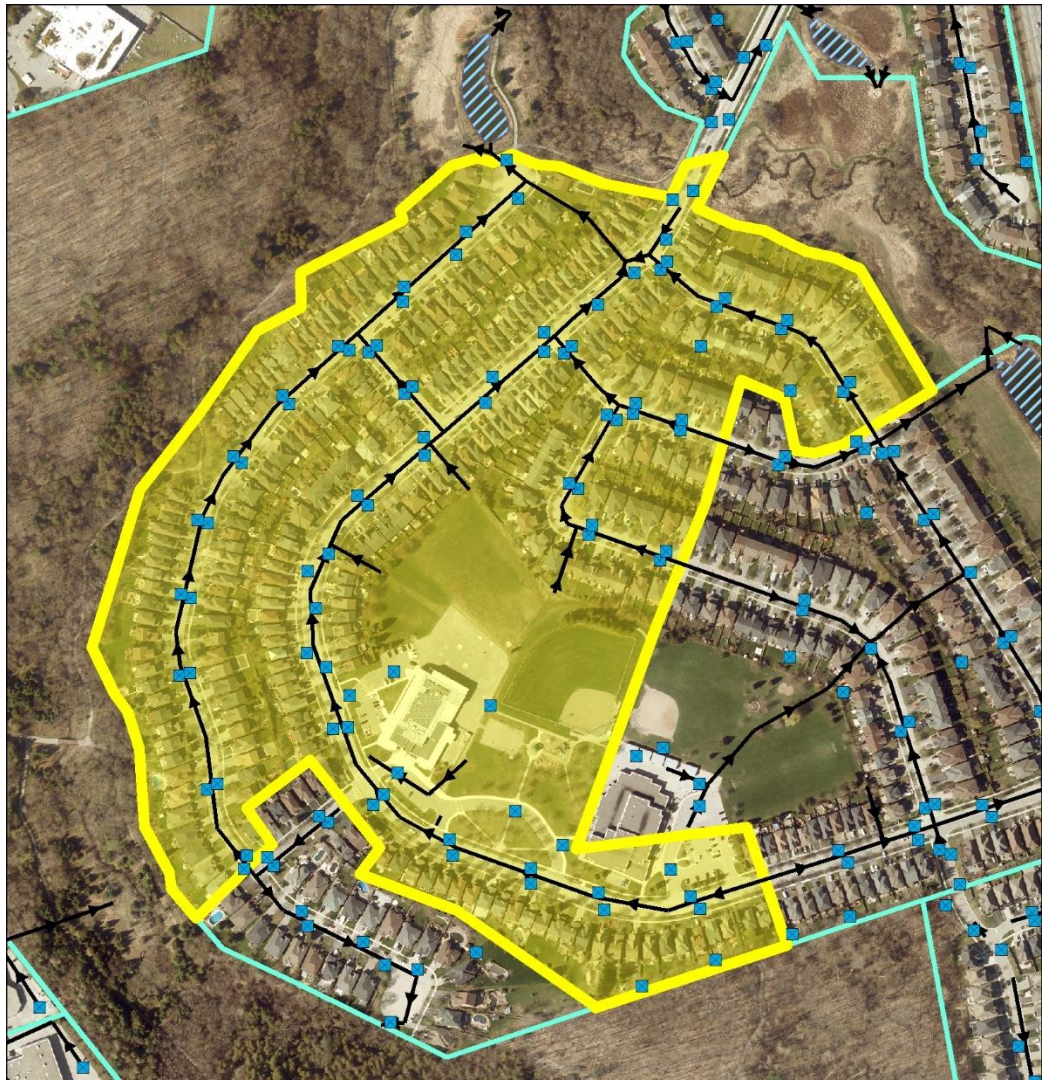
In Field studies:

- High capture rate of mixed material in unit
- Bulk of material captured was sediment and organics with minimal litter
- High proportion of organics captured in Barrie and Bradford studies
- Mesh basket effective at capturing sand and sediments
- Summer and fall yielded highest capture
- Units reduced scour in CB sumps

Cost Benefit Analysis of CB Inserts vs Stormwater Pond

Methods

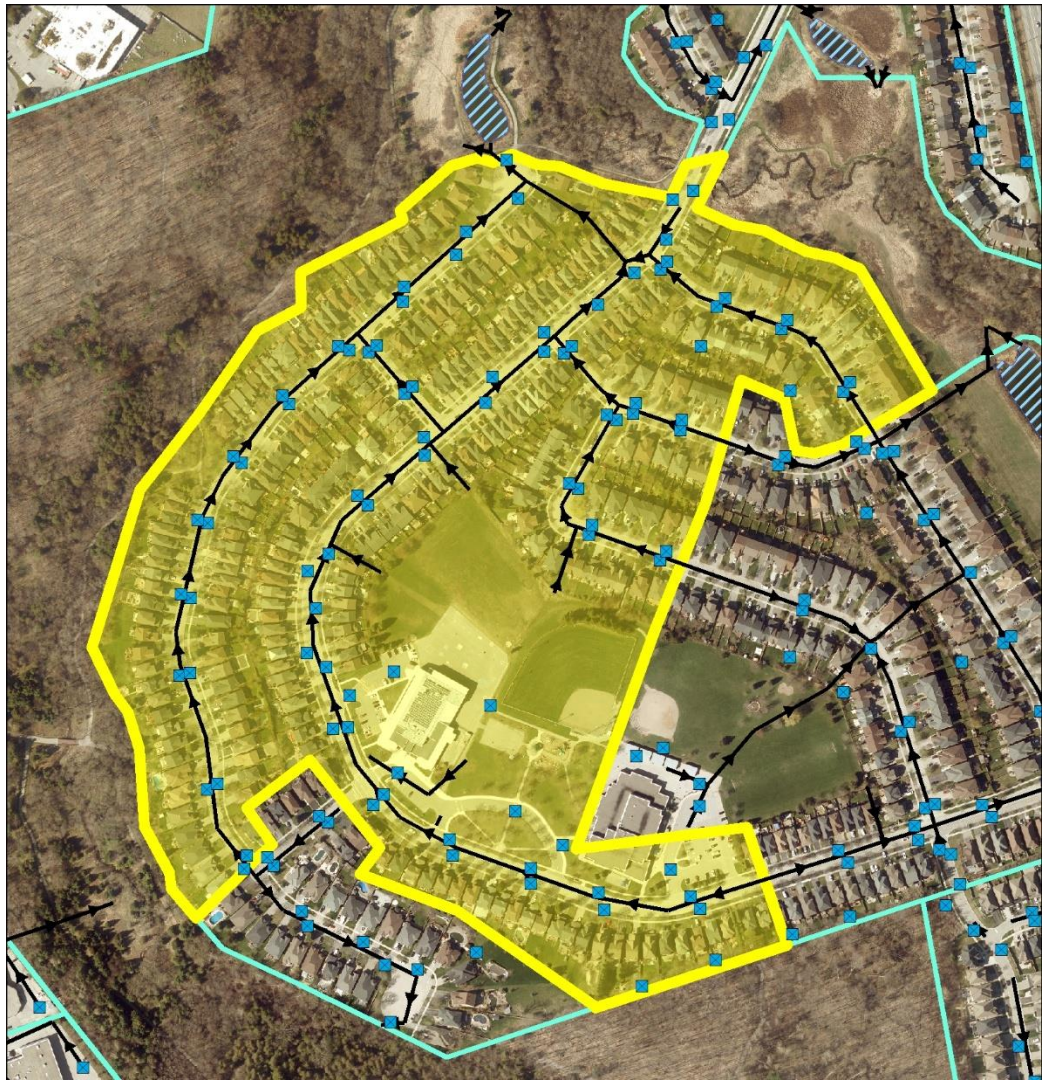
- Desktop exercise based on current costing
- Both inserts excelled in field and ETV tests
- Given similar efficacy of the two units and resolution of this approach, performance data combined for cost-benefit analysis
- Annual sediment load apportioned to CBs equally
- Annual CB clean out
- Uncaptured sediment to stormwater pond
- Continue until pond clean out threshold reached



Cost Benefit Analysis of CB Inserts vs Stormwater Pond

Test Catchment Characteristics

Catchment Characteristics	
Catchment Area	22.2ha
Pond Size (Enhanced control)	3,330m3
Sediment Accumulation @ 26 years	1,097m^3
Annual Sediment Accumulation	42.2m^3
# Catch Basins	83
Sediment Accumulation / year/ CB	0.5m^3
CB Sump Capacity (100%)	17.93m^3



Cost Benefit Assumptions

- Conventional 600mm CB sump (0.216m3)
- Scour equates to 60% loss of sump capture
- Purchase cost of units included
- Assume units are full with each clean out interval

Key Costing Assumptions

	Range[1]	Cost / m^3
Stormwater Pond	$500-$700	$600
Catch Basin Sump (100%)	$25[2] - $100	$116 - $463
Catch Basin Sump (40%)	$25[2] - $100	$289 - $1157

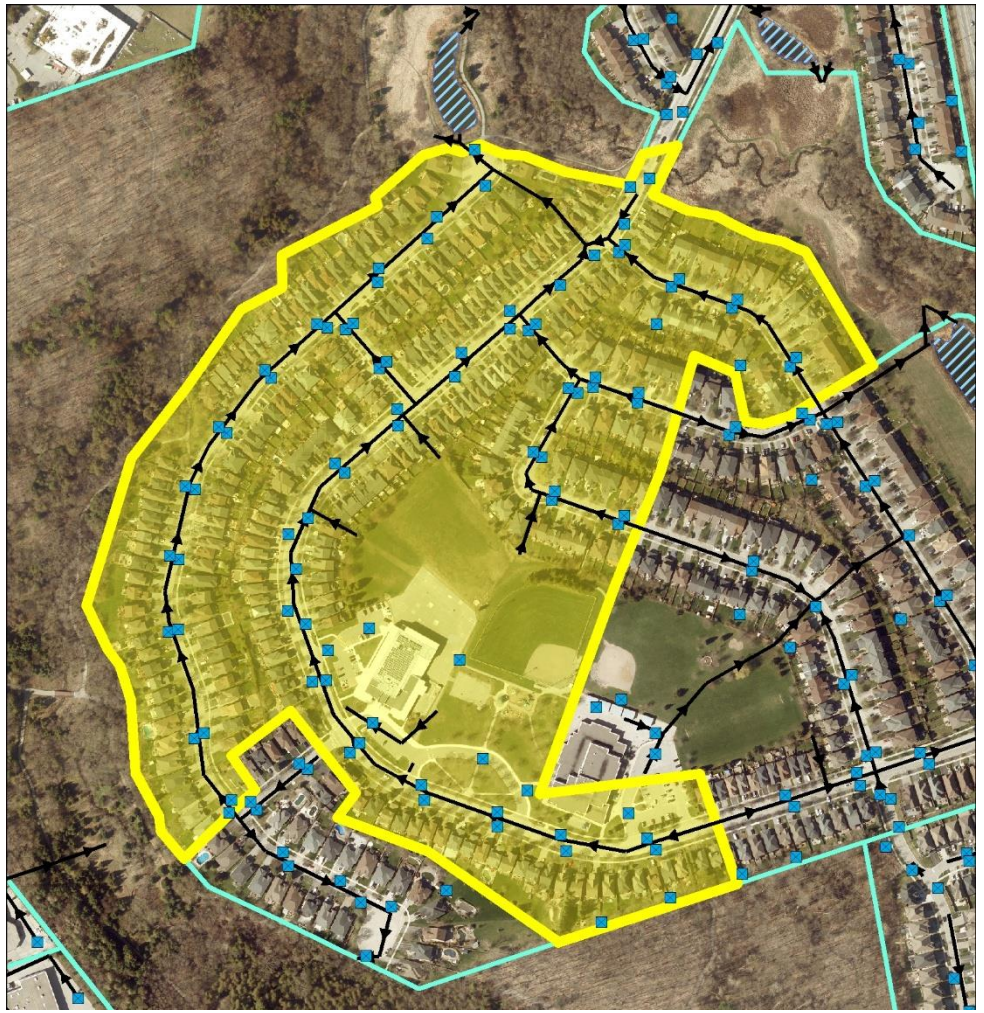
[1]based on Canadian Infrastructure Benchmarking Initiative

[2]$25/CB typically requires an inhouse sediment disposal

Cost Benefit Analysis of CB Inserts – Cost Breakdown

Varied CB Clean out costs

Annual CB Clean out ↑	Cost / CB Clean out	Time to Pond Clean out (yrs)	Annualized Cost*
Pond Clean Out Only	$0	26	**$25.3k**
CB Clean w/o inserts	$93	31	**$28.7k**
CB Clean with Inserts	$93	43	**$25.3K**
CB Clean with Inserts	$87	43	**$24.7k**
CB Clean with Inserts	$25	43	**$19.6K**
CB Clean with Inserts **Every 2 years**	$50	32	**$25.3K**

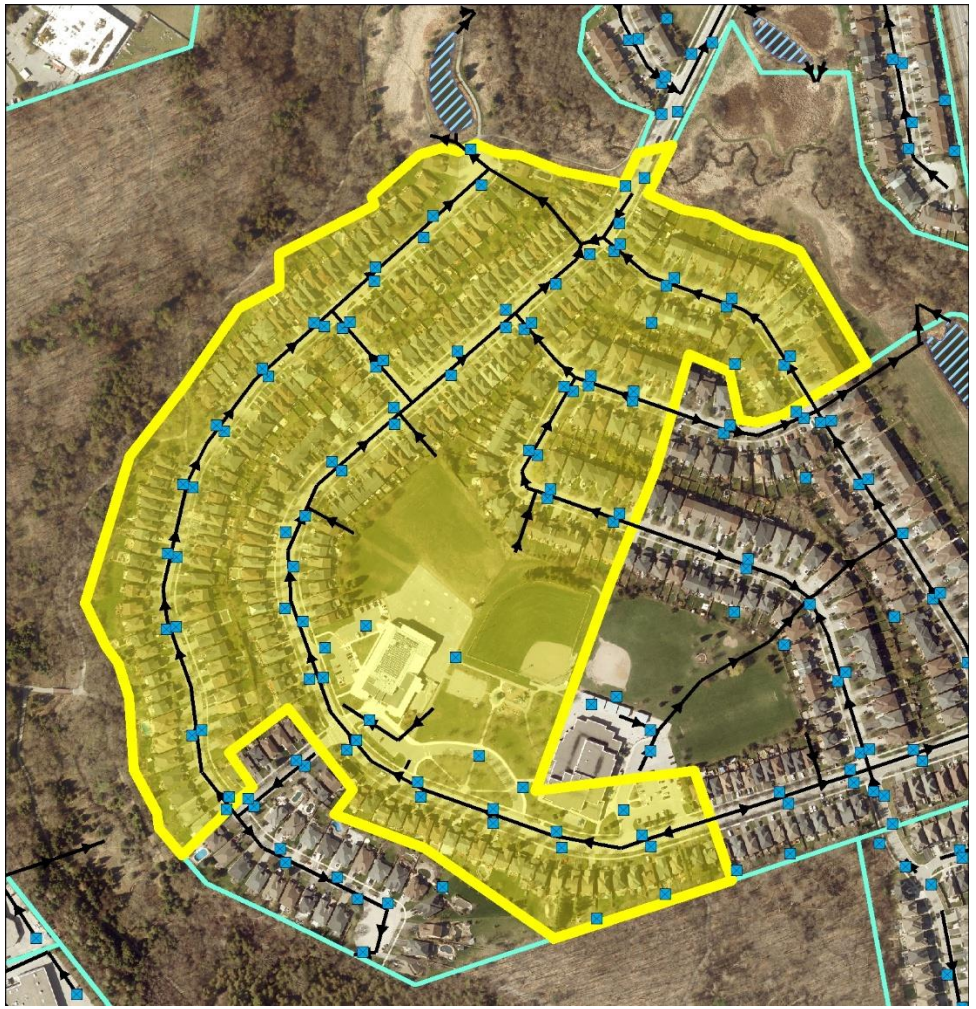


*Annualized cost includes: pond clean out, annual CB clean out and purchase of inserts

Cost Benefit Analysis of CB Inserts – Cost Breakdown

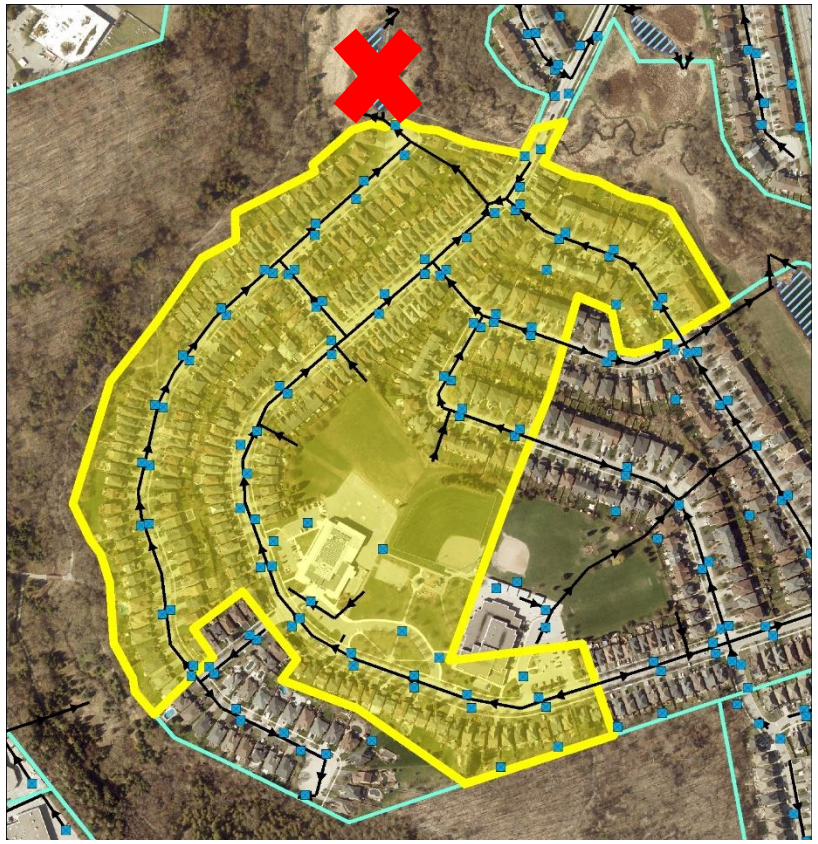
Varied Pond Clean out costs ($500 and $700/m3) @ $87/CB clean out

Annual CB Clean out	Cost / m^3	Time to Pond Clean out (yrs)	Annualized Cost
Pond Clean Out	$500	26	**$21k**
CB Clean w/o inserts	$500	31	$24.7k
CB Clean with Inserts	$500	43	$22.3k
Pond Clean Out	$700	26	**$29.5k**
CB Clean w/o inserts	$700	31	$37.7k
CB Clean with Inserts	$700	43	$27.4K



Pond clean out costs /m^3 includes major project costs not just disposal

But wait… What if there is no pond?



Treatment Option	Capital Investment	Sediment Maintenance required @26 yrs	Annualized Cost	% Sediment Capture @ 26yr	Cost / m^3
Stormwater Pond	$1.8M	$658K	$95.7k	80%	$2,839/m^3$
CB Inserts	$91.3k	$187.7K	$12.5k	39%	$653/m^3$
CB Cleaning	$0	$187.7k	$7.2k	17%	$1,009/m^3$

- The municipality in which our test catchment sits, 44% of it is uncontrolled / quantity only control (no sediment control!)

- **In uncontrolled areas CB Inserts are a no brainer!**

Maintenance Benefits of CB Inserts

- Case study pond is actually an undersized pond
  - Pond will be 40% full in 11.5 years
  - With inserts pond will be 40% full in 18.5 years
- Extend maintenance frequency of stormwater ponds
  - highly visible ponds
  - Inserts can be used to manage maintenance schedules
- Protect downstream stormwater infrastructure
  - LID (exfiltration)
  - quantity tanks / chambers,
  - OGS units

Operational Benefits of CB Inserts

- Sump clean outs are typically already part of operations
  - But rarely are sump accumulation rates measured…
- CB Inserts improve efficacy of routine CB clean out, more sediment / less water
  - Catch Basin Sump (40%) = $1007/m3 @ $87/CB
  - Decanting not as commonly practiced anymore
- Inserts ideal where winter sanding is used

Environmental Benefits of CB Inserts

- Litter capture in high pedestrian areas.
- Keep sediment and contaminants out of waterways
- Early nutrient removal

USGS Leaf Litter Study*

- Leaves a significant source of phosphorus.
- Nearly 60 percent of annual phosphorus yield from leaf litter in the fall.
- Timely removal of leaf litter can reduce phosphorus load by 80 percent.
- Leaf removal is one of a few options available to reduce dissolved phosphorus.

***Using leaf collection and street cleaning to reduce nutrients in urban stormwater**
https://www.usgs.gov/centers/upper-midwest-water-science-center/science/using-leaf-collection-and-street-cleaning-reduce

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