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A photograph of a stream with visible erosion on its banks. The water is murky and brown. The banks are covered with green grass and some bare, thin tree branches. In the background, there are houses and more trees.

Oops!...that wasn't our intention: Recognition and avoidance of unintended consequences of uncoordinated in-stream erosion mitigation in southern Ontario

Robin McKillop and Tatiana Hrytsak
TRIECA conference
March 21-22, 2018



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Outline

- Erosion mitigation in southern Ontario
- Unintended consequences and challenges
- How do we do better?

A photograph of a small stream flowing through a dense forest. A large, moss-covered log lies across the stream, partially blocking the water. The water is clear and reflects the surrounding greenery. The banks are covered in lush vegetation and trees.

EROSION MITIGATION IN SOUTHERN ONTARIO



Erosion mitigation: current status

- Plethora of local erosion mitigation projects being undertaken in the GTA...

Trail
Protection

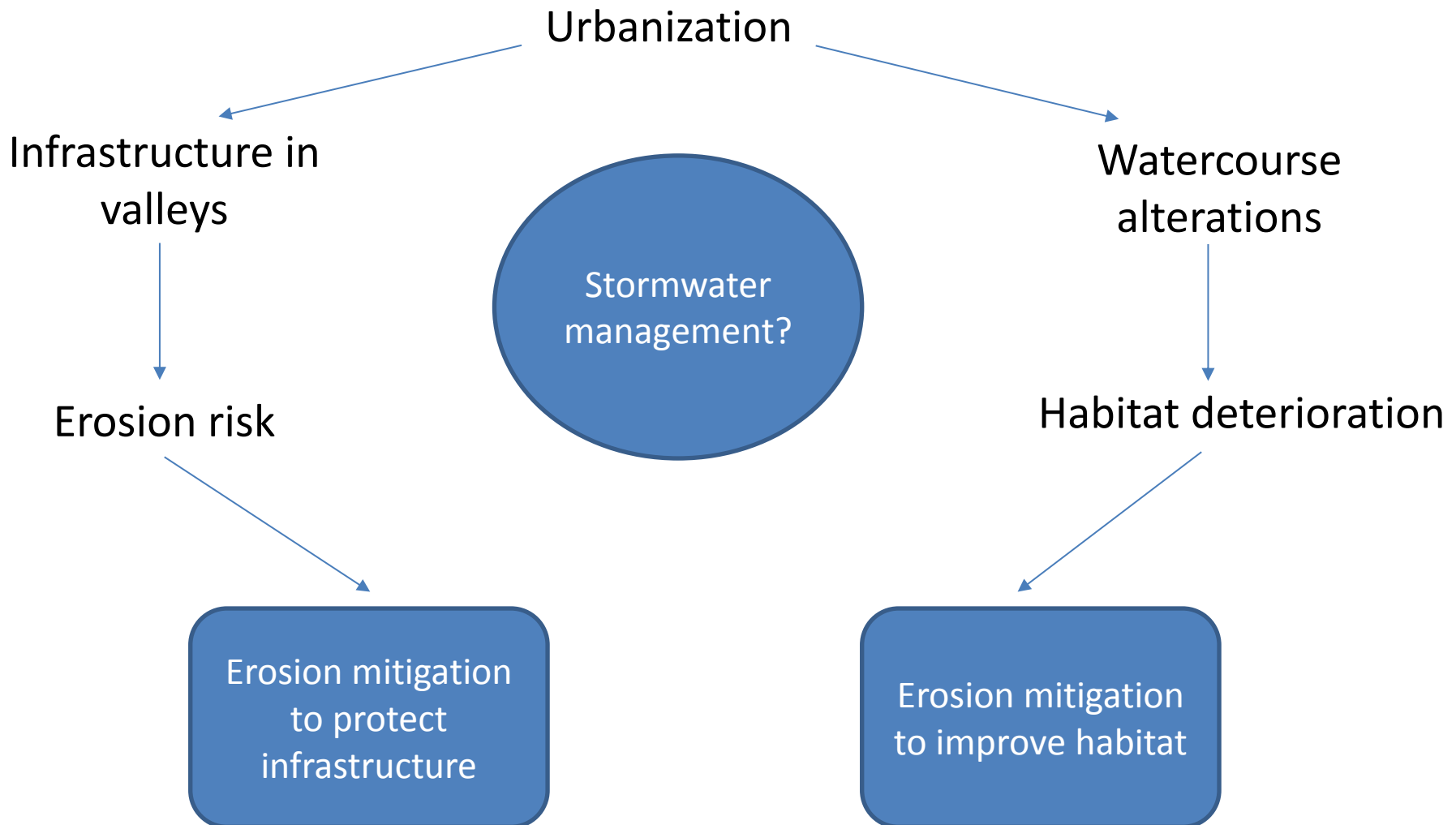
Protection
of at-risk
sewer

Eroding
bank
stabilization

- Different challenges related to timing of urbanization
- Not just a problem of older urbanized areas; also occurs in newer areas such as Brampton



Fluvial systems and urbanization





UNINTENDED CONSEQUENCES AND CHALLENGES





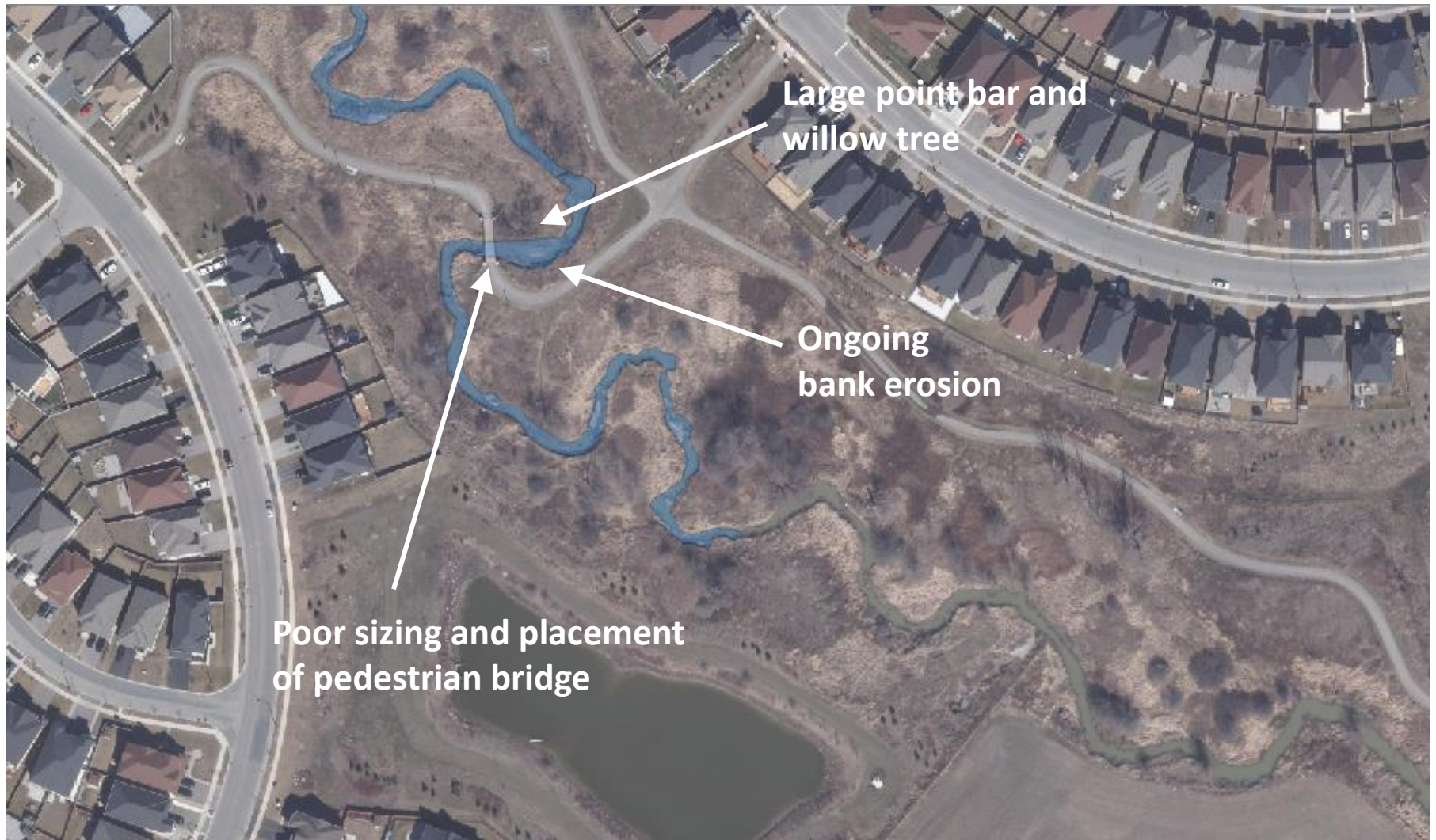
Repeated disturbance

- Failure of mitigation efforts that only address the symptoms (short-term solutions)
- ‘Tunnel vision’ – lack of consideration for other issues nearby that could also be addressed, or may be exacerbated





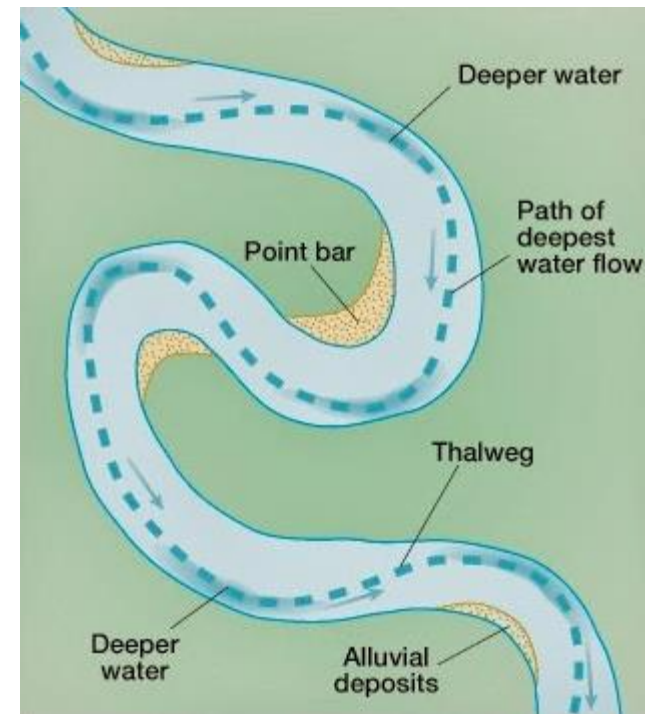
Repeated disturbance





Downstream effects

- Watercourses should be a mosaic of erosion and deposition under equilibrium conditions
- Reducing erosion at one location can upset this balance, transferring energy further downstream
- Fixing one problem.....while creating another





Discontinuous mitigation

- Streams with a patchwork of local mitigation work forming 'Franken-streams'
- Reach doesn't function properly; short natural sections where erosion is concentrated
- Different consultants completing the work can lead to inconsistent designs





- Streams v
- work form
- Reach do
- sections v
- Different
- lead to in



Continuous mitigation

mitigation

short natural

ated

the work can



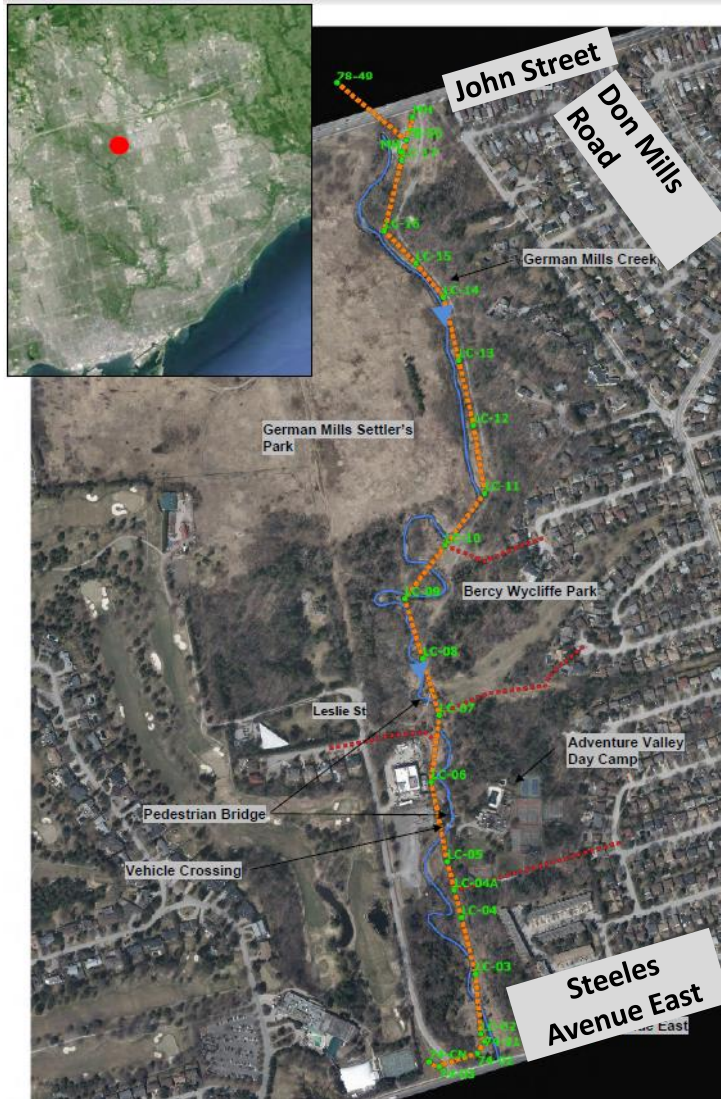


HOW DO WE DO BETTER?





Prevention

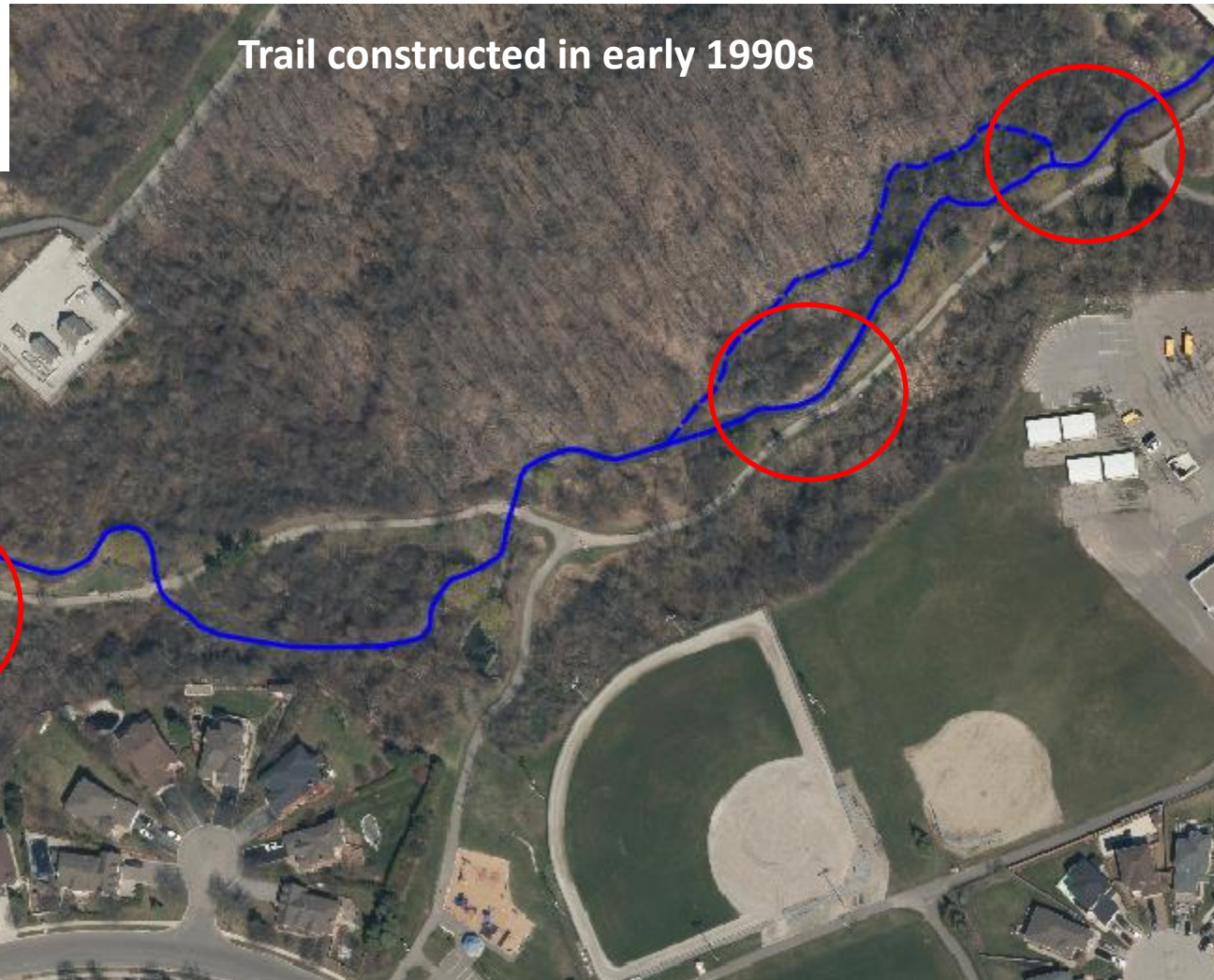


German Mills Creek in Bercy (Wycliffe) Park

- Proper planning studies to guide urbanization and prevent future issues
- Role of geomorphology at various planning levels
- Lifespan and permanency of recreational trails and bridges in the valley



Prevention



Trail constructed in early 1990s



Proactive

- Understanding **before** Action
- Systemic issues versus event-based, local issues
- Avoid local-scale solutions to large-scale problems
- Tipping point between local spot treatments and substantial continuous modification





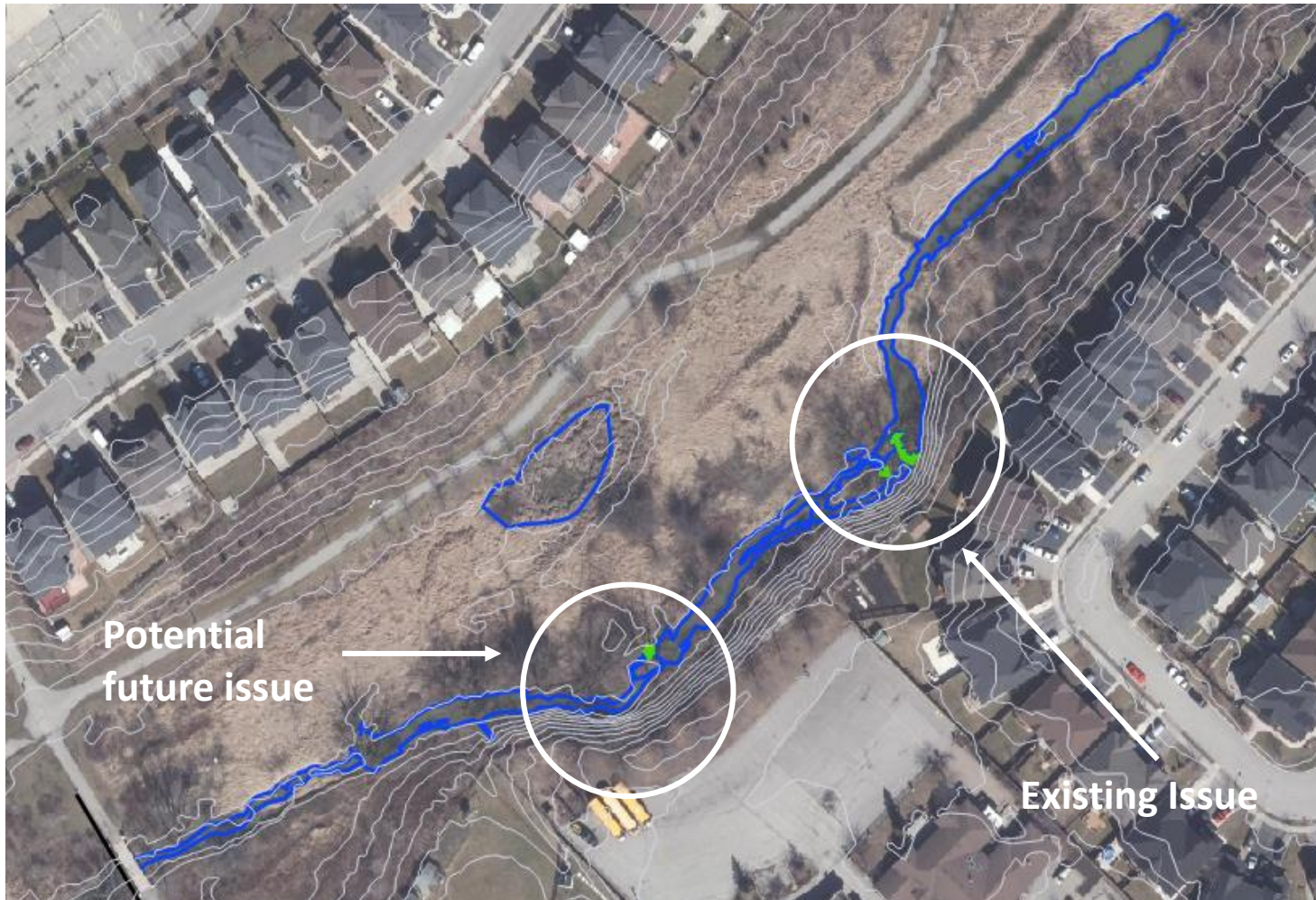
Proactive



- When the problem is bigger than just erosion mitigation...
- Geomorphic systems master plans to strategically plan channel works – avoid a Franken-stream!
 - Holistic watershed approach

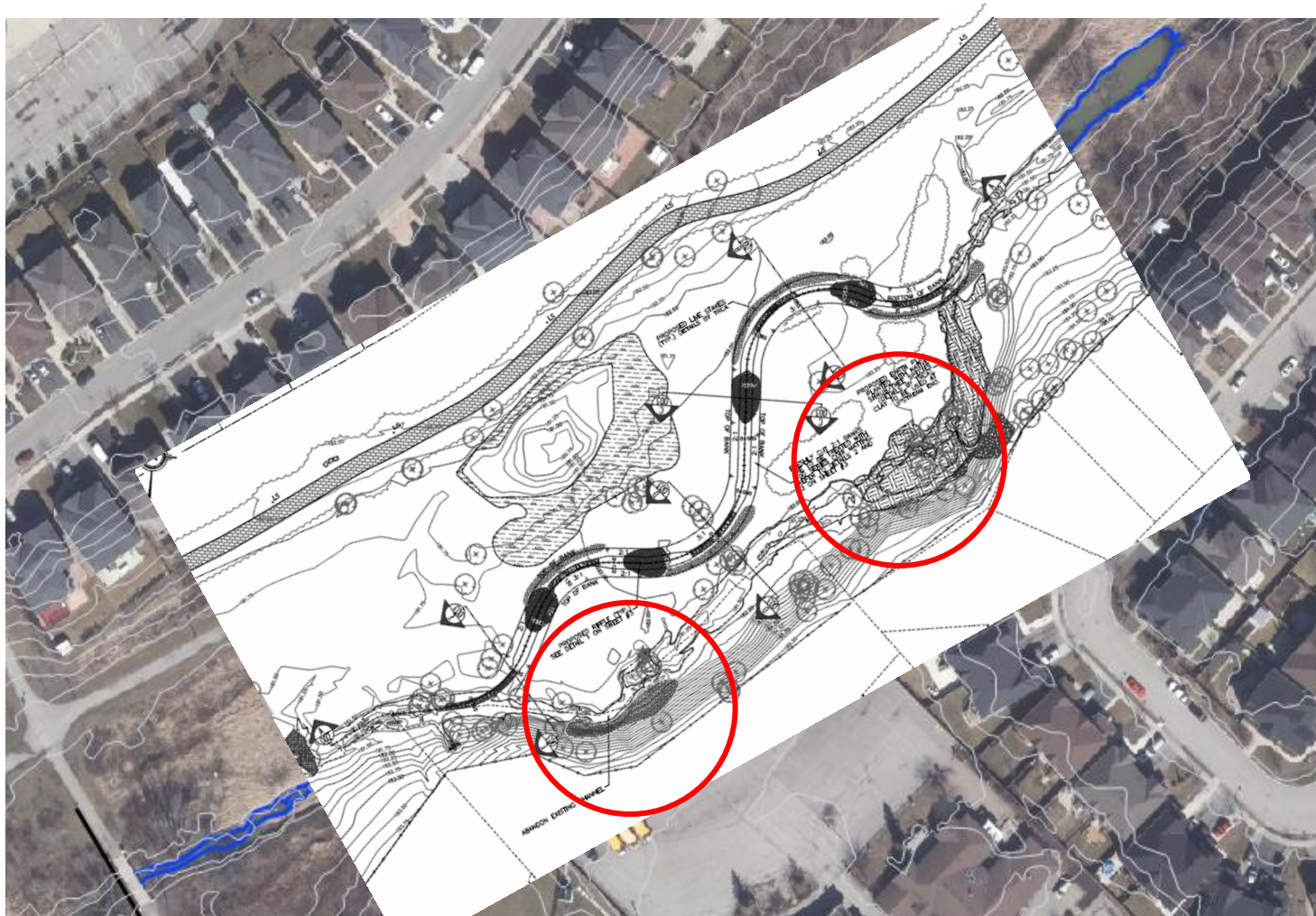


Proactive





Proactive





Coordination

- Several stakeholders may need to be involved to execute a holistic solution
- Who owns the land?...the infrastructure? Funding sources?
- Avoids need for potential redistribution and short-term solutions



Mindset

- Be open to accepting the 'do nothing' option when level of risk is acceptable
- Erosion will eventually reach an equilibrium condition
- Intervention should be the last option when all other alternatives have been explored
- When intervention is needed, use conservative options to reduce future need for intervention





Questions?

robin@pecg.ca

tatiana@pecg.ca



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