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Concrete Channels- A Return to Naturalized Streams in Urban Environments

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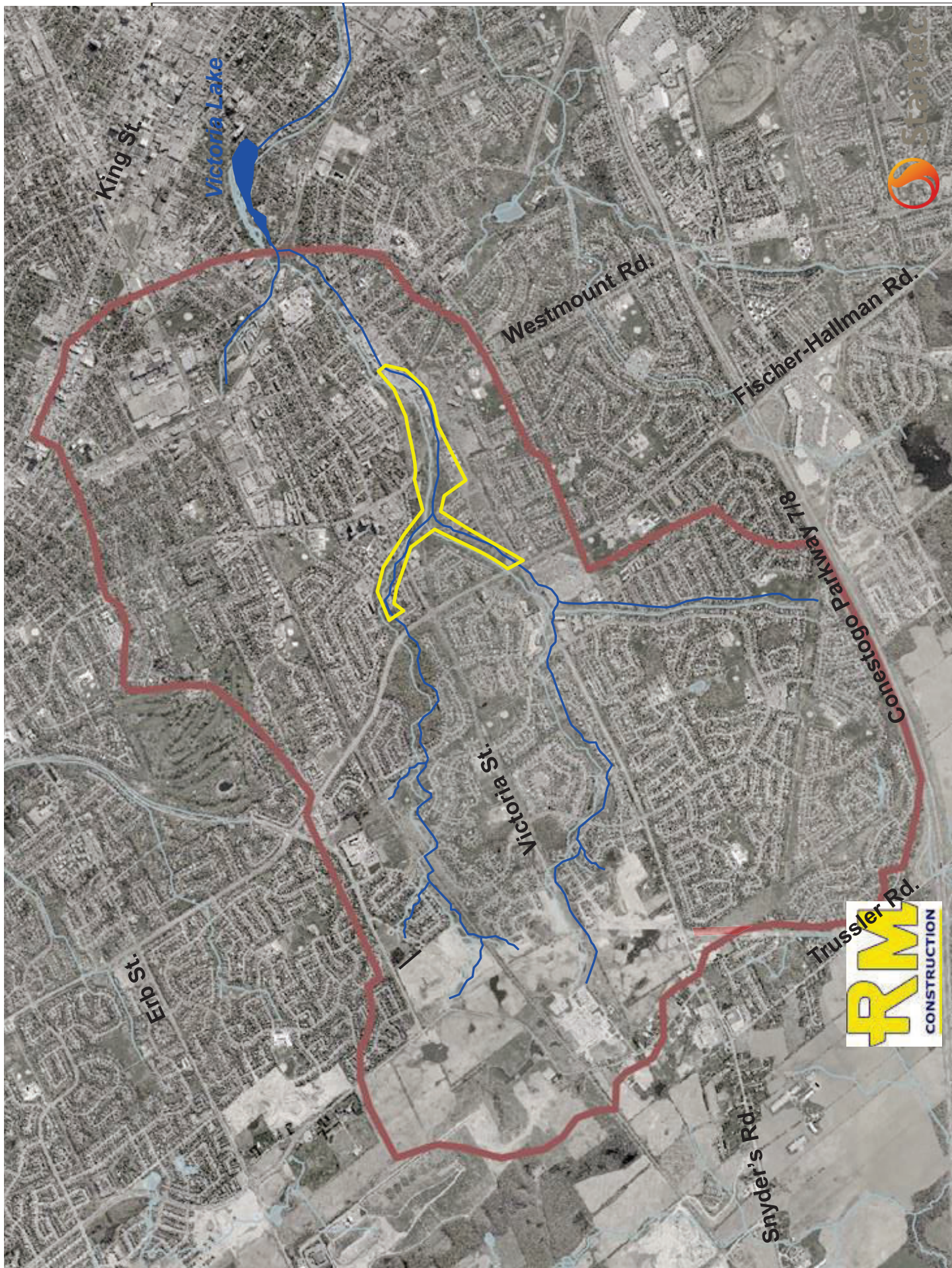


Presentation Overview

- Overview
- Public Acceptance
- Design
- Construction
- Conclusions

Objective: Provide 3 different perspectives on a project & provide lessons learned





History

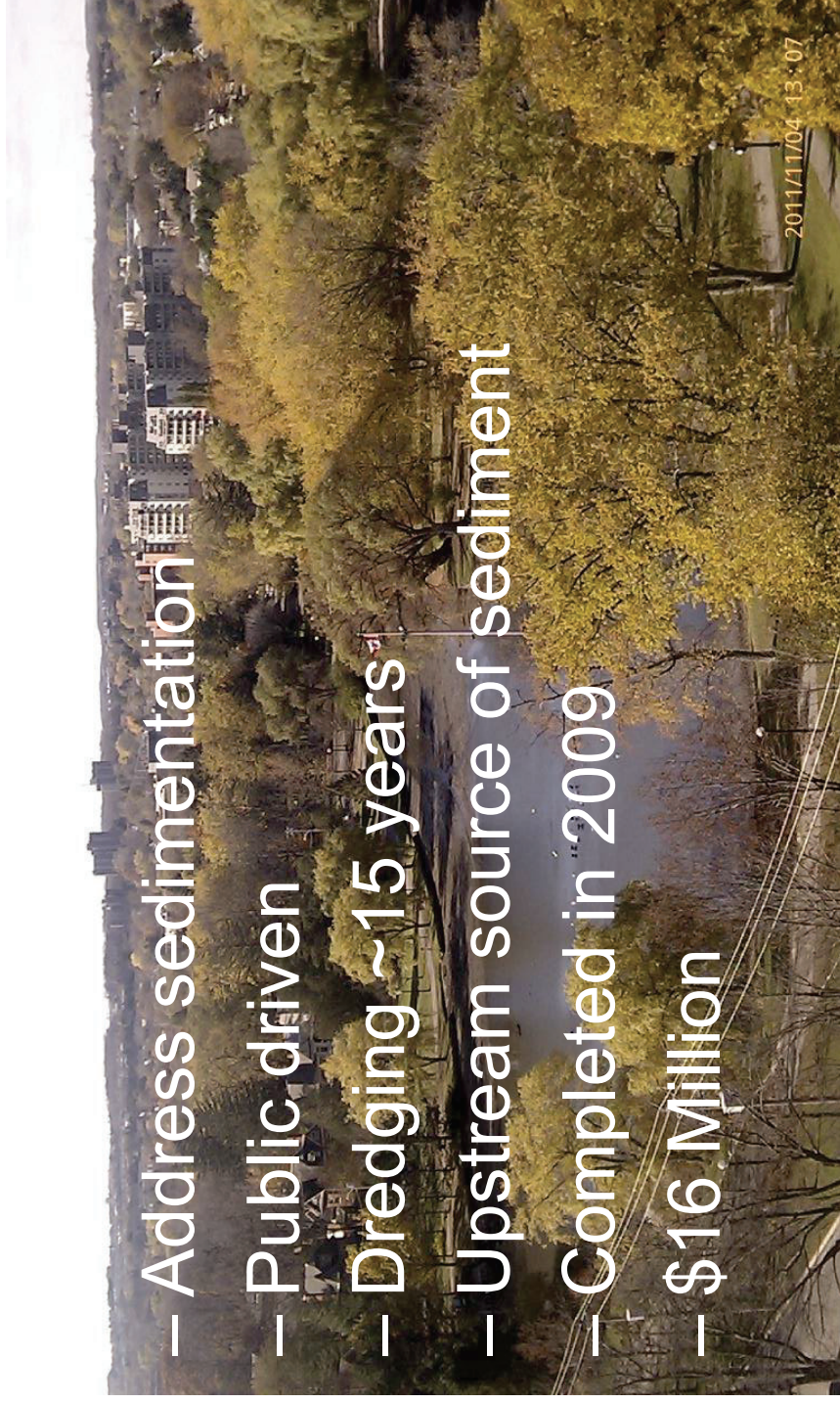
- Concrete channel built early 1980s
- For flood and erosion protection
- Several drop structures
- Flows into Victoria Park Lake



Victoria Park Lake EA



- Address sedimentation
- Public driven
- Dredging ~15 years
- Upstream source of sediment
- Completed in 2009
- \$16 Million



Funding the Work



- Stormwater Utility
 - 2011, transferred stormwater funding property taxes to a user-fee program
 -  imperviousness =  higher rate
 - Public attended 2011 Council budget meeting



Source: 570news.ca Feb 2011 budget meeting



Victoria Park Lake

- Construction 2011/2012



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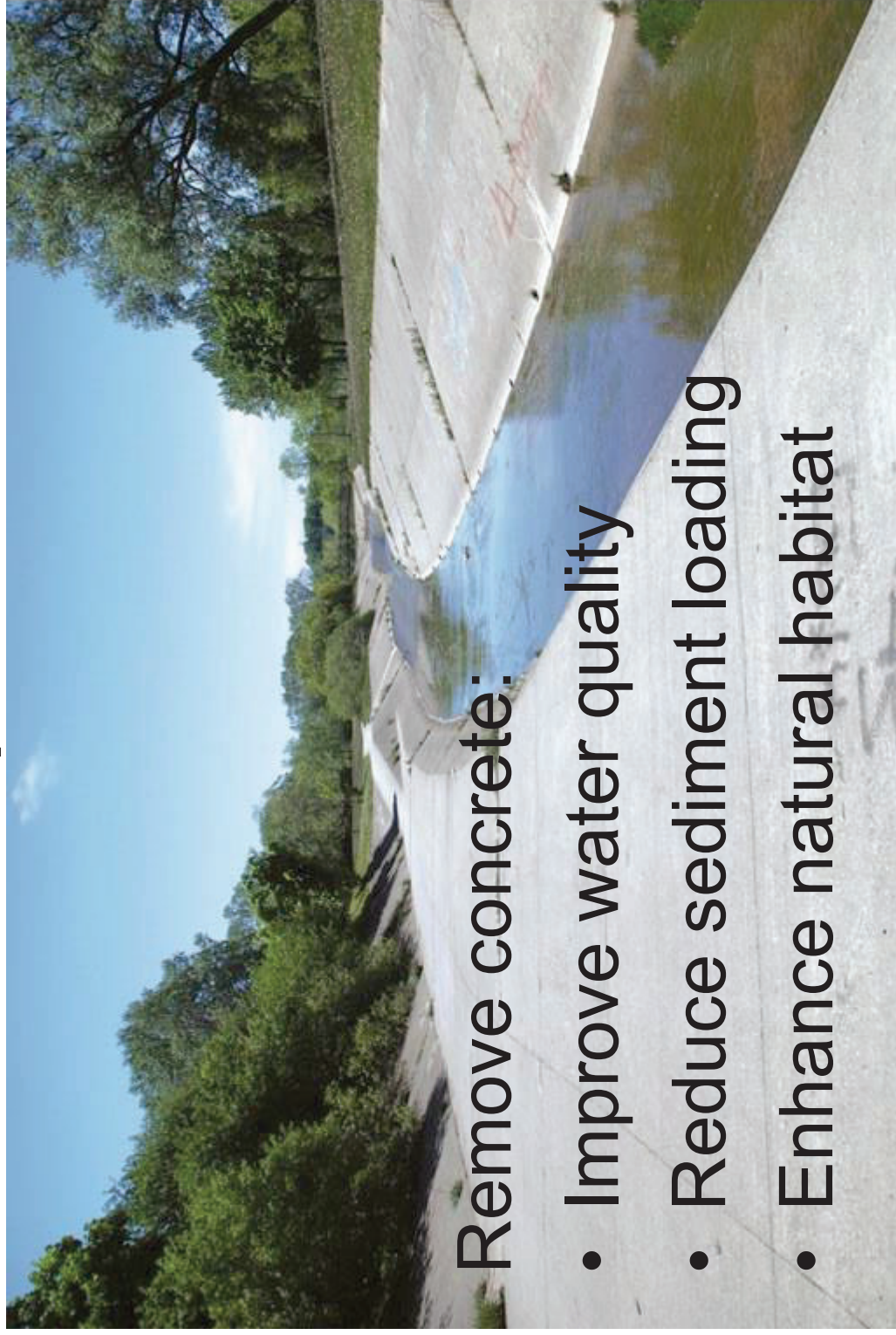


Upstream Works Begin

- Hired consultant (Stantec) – Spring 2013
 - Included removal of 4 km of concrete channel
 - Addition of 2 SWM Facilities at Filsinger Park



Purpose



Remove concrete:

- Improve water quality
- Reduce sediment loading
- Enhance natural habitat



Public Acceptance

- Petition to stop SWM Facility at Park
- Community Garden concerns
- Opposition to tree removal



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Public Outreach

- Enewsletters with progress
- Website updates
- CBC radio interview prior to work
- Responses
 - Extremely good
 - “Beautiful”, “Now I understand”

Lessons Learned



- Changed City PM at tender stage-not ideal
- Pre-qualification vs. qualified bidder process
- More flexible construction window
- Don't tender in May to start in July!
- Find ways to engage public

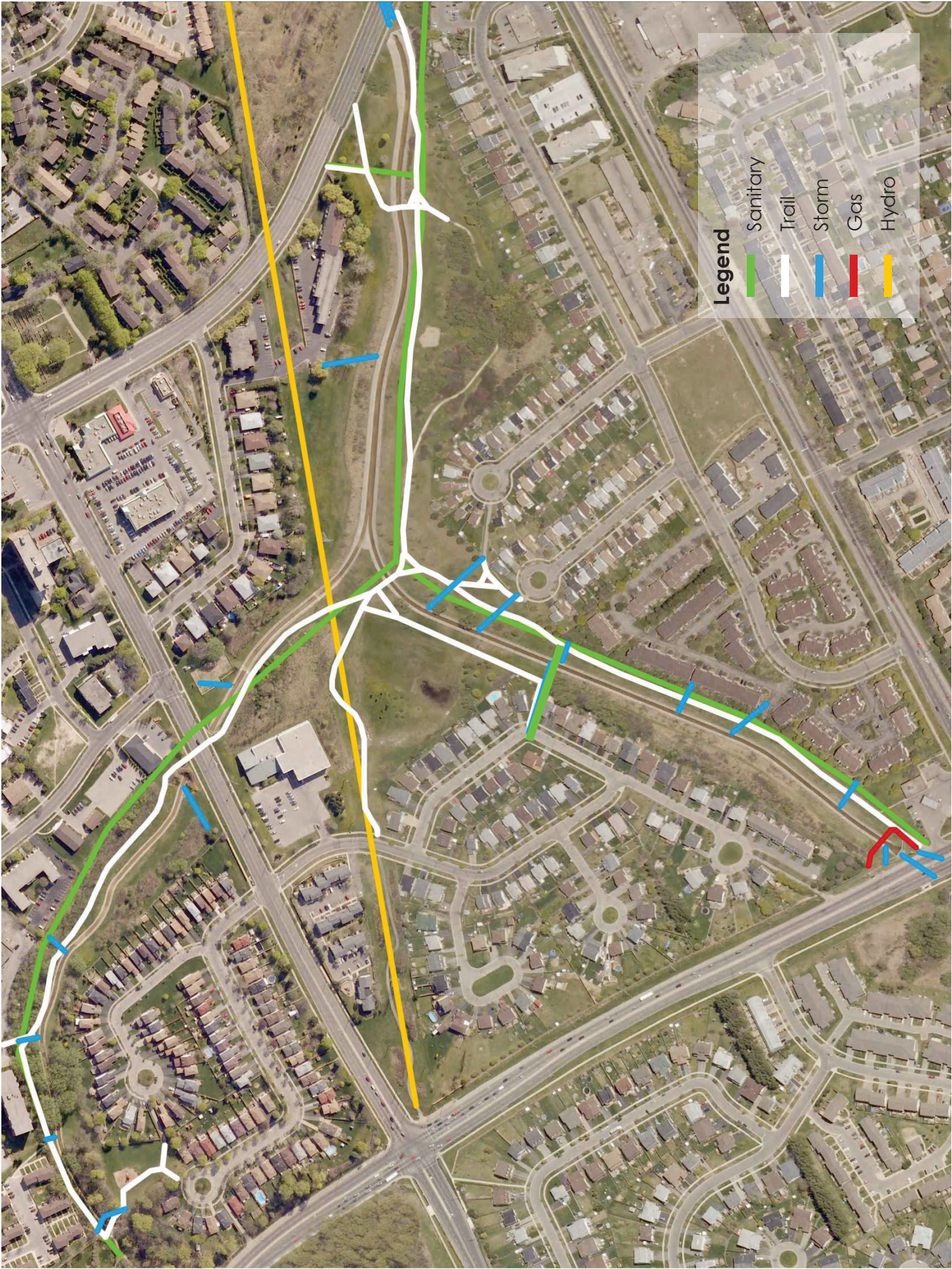


Design

- Existing Conditions:

- ~ 2,500 m of steep concrete channel (up to 2%)
- Tributary area ~12 km²
- Urban land uses





Design Criteria

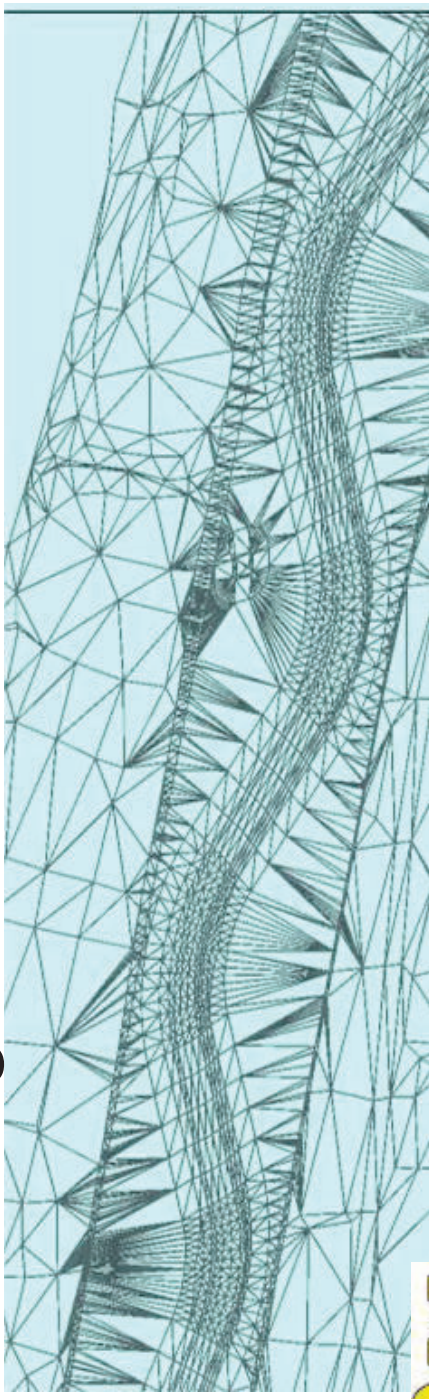
- Natural channel design with stable pattern, dimension, profile
- Enhance habitat features
- Maintain flood elevations
- Improve water quality

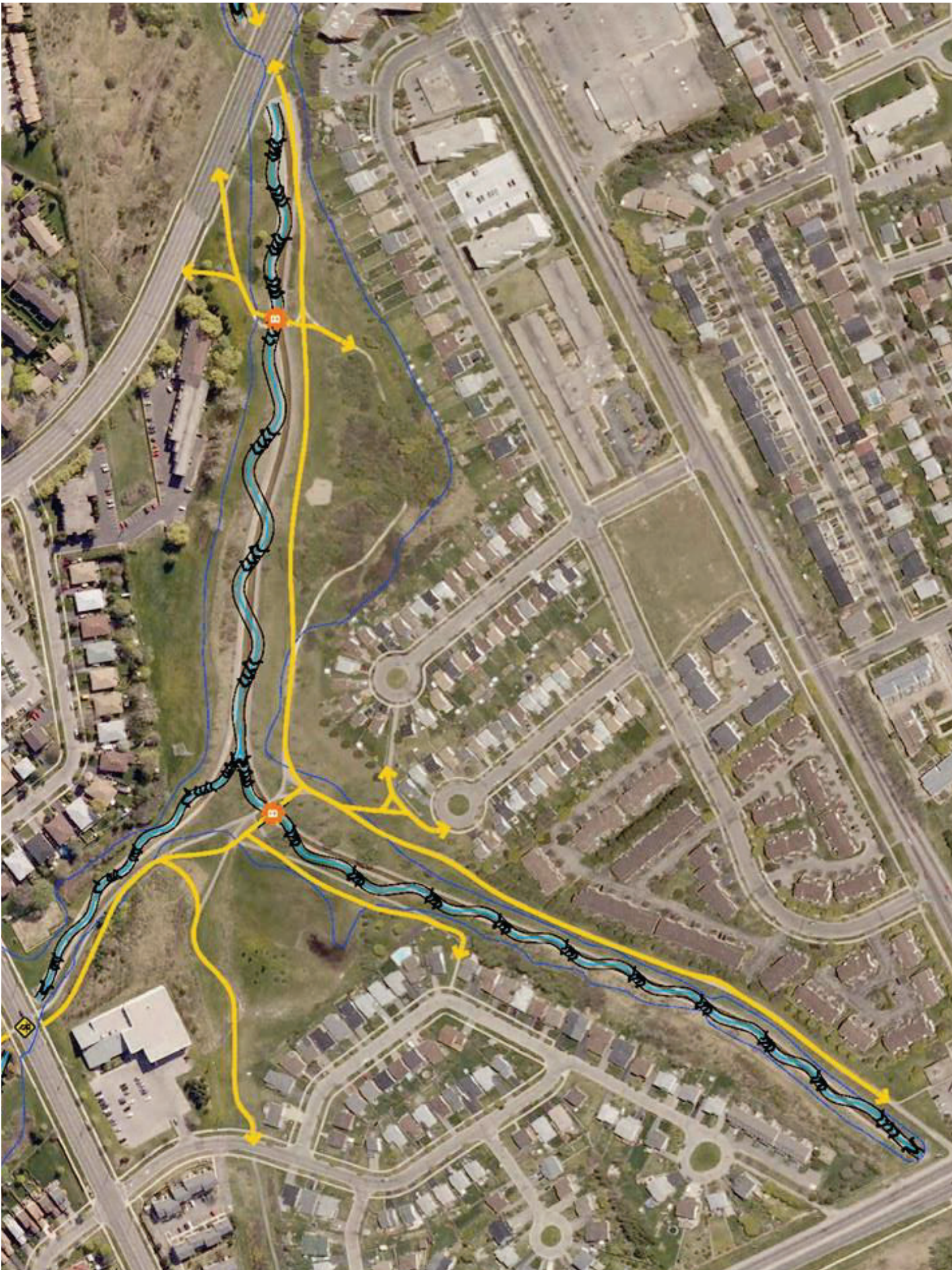
Design Elements

- No natural reaches on site – mini-regional curve & reference reaches
- Meandering planform, profile and cross sections
- Floodplain assessment

Design Elements

- 3D design
 - Optimize design with iterations
 - Enables GPS construction
- Structures
- Planting Plans







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Lessons Learned

- Existing Conditions:
 - Infrastructure, neighbours
 - Floodplain limits
- Design Elements:
 - Urban system
 - Structures (urban drainage – fine sediment, tree re-use)
 - 3D design
- Approvals

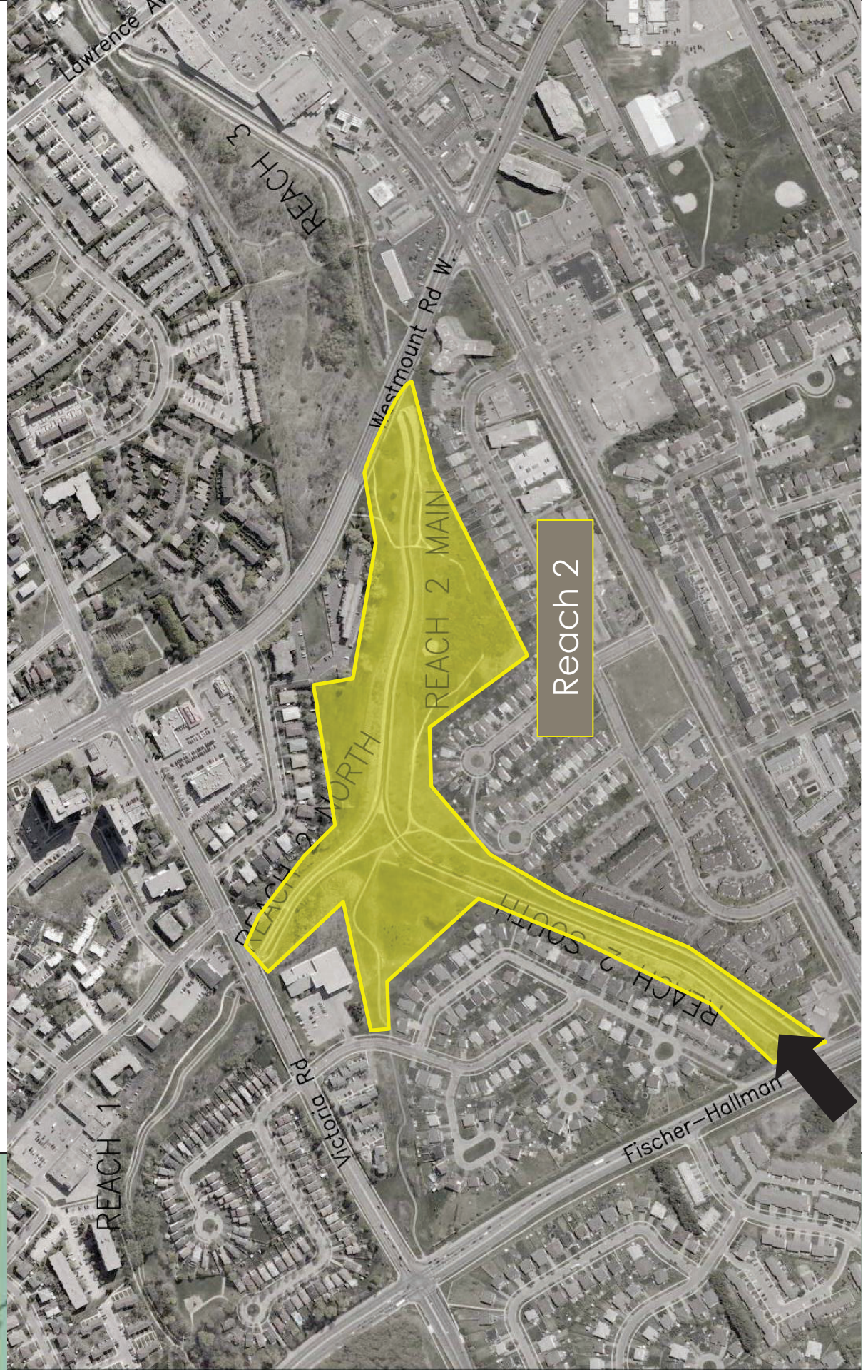
Construction

- Layout:
 - GPS Systems in equipment greatly increased productivity
 - As-builts were virtually identical to design drawings
- Experienced operators & the right equipment

Construction

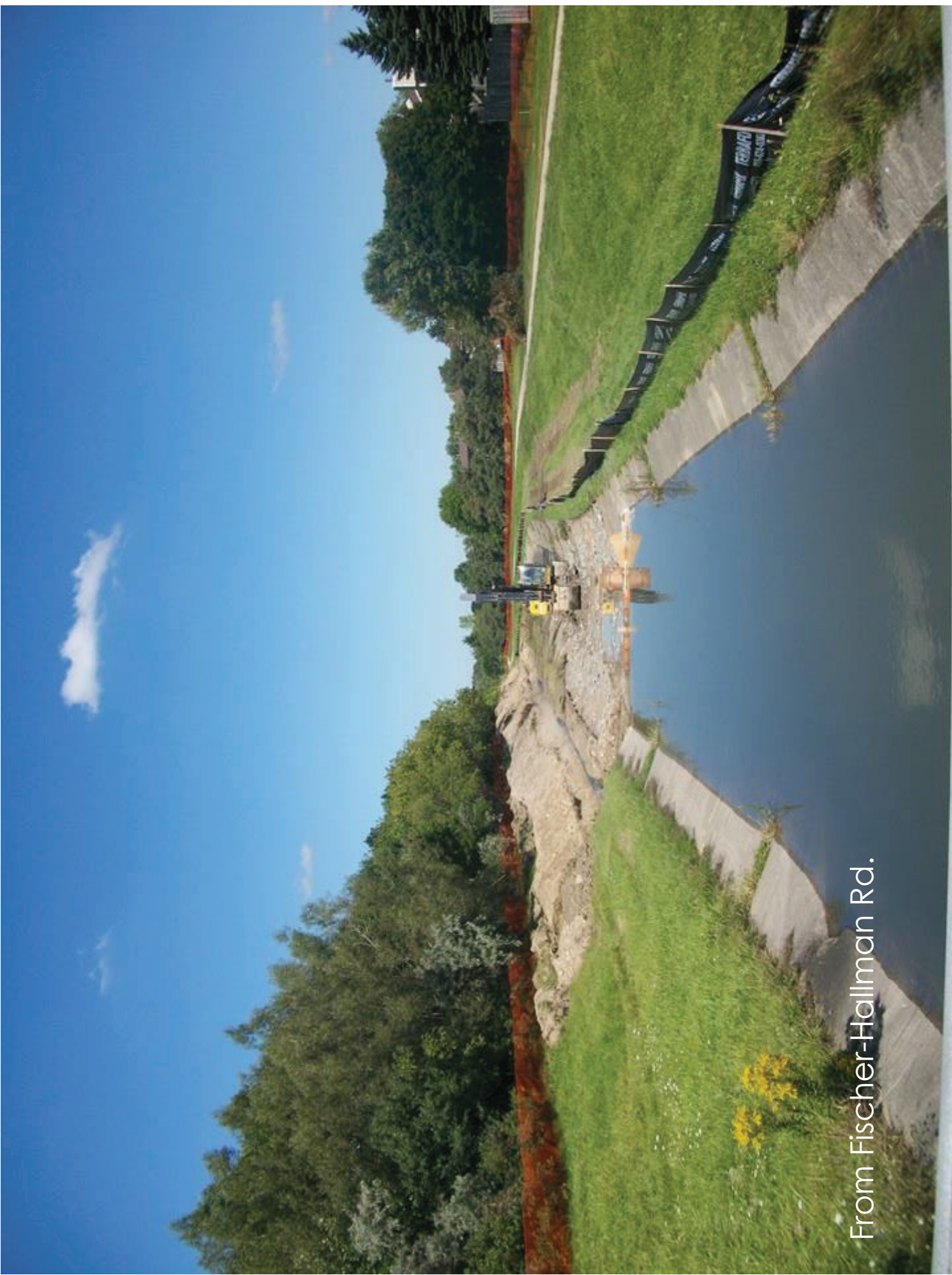
- Access:
 - Due to wet conditions, the existing channel was used as a haul road
 - Don't be afraid to modify methodology
- Dewatering:
 - Flume pipe vs. pumping or diversion
- Final landscaping immediately followed channel construction

Photo Location





From Fischer-Hallman Rd.



From Fischer-Hallman Rd.



From Fischer-Hallman Rd.



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From Fischer-Hallman Rd.

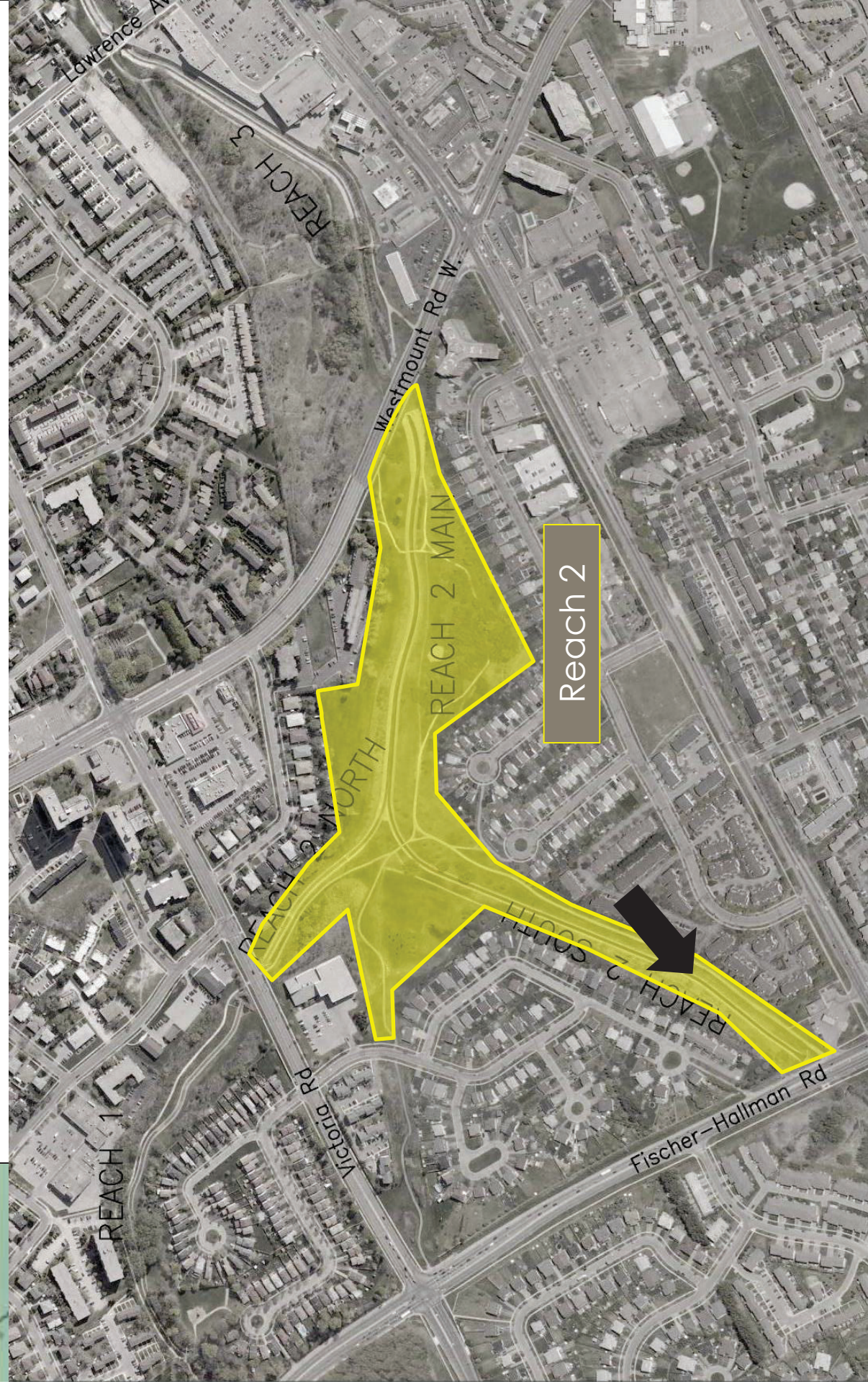


From Fischer-Hallman Rd.



From Fischer-Hallman Rd.

Photo Location





Towards Fischer-Hallman Rd.



Towards Fischer-Hallman Rd.



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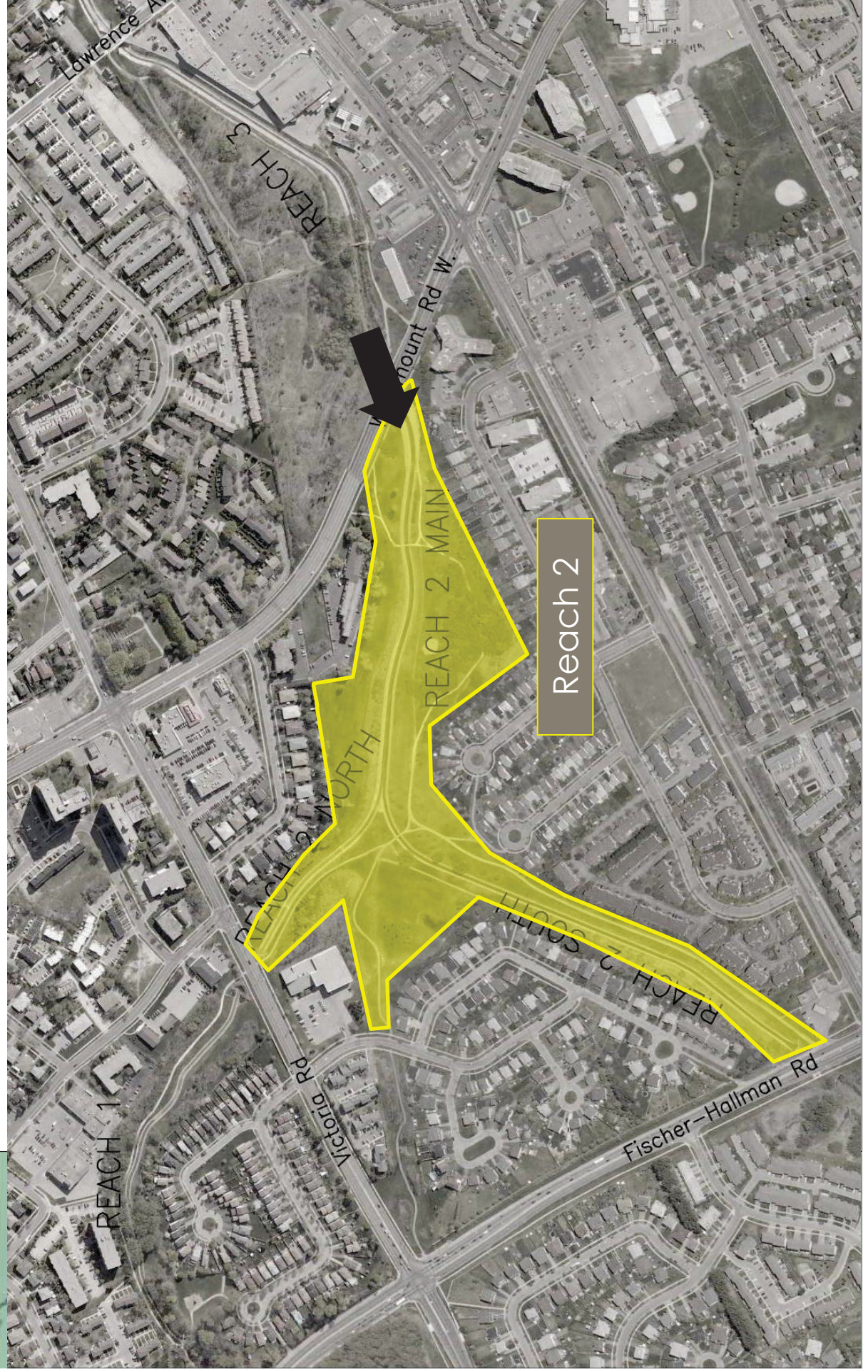


Towards Fischer-Hallman Rd.



Towards Fischer-Hallman Rd.

Photo Location





From Westmount Rd.



From Westmount Rd.



From Westmount Rd.



From Westmount Rd.

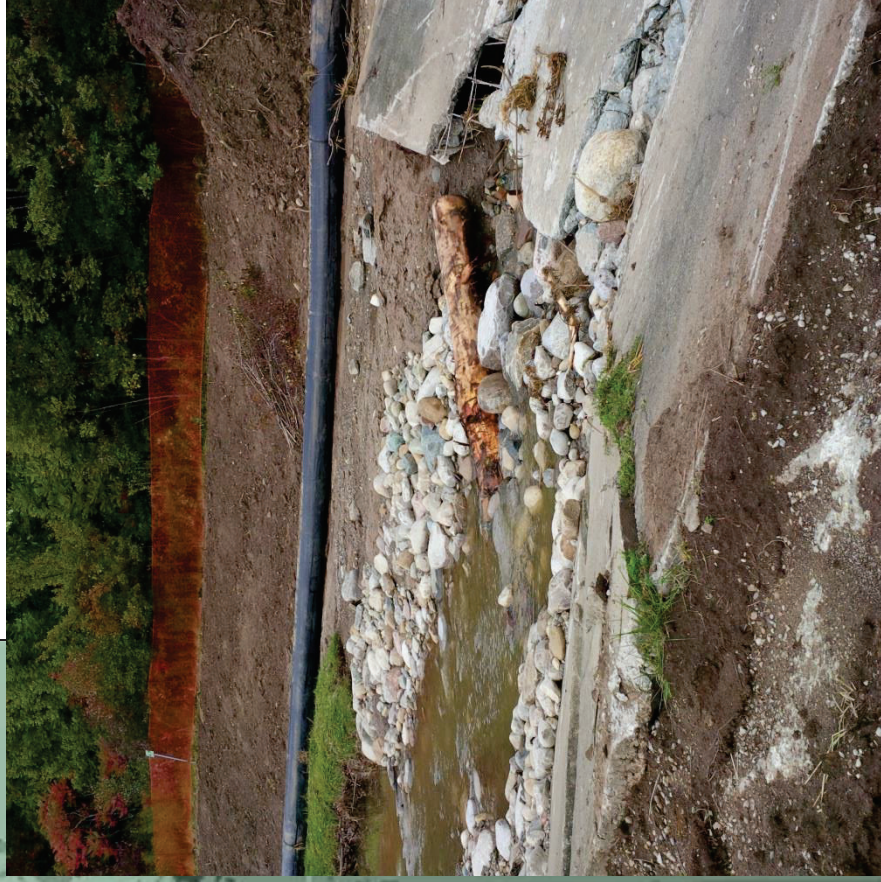


From Westmount Rd.

Expect the Unexpected!

- Vandalism
- Pet cemetery
- Rainfall events!!

First Storm

























From Westmount Rd.

Lessons Learned



- Use GPS if possible
- Jute floodplains if budget allows
- Jute seems to hold better than coir
- Communication & experience is key



Conclusion

- Importance of hiring qualified contractor
 - Cost Implications, Timely completion
- Competent designers
- Good Relationships
- Find ways to leverage this work
- Public Engagement

Thank You



Before



After