Restoration of a Confined Urban System – Funding and Design

Natural Channels Conference

Guelph, Ontario

May 25, 2018

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Outline

1. Project Background
2. Project Design
3. Project Funding

Project Background

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Project Background

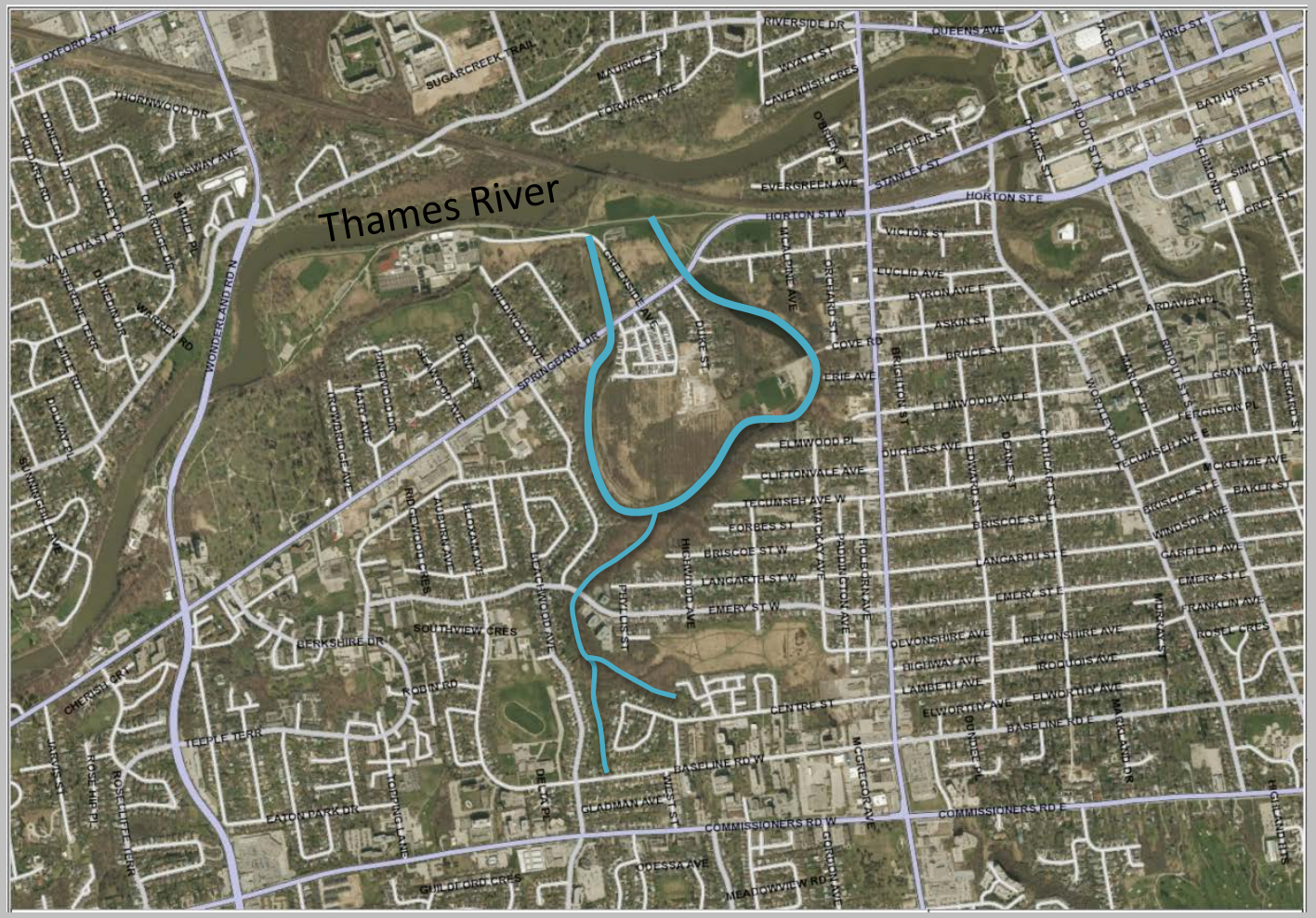
Players

- Friends of the Coves Subwatershed Inc. (FOTCSI)
- City of London
- Stantec

Project Background

The Site

- Thames River Watershed
- City of London
- The Coves Environmentally Significant Area
- Silver Creek



Map Source: Thames-Sydenham & Region Source Protection

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Project Background

- Coves ESA Conservation Master Plan, 2014
- Coves Subwatershed Study Final Report, 2000
- Reports recommend restoration to protect and enhance the habitat in the Coves ESA

- Friends of the Coves received an Ontario Trillium Foundation grant for Silver Creek Restoration Design
- City of London funded 1/3 of overall design cost

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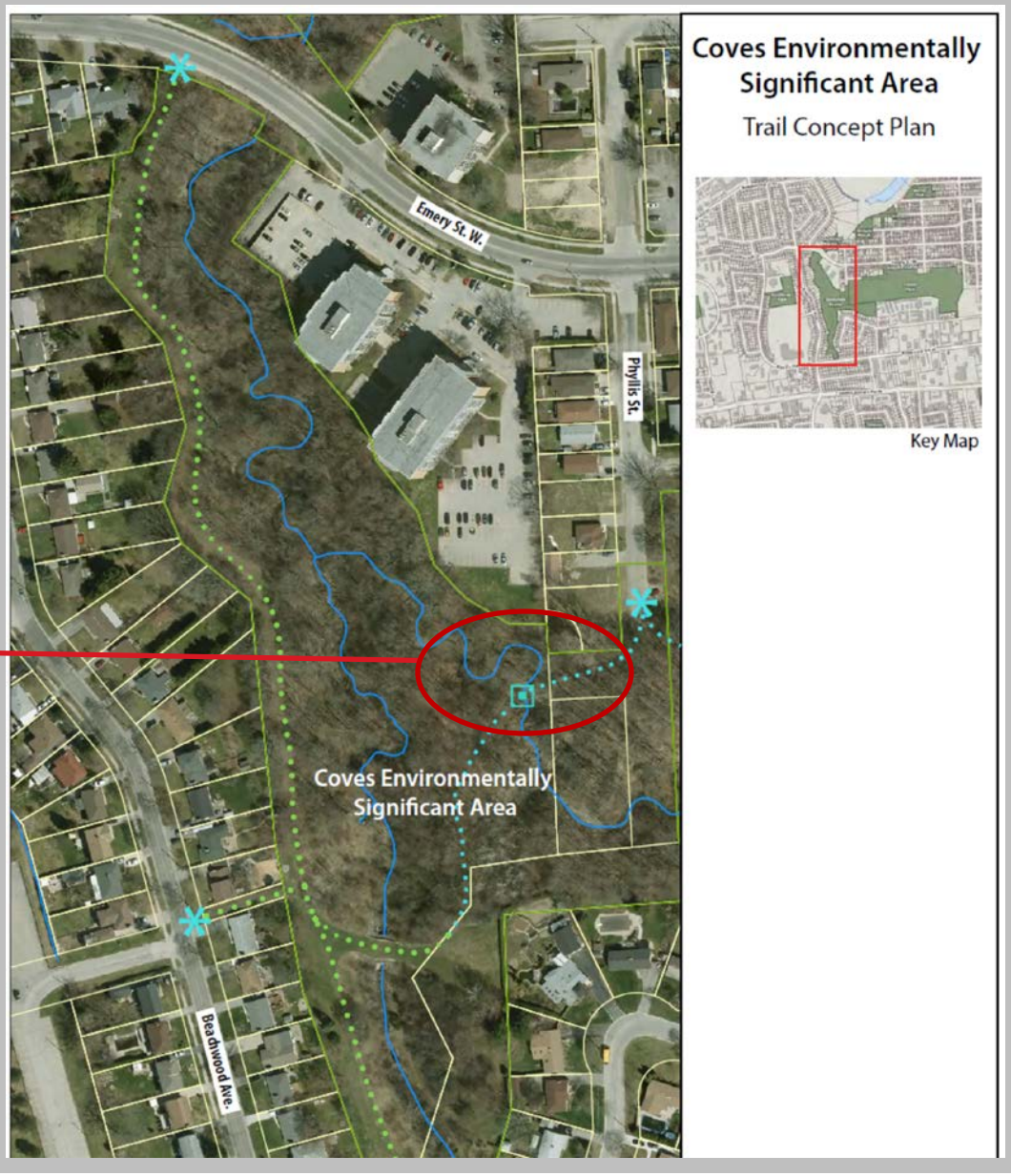
Project Background

Coves ESA

Trail Concept Plan

Stream Channel Restoration will allow for pedestrian bridge and trail implementation



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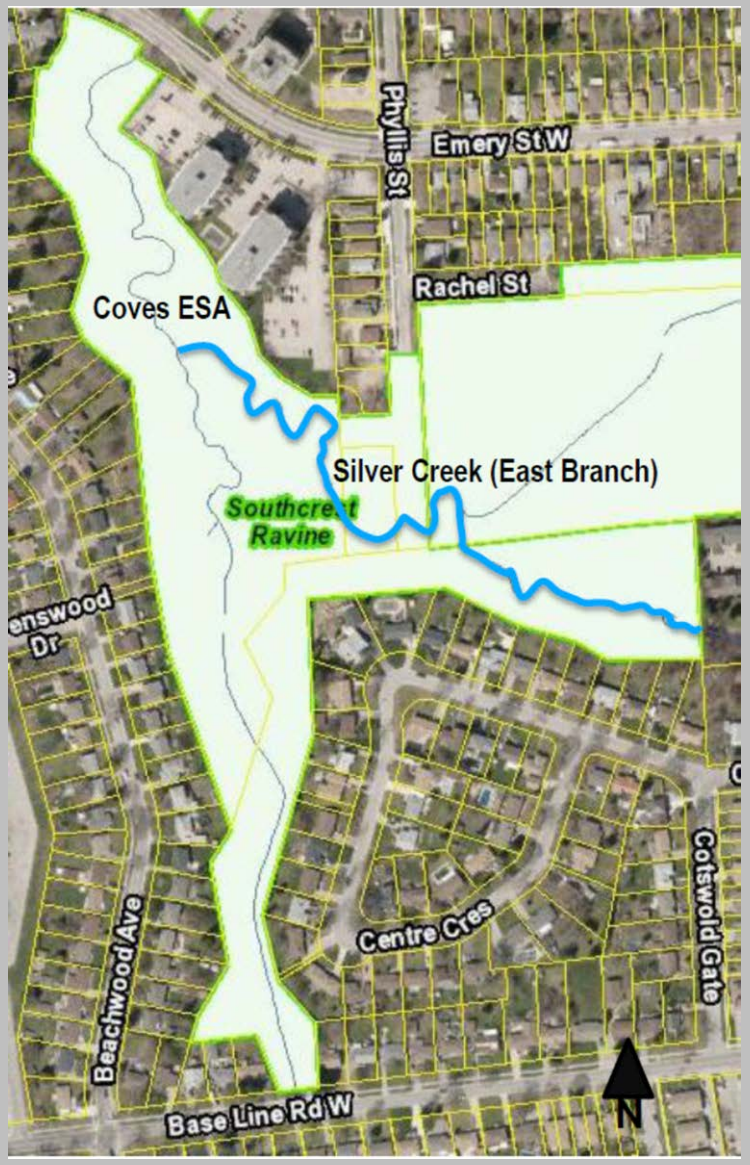

The **East Branch** was selected as the Restoration Reach:

- Contains highest and least vegetated banks, many erosional features, barriers to flow, long jams and woody debris.
- Includes pedestrian bridge location identified in Coves ESA Conservation Master Plan.

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Project Design

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Project Design

Design Goals and Criteria

- Channel stability for water quality and habitat
- Plantings for riparian habitat at 2:1 replacement ratio for trees
- Establish appropriate, stable location for pedestrian bridge
- Enhance riparian habitat
- Create suitable habitat for a warm water fishery

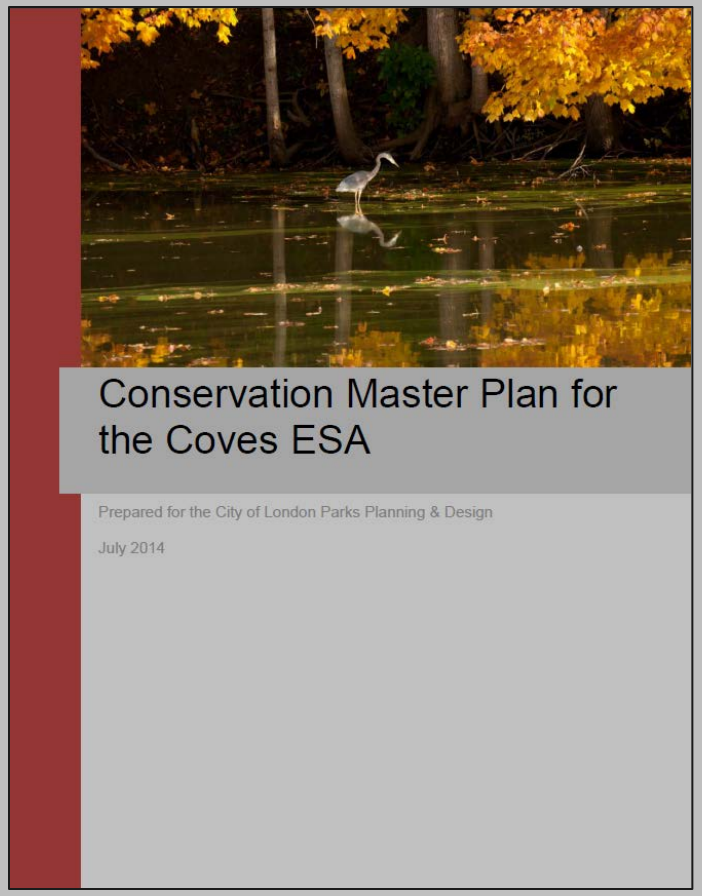
Project Design

Background Data and Desktop Review of Previous Studies:

- Council approved Coves ESA Conservation Master Plan, 2014
- Council approved Coves Subwatershed Plan, 2004
- Archaeological Assessments, 2016, 2017

Existing Conditions Review

- Land Use, Geology, Drainage
- Geomorphic Assessment and Topography
- Tree Inventory and Tree Preservation Report
- Aquatic Habitat and Species at Risk Screening



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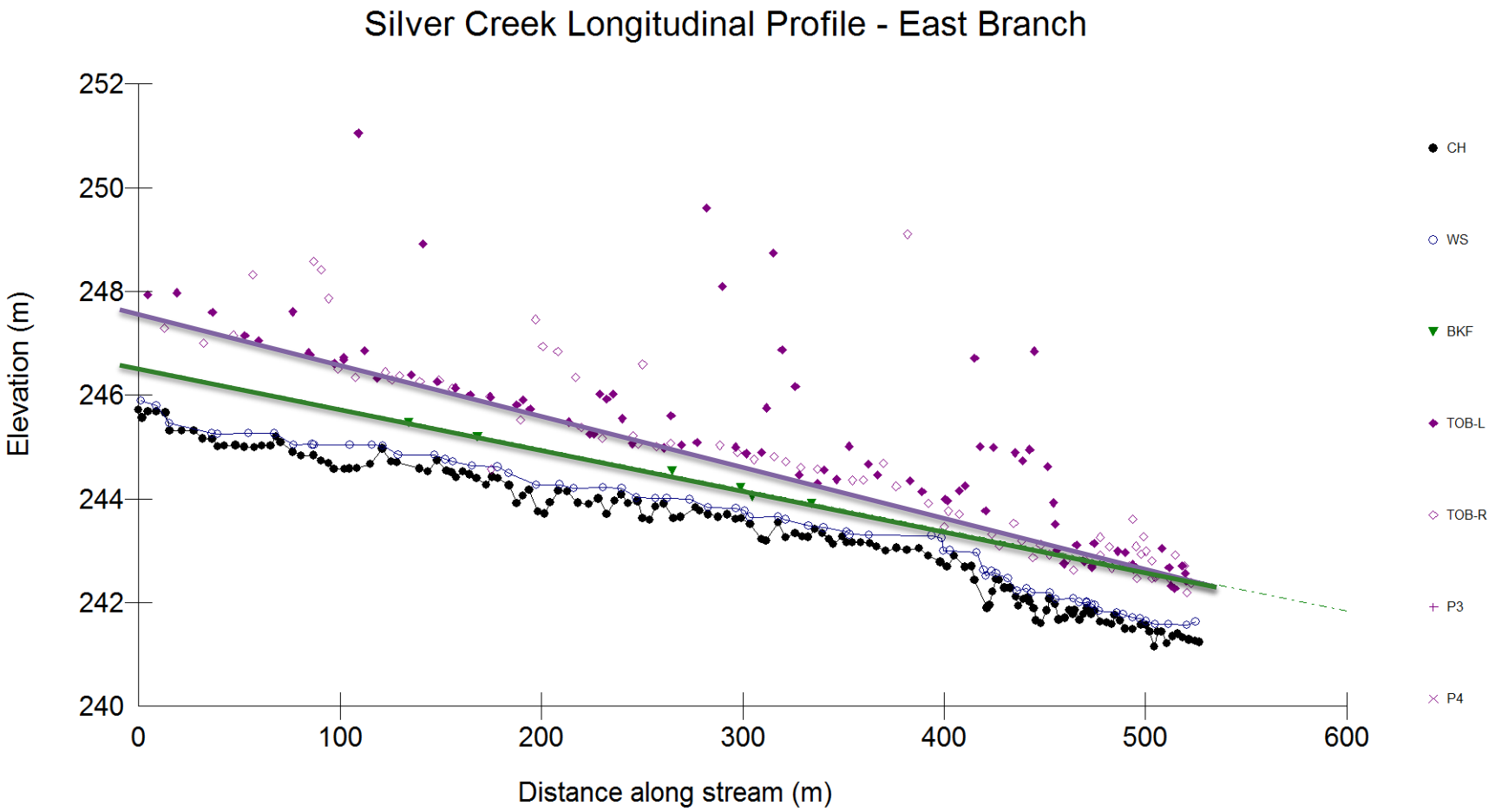
Project Design



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Bank Erosion Hazard Index – BEHI

- Bank height ratio
- Root depth / Bank height
- Root density
- Bank Angle
- Surface Protection
- Bank materials / stratification

Stream:	Silver Creek	Location:	East Branch
Station:	Bank L-31	Observers:	T. Chandler
Date:	Apr 12, 2017	Stream Type: F4	Valley Type: VIII

						BEHI Score (Fig. 3-7)
Study Bank Height / Bankfull Height (C)						
Study Bank Height (m) =	2 (A)	Bankfull Height (m) =	0.5 (B)	(A) / (B) =	4.0 (C)	10.0
Root Depth / Study Bank Height (E)						
Root Depth (m) =	0.3 (D)	Study Bank Height (m) =	2 (A)	(D) / (A) =	0.2 (E)	7.0
Weighted Root Density (G)						
		Root Density as % =	20% (F)	(F) × (E) =	0.03 (G)	9.5
Bank Angle (H)						
				Bank Angle as *Degrees* =	75 (H)	5.5
Surface Protection (I)						
				Surface Protection as % =	10% (I)	9.0

Bank Material Adjustment:		
Bedrock (Overall Very Low BEHI) **Boulders** (Overall Low BEHI) **Cobble** (Subtract 10 points if uniform medium to large cobble) **Gravel or Composite Matrix** (Add 5–10 points depending on percentage of bank material that is composed of sand) **Sand** (Add 10 points) **Silt/Clay** (no adjustment)	**Bank Material Adjustment**	0
	Stratification Adjustment Add 5–10 points, depending on position of unstable layers in relation to bankfull stage	0

Very Low	Low	Moderate	High	Very High	Extreme		
5 – 9.5	10 – 19.5	20 – 29.5	30 – 39.5	40 – 45	46 – 50	**Adjective Rating and Total Score**	**Very High** 41.0

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Near Bank Shear Stress- NBS

- NBS based on proximity of thalweg to the bank – the closer the thalweg the higher the near bank shear stress
- Use graph to determine bank erosion rate

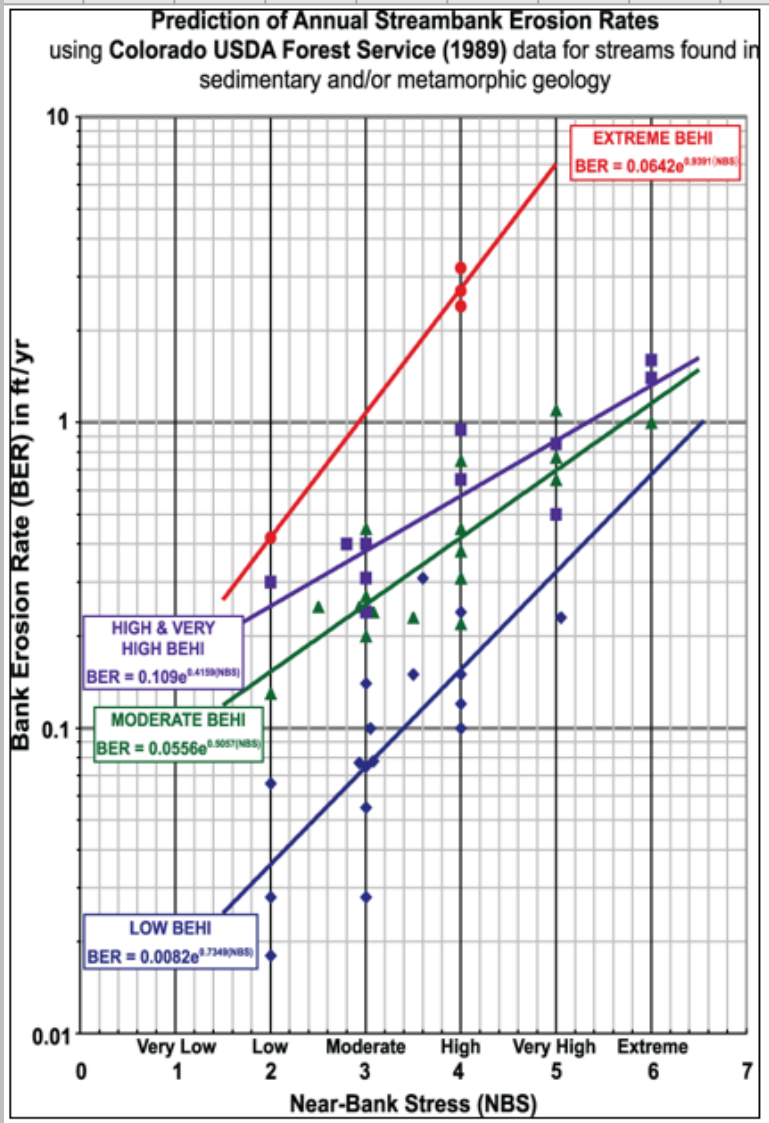

Figure 3-9. Relationship of BEHI and NBS to predict annual streambank erosion rates from Colorado data (1989) for streams found in sedimentary and/or

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Legend
- VERY LOW (BEHI)
- LOW (BEHI)
- MODERATE (BEHI)
- MODERATE HIGH (BEHI)
- HIGH (BEHI)
- VERY HIGH (BEHI)
- EXTREME (BEHI)

Notes

1:1000 0 10 30 50m

Client/Project
CITY OF LONDON
SILVER CREEK

Figure No.
FIG 3

Title
BANK EROSION HAZARD INDEX

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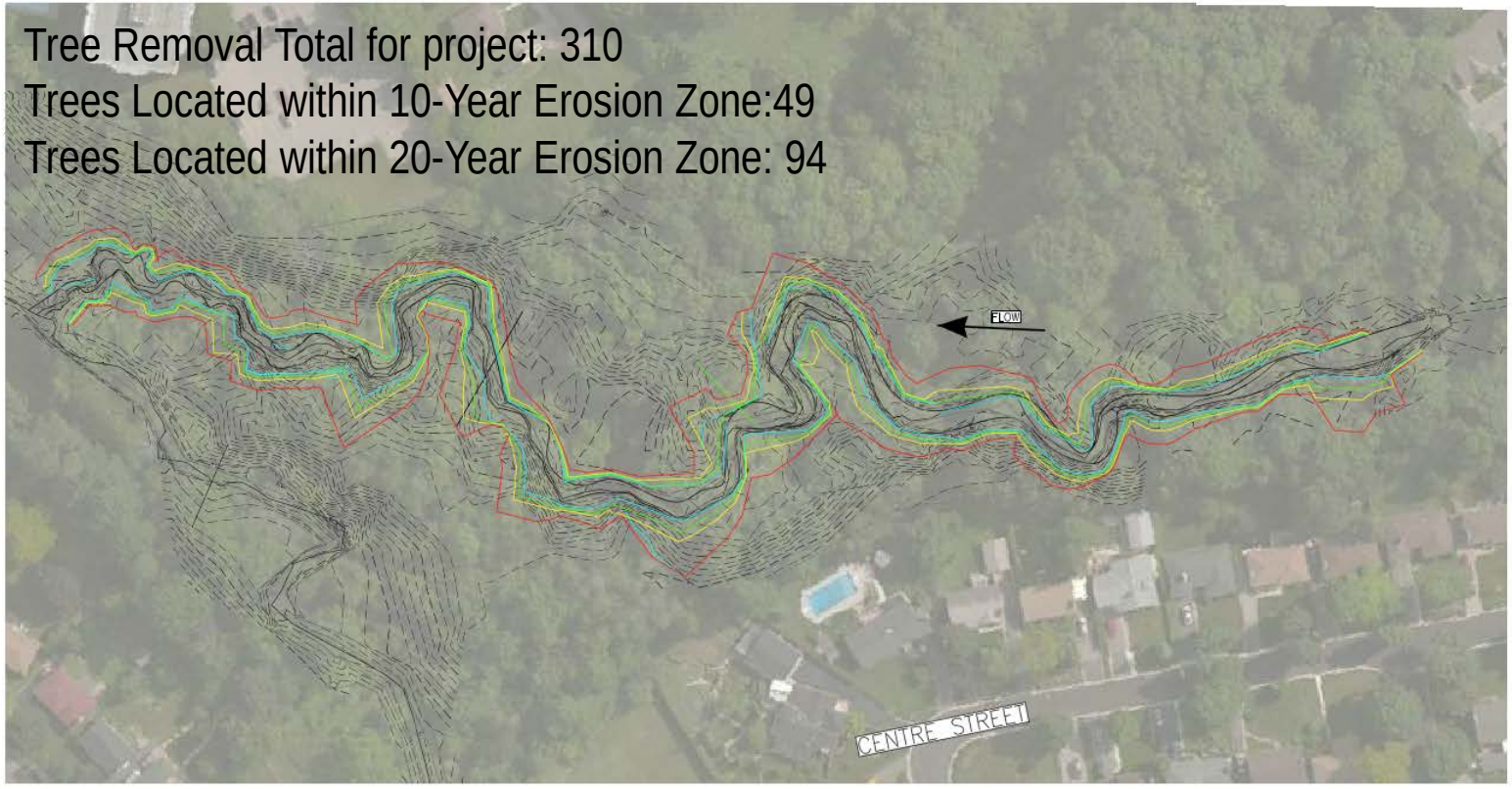

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ORIGINAL SHEET ANSI B

July, 2017
161413470

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Legend

- 50 YEAR TOP OF BANK
- 20 YEAR TOP OF BANK
- 10 YEAR TOP OF BANK
- EX TOP OF BANK

Notes

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Figure No.
FIG 4

Title
FUTURE TOP OF BANK

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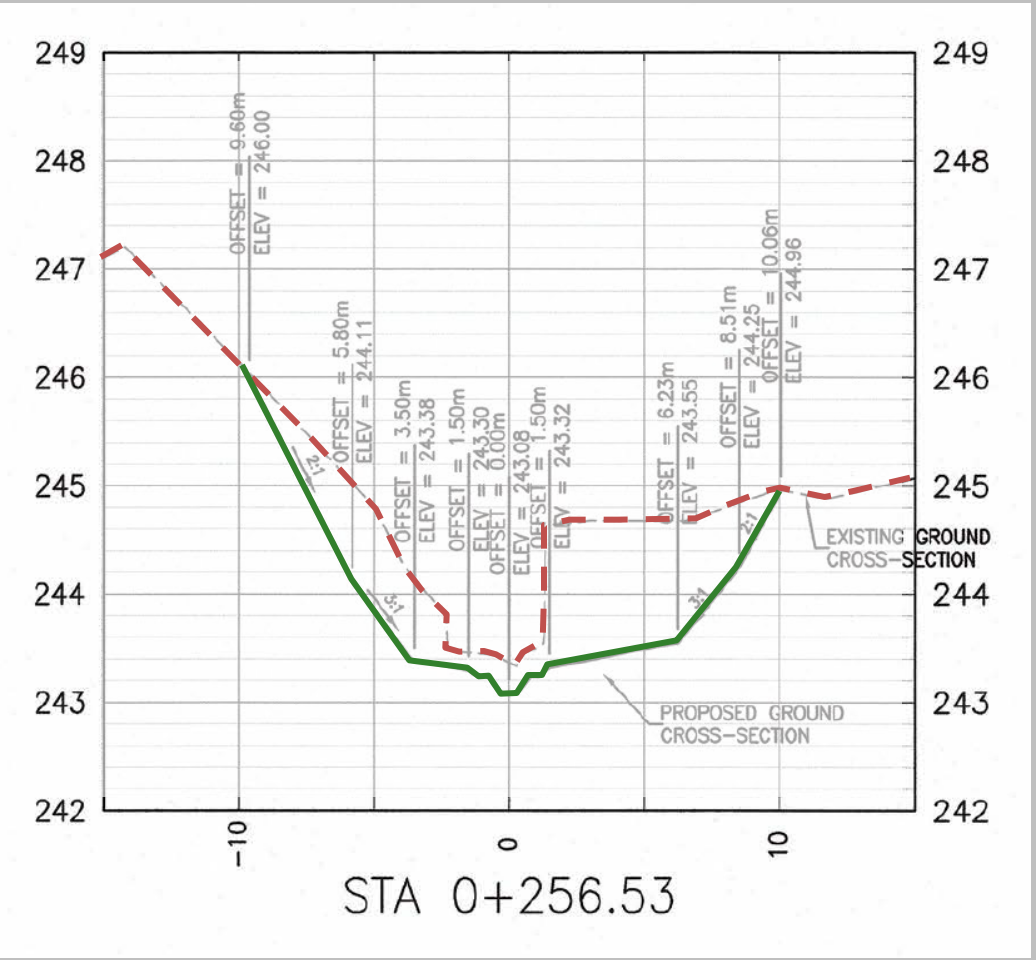
Cross-Section Design

- Create bankfull channel
- Create inner berm
- Add a floodplain

- Check Flows:
  - Bankfull: 0.5 m^3/s
  - 100-year: 16.7 m^3/s



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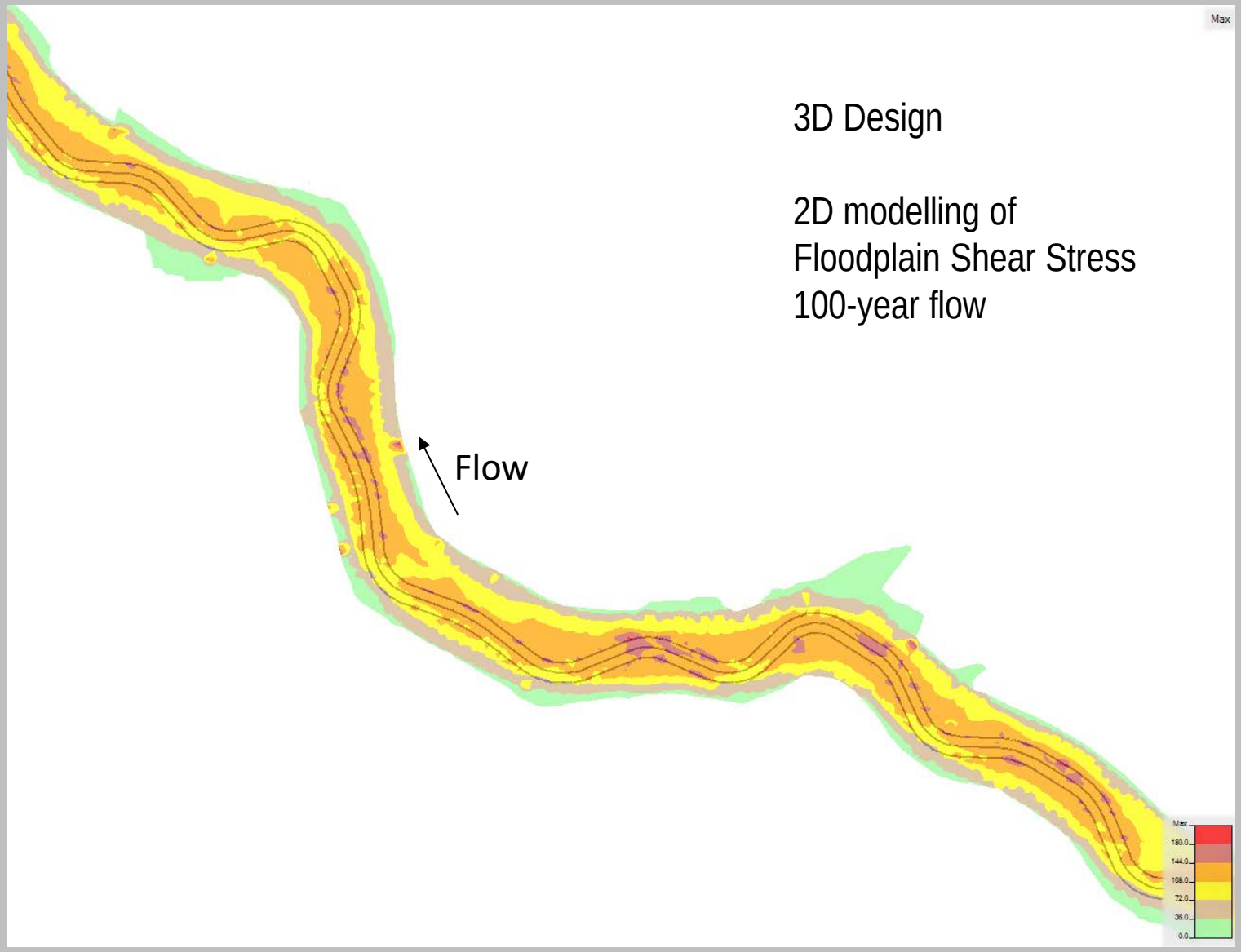

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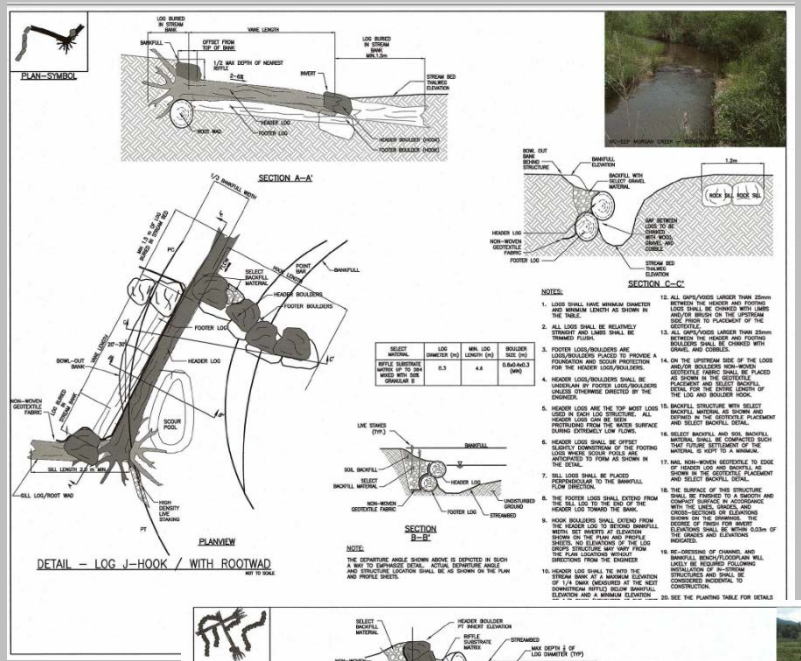

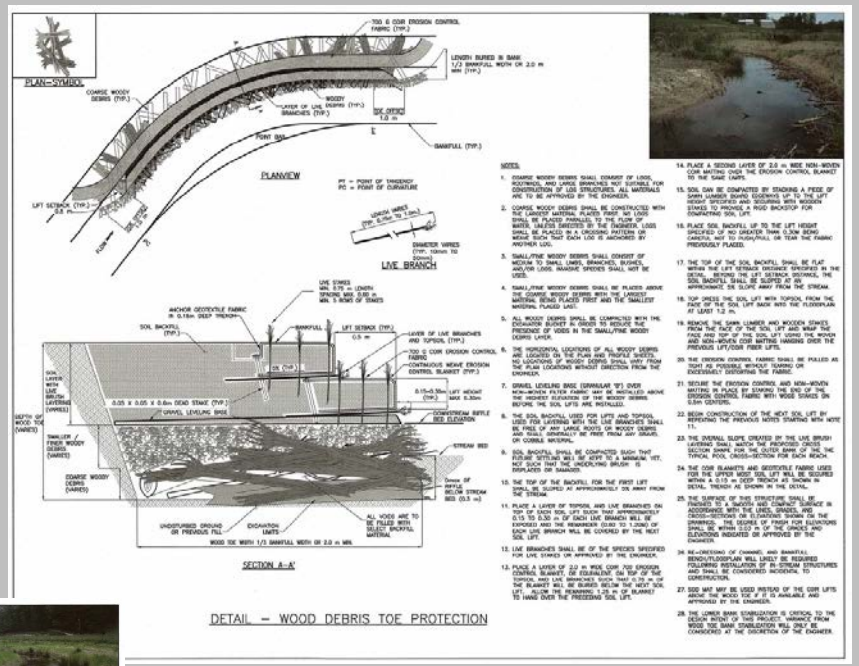

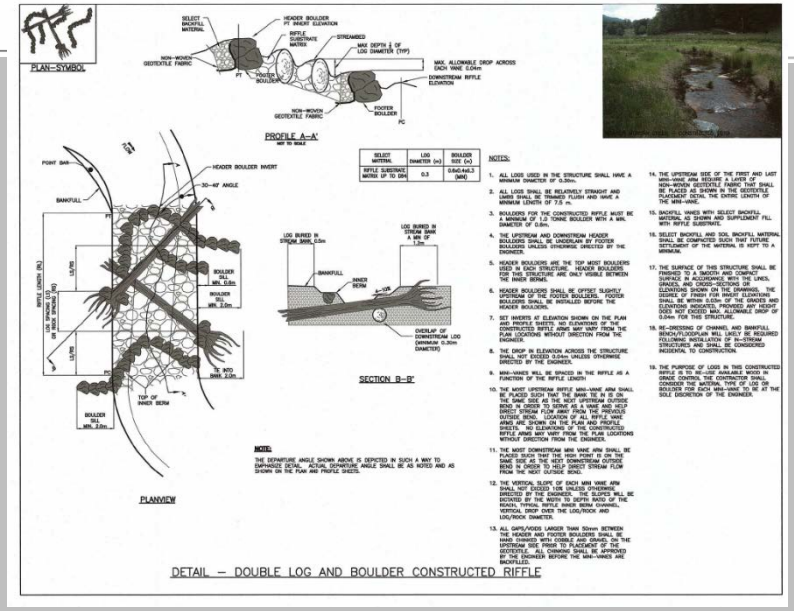

Instream and bank structures for fish habitat and stability

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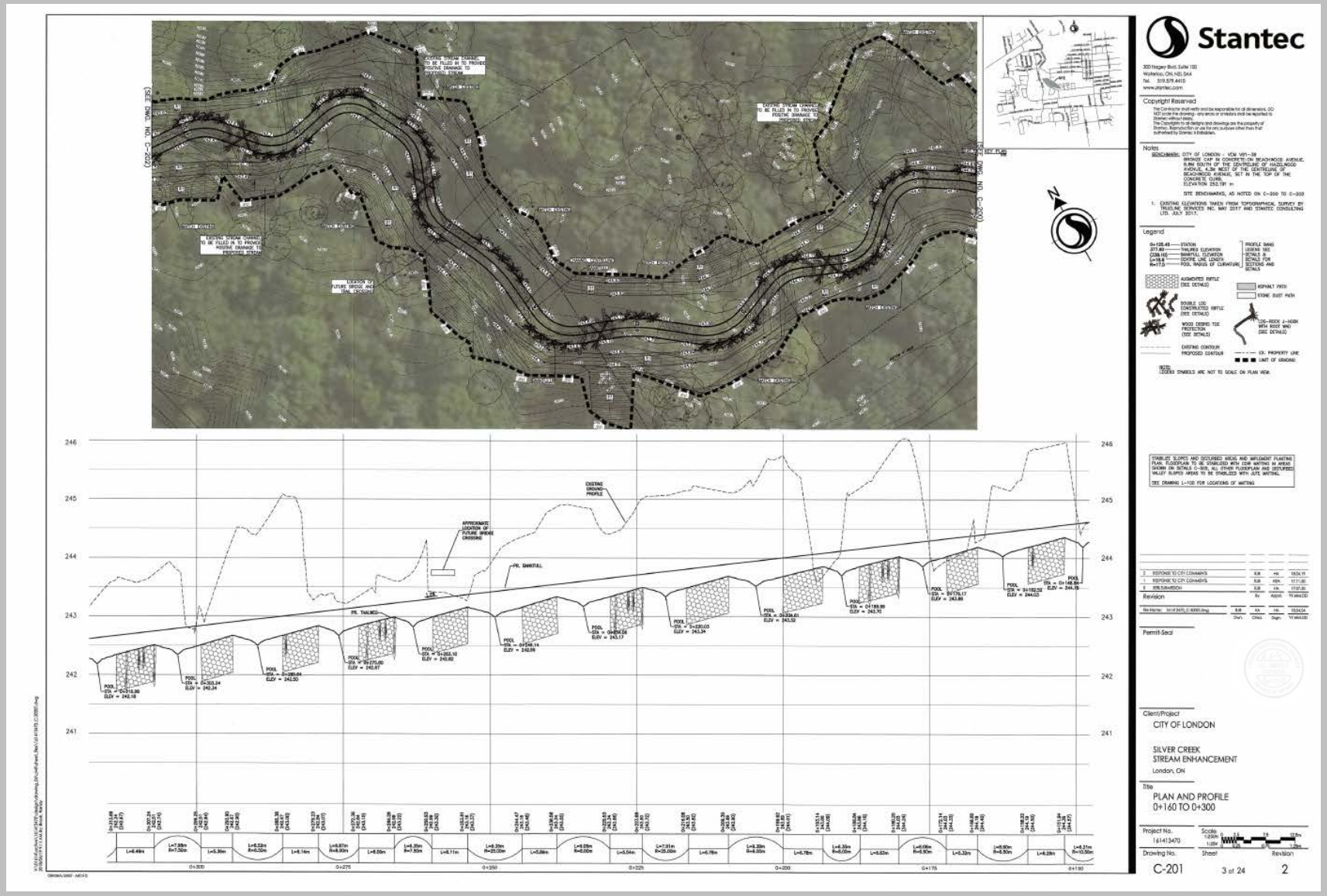
Project Design



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Project Design

Construction

- Mitigation measures to avoid disturbance to sensitive species
- Monitoring and, Erosion & Sediment Control

Post Construction Monitoring

- Channel stability, riparian vegetation, fish habitat (3 years)
- Site may be added to City of London's Fish Habitat Bank

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Project Funding

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Project Funding

Step 1: Apply for lots of grants

Step 2: Win lots of grants

Step 3: Collaborate

- Having Council approved Subwatershed Studies, Conservation Master Plans and/or Urban Waterways Studies all identifying need and benefits of stream channel restoration work makes applications stronger

Project Funding

- Design funding is typically harder to obtain
- Many funding sources prefer to fund designed, shovel ready projects

Design and other Community Led Funding

Friends of the Coves Subwatershed Inc. (FOTCSI) Fundraising

Year	Funding Source	Amount	Purpose
2000	Ontario Trillium Foundation	$150,000	Coves SWS Report
2003	Ontario Trillium Foundation	$100,000	Exec Director
2005	Eco Canada	$50,000	Program – education
2006	Ontario Trillium Foundation	$100,000	sustainabliity
2008	London Community Foundation	$70,000	Aquatic rehabilitation
2009	London Community Foundation	$17,000	Flora restoration
2010	Eco Canada	$50,000	Program Education
2011	Fed Gov't Summer student program	$30,000	Fundraising- enviro program
2012	City of London	$214,000	Land acquisition
2012	City of London	$10,000	Program-education-Film CFTC
2016	Ontario Trillium Foundation	$150,000	Trail implementation
2016	Fed Dev 150	$45,000	Trail implementation
2016	London Community Foundation	$17,000	Flora restoration
2016	Ontario Trillium Foundation	$69,000	Flora restoration
	TOTAL	$1,072,000	

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Silver Creek – Restoration Design Project Funding

- Friends of the Coves Subwatershed Inc. (FOTCSI) received an Ontario Trillium Foundation grant of $69,500 for the Silver Creek (East Branch), Natural Channel Design in the Coves ESA.

- City of London contributed $40,000 in funding as it is an ecological restoration project on City property recommended in the both the Council Approved Coves ESA Conservation Master Plan, and, the Coves Subwatershed Study Final Report in order to protect and enhance the habitat in the Coves ESA.

Seven local groups share $350,000 Trillium gift

BY RANDY RICHMOND

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- **$69,500:** Friends of the Coves watershed rehabilitation

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Silver Creek Restoration Design Implementation Funding

- **Clean Water and Wastewater Fund** (CWWF) is a potential source for funding the Silver Creek Restoration Design implementation – City of London received CWWF funding for an "**Urban Waterways Study**" that identified priority waterways for restoration (including Silver Creek)
- **Environmental Damages Fund** FOTCSI submitted an application to through this program for implementing the design - but were not selected for funding in 2017.
- **Ontario Trillium Foundation** is another potential funding source.

Thank You

Questions?

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