



SOURCE TO STREAM

2023 Conference

Canada's Premier
Stormwater and Erosion
and Sediment Control
Conference

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Natural Channel Design Solutions and Municipal Infrastructure: They Can Co-exist



Matrix Solutions Inc.

Mariette Pushkar, M.Sc., P.Geo.

Principal Fluvial Geomorphologist

Chris Moon, P.Eng.

Principal Water Resource Engineer, Project Manager

City of London

Environment and Infrastructure

Adrienne Sones, P.Eng.

Environmental Services Engineer

Stormwater Engineering Division

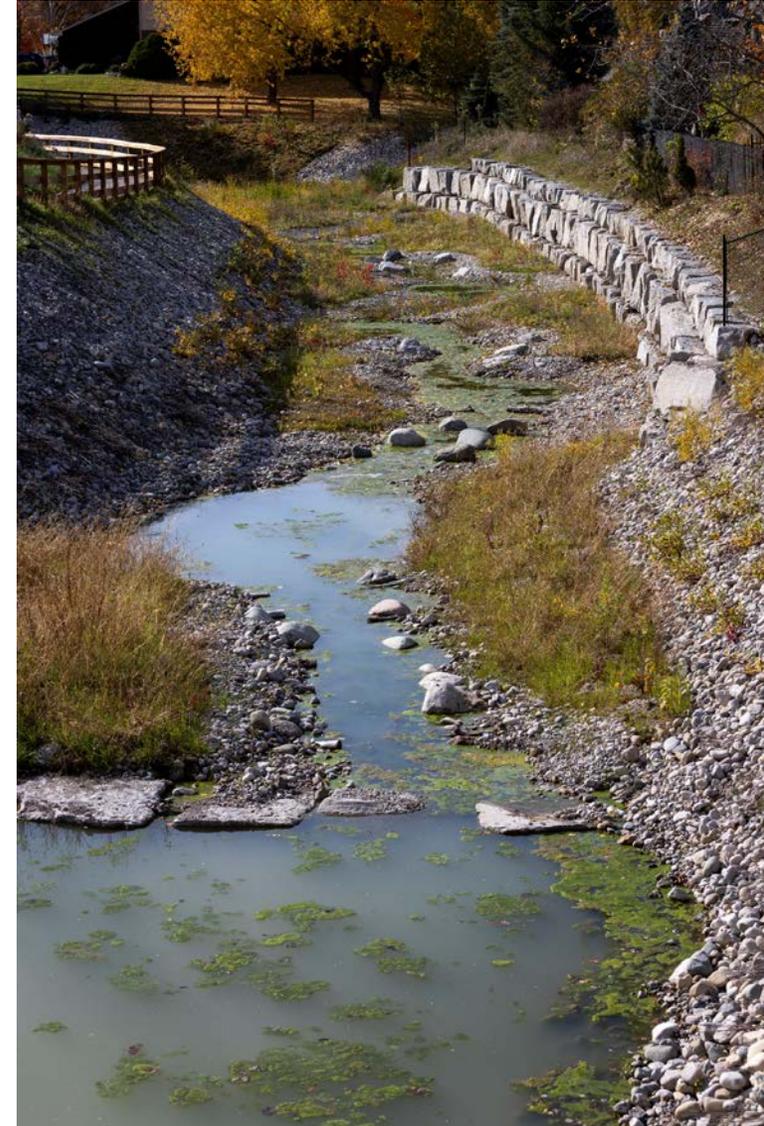
Source to Stream Conference

Brampton, ON

March 22, 2023

Outline

- Introduction/Background
- Policy Context
- Project Context
- Natural Channel Design Elements
- Engineering Design Elements
- Construction Challenges
- Future Considerations
- Finished Product
- Questions





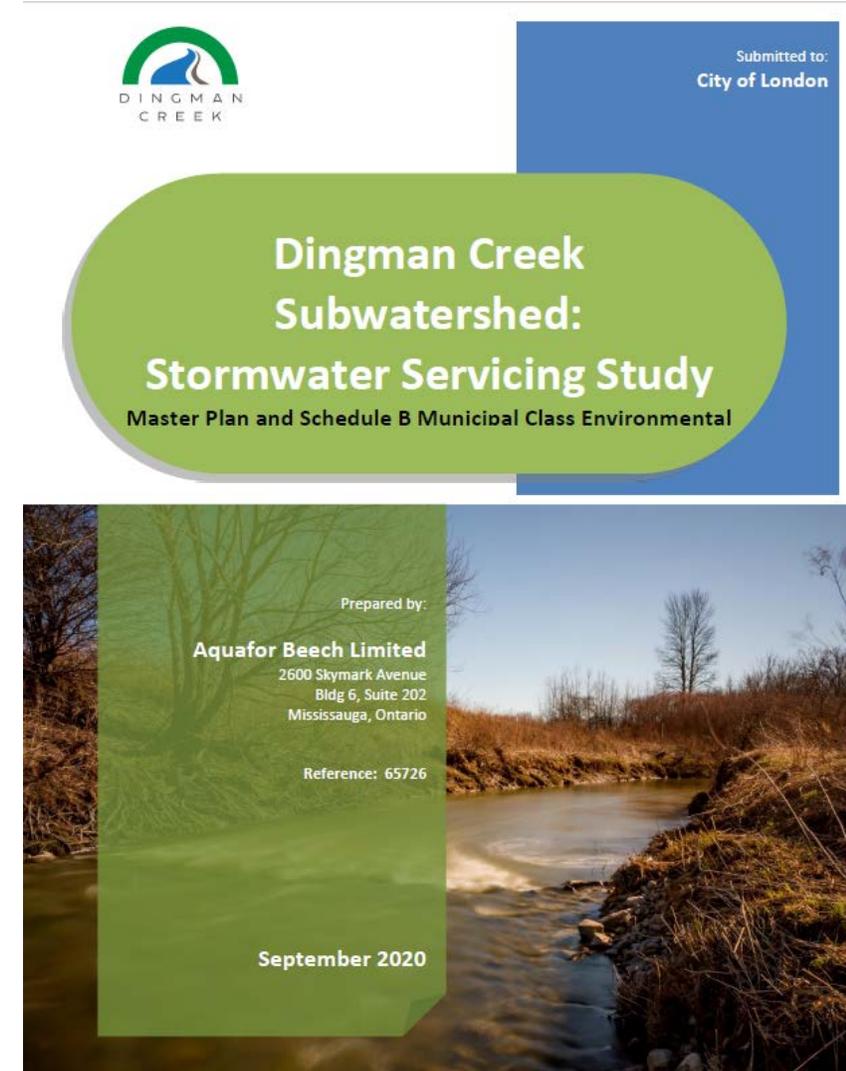
London's Stormwater Engineering Division



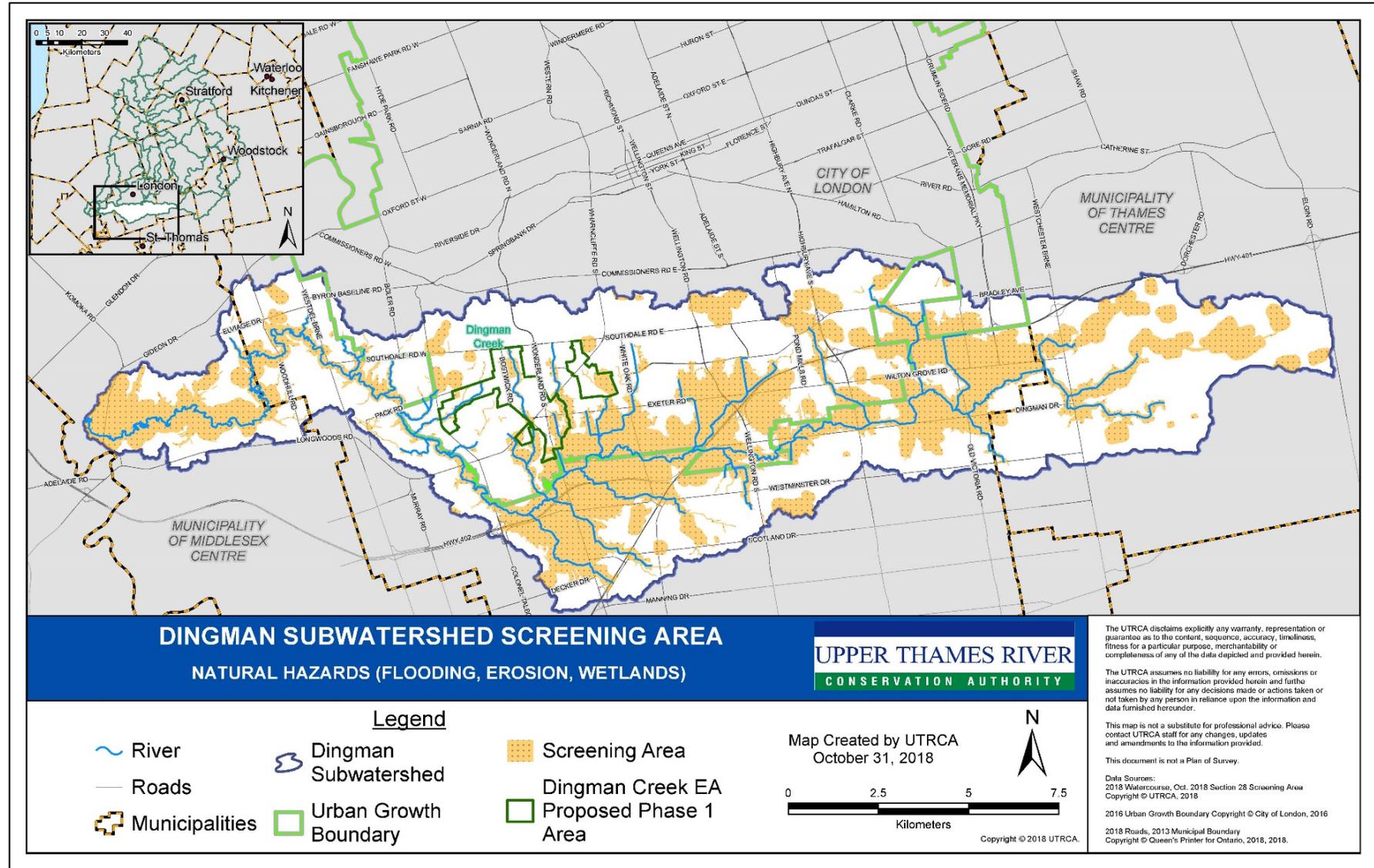


Dingman EA

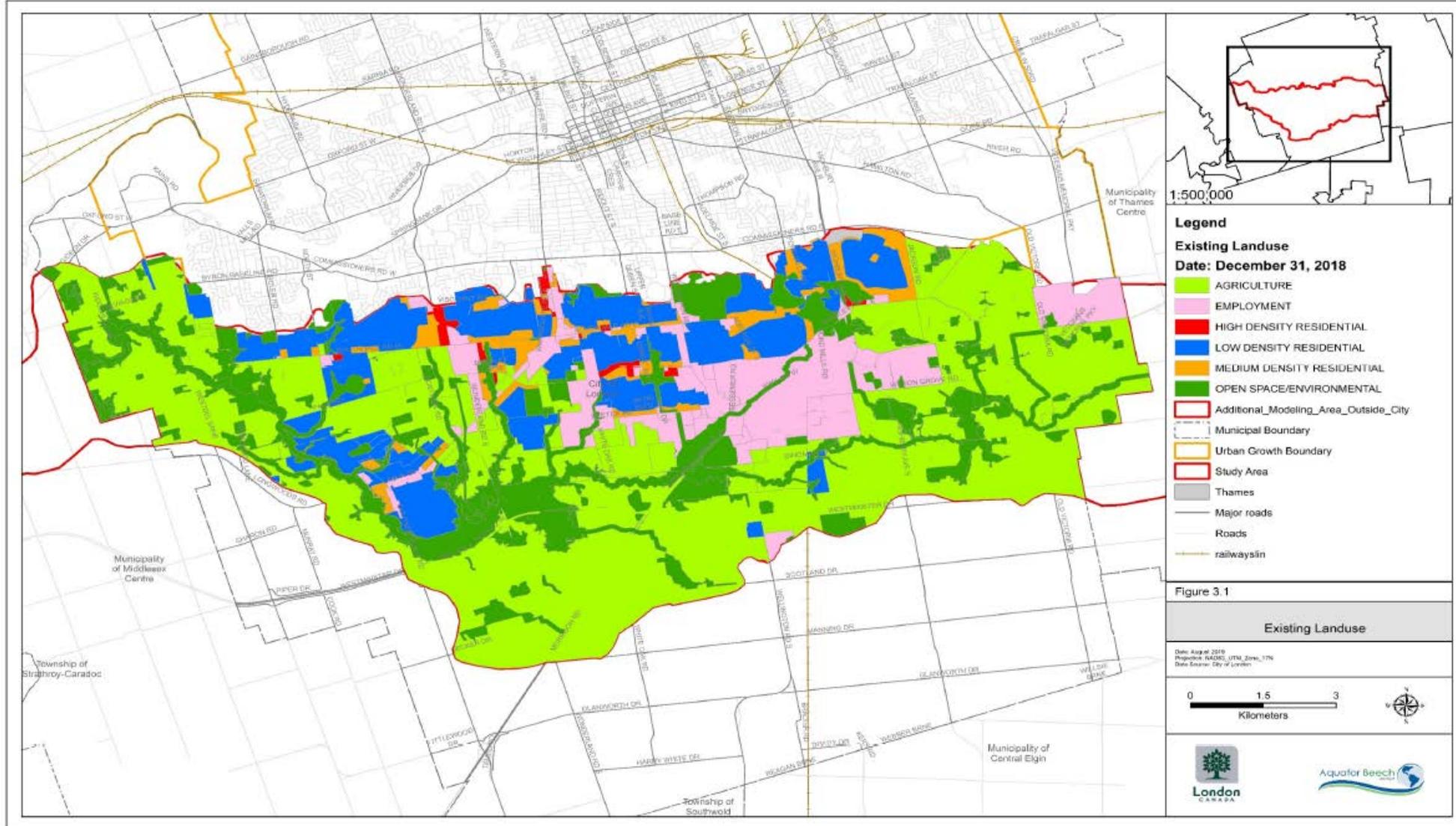
- Initiated in 2017 to develop subwatershed-wide stormwater strategy
- Municipal Dry Ponds in neighbourhood areas
- Low Impact Development 25 mm capture for new development
- Complete Corridors – 2 new construction, 2 restoration focused
- Identified areas susceptible to flooding



Dingman EA : Flood Model Update



2018 Land Use



Dingman Stage 1 EA: Strategy



<p>Date: November 2019 Source: City of London, 2016</p>	<h2>Dingman Creek Subwatershed Study</h2>		
	<h3>Implementation Plan - Overview</h3>	<p>Notes: Stream System Studies for White Oaks Fluvial Geomorphic Assessment - to be updated HDF Assessments - to be completed Erosion Hazards - meander belt assessment provided, stable slope hazard to be confirmed Maps are representative and do not include all features</p>	

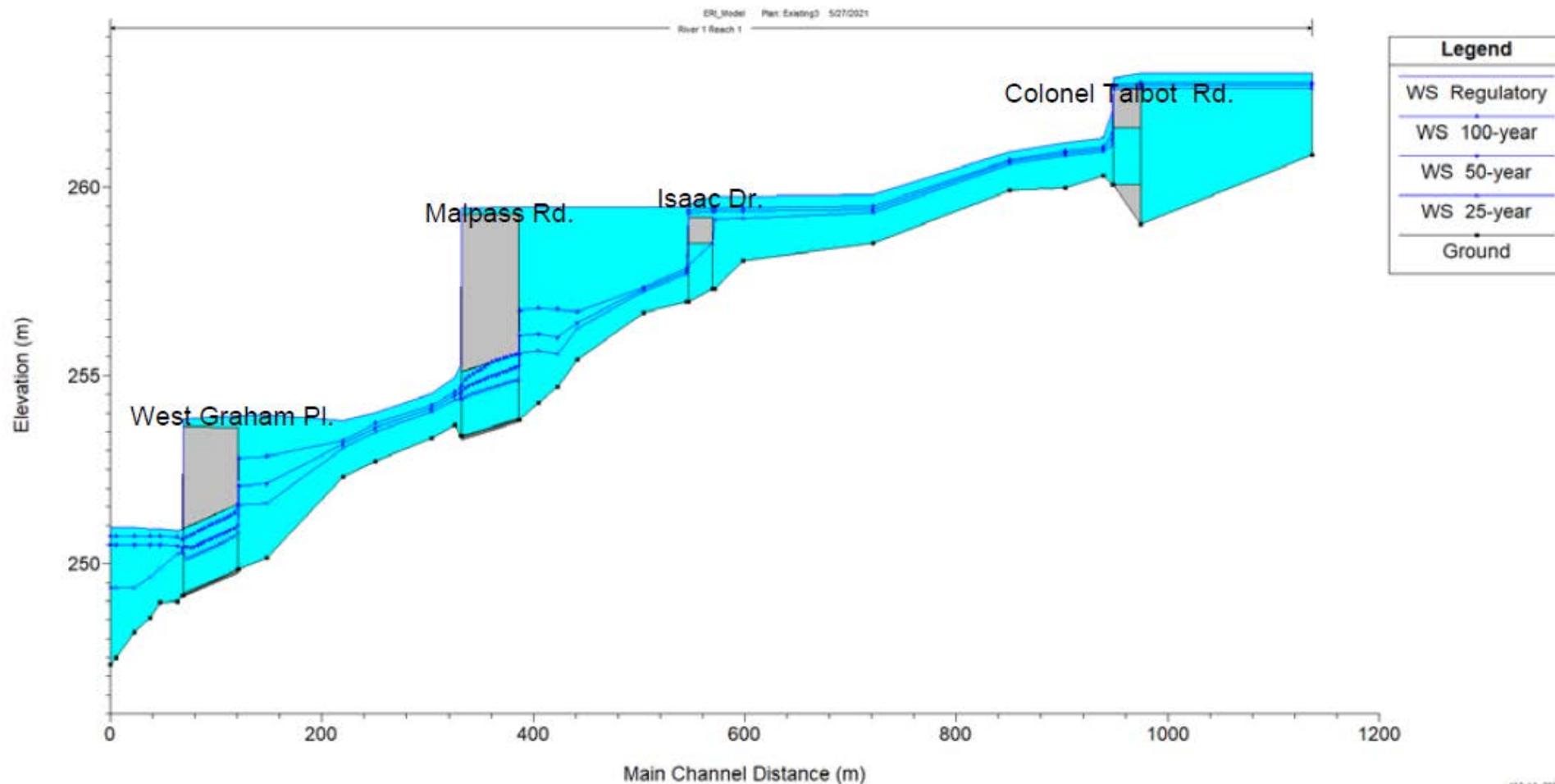


Tributary 12/Southwinds Channel

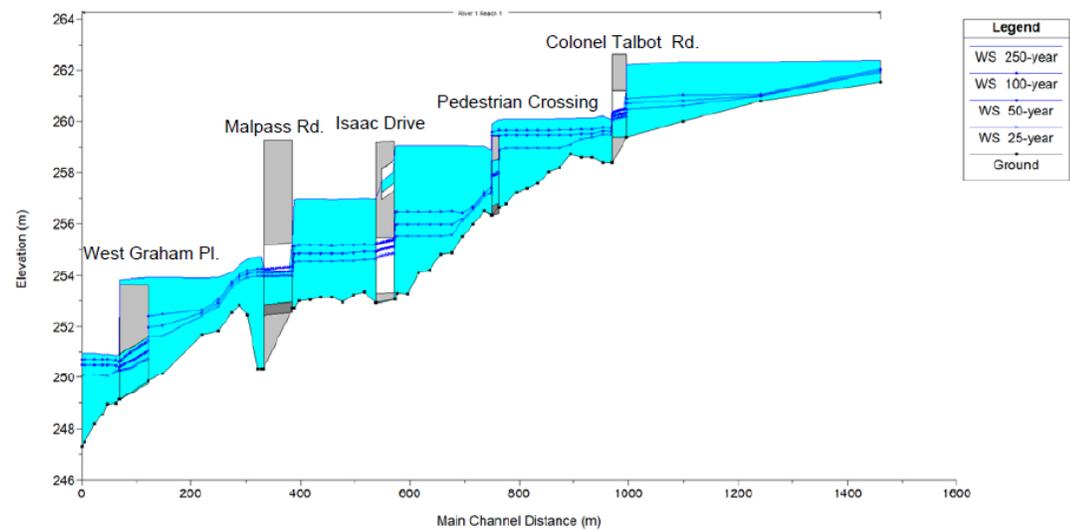
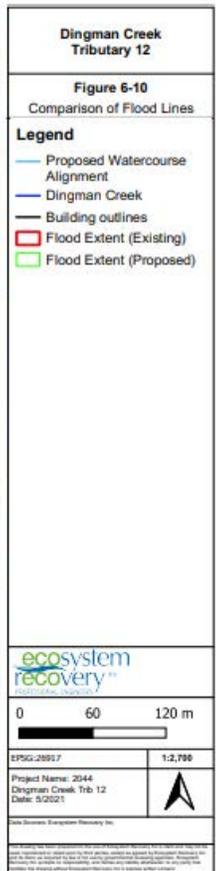




Existing Flood Conditions



Proposed Flood Conditions



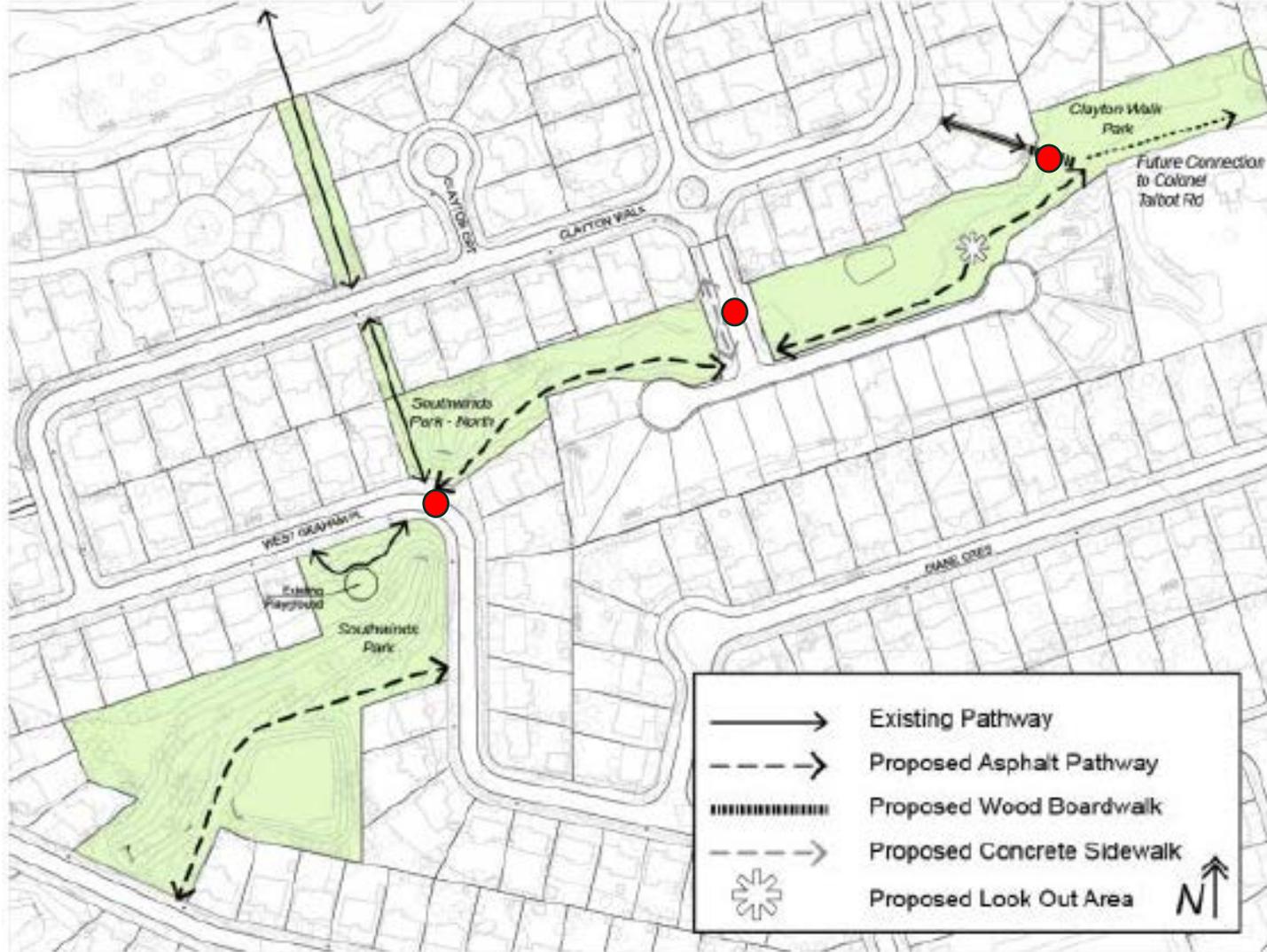


Proposed Flood Conditions (Cont.)

Crossing	Existing Culvert	Proposed Culvert	Utilities	Drop in Invert
Colonel Talbot Road	1.75 m x 1.5 m box	Twin 2.4 m x 1.8 m box (future work by others)	150 mm sanitary pipe 600 mm watermain	0.7 m
Pedestrian Crossing	-	2.1 m x 1.8 m box		-
Isaac Drive	1.8 x 0.9 m box 1.8 x 1.25 m box	2.1 m circular	200 mm sanitary pipe 200 mm watermain	3.7 m
Malpass Road	2.6 x 1.9 m arch	2.7 m x 3.0 m box	200 mm watermain	1.0 m
West Graham Place	2.6 x 1.9 m arch	-	200 mm sanitary pipe.	-



Multiuse Pathway Integration



LONDON BIKES

City of London
Cycling Master Plan

Final Executive Summary | September 2016

London CANADA | MMM GROUP

Site Constraints and Considerations

- Spatial
 - Horizontal
 - Vertical
- Geotechnical
 - Groundwater
- Ecology (EIS)
 - Fish passage for small bodied fish
 - Wetland pools
 - Amphibian, reptile, birds





Engineered Design Elements

- Side slopes
 - Armourstone wall
 - Rocky slopes
- Plunge pool
- Watermain support
- Pedestrian
 - Crossing
 - Trail



Permits

- Permits:

- UTRCA

- O. Reg 162/06
- Section 28

- MECP

- Environmental Activity Sector
Registration (EASR)

- DFO

- Request for Review
- Letter of Advice

- Construction:

- In-water work: July 1 – March 31
- Migratory birds: Sept. 30 – March 31
- Began: October 2021
- Completed: September 2022



Natural Channel Design Elements

- Two Design Reaches

- Single Channel (0.2%)
- Bifurcated channel (1.6%)

- Instream features

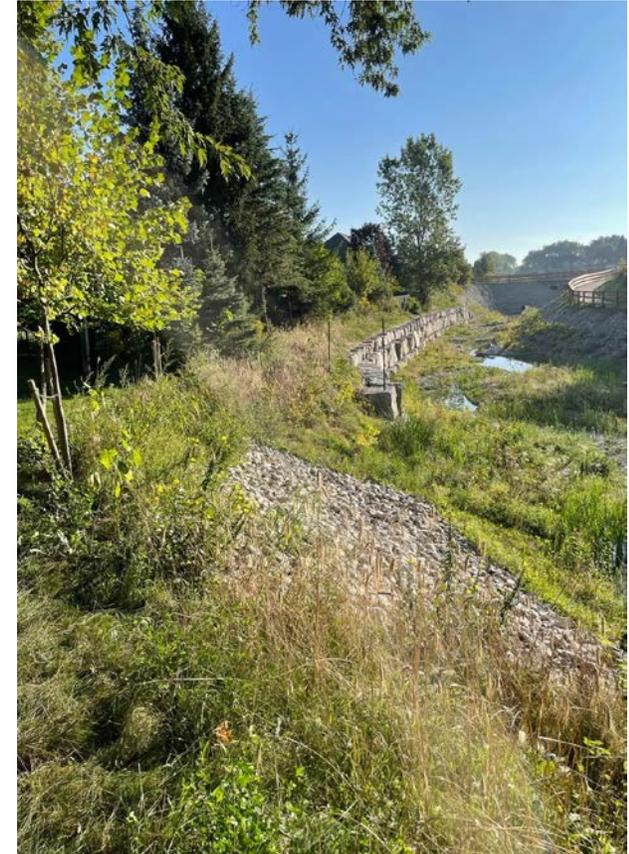
- Riffle logs
- Rootwads
- Pools
- Riffles





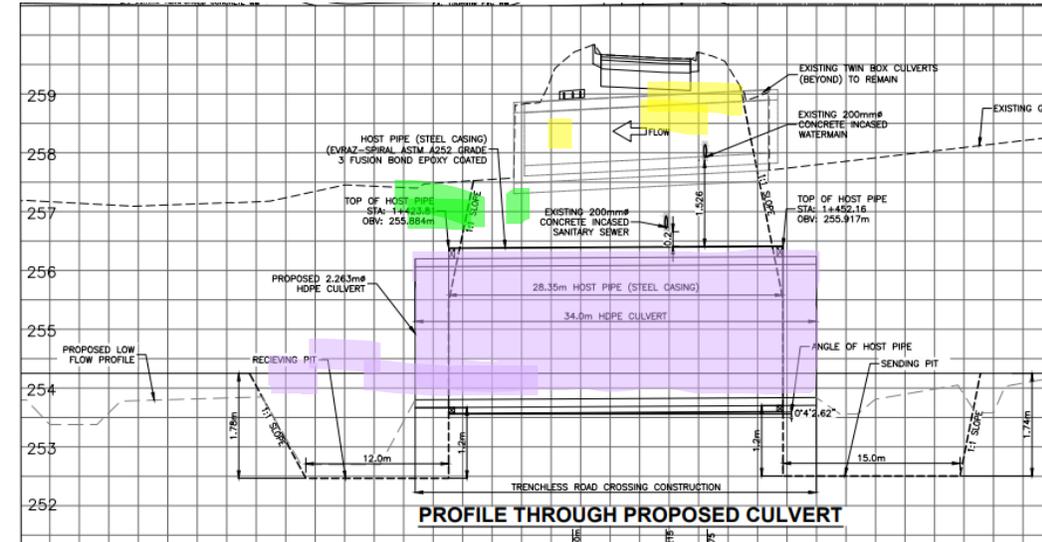
River Corridor Restoration

- Corridor features
 - Pocket wetlands
 - Snake hibernaculum
 - Vegetation
 - Brush layers and rootwads



Construction Challenges

- Isaac Drive Culvert
 - Single road access to private condo site
 - Utilities (storm, sanitary) under road
 - Variable stratigraphy
 - Silt till
 - Sand (saturated)
 - Groundwater
- Impact
 - Longer days
 - Construction delay
 - Redesign of outlet pool





Construction Challenges

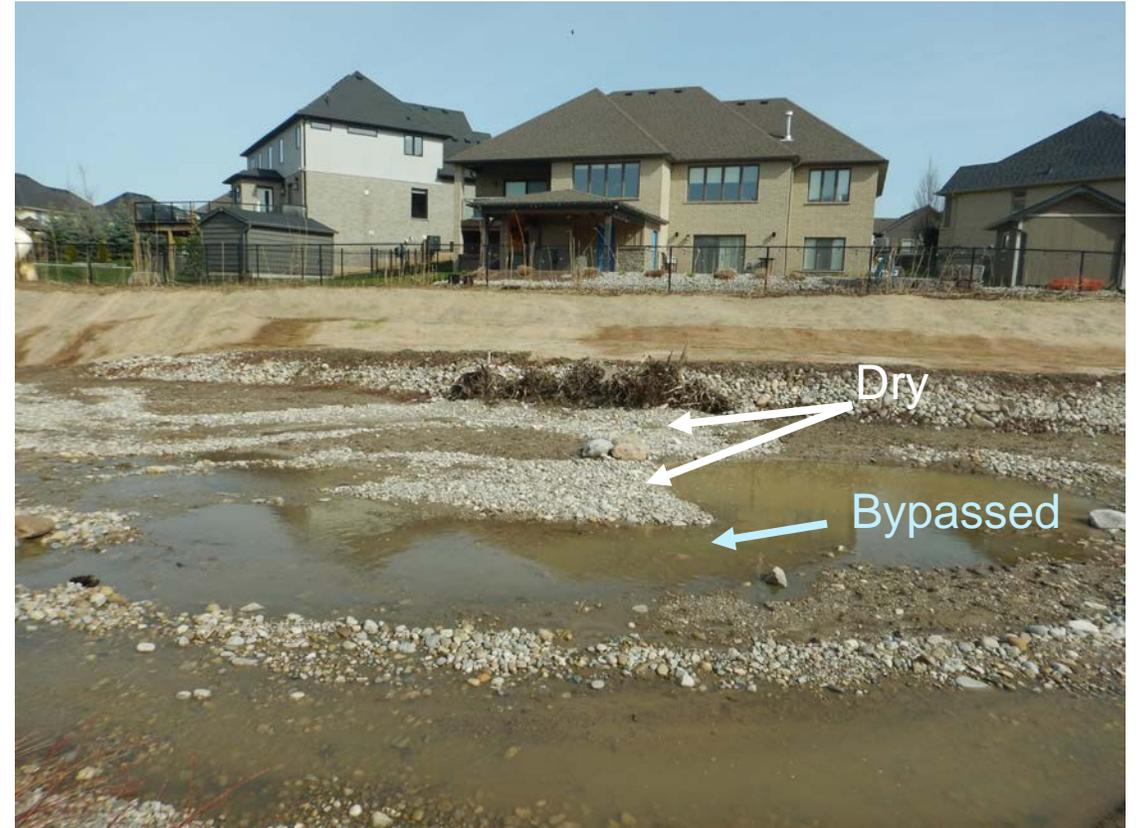
- Freeze-thaw
 - Dewatering pumps/hoses
 - Surface water ponding
 - Ground heave/settling
- Erosion and sediment control (turbidity)
- Public perception





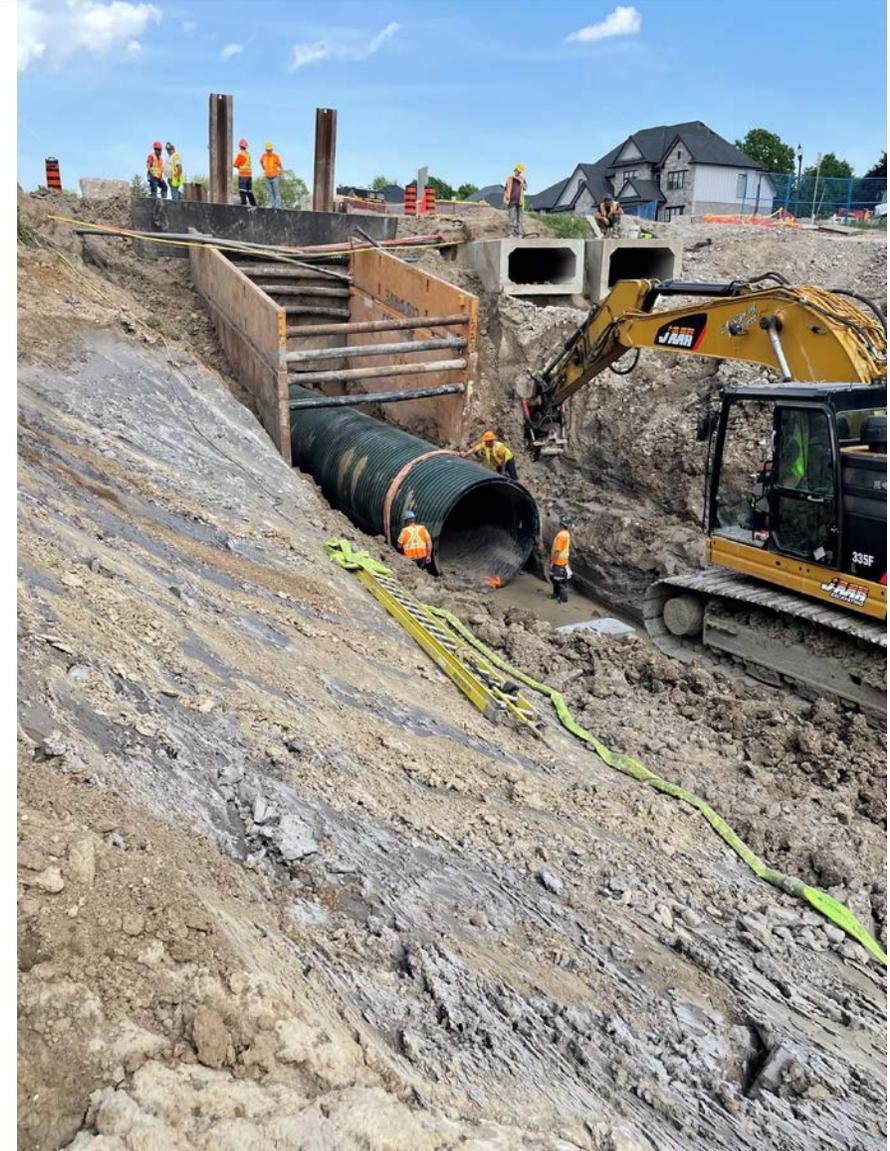
Construction Challenges

- Bifurcated channel
- Groundwater seeps on slopes



Future Considerations

- Impetus was uncontrolled regulatory flow
 - Leads to oversized channel
 - Consider risk-based approach
 - Consider level of service
 - Cost-benefit
- Environmental impact
 - Climate change resilience
 - Groundwater seepage
 - Groundwater infiltration
 - Narrower creek corridor
 - Downstream impacts





London
CANADA

Then and Now

Downstream of
Colonel Talbot Road



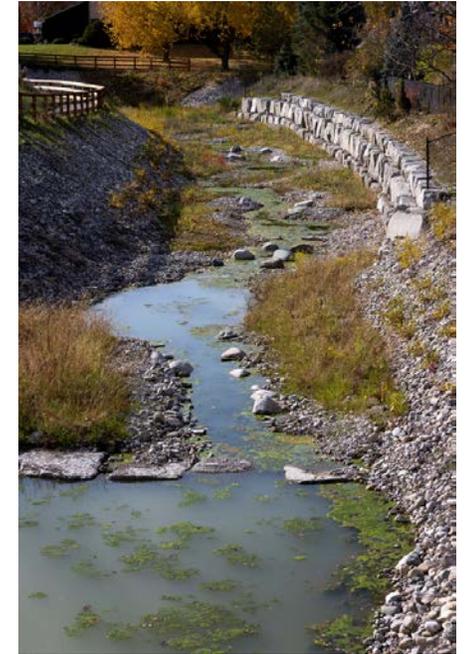
Upstream of
Isaac Drive/
Ped bridge





Then and Now (Cont.)

Upstream of
Malpass Road



Downstream of
Malpass Road



Thank You





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