



East Morrison Creek Erosion Mitigation Study

Welcome to the June 11, 2025
Public Information Center for the
East Morrison Creek Erosion Mitigation Study
Municipal Class Environmental Assessment
Schedule B

For additional information, please contact one of the
study team members:

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Land Acknowledgement

Honouring the Land and Territory

- Oakville, as we know it today, is rich in the history and modern traditions of many First Nations. From the lands of the Anishinaabe, to the Attawandaron and Haudenosaunee, these lands surrounding the Great Lakes are steeped in First Nations history. As we gather today on the sacred lands of Treaties 14 and 22, we are in solidarity with Indigenous brothers and sisters to honour and respect Mother Earth, the original nations of the trees and plants, the four legged, the flyers, the finned and the crawlers as the original stewards of Mother Earth. We acknowledge and give gratitude to the waters as being life and being sacred and to the carriers of those water teachings, the females. We acknowledge and give gratitude for the wisdom of the Grandfathers and the four winds that carry the spirits of our ancestors that walked this land before us.
- The Town of Oakville is located on the Treaty Lands and Territory of the Mississaugas of the Credit. We acknowledge and thank the Mississaugas of the Credit First Nation, the Treaty holders, for being stewards of this traditional territory.



Study Area/Background

Town of Oakville Erosion Studies

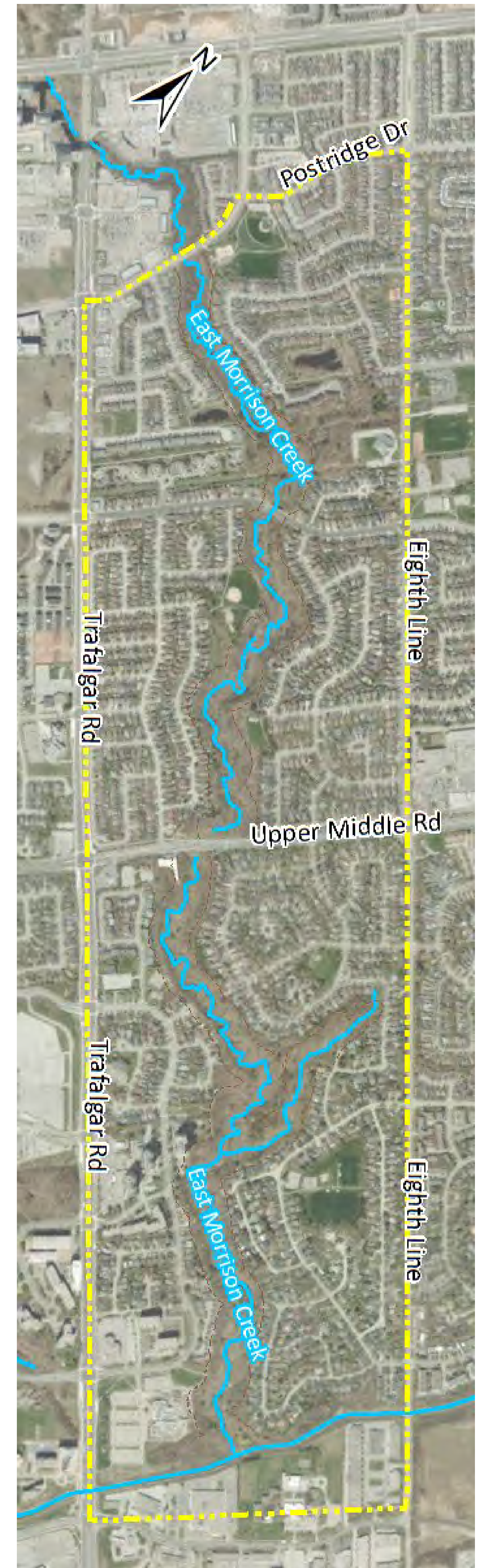
- Stream erosion is routinely assessed within the Town of Oakville and has been documented in a series of reports since 2001. Stream erosion is a natural process, but historic land use changes can result in accelerated rates of erosion that put infrastructure and property at risk when near the watercourse.
- The most recent Creek Inventory and Assessment Study was completed in 2021. This study identified East Morrison Creek, from the Morrison-Wedgewood Diversion Channel to Postridge Drive (Reaches 39-45), as the highest priority “long” reach of concern. The 2021 study recommended an Environmental Assessment (EA) to address erosion issues within these reaches. The current study fulfills this recommendation.

East Morrison Creek Erosion Mitigation EA Study

- The purpose of this study is to mitigate stream erosion risks and to identify stream restoration opportunities. Given the potential environmental impacts and public implications, this study will conform with the Municipal Class EA planning process (Schedule B) which includes public consultation. Schedule B projects include Phase 1 to identify the problems and Phase 2 to evaluate alternative solutions. This study focuses on creek erosion and is not related to flood mitigation.

Study Area Conditions

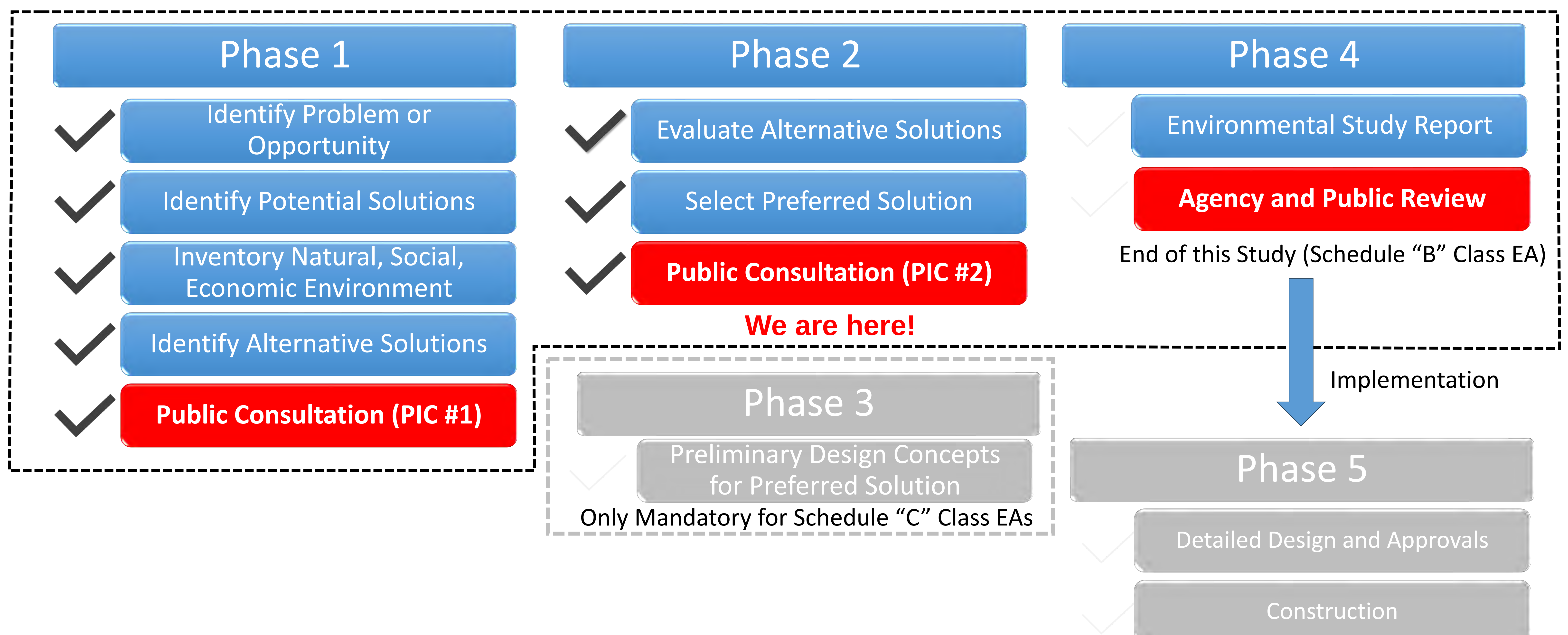
- The study area is situated from the Morrison-Wedgewood diversion channel located in the downstream lengths of the watershed to the upstream boundary along Postridge Drive. A pedestrian pathway is located through the Morrison Valley along East Morrison Creek. Through the study area, East Morrison Creek is generally characterized by active erosion, with local bank hardening measures including gabion baskets, armourstone and rip rap bank protection. In some locations, these channel engineering structures are failing.



Environmental Assessment Study Outline

- Through its ongoing erosion monitoring program, the Town of Oakville identified this reach of East Morrison Creek as a high priority site to review possible rehabilitation opportunities. Key concerns include bank erosion within the creek, bank and valley slope stability, failure of erosion control measures, and threats to private property and municipal infrastructure.
- The study will examine the creek and associated natural resources to identify existing erosion concerns, potential future risks, and opportunities for restoration and environmental enhancement. Through the Class EA process, multiple alternative solutions will be developed and evaluated by the Study Team and refined through public and agency consultation (see below) and including engagement with interested Indigenous Peoples. The Study Team will then select a Preferred Alternative. Detailed design and construction would be scheduled in the future through capital budget process. The Town will work with Conservation Halton to obtain permits for detailed design and construction of erosion mitigation measures as necessary
- This study is being completed under Schedule “B” of the Municipal Class EA process. This portion of the study specifically addresses Phases 1 & 2 of the EA Process.

Class EA Process:



Indigenous Engagement and Archeology

Indigenous Engagement

There are legal duties to consult with Indigenous Peoples. The project study area is located in treaty 13a, 1805 Mississaugas, within the traditional territory and claim of the Mississaugas of the Credit, and within the 1701 Nanfan Deed. As such, consultation is required with:

- Mississaugas of the New Credit First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council
- Métis Nations of Ontario

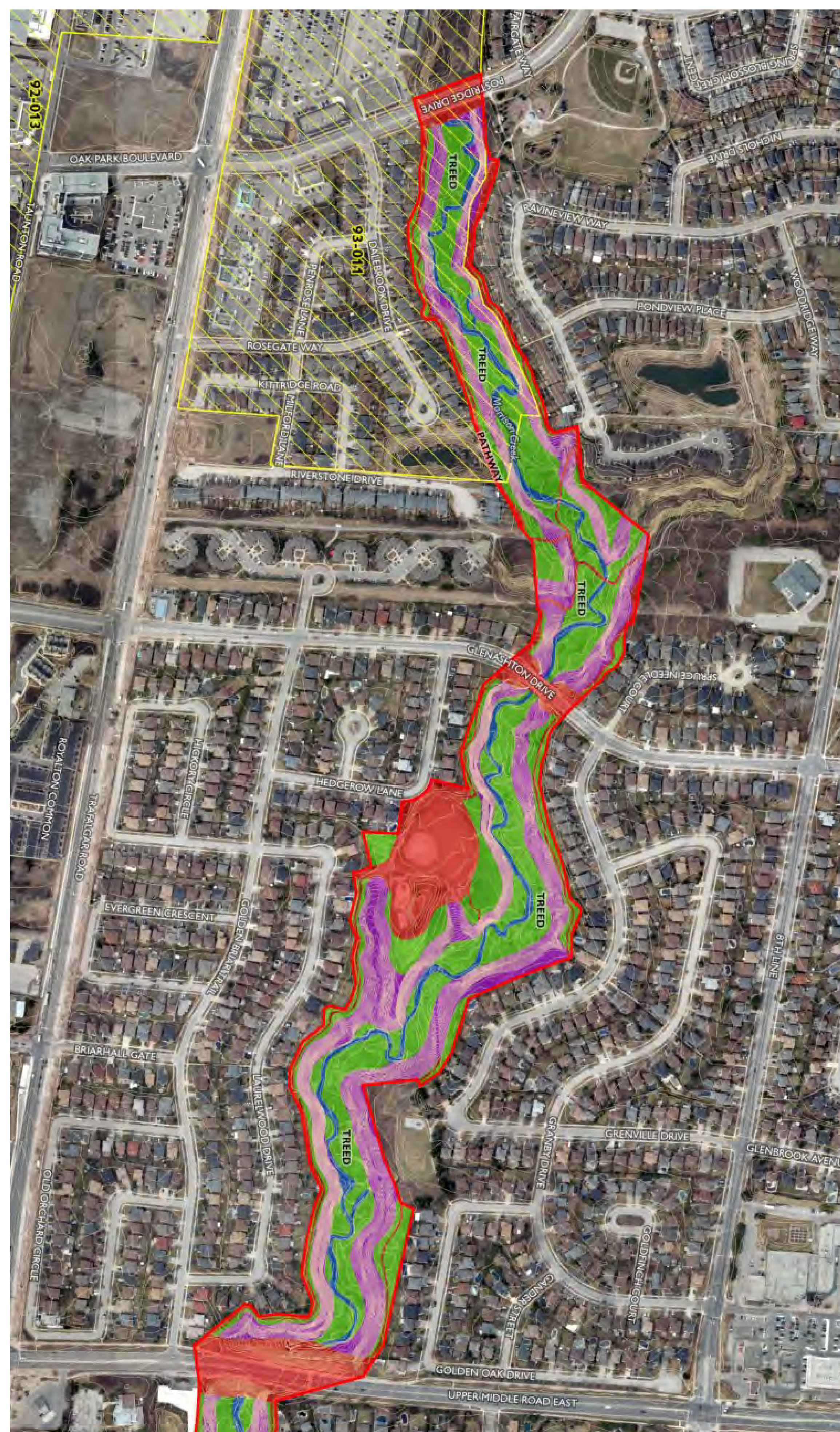
With the distribution of the initial Notice of Commencement for the project, interested Indigenous Peoples will be invited to review and comment on draft EA and archeological reports.

Archeological Assessment

A Stage I archeological assessment of the study area has been completed by TMHC Inc., included a review of current land use, historic and modern maps, registered archaeological sites and previous archaeological studies, past settlement history for the area, and a consideration of topographic and physiographic features, soils and drainage. Known, registered archeological sites are limited to the upstream study area near Postridge Drive, however most undisturbed grassed and treed areas surrounding East Morrison Creek have archaeological potential and would require Stage 2 test pits for areas likely to be impacted by future erosion mitigation works during detailed design.

STAGE 1 RESULTS & RECOMMENDATIONS

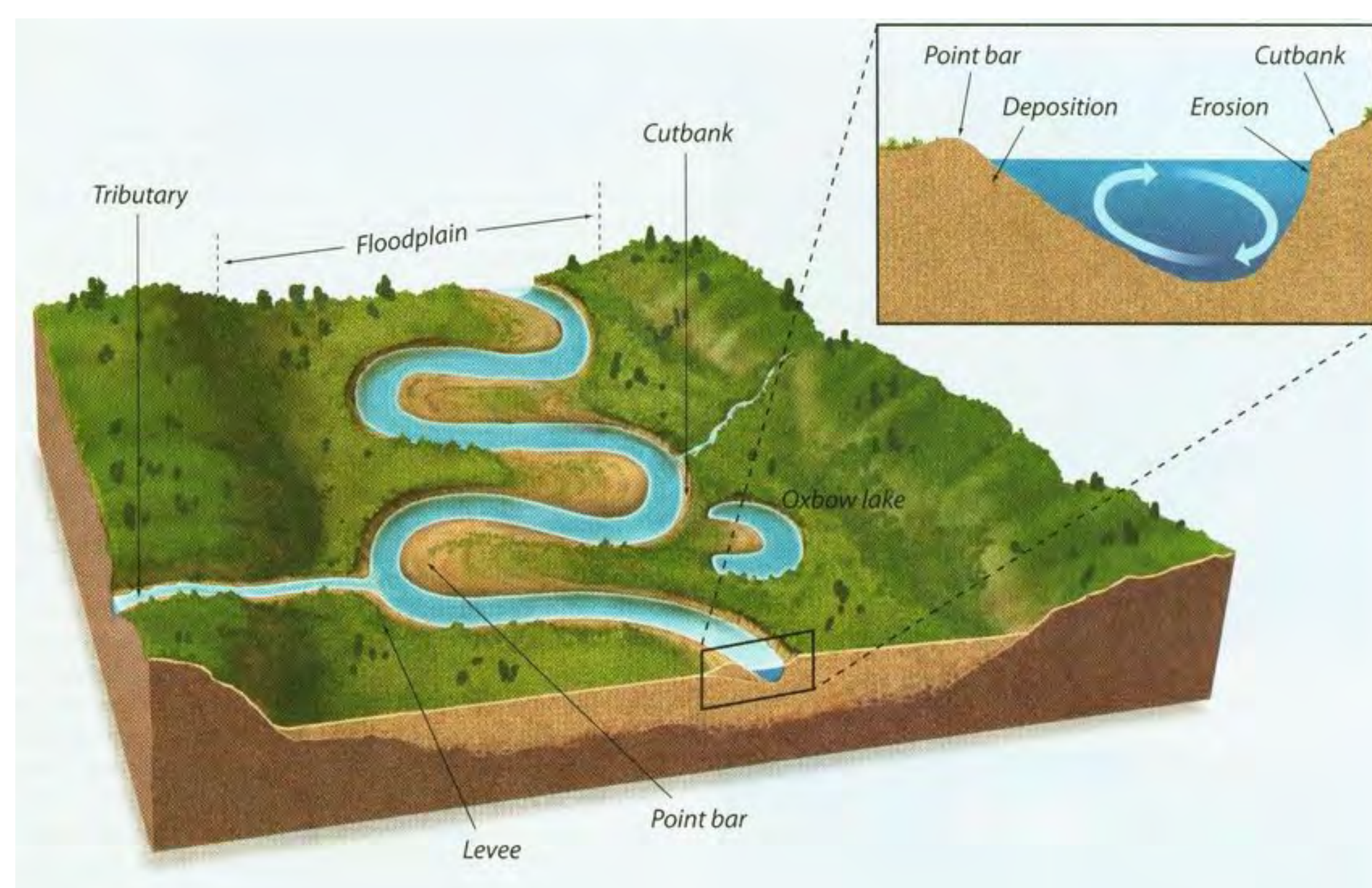
- Project Area
- Contours (1m)
- STAGE 1 ASSESSMENT RESULTS**
- Areas of Archaeological Potential**
- Grassed, Treed (Test Pit Survey Required)
- Areas of Low Archaeological Potential (No Assessment Required)**
- Disturbed (Channelized Drain, Pathways, Roads)
- Steeply Sloped
- Low-Lying/Wet



Erosion Assessment Introduction

What is Fluvial Geomorphology

Fluvial geomorphology is the study of rivers and streams to understand how channels change over time due to erosion and deposition of sediment.



Source: Bierman, P. and Montgomery, D. (2013). Key Concepts in Geomorphology. W.H. Freeman & Co (MacMillan)



East Morrison Creek (2023)

It helps engineers and geoscientists to better manage erosion and flooding hazards around watercourses, and to develop more environmentally sensitive solutions that can help restore and protect our green spaces and wildlife habitat.

Erosion Assessment

The objective is to identify the risks due to erosion hazards.

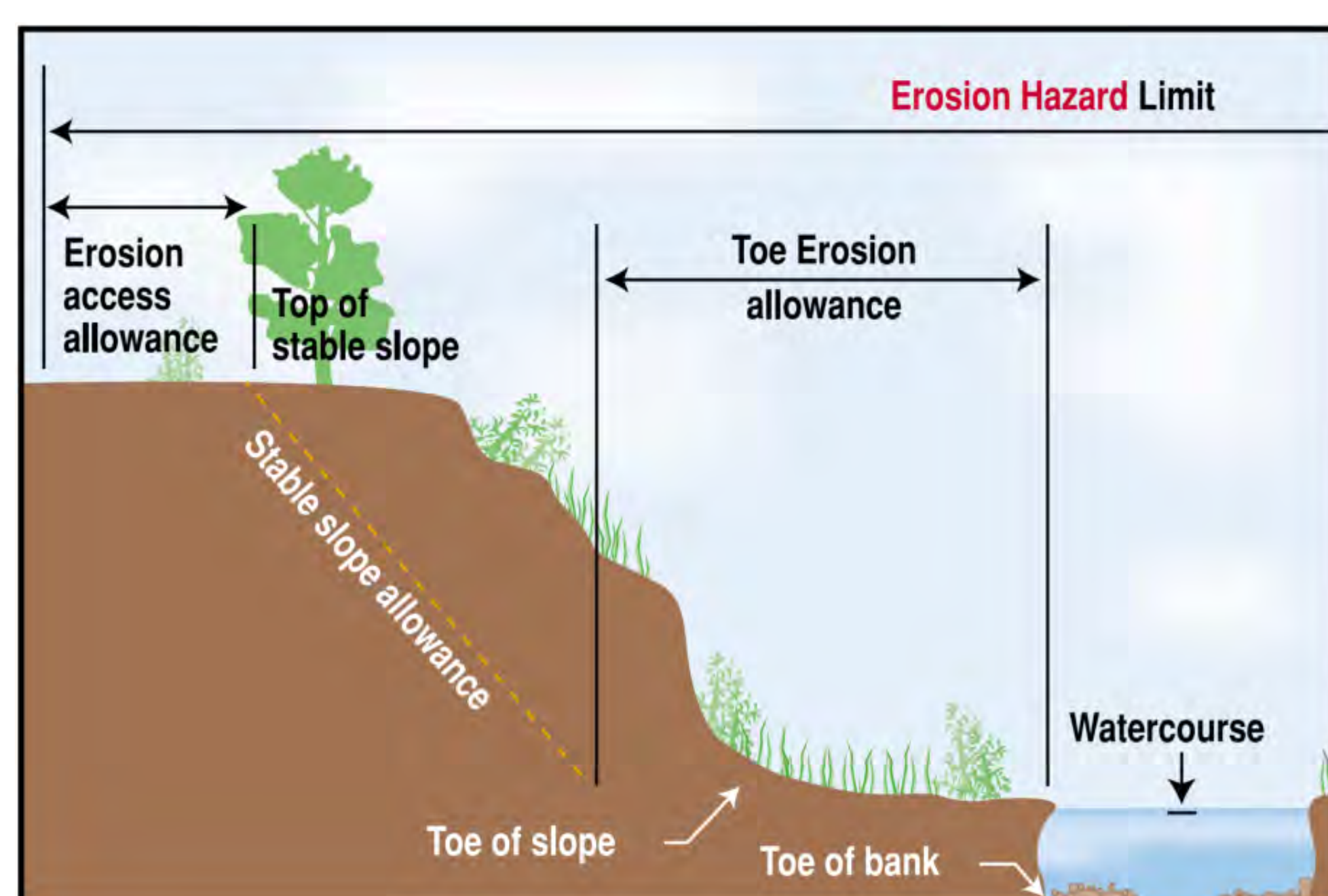
Erosion Hazards

- Bed Erosion
- Bank Erosion
- Slope Instability



Risks to

- Public Infrastructure
- Private Property
- Environment, habitat



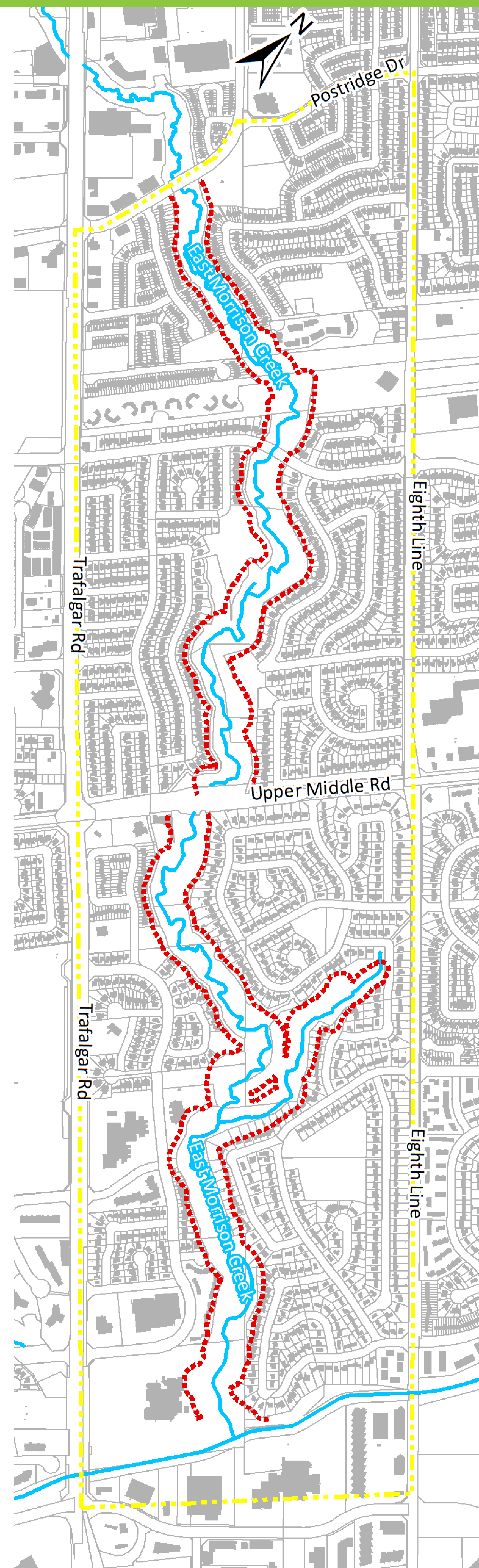
Source: Ontario Ministry of Natural Resources, 2001



East Morrison Creek (2023)

Erosion Hazard Zones Approximate

Long-term, streams and rivers have erosion hazard zones. Engineering and channel design can mitigate erosion risks in hazard zones, but such works may require ongoing maintenance and may not change the erosion hazard limit. Managing risks within the erosion hazard zone may require collaboration between the Town and private landowners to mitigate future problems.



Erosion Assessment Methodology

Erosion Site Scores

Erosion sites were reassessed in 2023 following the scoring framework applied in the 2021 erosion inventory. Sites were scored based on 8 erosion hazard criteria. A total erosion score out of 100 was calculated for each site by summing the score for the 8 criteria.

Criteria	Weight
Risk Type	45
Distance to Risk	20
Site Length	5
Site Height	5
Erodibility	10
Erosion Potential	5
Riparian Habitat	5
Aquatic Habitat	5
Total	100

Erosion Site	Risk Type	Total Score
E11	Critical Infrastructure (sanitary sewer)	79
E4	Private Property	65
E6	Private Property	64
E10	Private Property	60
E24	Private Property	59
E7	Private Property	56
E14	Private Property	54
E9	Private Property	53
E16	Private Property	53
E15	Private Property	53
E17	Private Property	51
E5	Secondary Infrastructure (gabion baskets)	51
E22	Private Property	44
E19	Private Property	44
E20	Pedestrian Bridge	43
E21	Pedestrian Bridge	43
E13	Pedestrian Bridge	43
E12	Secondary Infrastructure (stormwater outfall)	42
E18	Trail	39
E8	Trail	38
E23	Trail	37
E1	Trail	35
E3	Trail	34
E2	Trail	26

Erosion Sites Included in EA Evaluation of Alternatives

The highest scoring erosion sites with scores of 50/100 and above have been identified for inclusion in the Environmental Assessment evaluation of alternatives. These sites were assessed to be higher risk and require consideration of erosion mitigation opportunities. The higher priority sites are typically located at valley slope contacts (or within the Tributary) where private property or critical infrastructure is at risk. For private properties, rear yards, trees and fences may be at risk. All higher priority erosion sites are located south of Upper Middle Road.

Lower priority erosion sites (scores below 50/100) will continue to be monitored as part of the Town’s regular watercourse monitoring program. These sites are typically in locations where non-critical infrastructure, such as recreational trails, are at risk.

Erosion site results were confirmed during a site visit in December 2024 to document any impacts from the July 2024 storm event. This included photos, visual observations, and topographic survey points to confirm visual observations at top priority sites. At most sites no significant change was observed. Observed changes at a few sites did not affect the erosion assessment results. All sites within the study area are scheduled to be reassessed in 2026 through the Town inventory.

East Morrison Creek Erosion Sites Reaches 43-45



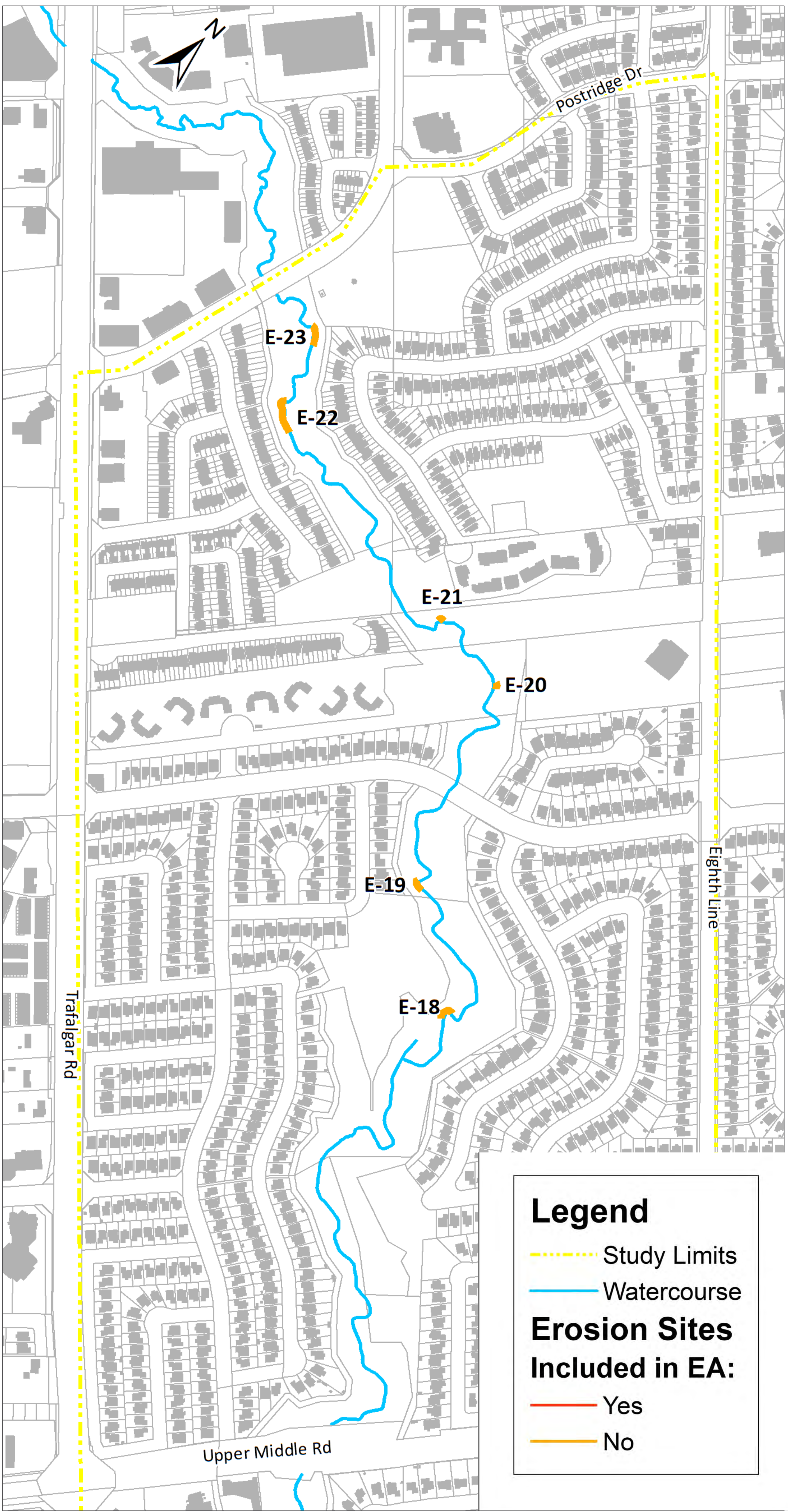
Site: E23
Score: 37
Issue: Valley wall contact; eroding valley slope
Risk: Potential risk to pedestrian trail system and private property
Length: 10 – 20 m



Site: E21
Score: 43
Issue: Erosion around pedestrian bridge; footing exposed within the channel. No damage to the concrete footing currently.
Risk: Trail infrastructure including pedestrian trail and pedestrian bridge crossing
Length: < 10 m



Site: E19
Score: 44
Issue: Valley wall contact along meander bend (90 degrees); gabion basket protection in fair condition (leaning)
Risk: Pedestrian trail system; private property
Length: 20 – 50 m



Site: E22
Score: 44
Issue: Valley wall contact; eroding valley slope
Risk: Potential risk to pedestrian trail system and private property
Length: 10 – 20 m



Site: E20
Score: 43
Issue: Erosion around pedestrian bridge crossing; footing exposed on the outer meander bend.
Risk: Trail infrastructure including pedestrian trail and pedestrian bridge crossing
Length: < 10 m



Site: E18
Score: 39
Issue: Valley wall contact; toe erosion along valley slope
Risk: Pedestrian trail system; park
Length: 20 – 50 m

East Morrison Creek Erosion Sites Reaches 39-42



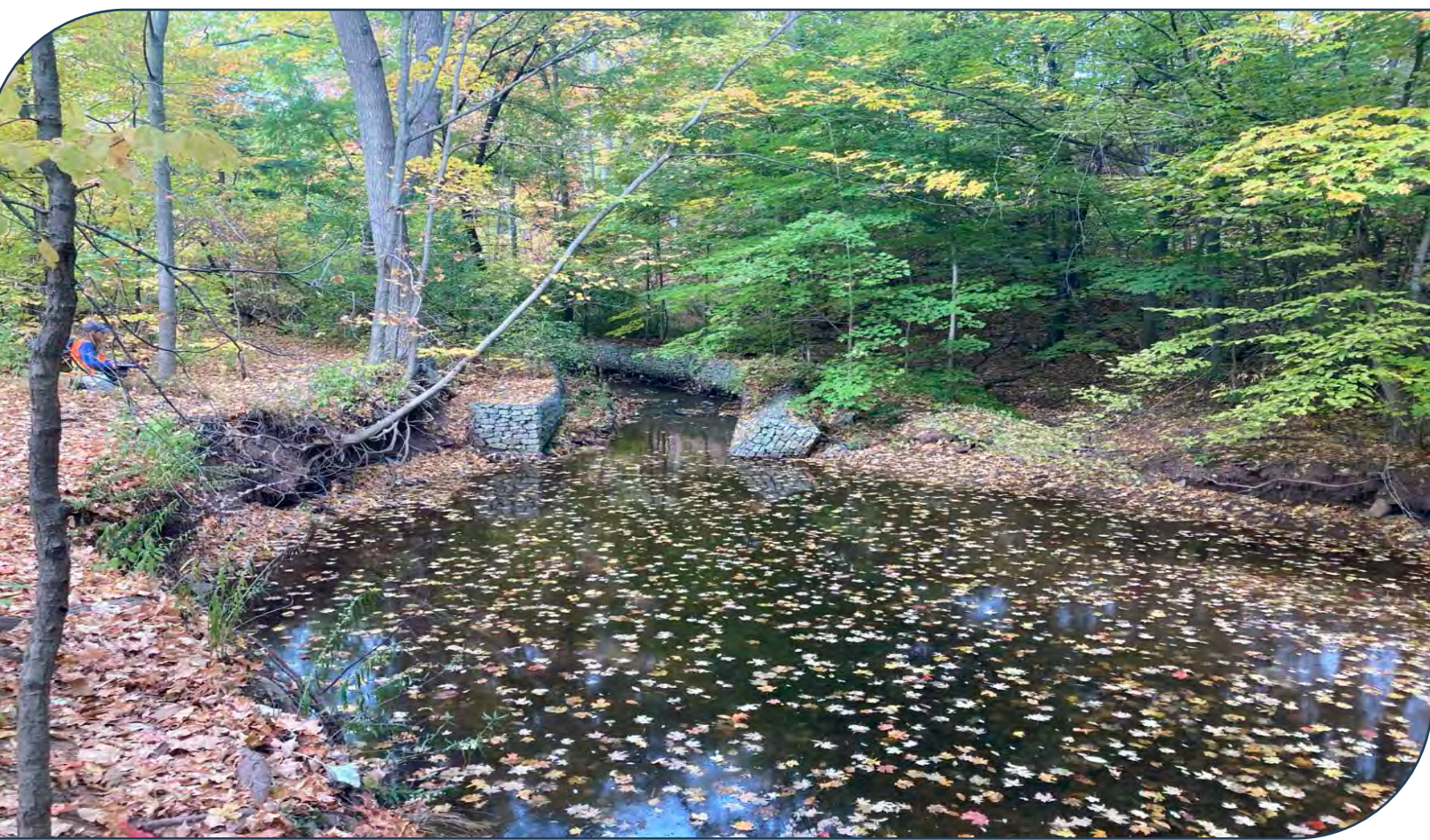
Site: E14, E15, E16, E17
Score: 54, 53, 53, 51
Issue: Toe erosion at valley contact (unprotected). ~5 to 10 m from fence line.
Risk: Private property, pedestrian trail
Length: 20 – 50 m



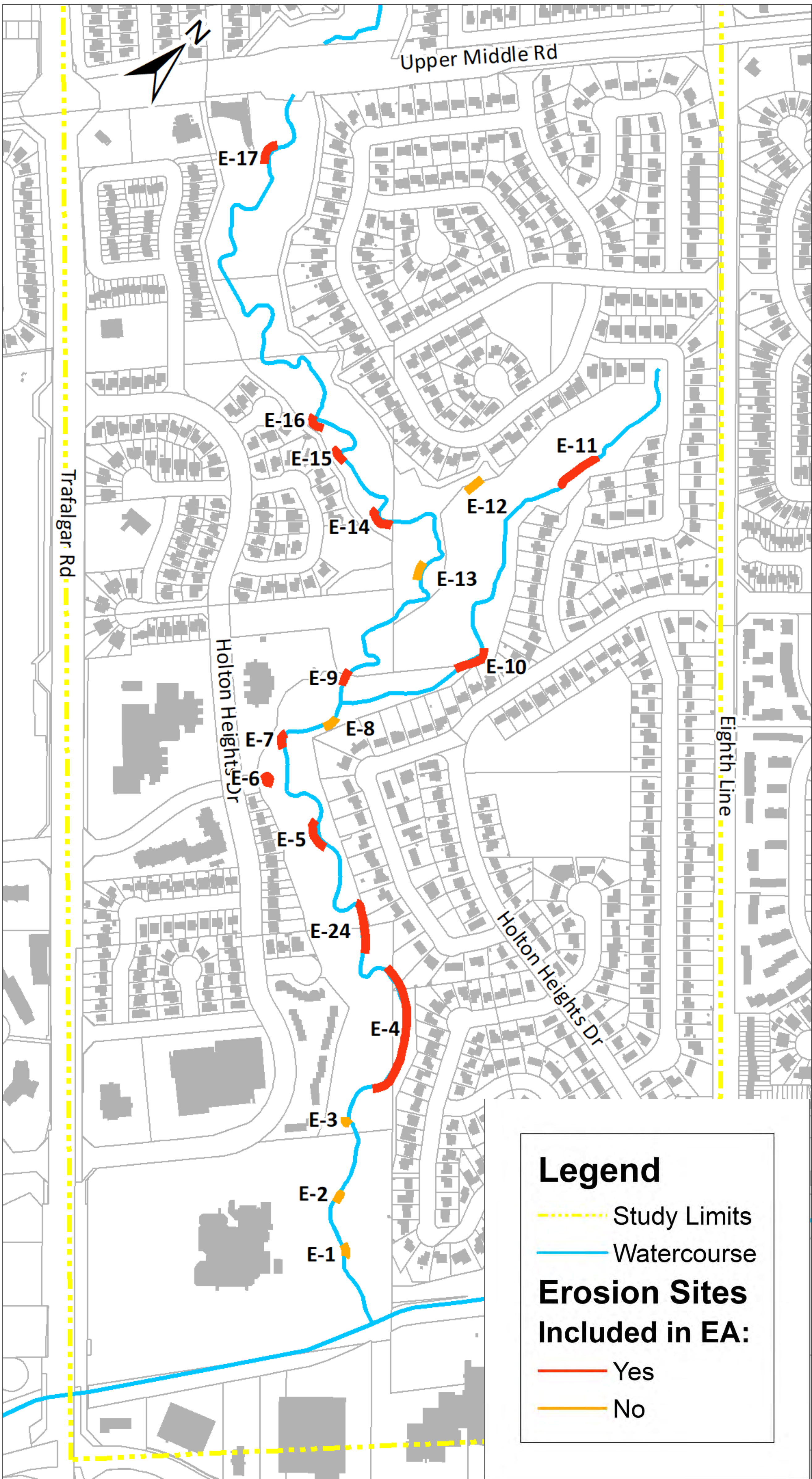
Site: E7, E9
Score: 56, 53
Issue: Toe erosion of valley slope (unprotected)
Risk: Private property (parking lot)
Length: 10 – 20 m



Site: E6
Score: 64
Issue: Perched outfall on valley slope, outfall drop structure suspended, scour pool below
Risk: Private property; secondary infrastructure (outfall)
Length: 50 – 100 m



Site: E5
Score: 51
Issue: Gabion baskets lining both banks. Failing at downstream end and large scour pool.
Risk: Secondary infrastructure (gabion baskets), pedestrian trail
Length: 20 – 50 m



Site: E1, E2, E3, E8, E12, E13 (not included in EA)
Score: 35, 26, 34, 38, 42, 43
Issue: Bank erosion in proximity to pedestrian trail system; not valley contacts.
Risk: Mainly pedestrian trail system, pedestrian bridge (E13), secondary infrastructure (stormwater outfall - E12)
Length: varies



Site: E11
Score: 79
Issue: CSP culvert below trail, bottom corroded. Scour pool downstream. Buried sanitary sewer.
Risk: Critical infrastructure (sanitary sewer), pedestrian path/crossing
Length: 20 – 50 m



Site: E10
Score: 60
Issue: Erosion at toe of valley slope in tributary (unprotected); private property at top of slope.
Risk: Private property
Length: 10 – 20 m



Site: E24 (new site)
Score: 59
Issue: Valley contact/slope erosion. Gabion toe protection - fair condition (functioning, some wire failure at toe)
Risk: Private property
Length: 20 – 50 m



Site: E4
Score: 65
Issue: Valley wall contact and slope erosion. Gabion protection near upstream end of erosion is in poor condition (bottom tier corroded/emptied)
Risk: Private property
Length: > 100 m

Ecology and Natural Heritage Assessment

Ecological Land Classification (ELC)



Vegetation Community

- Valley contains extensive areas of mature woodland
- Contains a mixture of native and exotic species, high amounts of sugar maple and red oak

- Red Oak
 - Sugar Maple
 - White Birch
 - Shagbark Hickory
 - Ironwood
 - Blue Beech
 - American Elm
 - Black Cherry
 - Crack Willow (I)
 - Manitoba Maple (I)
 - Norway Maple (I)
 - European Buckthorn (I)
 - European Privet (I)
 - Dog-strangling Vine (I)
 - Garlic Mustard (I)
 - English Ivy (I)
- *(I) indicate non-native



Typical woodland along East Morrison Creek

Terrestrial Wildlife

- Mature trees and understory habitat support numerous wildlife species, including birds and mammals

Birds

- Hairy Woodpecker
- Northern Flicker
- Great Crested Flycatcher
- Blue Jay
- Black-capped Chickadee
- Cardinal

Mammals

- Chipmunk, Raccoon, Squirrel, skunk, bat



Black-capped Chickadee

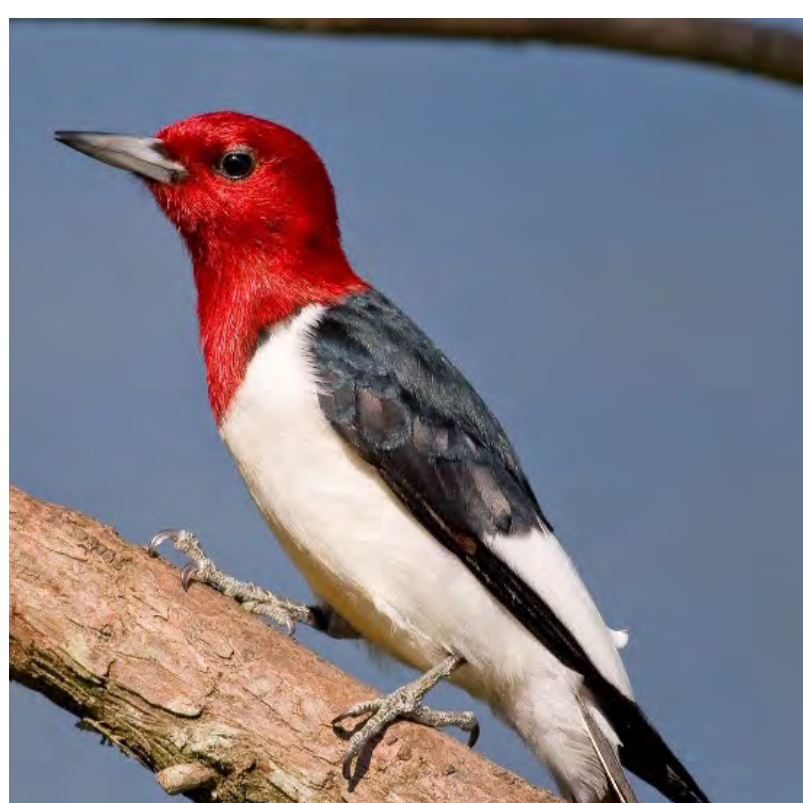


Big Brown Bat

Species at Risk & Special Concern

- Habitat is present which may support protected species
- Species at risk with potential to occur in the study area include:

- Species at Risk bats (Little Brown Myotis, Northern Myotis, Tri-coloured Bat)
- Chimney Swift
- Red-headed Woodpecker



Red-headed Woodpecker



Tri-coloured Bat

Aquatic Habitat

- Substrate variability and cool-water temperatures with substantial erosion and anthropogenic pressures

- Minnow species
- Creek Chub
- Brook Stickleback
- Blacknose Dace
- Common Carp
- Goldfish



Creek Chub



Brook Stickleback



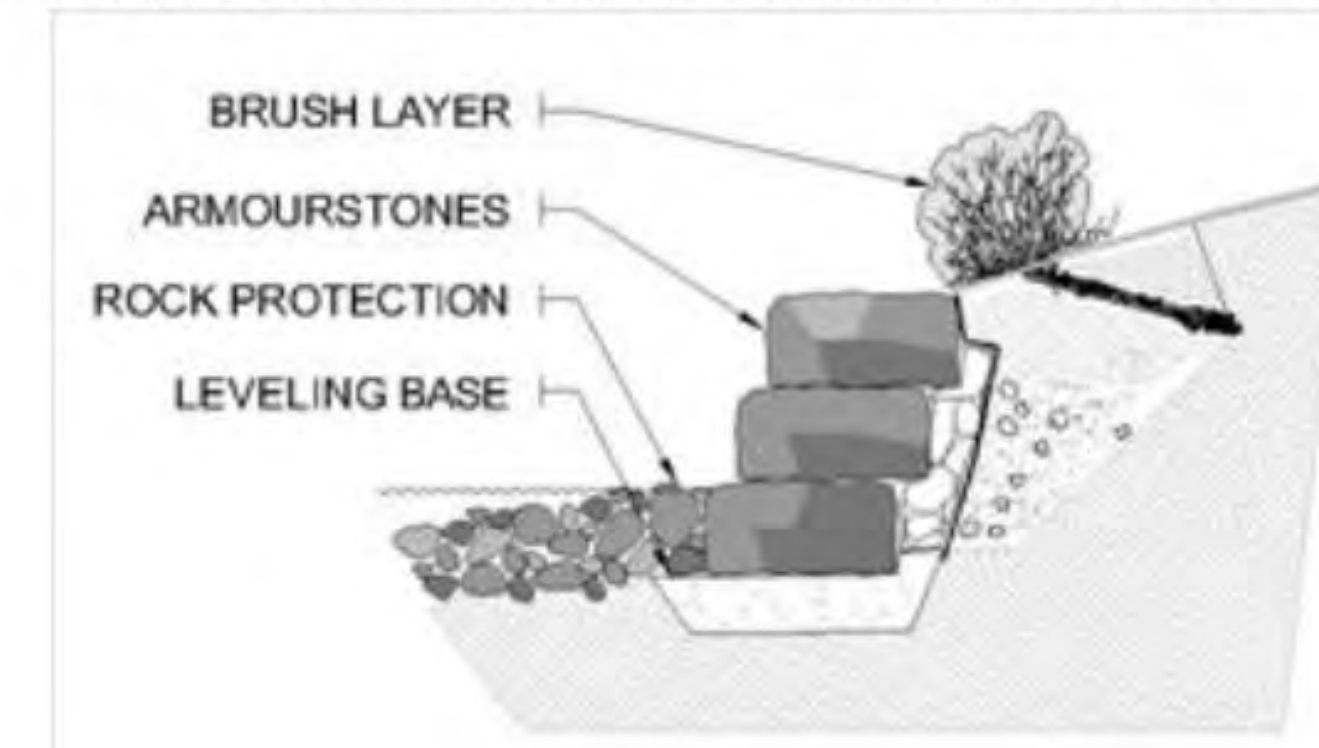
Common Carp

Long List of Erosion Mitigation Techniques

There are many techniques used to rehabilitate creeks that have been degraded due to erosion and that address the erosion mechanisms identified above. The use of each technique will depend on the site-specific requirements, including the available space, flow and velocity characteristics, location along the creek (i.e., at a riffle or bend), aquatic habitat requirements and the height of the bank. Common erosion mitigation techniques include:

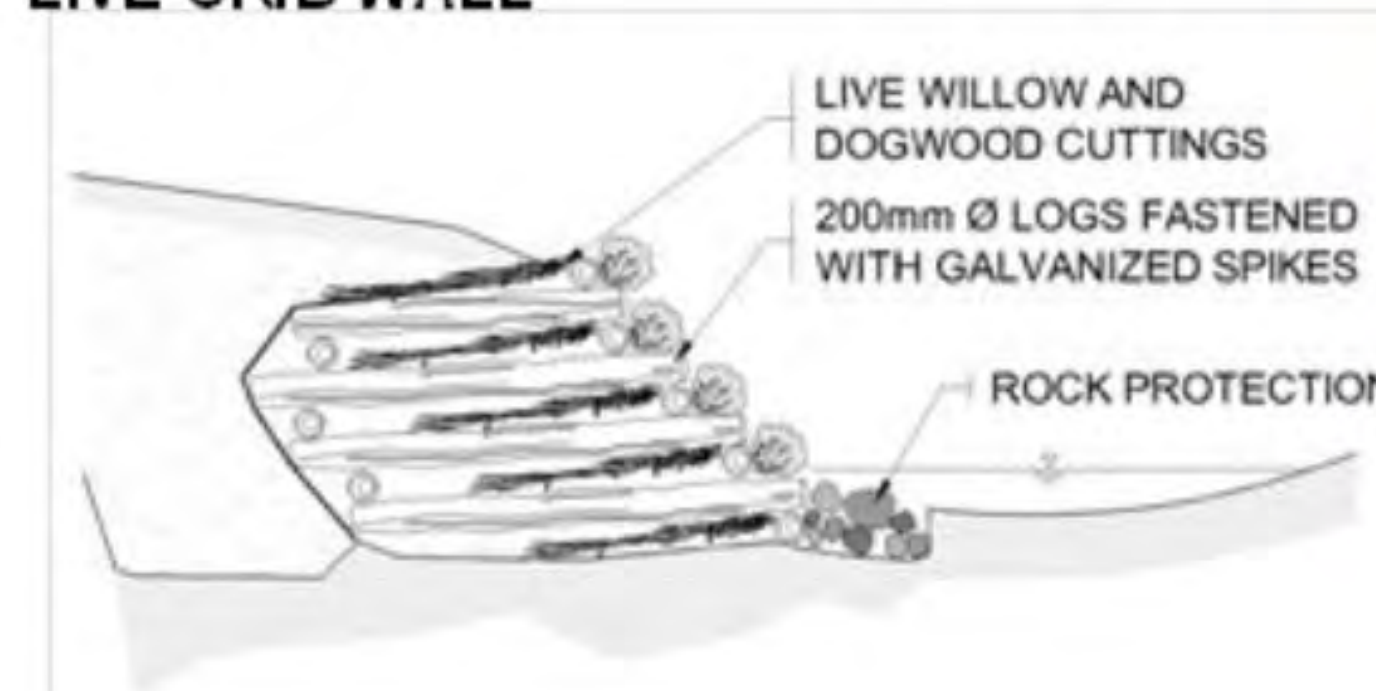
- **Armourstone Retaining Wall**
 - 'Hard' solution
 - Cost-effective way to mitigate high erosion potential in constrained situations but provide less habitat potential
- **Rock Vanes and Vortex Rock Weirs**
 - Reduces stream energy and redirects flow
 - Provides grade control to minimize bed erosion
- **Live Log Crib Wall**
 - Structure of logs filled with soil and rocks
 - Can be used in constrained situations (similar to armourstone walls) while providing habitat
- **Vegetated Rock Revetment**
 - Use of rock on sloping banks
 - Bioengineering features can be placed between rock ('soft' solution)
- **Bioengineering** (brush mattress, brush layer, live fascine)
 - Use of live dormant plant material to stabilize banks
 - Does not generally resist high velocities
- **Terraced Floodplain**
 - Cost-effective way to decrease the stream energy by expanding the channel cross-section and flow area
 - Requires a large amount of space
- **Creek Realignment**
 - Channel realignment away from risk
 - Opportunity to use natural channel design concepts
 - Requires large area and high initial cost but can offer the most long-term benefit
- **Morphological Channel Modifications**
 - Modification to channel planform, profile, or cross section
 - Opportunity to use natural channel design concepts

ARMOURSTONE WALL WITH BRUSH LAYER



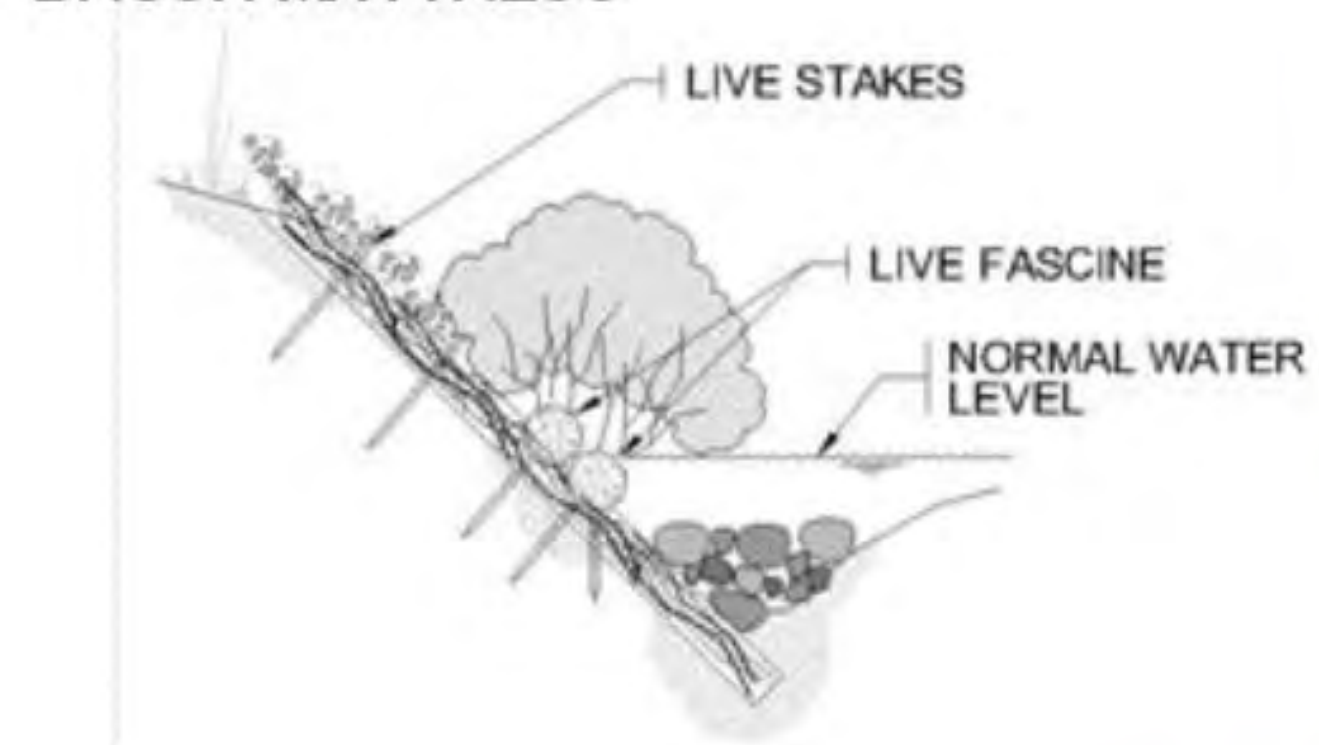
Armour Stone Wall with Brush Layer Concept

LIVE CRIB WALL



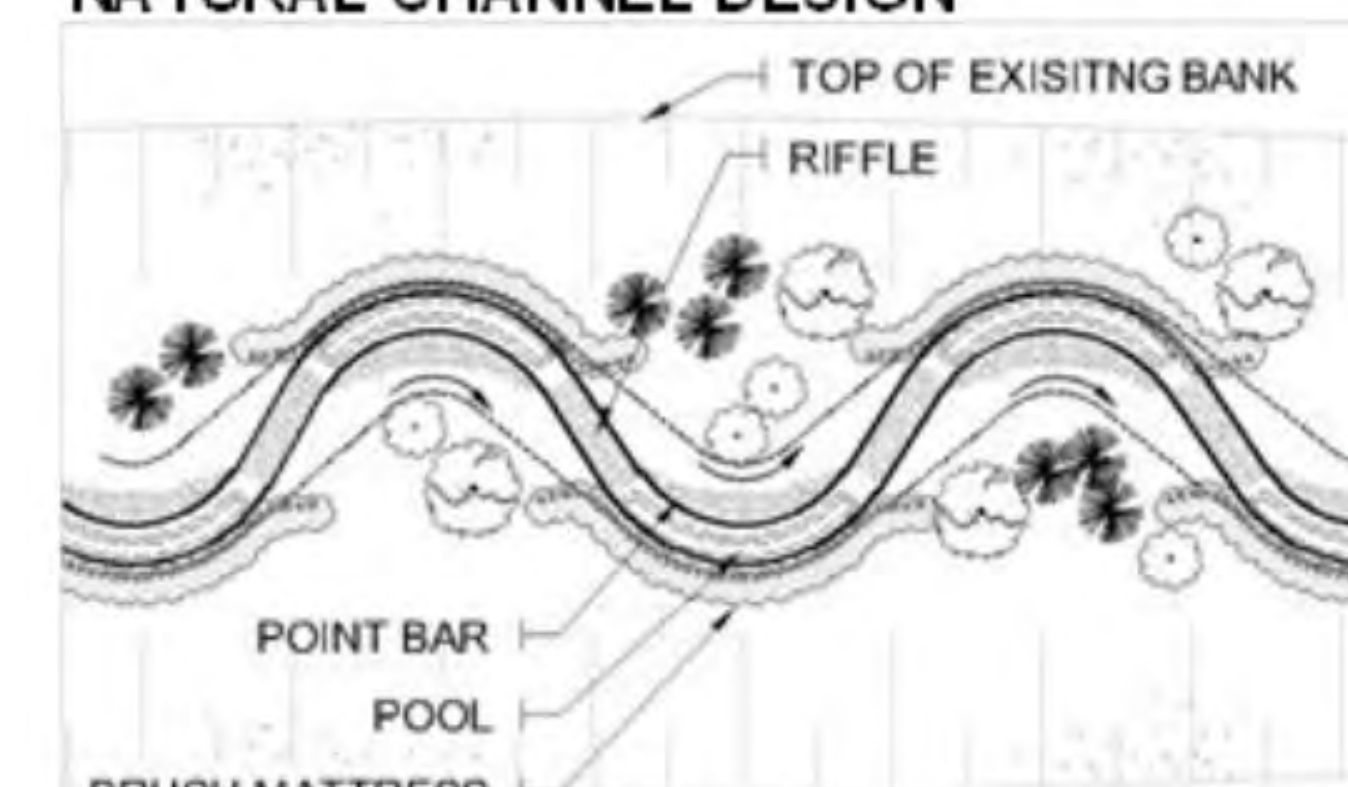
Live Log Crib Wall Concept

BRUSH MATTRESS



Brush Mattress Concept

NATURAL CHANNEL DESIGN



Stream Realignment Design Concept

Alternatives to be Evaluated

Evaluation of alternatives will be completed for each erosion site:

1: Do Nothing

- Do nothing must be considered as part of Municipal Class EA process. Regular monitoring
- May be recommended where, for example, other alternatives have extensive environmental impacts and/or are not economically feasible



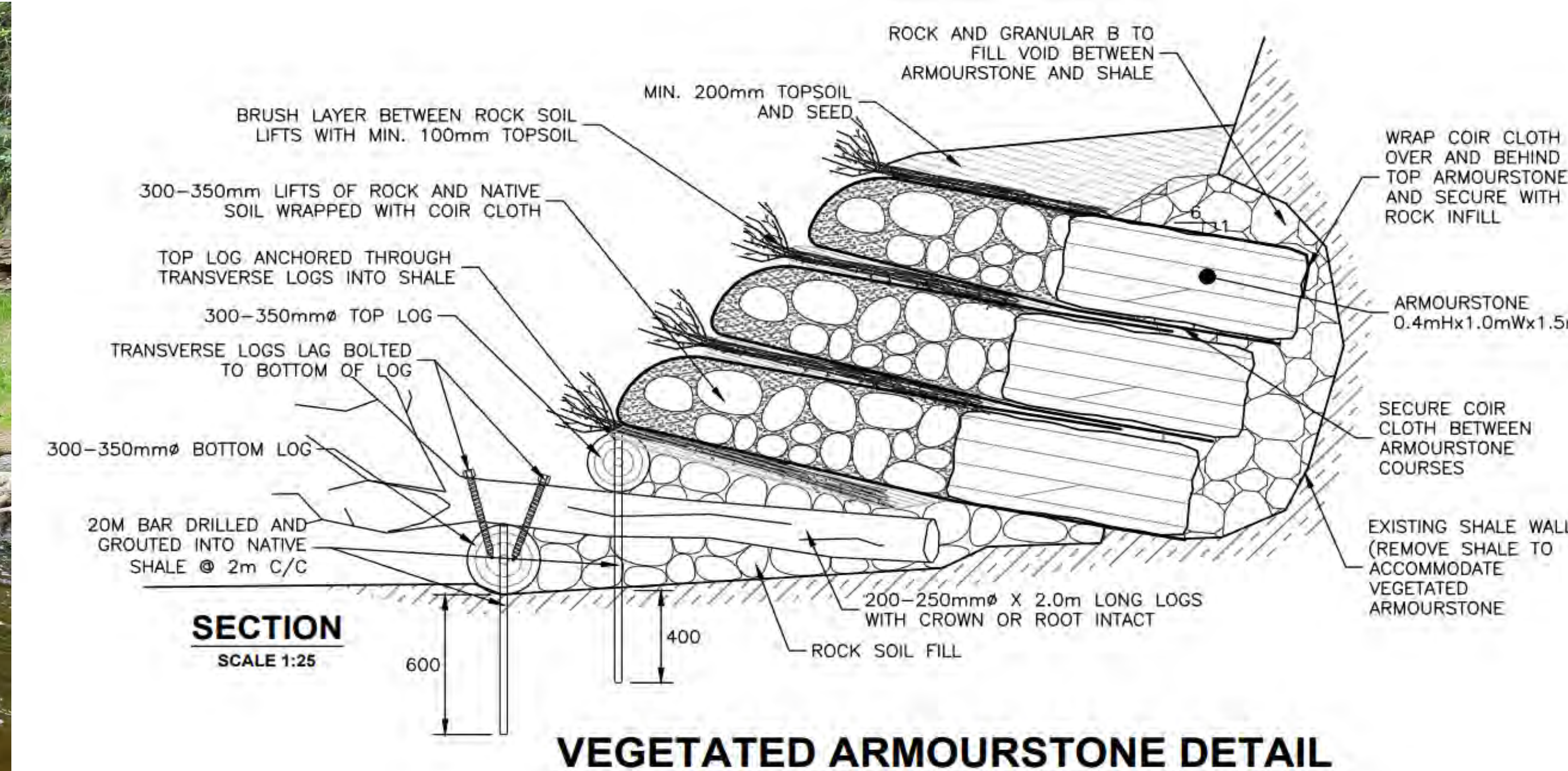
2: Continuous Monitoring

- Detailed study of erosion site for up to 5 years
- Accurate measurements of erosion hazard rates
- In cases where detailed studies identify higher risk sites, an addendum to the EA study may be submitted to allow for additional mitigation works



3: Selective Works

- Localized erosion mitigation
- Addresses erosion risks over years to decades
- Promoting '**green solutions**' to incorporate use of natural materials



4: Reach-Scale Natural Channel Design

- Channel design over longer lengths of the creek
- Balance between 'hard' control and 'soft' restoration approaches
- Higher costs and disturbance of habitat



5: Remove from Hazard Zone

- Remove infrastructure or property from hazard zone
- Easements and/or land acquisition within hazard zone
- See erosion hazard zones on alternative concept figures

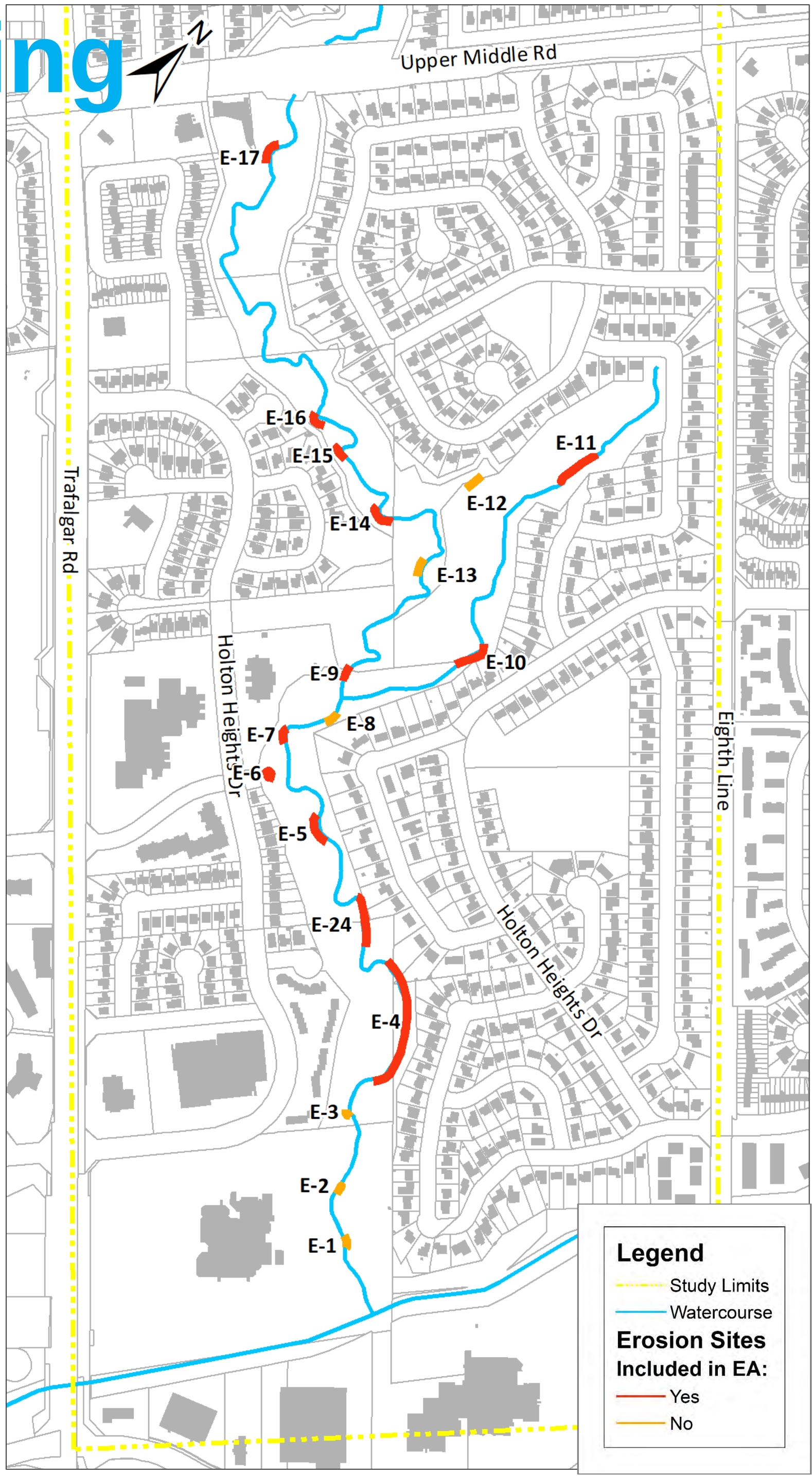
Potential Erosion Mitigation Concept

Reaches 40-42 (including Tributary)

Note: Sites upstream of Upper Middle Road were deemed lower priority and not included in the EA evaluation

Alternative 1: Do Nothing or Alternative 2: Continuous Monitoring

‘Do Nothing’ Alternative:
Active valley wall / channel erosion anticipated to continue, increasing potential risk to infrastructure and private property. Town-wide erosion is monitored on a 5-year cycle. The erosion sites will continue to be monitored as part of the Town’s routine watercourse monitoring program

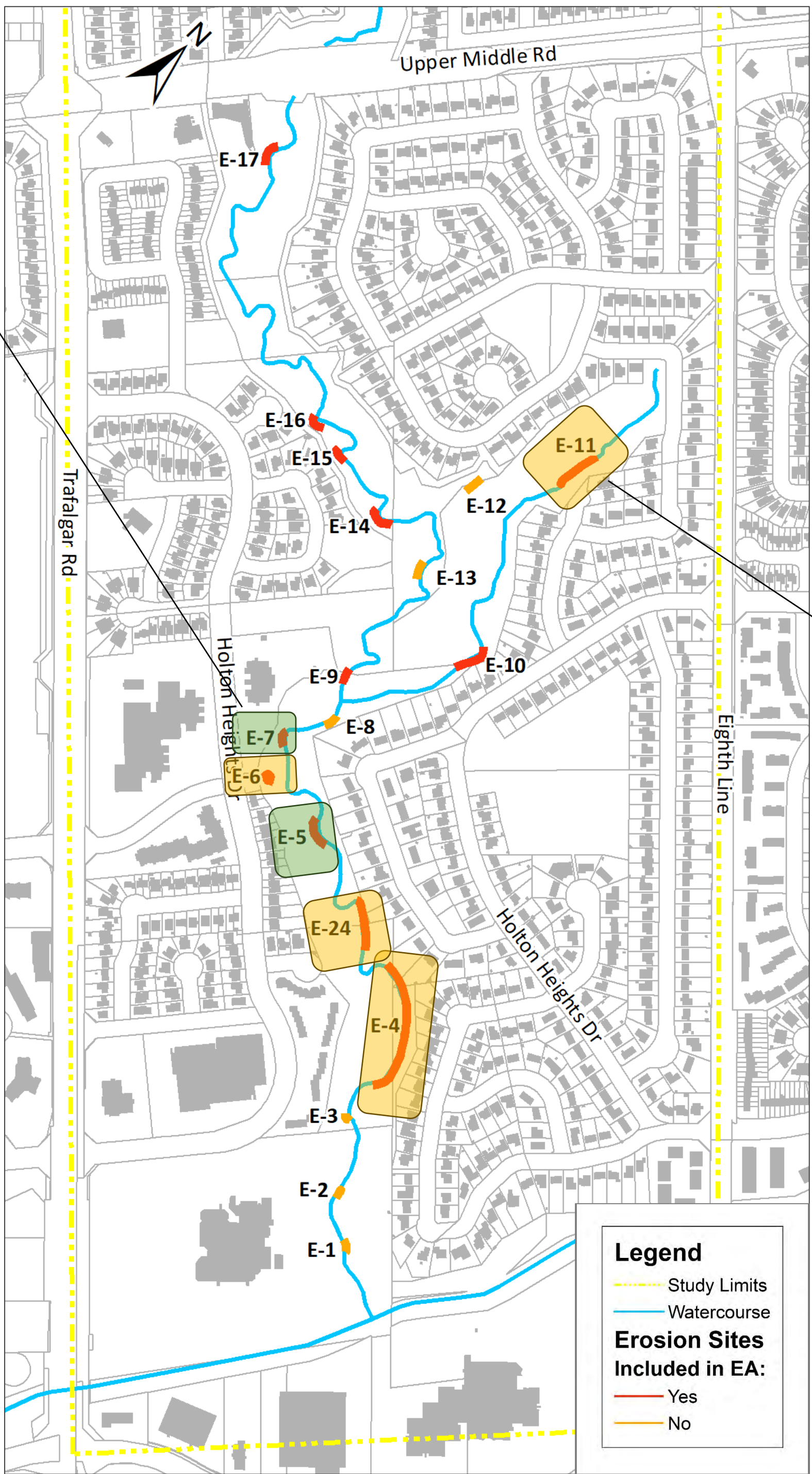


Continuous Monitoring Alternative:
Continuous monitoring of active erosion sites to identify rates of erosion and assess potential of increased risk in the future. Erosion sites will be monitored in detail for a 5-year period following the EA to provide an accurate assessment.

Alternative 3: Selective Works

Erosion Sites for ‘Soft’ Selective Works Erosion Sites for ‘Hard’ Selective Works

‘Soft’ solutions
(i.e., vegetated rock revetment) and/or channel reconfiguration to reduce risk of erosion to assets (infrastructure, private property)

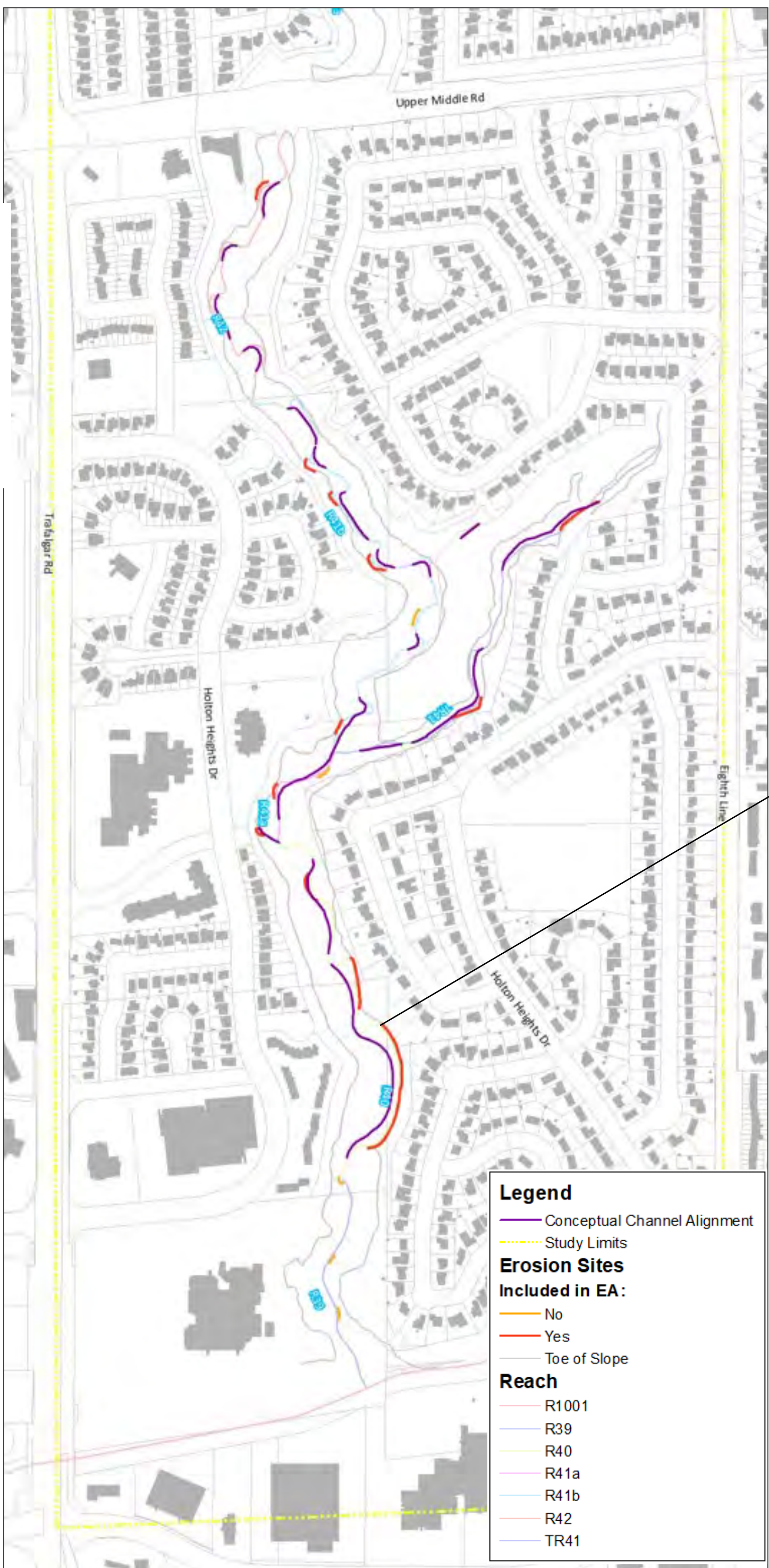


‘Hard’ solutions
(i.e., armourstone) and/or channel reconfiguration in areas where erosion site is within proximity to assets (infrastructure, private property)*

*Engineering and channel design can mitigate erosion risks in hazard zones, but such works may require ongoing maintenance and may not change the erosion hazard limit.

Alternative 4: Reach-Scale Natural Channel Design

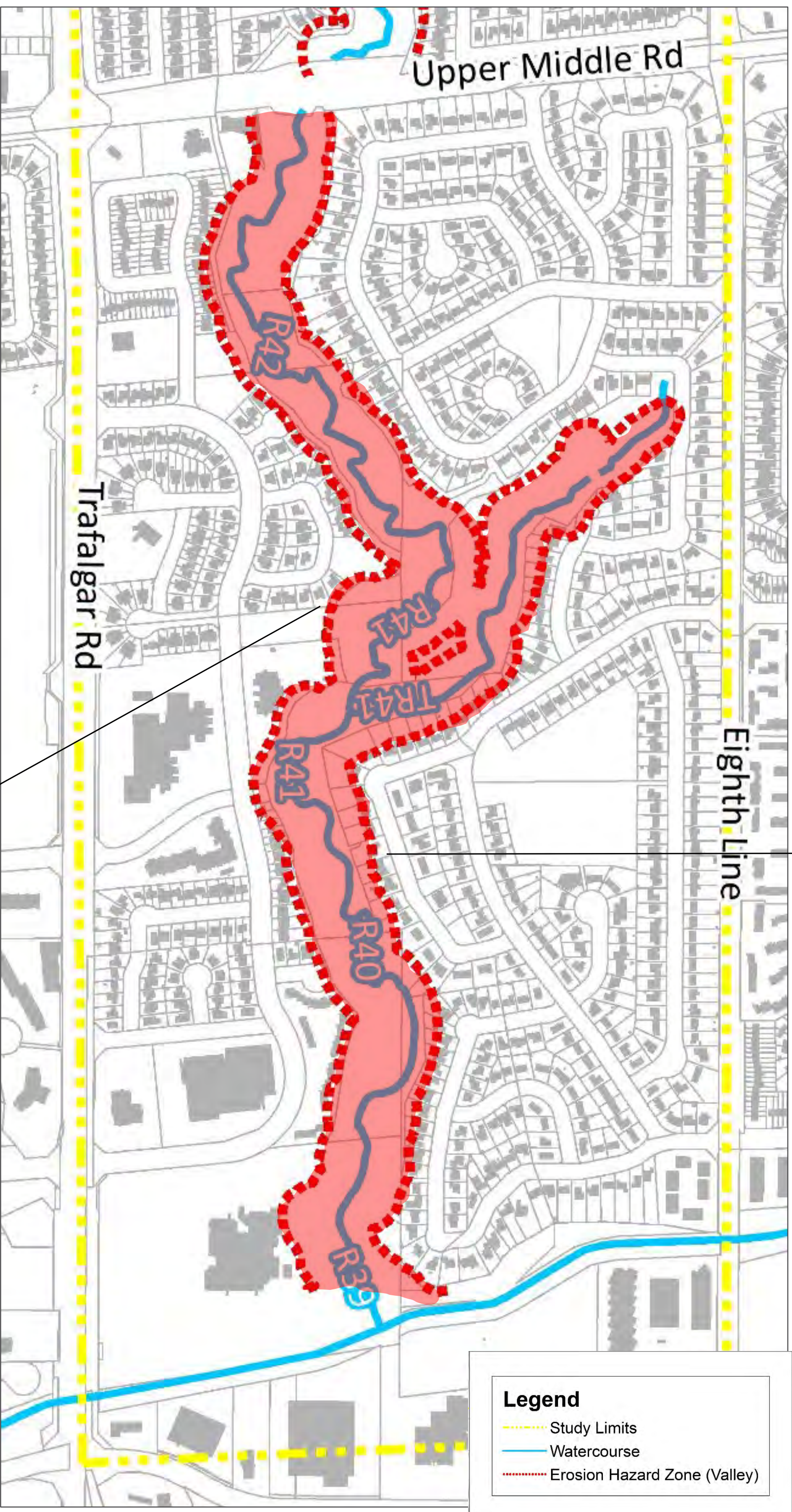
Local channel re-alignment and reconfiguration works through Reach 41 – 42



Re-alignment of the channel planform away from erosion hazard; potential cross-section reconfiguration

Alternative 5: Removal of Risk

Removal of select infrastructure from hazard zone (valley), including trail realignments further from hazard



Potential land acquisitions and easements along private properties

Evaluation Criteria

The following four (4) categories, with three (3) criteria each, were used to evaluate alternatives:



Promote Green Solutions:

Promoting ‘green solutions’ which emphasize use of natural materials / natural channel design approaches in combination with engineering techniques to encourage environmentally sustainable solutions. Emphasis on reduction of impacts (spatial and temporal) of the selected alternatives on the natural environment.

Evaluation of Alternatives

As part of the EA process, each alternative was assessed across four equally weighted (25%) categories: environmental, technical/engineering, social/cultural, and economic. Within each category, the three evaluation criteria were scored on a scale from 1 (negative impact) to 5 (positive impact), indicated by the shaded dots. The total score, out of 60, determined the overall erosion mitigation performance.

Selected Example Evaluation for Erosion Site E4:

Criteria	Alternative 1: Do Nothing	Alternative 2: Continuous Monitoring	Alternative 3: Selective Works	Alternative 4: Reach-Scale Works	Alternative 5: Removal of Risk
Physical / Natural Environment (25%)					
Management of Existing Erosion Risks	●○○○○	●●○○○	●●●●○	●●●●●	●●●○○
Impacts to Aquatic & Terrestrial Habitat	●●●●○	●●●●○	●●○○○	●●○○○	●●●○○
Climate Change Adaptation/Resiliency	●○○○○	●●●○○	●●●○○	●●●●●	●●●●○
Subtotal	6	9	9	12	10
Technical / Engineering (25%)					
Technical Feasibility	●●○○○	●●●○○	●●●●●	●●●●○	●○○○○
Approvability	●●○○○	●●●○○	●●●●●	●●●●○	●○○○○
Green Solutions	●●○○○	●●●○○	●●●○○	●●●●●	●●●●●
Subtotal	6	9	13	13	7
Social / Cultural Environment (25%)					
Community Disruption & Recreational Impacts	●●●○○	●●●○○	●●●●○	●●○○○	●○○○○
Landowner & Public Acceptance	●○○○○	●●○○○	●●●●●	●●●●○	●○○○○
Archaeological Impacts	●●●●○	●●●●○	●●●○○	●○○○○	●●○○○
Subtotal	8	9	12	7	4
Economic (25%)					
Construction & Capital Costs	●●●●●	●●●●○	●●●○○	●●○○○	●○○○○
Maintenance Costs	●●●○○	●●●○○	●●●●○	●●●●●	●●●●○
Life-Cycle Costs	●●●○○	●●●○○	●●●●○	●●●●●	●●●●●
Subtotal	11	10	11	12	10
Total Score	31/60	37/60	45/60	44/60	31/60
Total Score (%)	51.7	61.7	75.0	73.3	51.7

Selected Example Evaluation for Erosion Site E14:

Criteria	Alternative 1: Do Nothing	Alternative 2: Continuous Monitoring	Alternative 3: Selective Works	Alternative 4: Reach-Scale Works	Alternative 5: Removal of Risk
Physical / Natural Environment (25%)					
Management of Existing Erosion Risks	●○○○○	●●●●○	●●●●○	●●○○○	●●●○○
Impacts to Aquatic & Terrestrial Habitat	●●●●○	●●●●○	●●○○○	●○○○○	●●○○○
Climate Change Adaptation/Resiliency	●●○○○	●●●●○	●●●○○	●●●●○	●●●○○
Subtotal	7	12	9	7	8
Technical / Engineering (25%)					
Technical Feasibility	●●●○○	●●●●●	●●●○○	●●○○○	●○○○○
Approvability	●●●●○	●●●●●	●●●○○	●●○○○	●○○○○
Green Solutions	●●○○○	●●●○○	●●●○○	●●●●○	●●●●●
Subtotal	9	13	9	8	7
Social / Cultural Environment (25%)					
Community Disruption & Recreational Impacts	●●●○○	●●●●○	●●○○○	●○○○○	●○○○○
Landowner & Public Acceptance	●●●○○	●●●●○	●●○○○	●○○○○	●○○○○
Archaeological Impacts	●●●●○	●●●●○	●●●○○	●○○○○	●●○○○
Subtotal	10	12	7	3	4
Economic (25%)					
Construction & Capital Costs	●●●●●	●●●●○	●●●○○	●●○○○	●○○○○
Maintenance Costs	●●●●○	●●●●○	●●●○○	●●●●○	●●●●○
Life-Cycle Costs	●●●○○	●●●○○	●●●●○	●●●●●	●●●●●
Subtotal	12	11	10	11	10
Total Score	38/60	48/60	35/60	29/60	29/60
Total Score (%)	63.3	80.0	58.3	48.3	48.3

Evaluation of Alternatives

The preferred solutions are identified by the highest scoring alternative. Sites that were similar and scored the same are grouped together. Six (6) erosion sites were selected for Alternative 3 (Selective Works) and 6 sites were selected for Alternative 2 (Continuous Monitoring).

Evaluation Result (%)

Erosion Site(s)	Alternative 1: Do Nothing	Alternative 2: Continuous Monitoring	Alternative 3: Selective Works	Alternative 4: Reach-Scale Works	Alternative 5: Removal of Risk
E4, E24	51.7	61.7	75.0	73.3	51.7
E11	46.7	58.3	75.0	68.3	53.3
E5	45.0	56.7	75.0	71.7	55.0
E6	51.7	66.7	76.7	58.3	50.0
E7	53.3	68.3	73.3	55.0	50.0
E9, E10, E17	60.0	76.7	65.0	50.0	50.0
E14, E15, E16	63.3	80.0	58.3	48.3	48.3

Sites E9, E10, E14, E15, E16, E17
Continuous Monitoring

General Recommendations:

- Annual topographic surveys for accurate measurement of erosion rates (5 years)
- Monumented photos

Risk Probability Trigger for Intervention:
Monitoring & erosion hazard assessment studies to indicate time to contact of less than 25 years

Cost Estimate: \$300,000 for 6 sites for 5 years with reporting (\$60K/year)*

*Costs may be less if combined with other sites from Town's Major Slope monitoring program (not including geotechnical investigations if required)

Sites E5, E6, E7
Selective Works

General Recommendations:

Natural Channel Design with Soft Engineering

- Vegetated Flagstone Buttress
- Flagstone Riffle Substrate
- Bank Restoration, Bioengineering

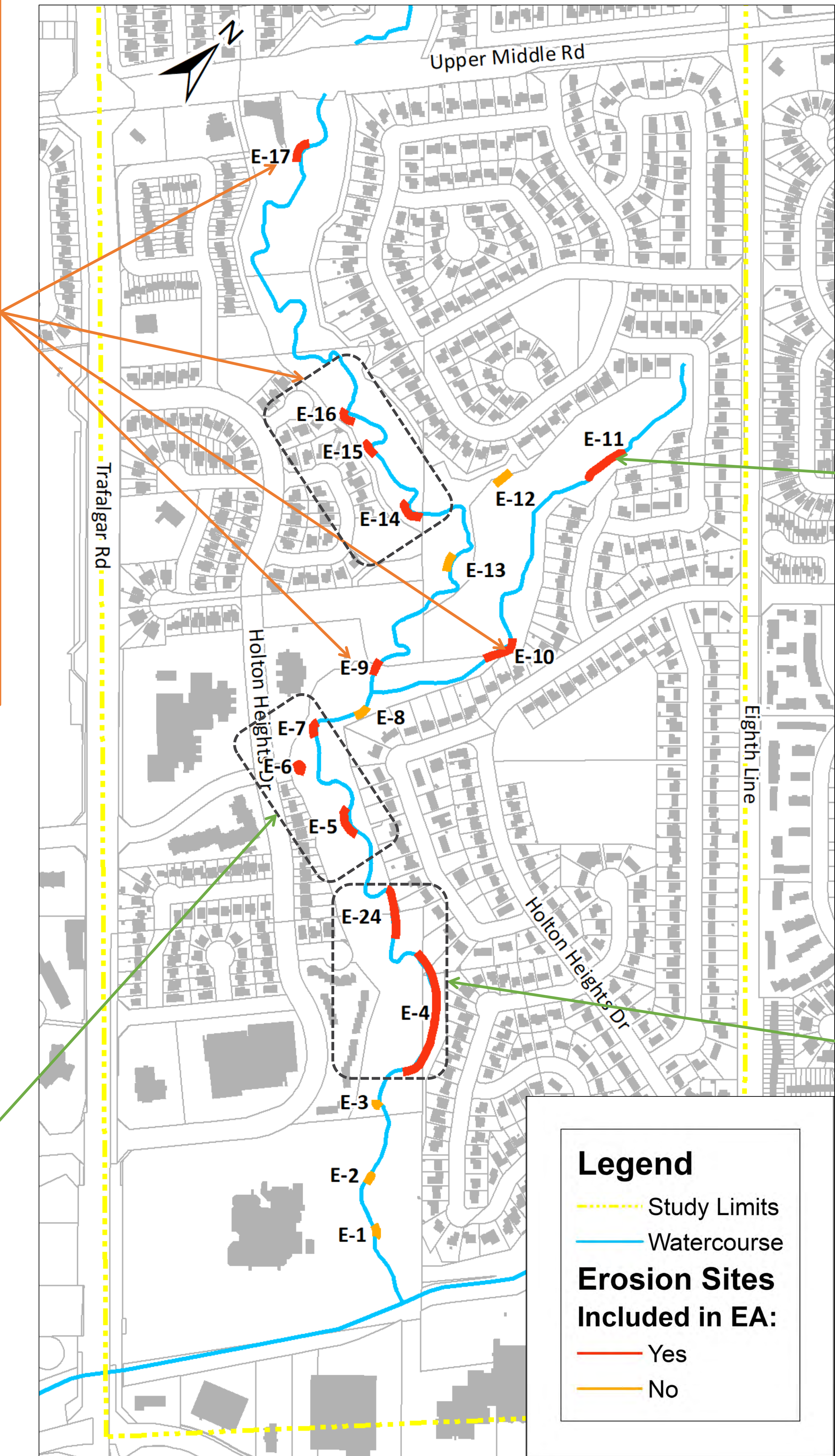
Site Recommendations:

E5: Removal of Gabion Baskets And Larger Span Pedestrian Bridge

E6: Reinforce Outfall (Armourstone) And Restoration of Outfall Channel

E7: Channel Realignment and Vegetated Flagstone Buttress at Toe of Slope Erosion

Preferred Alternatives



Green Solutions

All proposed works will include bioengineering and plantings to restore native vegetation

Site E11
Selective Works

Recommendation:

Retrofit CSP Crossing, Stabilize Trail Embankment with Armourstone Walls And Stabilize Channel Downstream

Site E4 & E24
Selective Works

General Recommendations:

Natural Channel Design with Combined Hard & Soft Engineering Approaches

- Vegetated Flagstone Buttress
- Flagstone Riffle Substrate
- Bank Restoration, Bioengineering

Site Recommendations:

E4 & E24: Realign Channel Away from Slope with Armourstone Wall, Replacement of Gabion Basket

Note: Cost estimates for selective works are on the following site-specific posters

Preliminary Functional Design

Sites E4 & E24

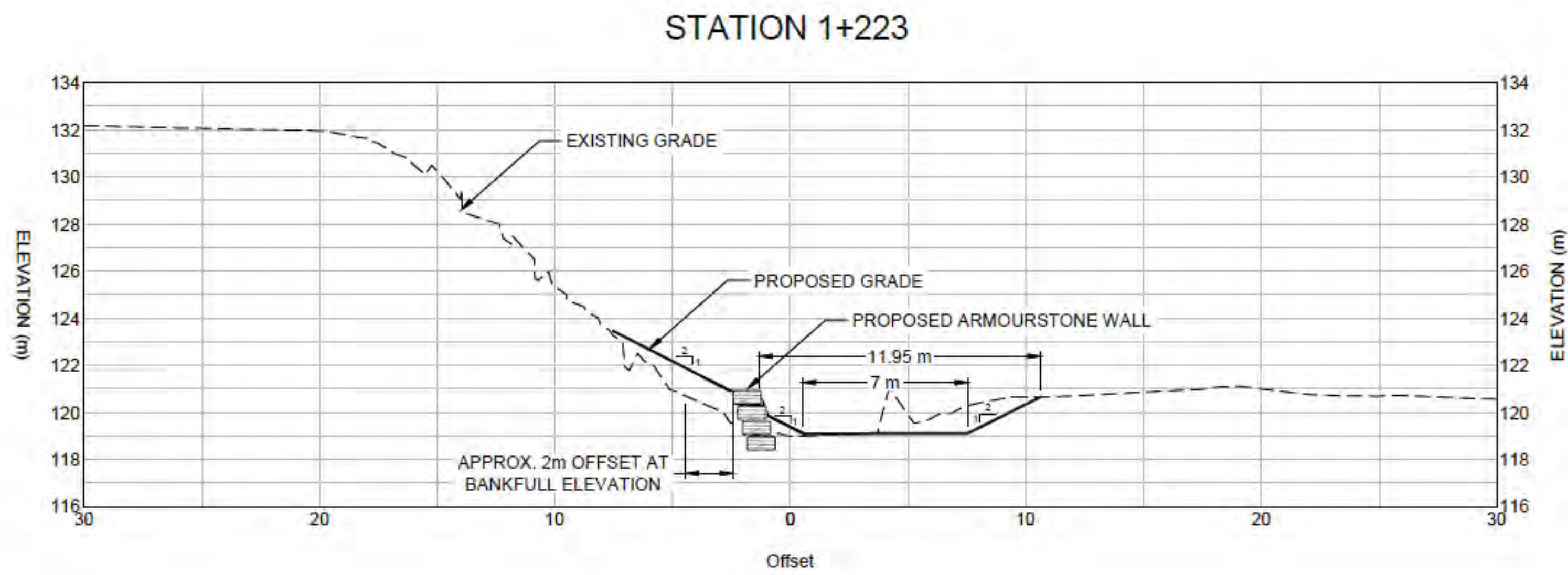
Existing Conditions

Issue: Valley contact with slope and toe erosion. Gabion baskets failing at toe
Risk: Private properties at top of slope
Length: >100 m



Proposed Conditions

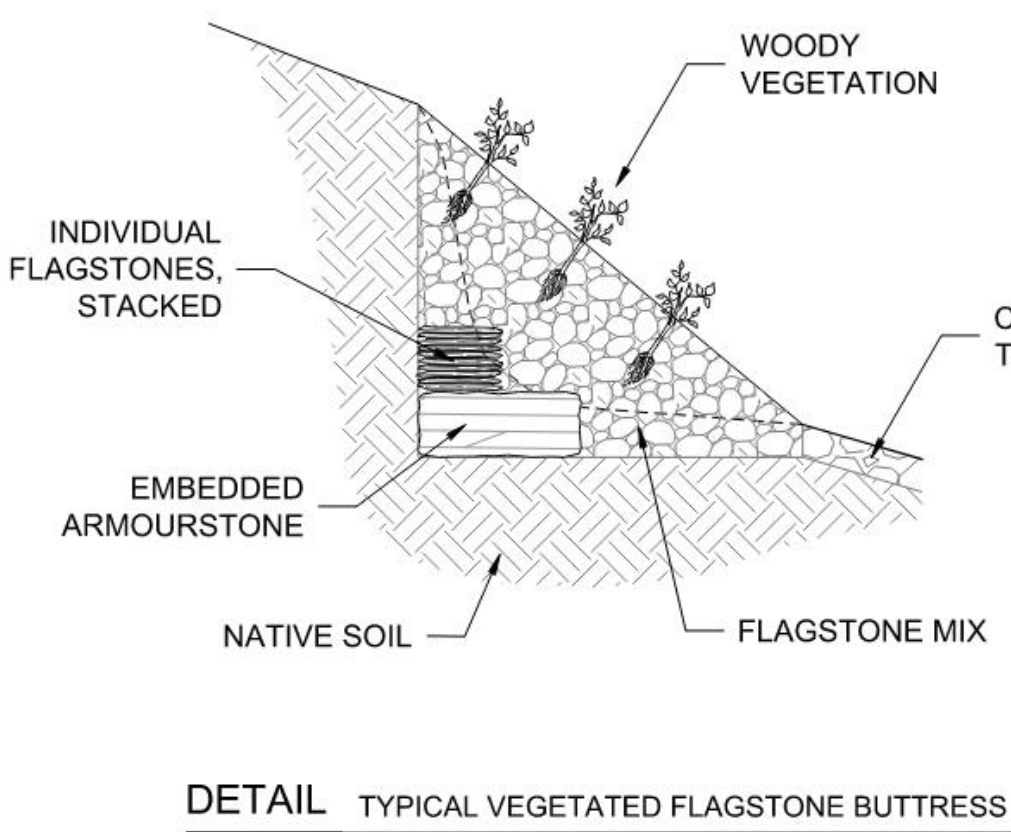
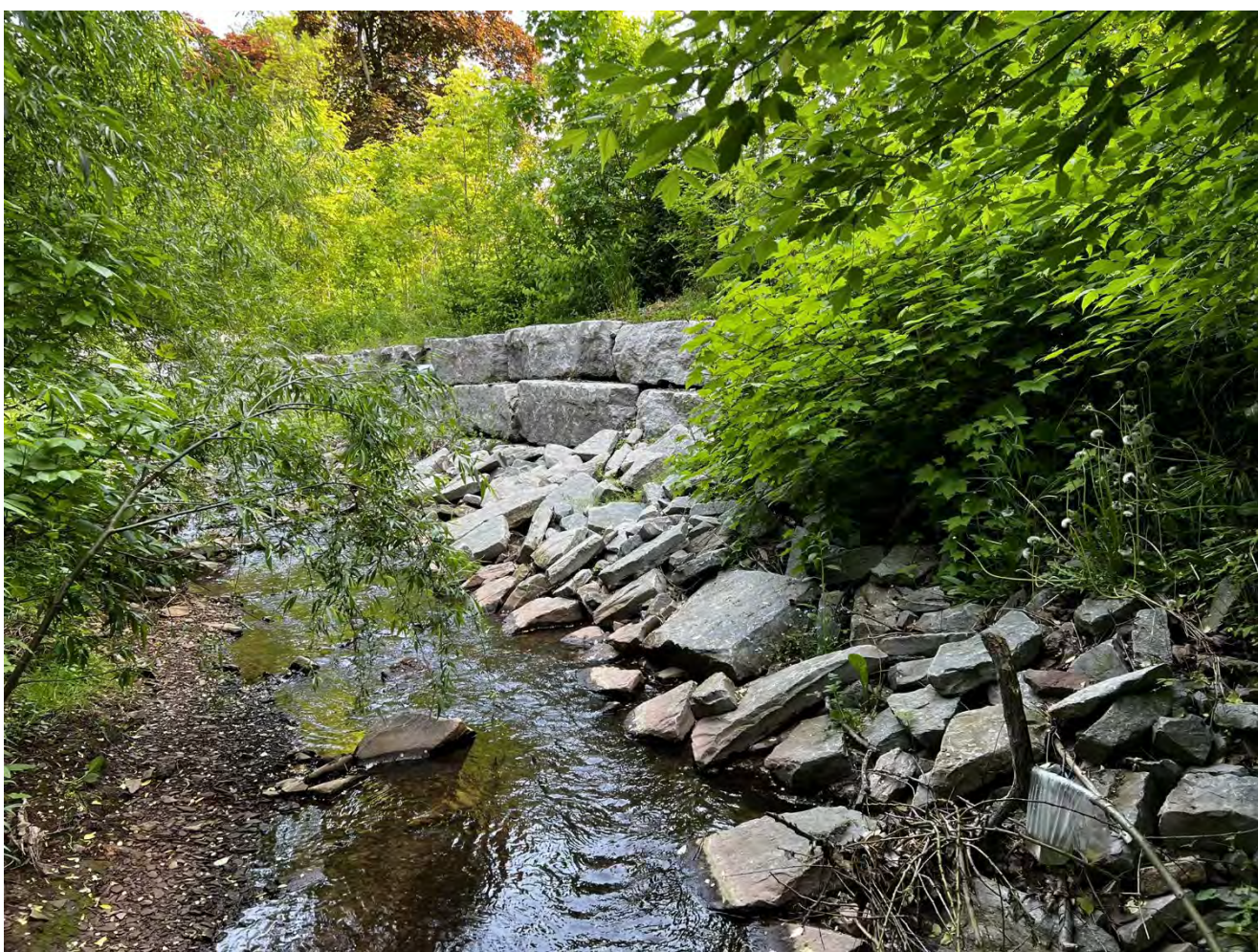
Preferred Alternative: Selective Works
Recommendation: Realign channel away from slope and replace gabion baskets with armourstone wall. Restore channel and banks with bioengineering.
Preliminary Cost Estimate: \$1,800,000
Estimated Tree Removals: 215 trees (~25% large trees > 30 cm diameter)



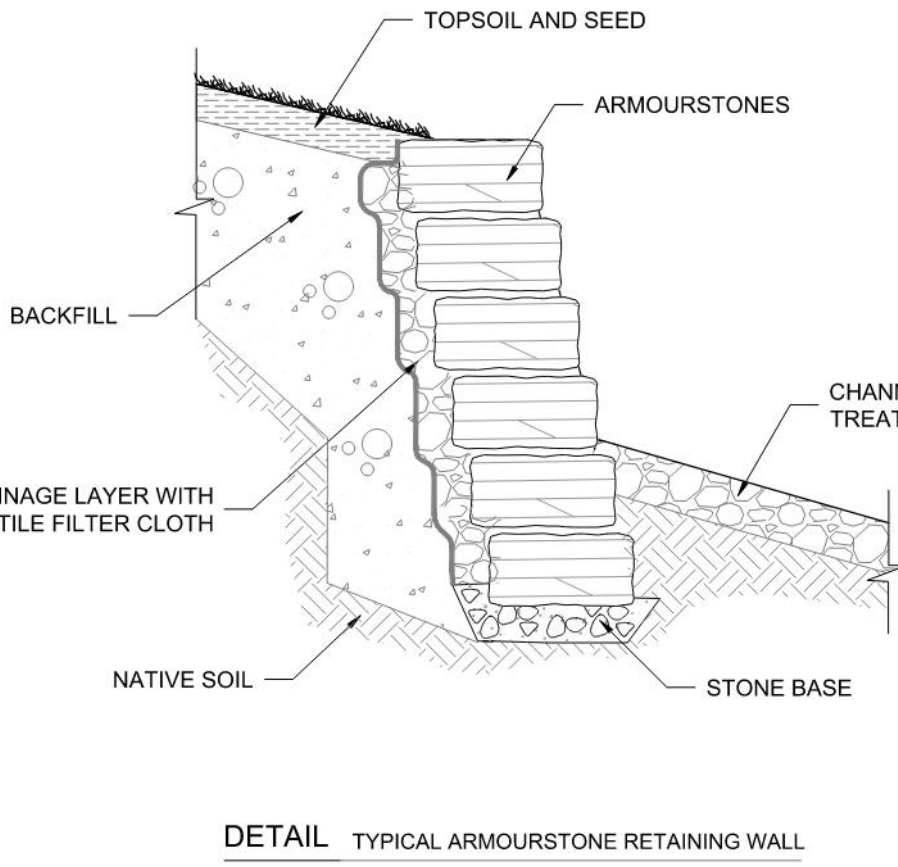
During Construction



After Construction



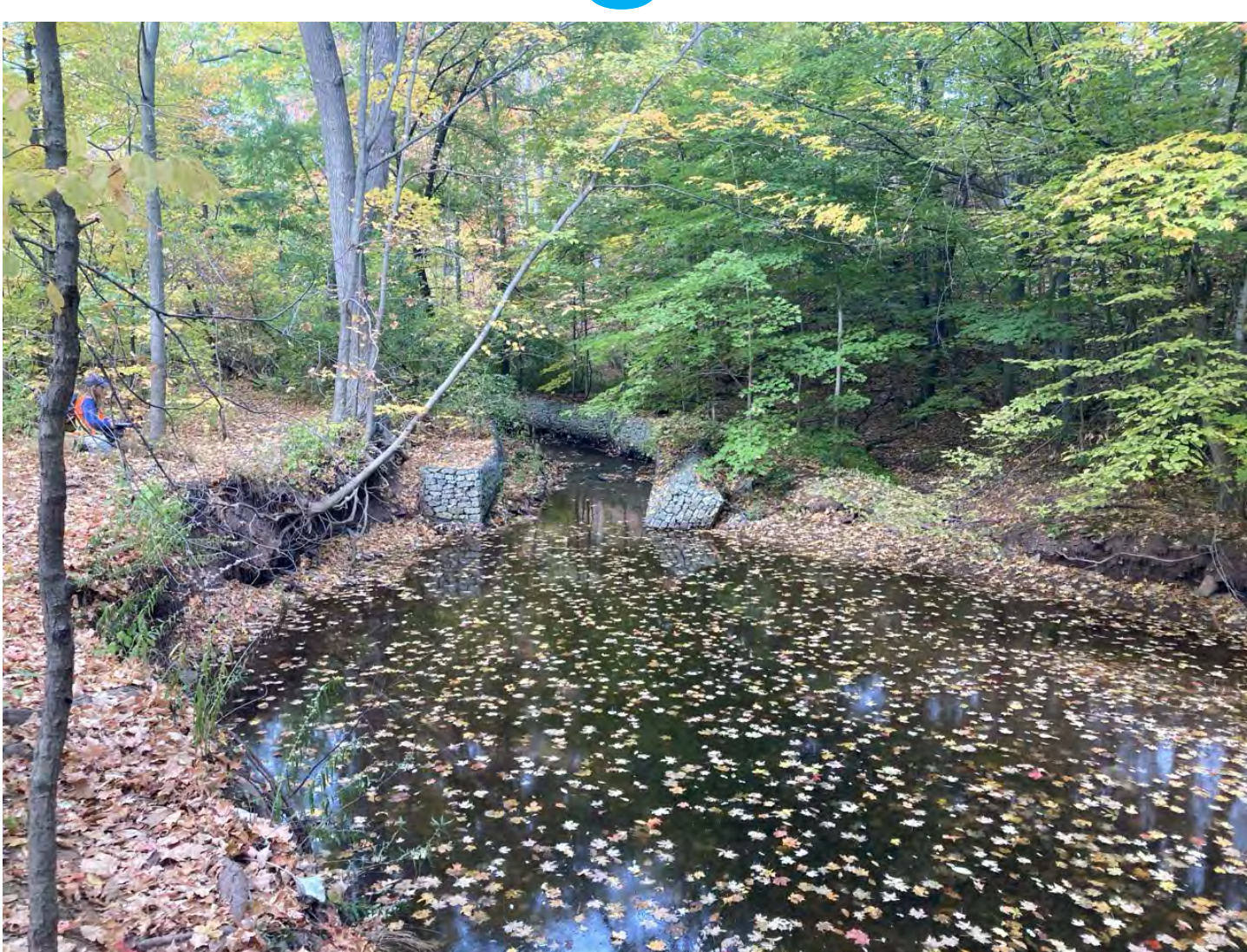
After Construction



Preliminary Functional Design

Sites E5, E6, & E7

Existing Conditions



E5: Failing gabion baskets with downstream scour pool. Risk to pedestrian bridge/trail



E6: Perched outfall on valley slope with suspended drop structure and scour pool. Risk to outfall and private properties at top of slope.



E7: Toe erosion of valley slope. Risk to private properties (parking lot) at top of slope.

Proposed Conditions

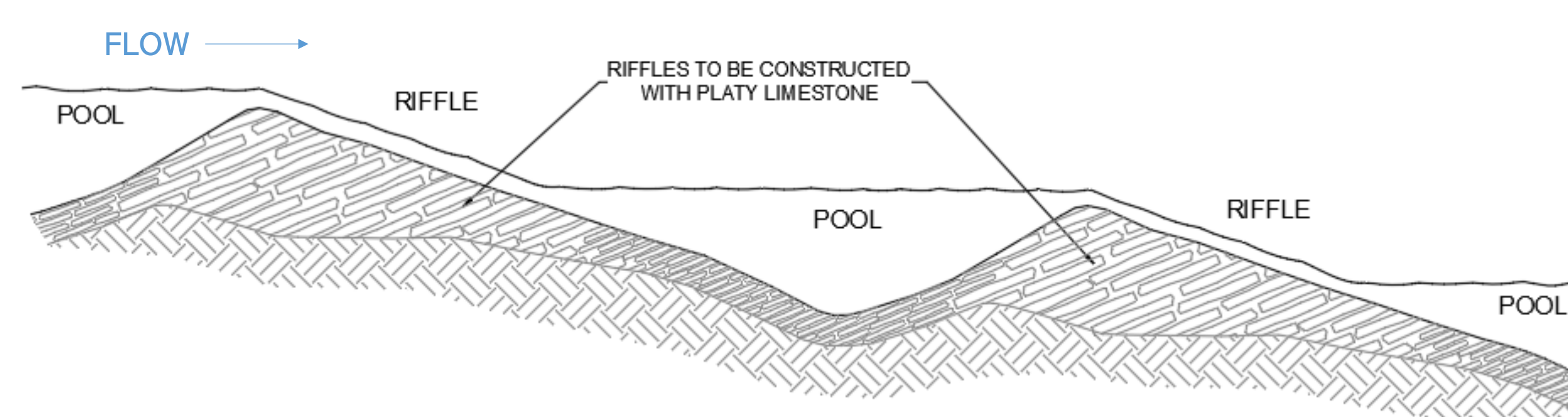
Preferred Alternative: Selective Works

Recommendation:

- E5:** Removal of gabion baskets. Natural channel design with riffle-pool morphology, vegetated flagstone buttress, and bank restoration. Replacement with larger span pedestrian bridge.
- E6:** Reinforce outfall with armourstone, construct scour pool, and restore outfall channel.
- E7:** Channel realignment and vegetated flagstone buttress at toe of slope

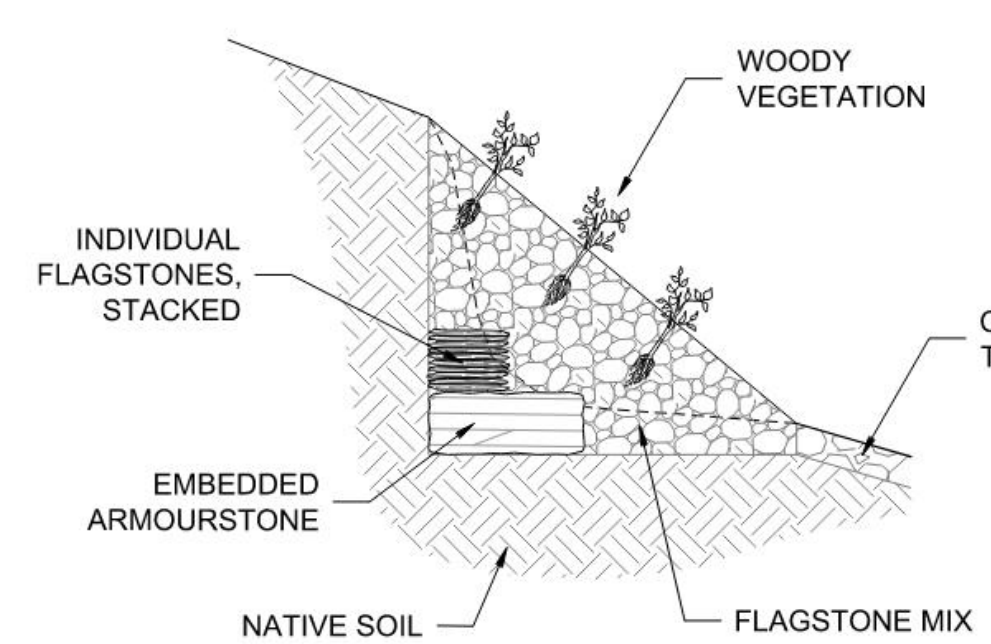
Preliminary Cost Estimate (All Sites): \$1,300,000

Estimated Tree Removals: 110 trees (~25% large trees > 30 cm diameter)



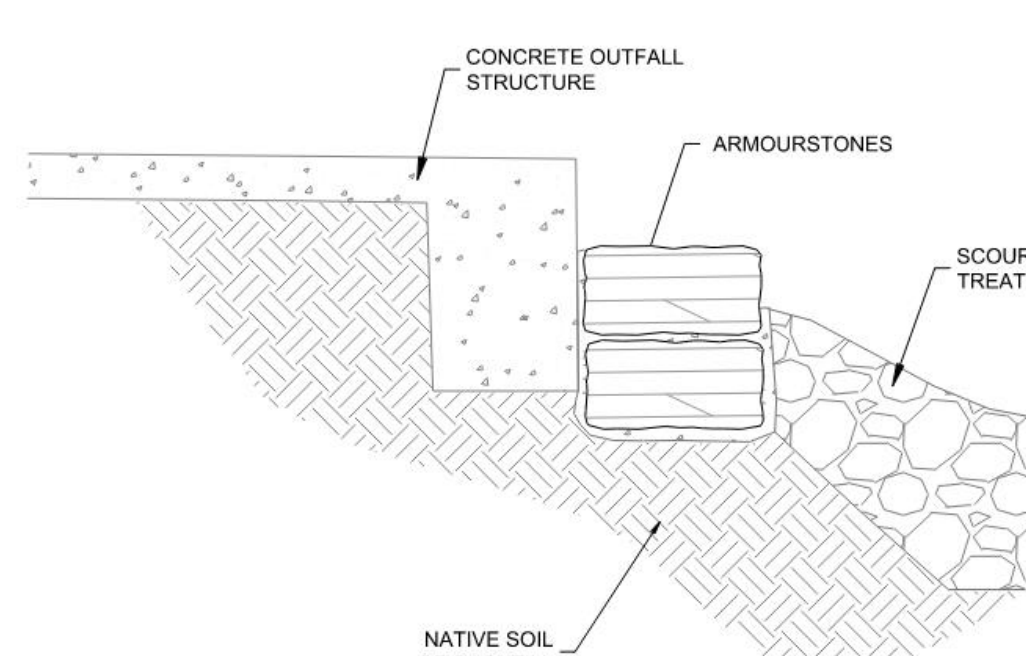
DETAIL TYPICAL RIFFLE-POOL SEQUENCE

During Construction



DETAIL TYPICAL VEGETATED FLAGSTONE BUTTRESS

After Construction

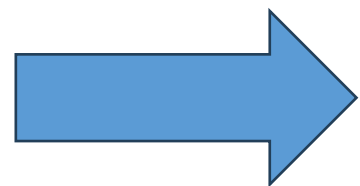


DETAIL TYPICAL ARMOURSTONE PROTECTION OF APRON WALL



Preliminary Functional Design

Site E11

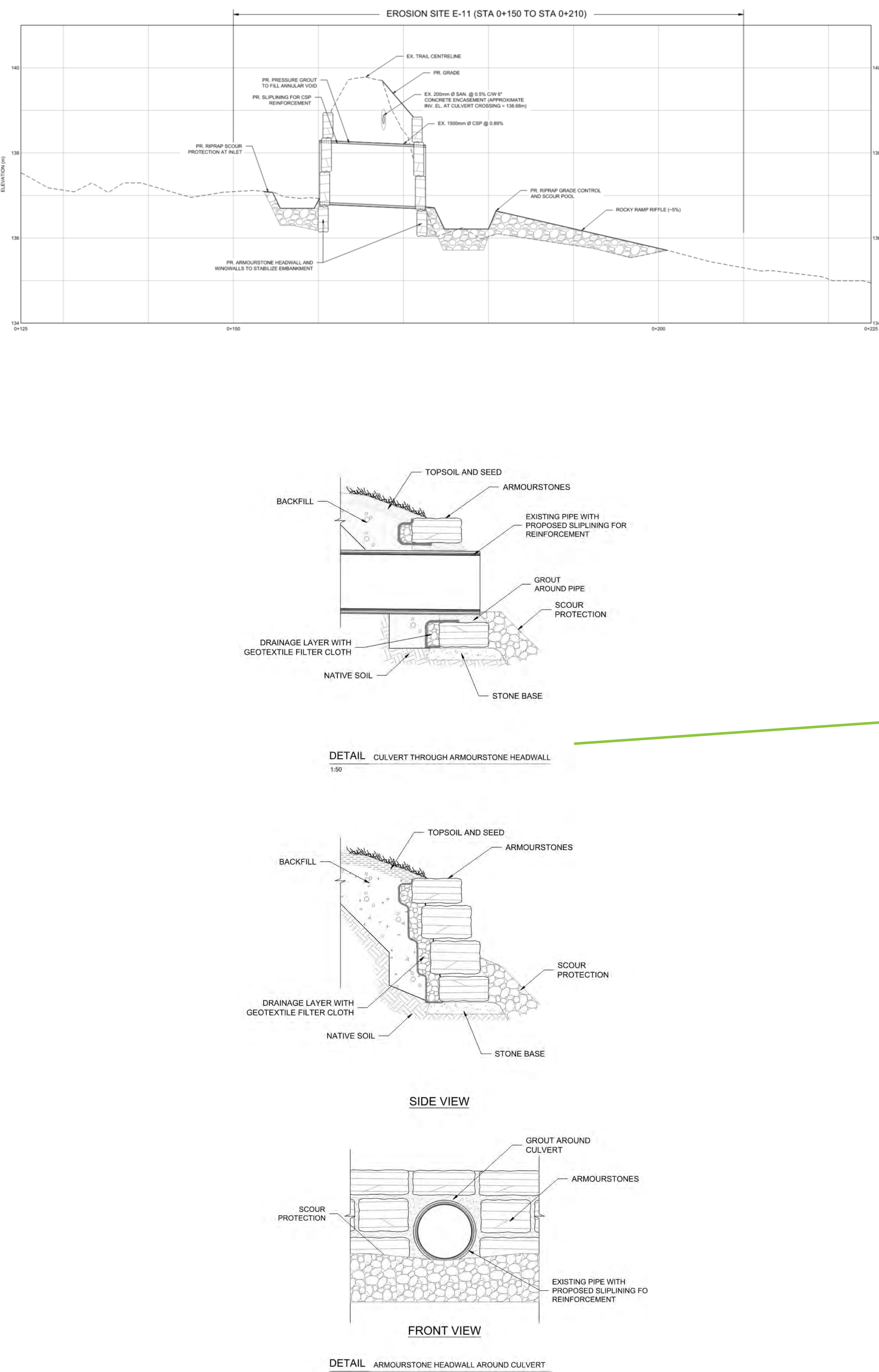


Proposed Conditions

- Preferred Alternative:** Selective Works
- Recommendation:** Retrofit CSP crossing, stabilize trail embankment with amourestone walls and stabilize channel downstream with scour pool and rocky riffle ramp.
- Preliminary Cost Estimate:** \$400,000
- Estimated Tree Removals:** 60 trees (~10% large trees > 30 cm diameter)

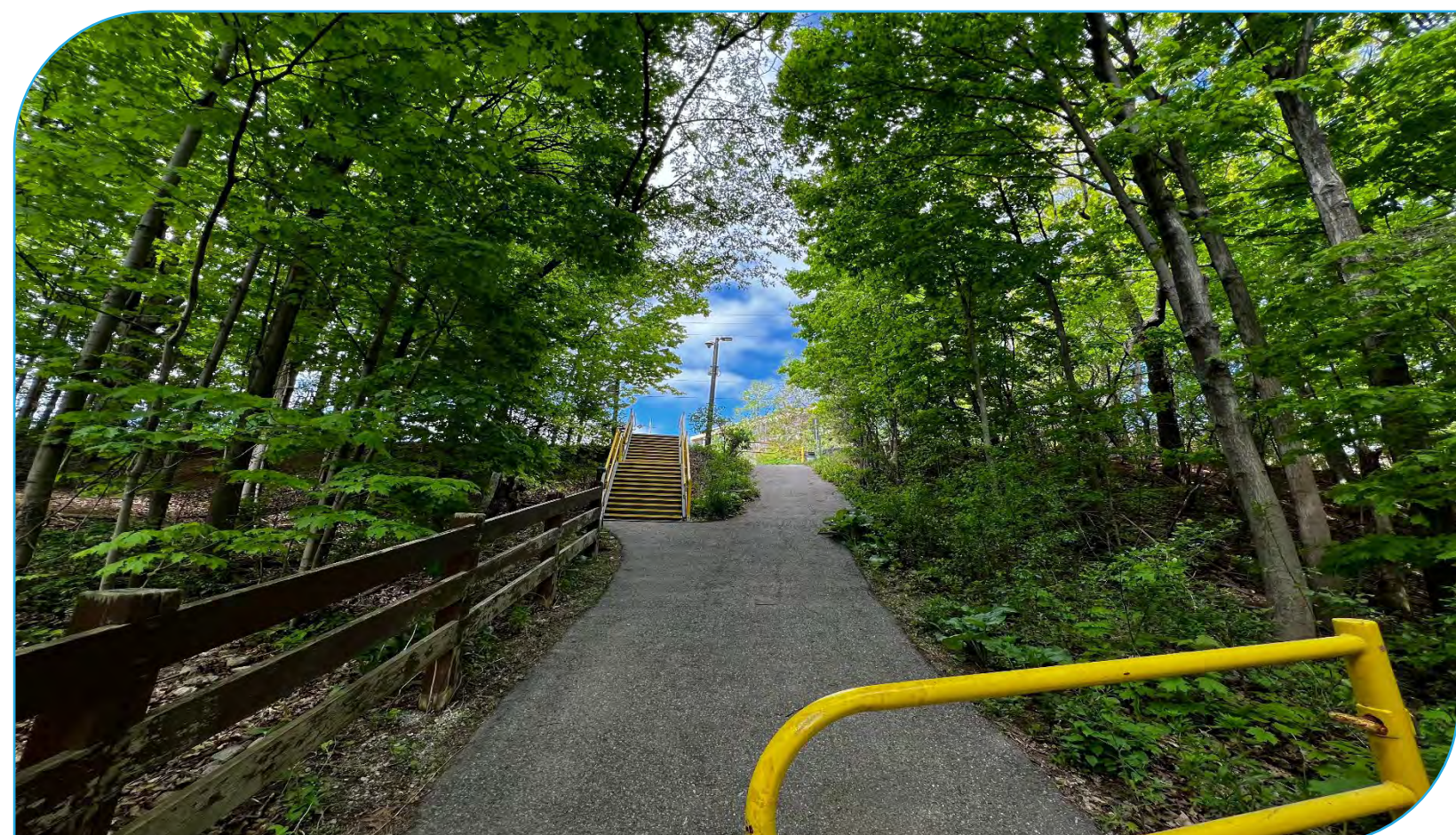
Existing Conditions

- Issue:** CSP culvert below trail, bottom corroded. Scour pool downstream. Buried sanitary sewer.
- Risk:** Critical infrastructure (nearby sanitary sewer), pedestrian path/crossing
- Length:** 20 – 50 m



Implementation - Construction Phase

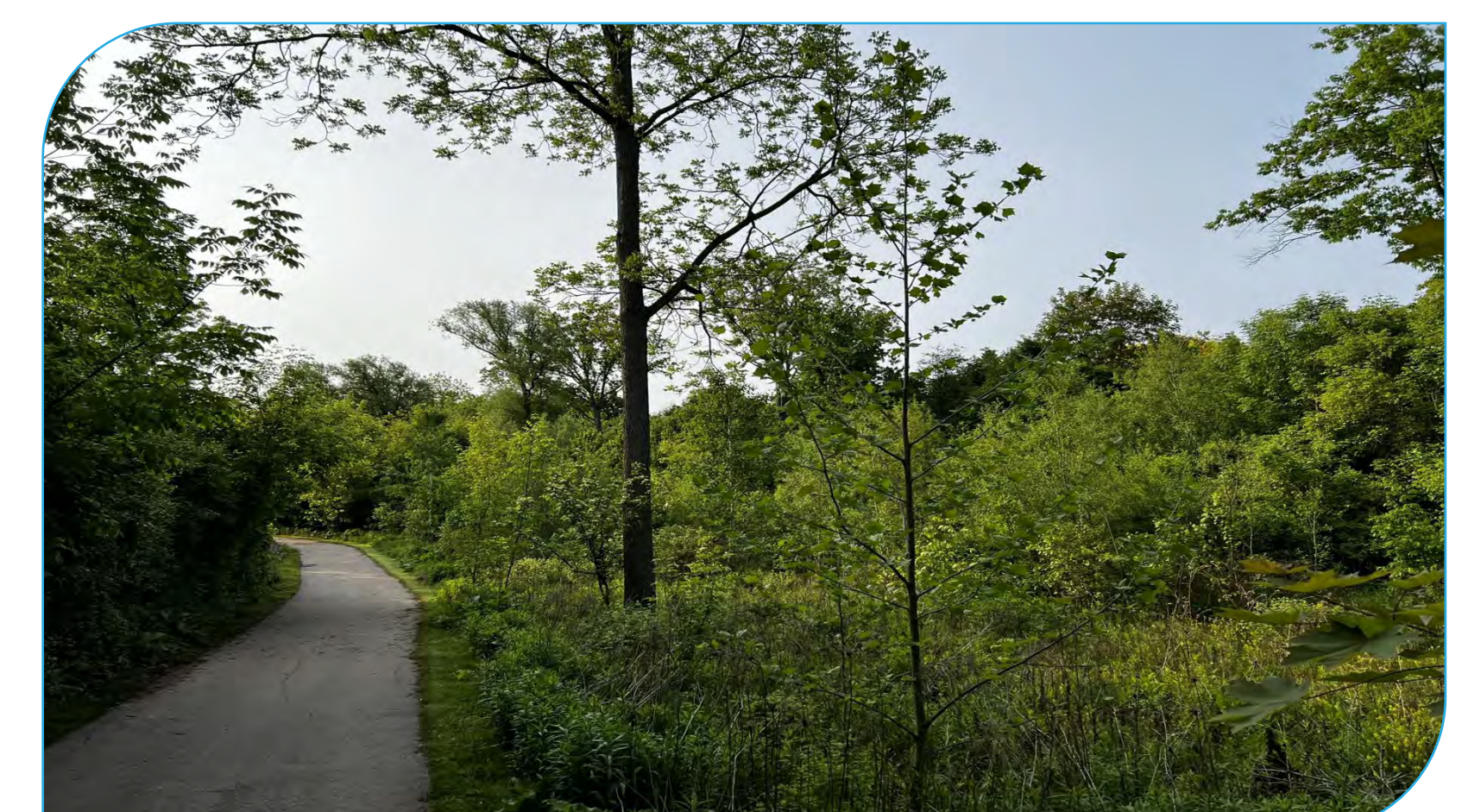
Note: Additional public engagement opportunities will be available during detailed design.



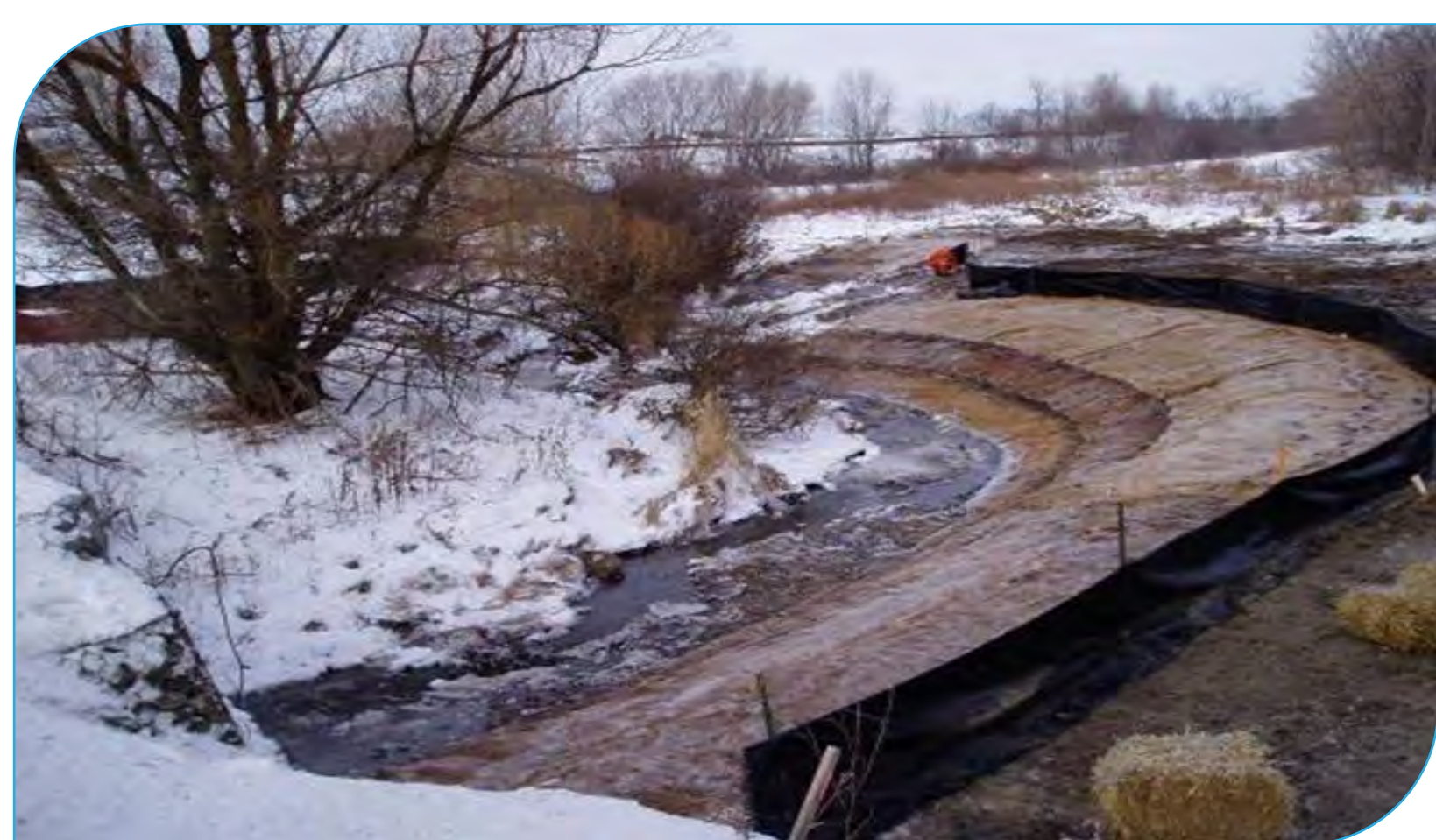
Construction access into creek corridor along existing trail. Tree removals will be required (estimated 100 trees).



Tree protection fencing to be installed



Floodplain to be revegetated and pedestrian trail restored

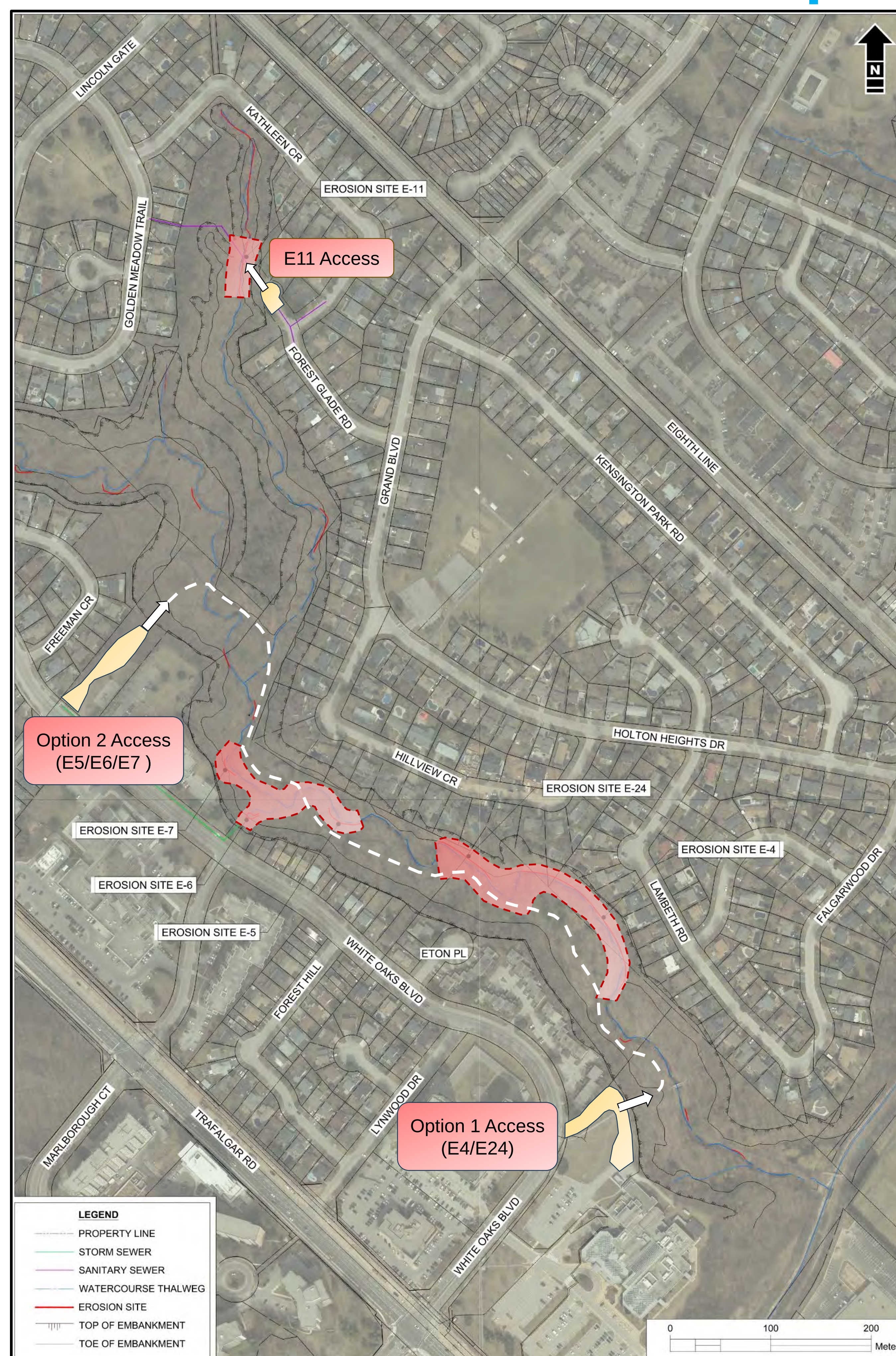


Temporary silt fencing for erosion and sediment control to be installed

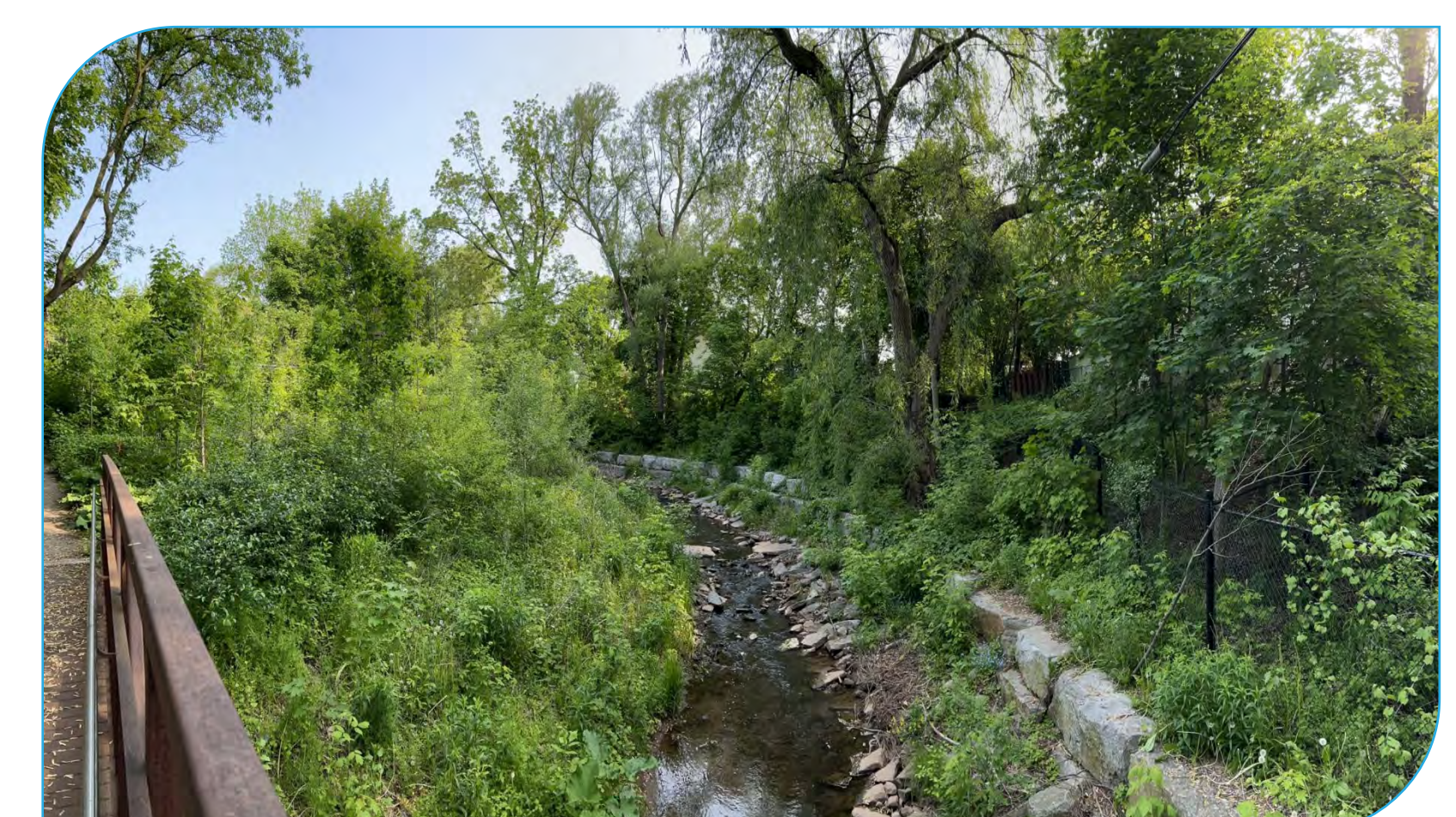


Channel to be isolated with temporary check dams and pumps to bypass creek flows

Construction Access Map



Work Areas Staging Areas Access route along existing trail



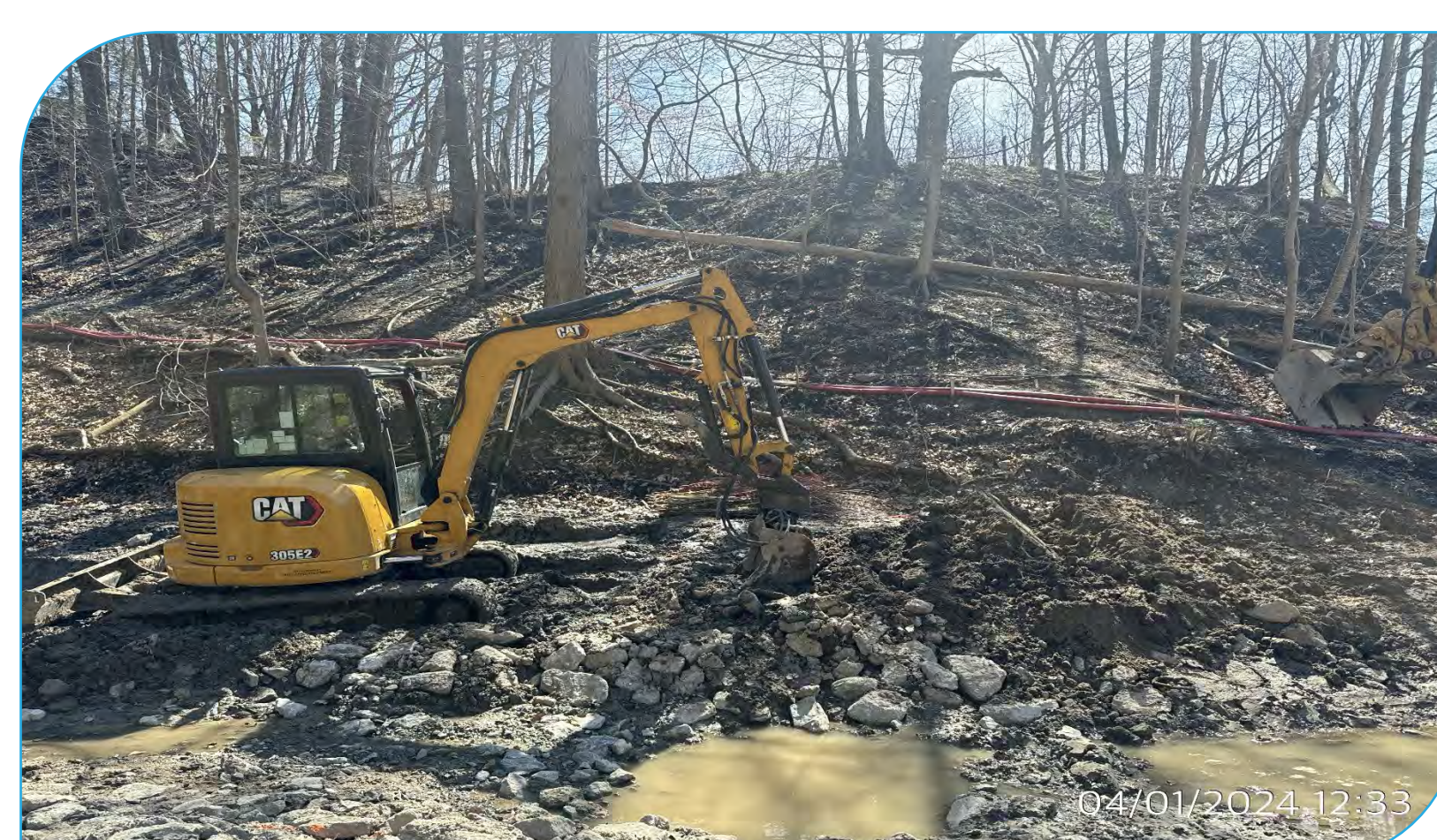
Sites to be restored with native plantings and vegetation



Erosion control blankets to be installed on restored banks



Heavy machinery will be required to build armourstone structures



Light machinery to be used where possible to minimize footprint and reduce tree removals



Riffles to be constructed with platy limestone (flagstone) similar to native shale material

Public Feedback & Next Steps

Thank you for your participation!

Please submit your input by June 27, 2025 using the comment sheet or online using the QR code below

After tonight's meeting, the study team will gather your comments, review your input, and undertake the following steps:

Erosion Mitigation EA Study

- ☐ EA finalization – **Summer 2025**
- ☐ Detailed design – **2026, subject to budget approval**
- ☐ Phased Construction to start – **2028 to 2029, subject to budget approval**



For additional information, please contact one of the study team members:



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