

Mimico Creek Erosion Control Project (Rena Road and Etude Drive to Derry Road East)

Schedule 'B' Municipal Class Environmental Assessment

Online Public Engagement (June 3, 2021 - July 8, 2021)



Presentation Outline

- Overview of Study Area and the Environmental Assessment process
- Historic Evolution of Mimico Creek West and East Branches
- High Priority Erosion Sites in Mimico Creek West and East Branches
- Hydrologic Conditions
- Slope Stability
- Terrestrial and Aquatic Resources
- Archaeological Resources
- Evaluation of Alternative Solutions
- Preferred Solution for West Branch and East Branch
- Example Photos of Creek Erosion Stabilization Works
- Next Steps

Background

Urban creeks and valleys are important elements of the urban landscape. **They convey stormwater, provide habitat for terrestrial and aquatic life and opportunities for social uses, such as trails, and enjoyment of greenspace.** Over time, these creeks and valleys are worn away due to natural forces such as water and wind. This process of wearing down is called erosion. Erosion can affect the path a creek follows (form) and the aquatic and terrestrial habitats it supports (function). The impacts to creek form can also impact social uses and visual aesthetics of these creeks.

The City of Mississauga has identified two sections (reaches) of Mimico Creek that have several locations of significant active erosion. These sections are referred herein as West Branch & East Branch.



Photograph showing erosion in Mimico Creek West Branch



Photograph showing erosion in Mimico Creek East Branch

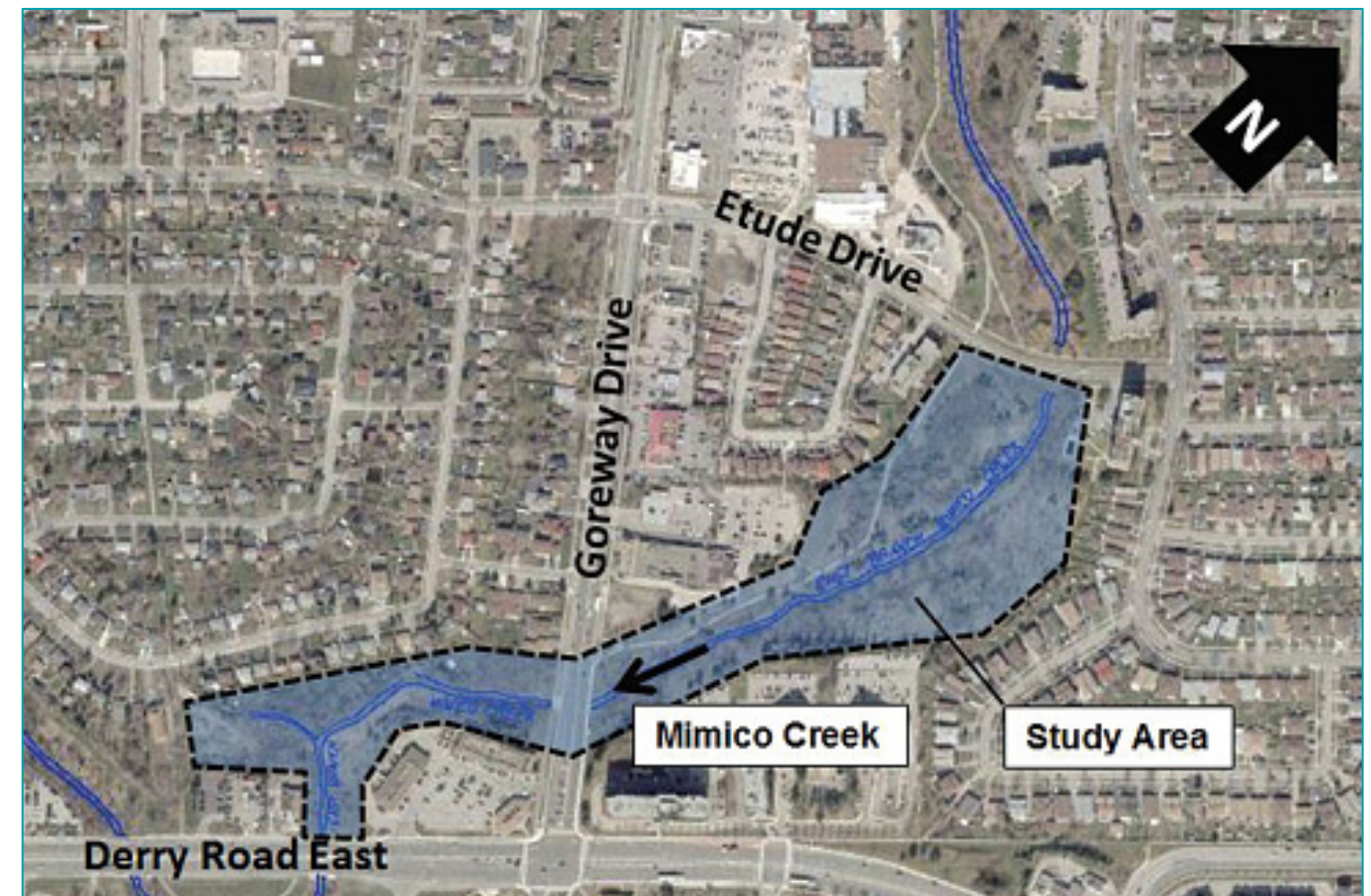
Mimico Creek West Branch and East Branch

The West Branch study area extends from the Canadian National Railway tracks located approximately 300m north of Rena Road to approximately 650m south of Rena Road.



Mimico Creek West Branch Study Area

The East Branch study area extends from Etude Drive to Derry Road East, which is a distance of approximately 800 m.



Mimico Creek East Branch Study Area

Municipal Class Environmental Assessment

The City of Mississauga is undertaking a Municipal Class Environmental Assessment (Class EA) to identify the processes causing the erosion problems and recommend a solution that addresses these problems within the west and east branches of Mimico Creek within study area. This project is being planned in accordance with the requirements of a Schedule 'B' project under the Municipal Class EA process.

The Class EA is being completed in following two phases:

Class EA Phase 1

- Identify problem and opportunities

Class EA Phase 2

- Inventory natural, social and economic existing conditions
- Identify and evaluate alternative solutions
- Identify preferred solution
- Consult with the public, Indigenous Nations, government review agencies, and interested stakeholders
- Prepare Project File Report
- Publish Project File Report for review by the public, Indigenous Nations, government review agencies, and interested stakeholders

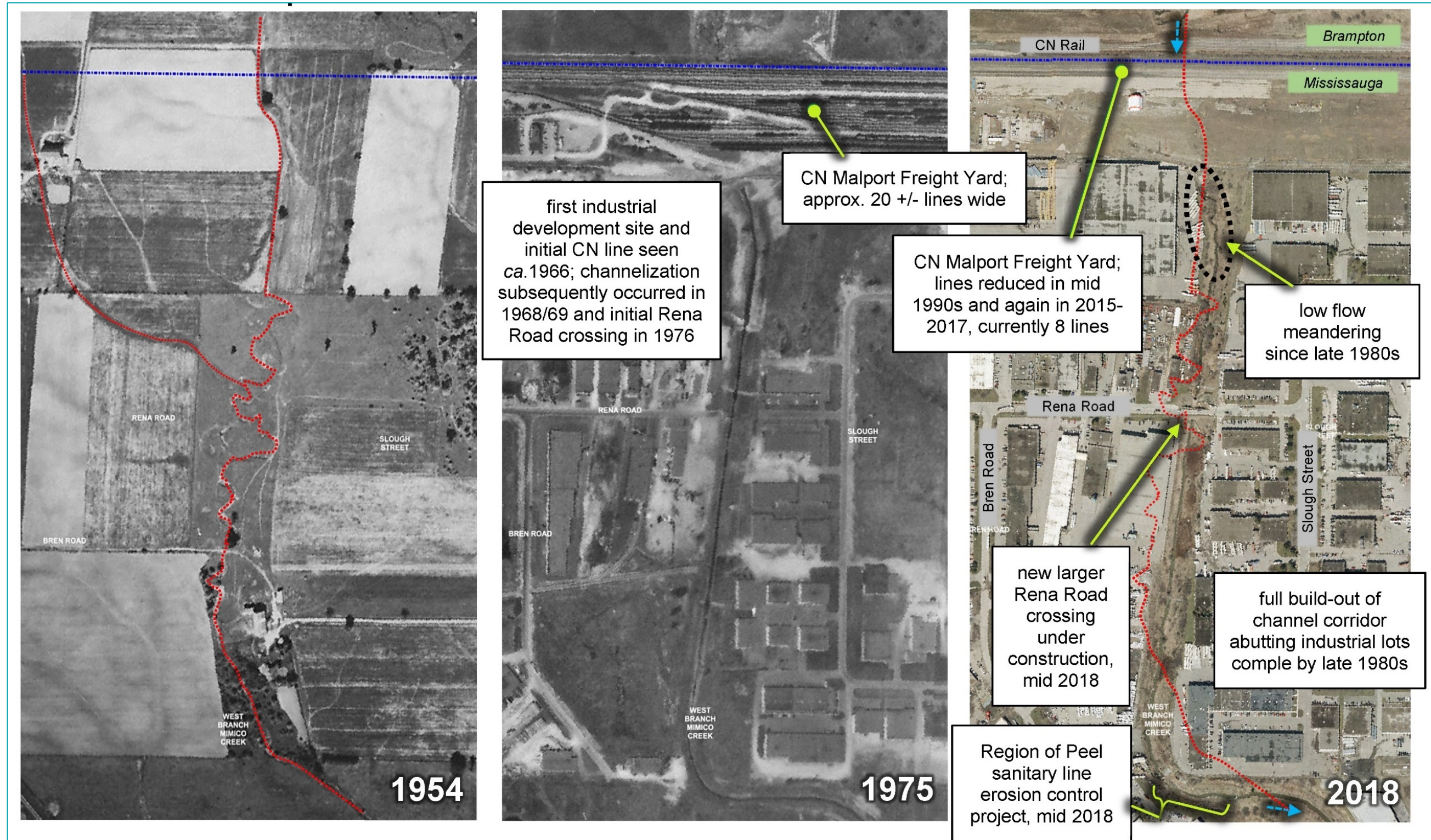
In accordance with the Class EA Phases 1 and 2, several technical investigations were completed to identify existing conditions and erosion problems within the Study Area. Following completion of technical investigations, various alternative solutions were identified and evaluated to identify a preferred solution to address erosion problem within the study area. Results of these investigations and evaluation process are discussed on the following slides.

Historic Evolution of Mimico Creek West Branch Channel

1954: Agricultural conditions

1975: Engineered channelization, rail corridor development at the upstream limits, and the start of surrounding industrial development

2018: Meander development below the rail line. Moderate levels of incision and widening are also deemed to have occurred since original channelization.



Historic Evolution of Mimico Creek East Branch Channel

1963: Urbanization of surrounding lands and channel realignment



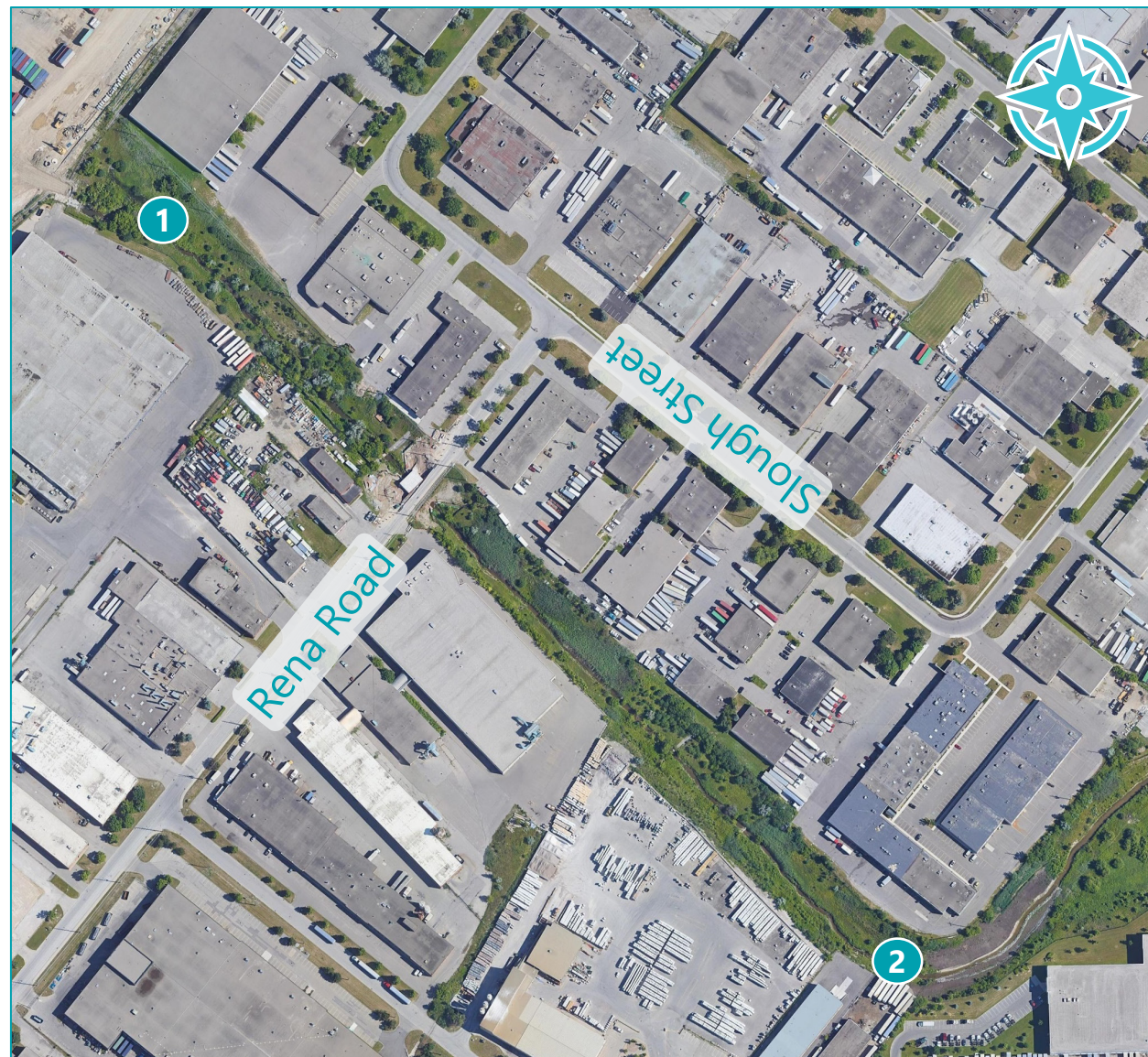
2000s: Channel naturalization, tree planting, moderate levels of incision and widening, and development of Malton Greenway Trail (2008)



2018: Naturalization of entire riparian corridor



High Priority Erosion Sites in Mimico Creek West Branch



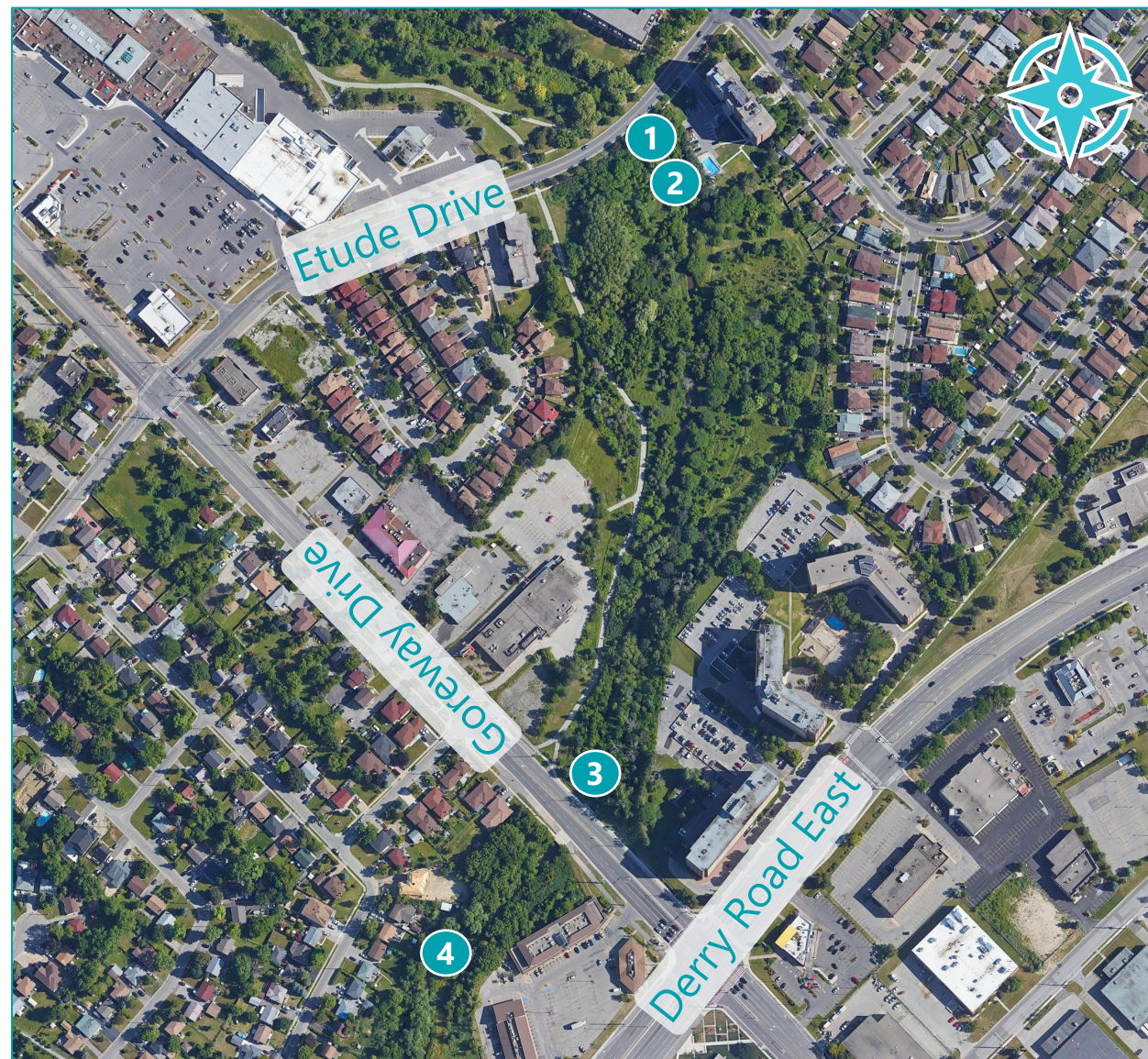
1 - Bank and slope erosion scar with vertical exposure and vegetation failure into the channel.



2 - The storm outfall and headwall structure has been exposed due to meander movement and widening. The northerly wingwall has failed and rests on the creek bed.



High Priority Erosion Sites in Mimico Creek East Branch



1 - The base or toe of each gabion has broken due to rusted wire and stone displacement has occurred.



2 - Channel bank erosion has resulted in additional slope failure up the slope face and loss of vegetation.



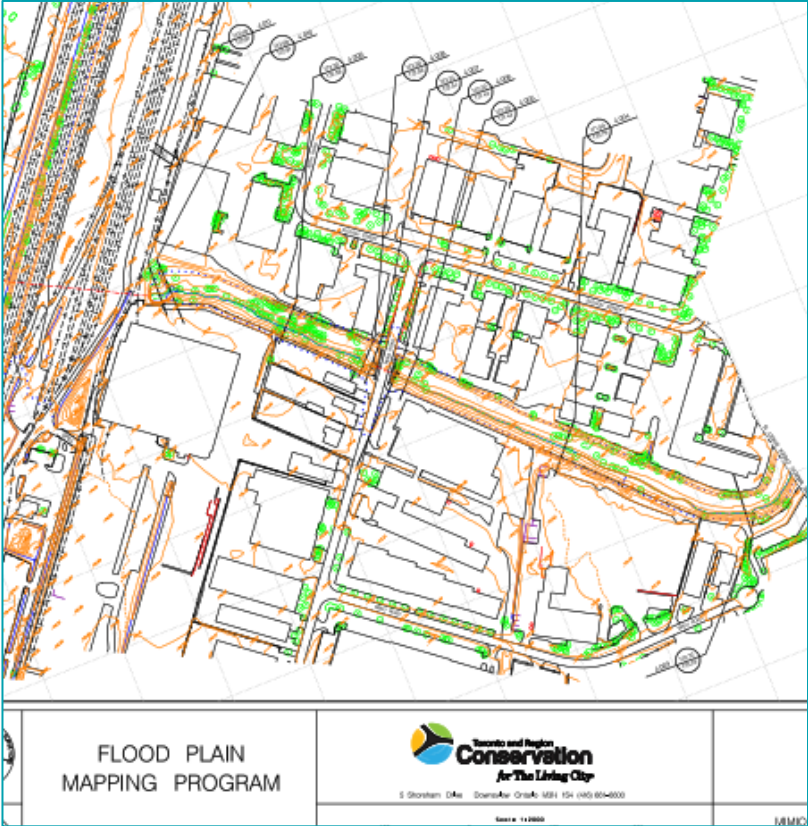
4 - The gabion wingwall is slightly undermined, and the base is sitting on soft saturated sediment.



3 - Base row of gabions is failing along the low flow due to rusted wire. Erosion below the storm outfall.

Hydrology

Hydrology is the science of the movement and quantity of water, derived from rain and snow on the watershed as runoff in creeks, ditches, gutters and storm sewers. Hydrologic models are numerical tools (computer-based) which are used to determine runoff rates and volumes from various land uses in response to a rainfall or snowmelt event. Runoff rates and volumes have an influence on creek erosion. The Toronto Region Conservation Authority provided the 2009 background report and model for the Mimico Creek hydrology.



Storm Event (return period, Regional)	East Branch Peak Flow (cubic metres / second)	West Branch Peak Flow (cubic metres / second)
2yr	17.8	16.0
5yr	26.7	24.2
10yr	32.9	30.0
25yr	40.6	37.1
50yr	46.5	41.9
100yr	52.2	46.5
Regional	199.2	88.9

Hydraulics

Hydraulics is the study of the capacity and water levels associated with storm sewers, creeks and valleys, culverts, bridges, etc. Hydraulic models are used to determine the velocity and depth of storm water runoff in the creek and floodplain. Existing conditions hydraulic modelling and mapping was obtained from Toronto Region Conservation. This modelling has been used to assess the existing erosion conditions, and will be used in the detailed design stage, with the approved 2009 peak flows, to confirm the design of all channel bed and bank works.

Slope Stability

A total of four sites were identified requiring geotechnical design input regarding erosion control / slope stability / structure rehabilitation. A geotechnical visual survey of slopes and stability at these sites was completed, which documented slope height and any indicators of slope instability. Results of the visual survey are summarized below:

Mimico Creek West Branch:

- The overall slope height at the two sites were identified to be approximately 3.5 m high.
- Slope failures were observed at the outside of the meanders (bends). Sloughed material was observed at the toe of the slope/creek bank at one site and within the creek at the other site.
- These sites were identified as areas of active erosion where further erosion and sloughing are expected without remediation.

Mimico Creek East Branch:

- The overall bank heights at the two investigated sites ranged from approximately 4 to 6 m high.
- The lower portions of the slopes along the outside of the meanders were identified as areas of erosion with surficial sloughing.



Photo showing slope erosion in Mimico Creek East Branch

A more detailed subsurface investigation will be completed during detailed design phase of this project to assess the slope stability and provide geotechnical recommendations regarding erosion control / slope stabilization.

Fish Habitat

The Fish Habitat Assessment was completed to assess fisheries and aquatic habitat within the Mimico Creek West Branch and East Branch Study Areas. As part of the Fish Habitat Assessment, an additional 50 m upstream and 200 m downstream of each identified channel reach was assessed during field investigations.

- Mimico Creek within the West Branch and East Branch Study Areas provides direct fish habitat.
- Mimico Creek is a permanent watercourse, with a warm water thermal regime, containing common fish species which are tolerant of conditions generally found in urban settings.
- No species at risk fish were identified through a review of online resources or during field investigations.
- Low water levels and structures/barriers within the creek provide impediments to fish passage during certain times of the year.
- Potential impediments to fish passage and areas of instability due to erosion were present in several locations in both branches.



Photo showing low water levels in Mimico Creek West Branch that may impede fish passage

Fish Habitat Integration Objectives:

1. Use of natural material treatments for erosion control that add physical aquatic environment complexity, and
2. Mitigation of instream fish passage barriers.

Appropriate mitigation measures will be proposed to avoid/minimize project impacts to fish habitat.

Terrestrial Resources - Vegetation

Terrestrial Resource Assessment involves study of land-based ecosystems, their populations and communities of plants, animals, their interactions with the atmosphere and with water. Results of this Terrestrial Resource Assessment and Species-at-Risk (SAR) Screening completed in support of this Class EA Study are summarized below and on the following slides:

Vegetation: Overall, the West Branch Study Area is comprised of meadows and thickets as the dominant communities, and the East Branch Study Area contains a larger forest land coverage. No Species-at-Risk plants were observed within the East and West Branch Study Areas during the botanical inventory. Vegetation communities identified in the field are listed in the table below:

Mimico Creek West Branch Study Area - Vegetation communities	Mimico Creek East Branch Study Area - Vegetation communities
MEGM3 – Dry-Fresh Graminoid meadow Ecosite (L+)	FODM7-9 – Fresh – Moist Exotic Lowland Deciduous Forest Type (L+)
MEGM3-8 Reed Canary Grass Graminoid Meadow Type (L+)	MEFM1-1 – Goldenrod Forb Meadow Type (L5)
MAMM1-12 Common Reed Graminoid Mineral Meadow Marsh Type (L+)	THMM1-1 – Native Mixed Regeneration Thicket Type (L5)
THDM2-4 Gray Dogwood Deciduous Shrub Thicket Type (L4)	FODM12 – Naturalized Deciduous Plantation Ecosite (L5)
THDM2 – Deciduous Shrub Thicket Ecosite (L4)	
MEFM1 – Dry – Fresh Forb Meadow Ecosite (L5)	
THDM2-6 - Buckthorn Deciduous Shrub Thicket Type (L+)	
FODM7-9 Fresh - Moist Exotic Lowland Deciduous Forest (L+)	

Toronto and Region and Conservation Authority (TRCA) ranking status: L+ refers to those communities comprised largely of exotics or introduced species. L5 are those communities that are able to withstand high levels of disturbance and considered secure. L4 are those communities that are able to withstand some disturbance and are considered a concern in urbanized areas.



Mimico Creek West - MAMM1-12 - Common reed graminoid mineral meadow marsh type



Mimico Creek West MEGM3-8 - Reed canary grass graminoid meadow



Mimico Creek East FODM7-9 - Fresh – moist exotic lowland deciduous forest

Terrestrial Resources - Wildlife (Breeding Birds & Mammals)

Breeding Birds: Through a review of online resources, a total of 114 birds were identified in areas that encompass the West and East Branch Study Areas, including five (5) threatened and, three (3) special concern SAR. A summary of those SAR are as follows:

- Bank Swallow (*Riparia riparia*) – Threatened;
- Barn Swallow (*Hirundo rustica*) – Threatened;
- Bobolink (*Dolichonyx oryzivorus*) – Threatened;
- Chimney Swift (*Chaetura pelagica*) – Threatened;
- Common Nighthawk (*Chordeiles minor*) – Special Concern;
- Eastern Meadowlark (*Sturnella magna*) – Threatened;
- Eastern Wood-pewee (*Contopus virens*) – Special Concern; and
- Wood Thrush (*Hylocichla mustelina*) – Special Concern.

It is important to note that most of the birds reported were identified from the OBBA data, which is based on a 10km X 10km square area. As such, the exact locations of these birds are unknown relative to the East and West Branch Study Areas. During the botanical inventory, a limited number of birds were noted incidentally, both visibly and audibly which include Cooper's Hawk, American Kestrel and House Finch for the West Branch study area, and Northern Cardinal, Red-tailed Hawk, and Ruby-crowned Kinglet for the East Branch study area. No nests were found on the culverts and bridges within both the East and West Branch Study Areas.

Mammals: Through a review of online resources, a total of 41 mammal species were identified in the West and East Branch Study Areas, four of which are considered endangered. It is important to note that the exact locations of species occurrences are not available from the online resources. Given the vegetative characteristics and habitat suitability, there is a moderate probability for non-SAR and SAR bats, to occur within the East and West Branch Study Areas. During the field investigations, Wood observed evidence of Beaver, and Racoons within the East Branch Study Area, and had visual sightings of Eastern Cottontail, Gray Squirrel, and a White-tailed Deer. The evidence of mammals observed by Wood at the West Branch Study Area was that of Raccoon.

Terrestrial Resources - Wildlife (Reptiles, Amphibians & Butterflies) & NHS

Reptiles and Amphibians: Within the East and West Branch study areas, a total of 10 species of amphibians and 10 species of reptiles were identified through online resources. Species at Risk reptiles and amphibians with historic records within the East and West Branch Study Areas include, one (1) threatened turtle, and two (2) turtles that are special concern, as noted below:

- Blanding's Turtle (*Emydoidea blandingii*) – Threatened;
- Snapping Turtle (*Chelydra serpentina*) – Special Concern; and
- Northern Map Turtle (*Graptemys geographica*) – Special Concern.

It is important to note that the exact locations of species occurrences are not available from the atlas. Given the characteristics of the East and West Branch study areas, there is a probability for amphibians and reptiles to occur due to the presence of wetland pockets, particularly along the West Branch. There is also suitable habitat for SAR, specifically to that of Snapping Turtle (special concern).

Butterflies: Background research using online resources revealed a total of 52 butterfly species to have occurrences within the East and West Branch Study Areas, including one (1) special concern species (Monarch (*Dananeus plexippus*)). It is important to note that the exact locations of species occurrences are not available from these sources.

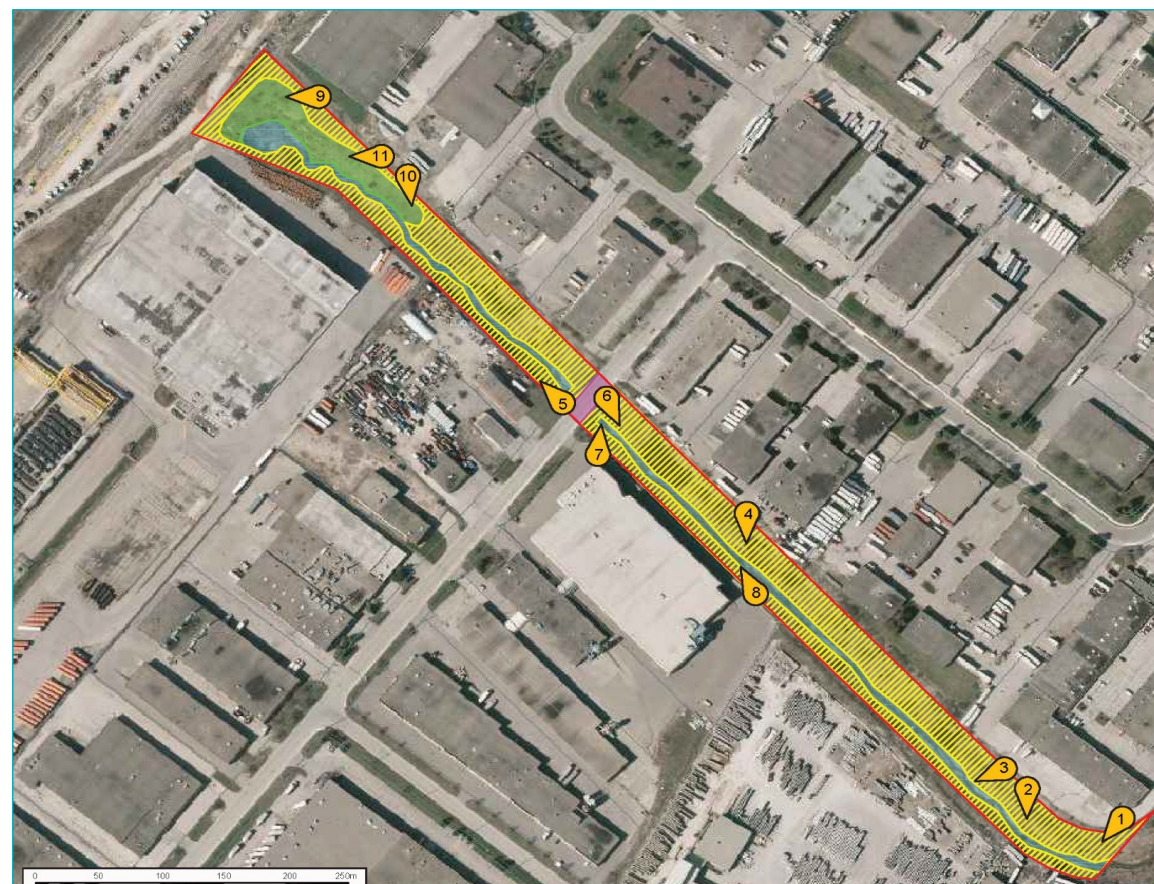
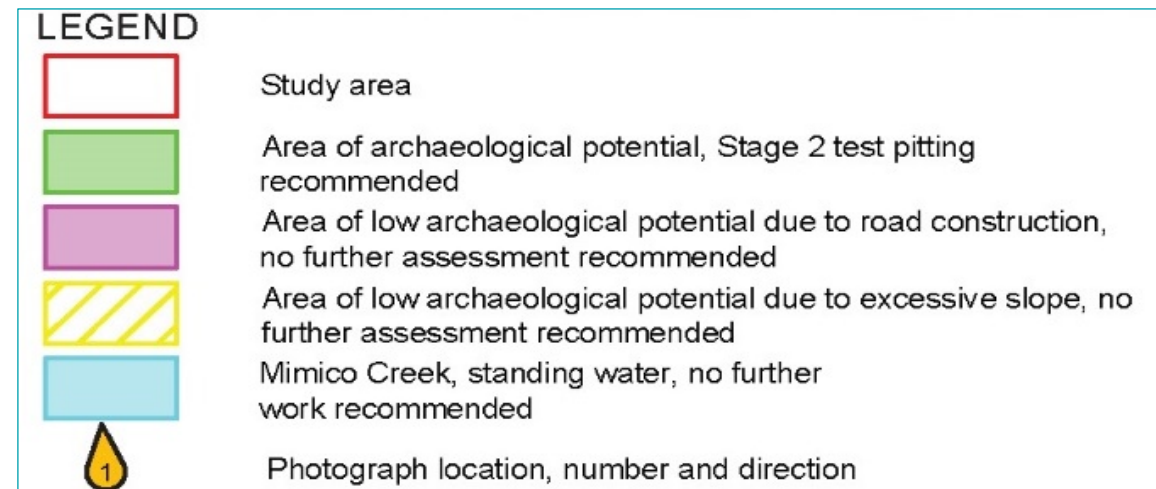
Consequently, it is possible that some of these species do not occur in the East and West Branch Study Areas. Based on the field investigations completed, there is meadow habitat within both the West and East Branch Study Areas. These meadow communities could be used as feeding habitat for the Monarch. Common Milkweed, which is considered the host plant for the Monarch was found in the MEFM1-1 Goldenrod Forb Meadow Type community in the East Branch Study Area. Although no Common Milkweed was noted within the West Branch Study Area, additional nectar plants (e.g., Goldenrod and Aster spp. etc.) were observed in the West Branch Study Area as well.

Natural Heritage System: The NHS includes natural areas (e.g., wildlife habitat) wetlands, valleys and watercourse corridors. Based on a review of online resources and field investigations, **unevaluated wetlands** are located in West Branch Study Area. **Significant valleylands** are likely associated with both the East and West Branch Study Areas. Based on the field investigations, there are **Significant Woodlands** located within the East Branch Study Areas. Woodlands located within the West Branch Study Area would be considered too small to meet significance levels.

Appropriate mitigation measures will be proposed to avoid/minimize project impacts to terrestrial resources.

Archaeological Resources

A Stage 1 Archaeological Assessment was completed, which identified areas of archaeological potential within the West Branch and East Branch Study Areas. Stage 2 assessment is recommended for these areas of archaeological potential prior to any disturbance/construction activities.



Areas of Archaeological Potential - Mimico Creek West Branch



Areas of Archaeological Potential - Mimico Creek East Branch



Areas of Archaeological Potential - Mimico Creek East Branch

A Stage 2 Archaeological Assessment will be completed during detail design to assess areas of archaeological potential.

Problem



The Mimico Creek east branch between Derry Road East and Etude Drive, and the west branch between the Canadian National Railway tracks and downstream of Rena Road, has been experiencing erosion, related to historic urbanization in the City of Mississauga, and upstream in the watershed in the City of Brampton.

The City of Mississauga, through its ongoing annual erosion inventory and assessment program, identified the two study reaches as a high priority for rehabilitation due to the risk to infrastructure and adjacent residential (east branch) and industrial (west branch) properties throughout the study area, and the risk to City trails in the park on the east branch between Goreway Drive and Etude Drive.

In addition, erosion has led to localized bank instability, undermining of abutments, undermining of storm sewer outfalls, deteriorating gabion baskets and concrete grade control structures, imbalances in sediment transport, and degradation of both aquatic habitat and riparian vegetation.

Opportunity



The City, through the current Class EA and detailed design assignment, has the opportunity to address the areas with significant erosion, through design of erosion control works and appropriate mitigation. The City will be able to work on primarily City lands and will be able to work adjacent to two recently completed Region of Peel and TRCA projects for channel works and bank stabilization on both the west and east branches. The City is also undertaking a flood mitigation study in the contributing drainage area, which may also offer an opportunity for future works to be identified on the east branch.

Long List of Alternative Solutions

Alternative A: Do Nothing

Under this alternative, no measures are proposed to mitigate the existing erosion problem.

Alternative B: Stormwater Management

Alternative B1: End-of-Pipe Facilities

End-of-pipe stormwater management facilities are most often constructed as wet ponds or wetlands and can provide erosion control, as well as flood and water quality controls. These facilities require a significant dedicated land area and in this case the land would be required to be in municipal control and have municipal access. These facilities are generally located at storm sewer outfalls and most often adjacent to the receiving watercourse.

Alternative B2: Source Controls

Source controls have become an important component in the recent shift towards Low Impact Development (LID) stormwater management planning and control. Where implemented, LID practices (e.g., bioswales, infiltration trenches, vegetated buffer strips, rain barrels, etc.) are distributed throughout the development area and can be incorporated into the landscaping of individual lots and public right-of-ways and can provide water balance, stormwater quality and erosion control functions.

Alternative C: Diversion

Diversions can be implemented to address erosion problems by transferring runoff to a neighbouring subcatchment and its associated conveyance system (presumed to have greater capacity), thereby reducing peak flows and runoff volume to the problem area.

Alternative D: Creek Rehabilitation

Alternative D1: Realignment

In channel realignment, an entirely new channel is constructed some distance away from the original channel with dimensions and characteristics based on those of the original channel. By relocating the channel away from at-risk features, such as infrastructure, the channel construction requires fewer hard structures and allows for the use of more natural techniques.

Alternative D2: Protect In-Place

The protect-in-place alternative employs local or spot treatments to address channel issues which are small-scale or isolated. Generally, it is used for concerns such as bank erosion or issues related to infrastructure within the channel (sewer outfalls and bridges). Protect-in-place is preferable for areas where the channel is highly constrained by the surrounding area and therefore the channel footprint cannot be altered.

Alternative E: Infrastructure Improvements

The City recently upgraded the Rena Road crossing on the west branch. There are no plans to upgrade Derry Road East or Goreway Drive on the east branch. The City may widen the gabion-lined west tributary of the east branch upstream of Derry Road as part of a different study regarding conveyance and flooding on this tributary system.

Alternative F: Land Acquisition

Where erosion poses a risk to adjacent private property, the option to mitigate the risk by acquiring the property is available. Due to the high socioeconomic impacts of this type of solution, it is generally only considered when the subject valley corridor is very constrained and where the risk is critical/imminent, and no other viable options exist.

Evaluation of Alternatives

Legend

Positive		Neutral/Positive		Neutral		Neutral/Negative		Negative	
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Environment	Criteria	Factor Significance	Alternative A:	Alternative B: Stormwater Management		Alternative C:	Alternative D: Creek Rehabilitation		Alternative E: Infrastructure Improvements		Alternative F:
			Do Nothing	B1: End-of-Pipe Facilities	B2: Source Controls	Diversion	D1: Realignment	D2: Protect-in-Place	E1: Gabion Outfall Channel Upgrade	E2: Road Bridge Upgrades	Land Acquisition
Functional	Erosion Mitigation	High	Existing erosion unmitigated	High degree of mitigation if implemented for all existing development without SWM	High degree of mitigation if implemented for all existing development without SWM	Theoretically high potential for erosion mitigation	A new channel would be designed to be stable within the existing flow regime	Isolated works would stabilize the existing channel in key locations	Isolated works would stabilize the existing channel in key locations	Minor reduction in erosive flows	Existing erosion unmitigated
	Slope Stability	Moderate	Existing risk to slope stability unmitigated	Mitigated erosion would reduce risk to slope stability	Mitigated erosion would reduce risk to slope stability	Mitigated erosion would reduce risk to slope stability	Channel realignment would remove the risk to slope stability	Toe armouring would mitigate the risk to slope stability	Design would address slope stability	Design would address adjacent slope stability	Slope stability would not be improved, but no longer a significant constraint
	Impact to Infrastructure	Moderate	Existing risk to infrastructure unmitigated	Mitigated erosion would reduce risk to infrastructure	Mitigated erosion would reduce risk to infrastructure	Mitigated erosion would reduce risk to infrastructure	Channel realignment would impact in-reach infrastructure such as sanitary sewer and bank works	Protect in place would mitigate the risk of impact to existing infrastructure	Design would improve infrastructure	Design would improve infrastructure	Infrastructure would not be improved, but not impacted either
Natural	Terrestrial Environment	Moderate-High	No direct impacts. Potential for continued loss of riparian and tableland habitat and species	Mitigated erosion would reduce risk of further loss of riparian and tableland habitat and species. Significant direct impacts at pond location	Mitigated erosion would reduce risk of further loss of riparian and tableland habitat and species	Loss of baseflow would have a permanent negative impact on riparian habitat	Loss of mature trees. Short term impact to riparian species. Long term stabilization of riparian habitat.	Minor Loss of mature trees. Short term impact to riparian species. Long term stabilization of riparian habitat.	Continued negative impact on riparian habitat and species	Increased local impacts on riparian and tableland habitat and species	Potential for continued loss of riparian and tableland habitat and species
	Aquatic Environment	High	Continued degradation of habitat	Mitigated erosion and improved water quality would benefit aquatic habitat. Potential for thermal impacts	Mitigated erosion and improved water quality would potentially allow for recovery of aquatic habitat	Loss of baseflow would have a permanent negative impact on aquatic habitat	Opportunity for improved habitat in lower reaches. No water quality benefits.	Some opportunity for improved habitat in lower reaches. No water quality benefits	Continued degradation of habitat	Continued degradation of habitat	Continued degradation of habitat
Social	Construction	Low	No impact	High social impacts (Land Acquisition)	High social impacts (Construction on private property)	A feasible location has not been identified and as such this criteria cannot be assessed	Largest construction area/duration proximate to private property	Large construction area duration proximate to private property	Large construction area/duration proximate to private property	Minimal impact to private property – disruption to traffic	Significant impact to affected landowners
	Public Safety	High	Existing risk associated with erosion adjacent to slopes and trails unmitigated	Mitigated erosion reduces risk	Mitigated erosion reduces risk	Mitigated erosion reduces risk	Creek moved away from slopes and trails. Risk reduced	Erosion mitigated where creek is adjacent to slopes and trails	Mitigated erosion reduces risk	No impact on public safety.	Risk near slopes mitigated by property acquisition. Risk along trail persists
Economic	Capital Cost	High	None	\$3 M to \$5 M	\$3 M to \$5 M	\$1 M to \$3 M	\$500 K - \$1 M	\$500 K to \$1 M	\$500 K - \$1 M	\$1 M to \$3 M	\$5 M +
	Maintenance Cost	Moderate	Potential for maintenance related to ongoing erosion (fallen tree removal, sediment accumulation, etc.)	Regular maintenance required in perpetuity	Maintenance of source controls challenging, reconstruction would be required at end of design life	Minimal maintenance, replace at end of design life	Natural channel design requires minimal maintenance	Erosion related maintenance potential reduced significantly	Regular maintenance required in perpetuity	Regular maintenance required in perpetuity	Potential for maintenance related to ongoing erosion (fallen tree removal, sediment accumulation, etc)
Summary			Screened Out. Not effective.	Screened Out. Not feasible.	Screened Out. Not effective.	Screened Out. Not feasible.	Short-listed.	Short-listed.	Short-listed.	Screened Out. Not effective.	Screened Out.

Short-List of Alternatives

Three (3) alternatives were advanced to the short-list evaluation. The following provides additional information on opportunities and constraints related to each alternative and if or how the alternative is recommended to be included as part of the Preferred Solution.

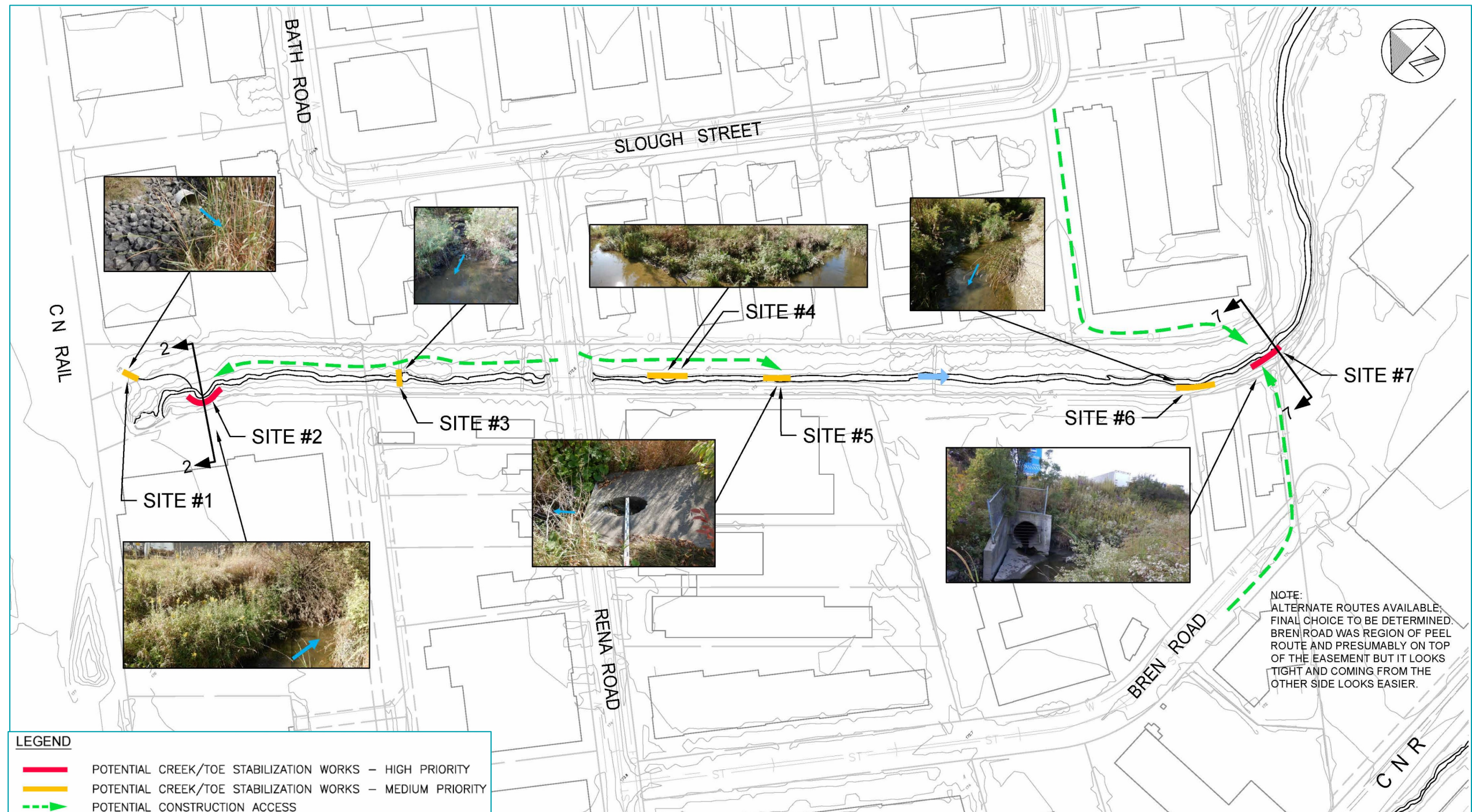
Alternative D1: Creek Rehabilitation - Realignment was advanced as it presents the opportunity to construct a stable natural channel with an alignment and cross-section appropriate for the existing flow regime in Mimico Creek. However, as noted in the evaluation, there are multiple constraints to realignment in the study area, in particular the Region sanitary sewer infrastructure, and recent natural channel design and creek bank stabilization works on both branches. Minor shifting of the creek to accommodate protection in place may be included as part of the preferred solution, provided that there are no constraints to the shifting of the opposite bank. Larger-scale realignment is not proposed to be required. Therefore, Alternative D1 is only recommended in support of Alternative D2, where feasible.

Alternative D2: Creek Rehabilitation – Protect-in-Place was advanced as it presents the opportunity to stabilize the existing watercourse while minimizing the impact to the surrounding terrestrial environment. Protect-in-place is particularly applicable in space constrained areas within the valley (i.e., nearby constraints such as slopes, private property or infrastructure). In locations where the watercourse is close to an at-risk slope, protection-in-place would require significant armouring. In these locations, moderate creek realignment may be an option in support of the protect-in-place, subject to not being constrained by infrastructure. Therefore, Alternative D2 is recommended as the preferred solution, in combination with select support from Alternative D1 where feasible.

Alternative E1: Infrastructure Improvements – Gabion Outfall Channel Upgrade was initially short-listed for this study. However, the City is concurrently working on a separate study related to the watershed and storm sewers upstream of the gabion outfall channel (Malton Flood Mitigation Study, 2020-ongoing) and will assess the gabion channel as part of that study.

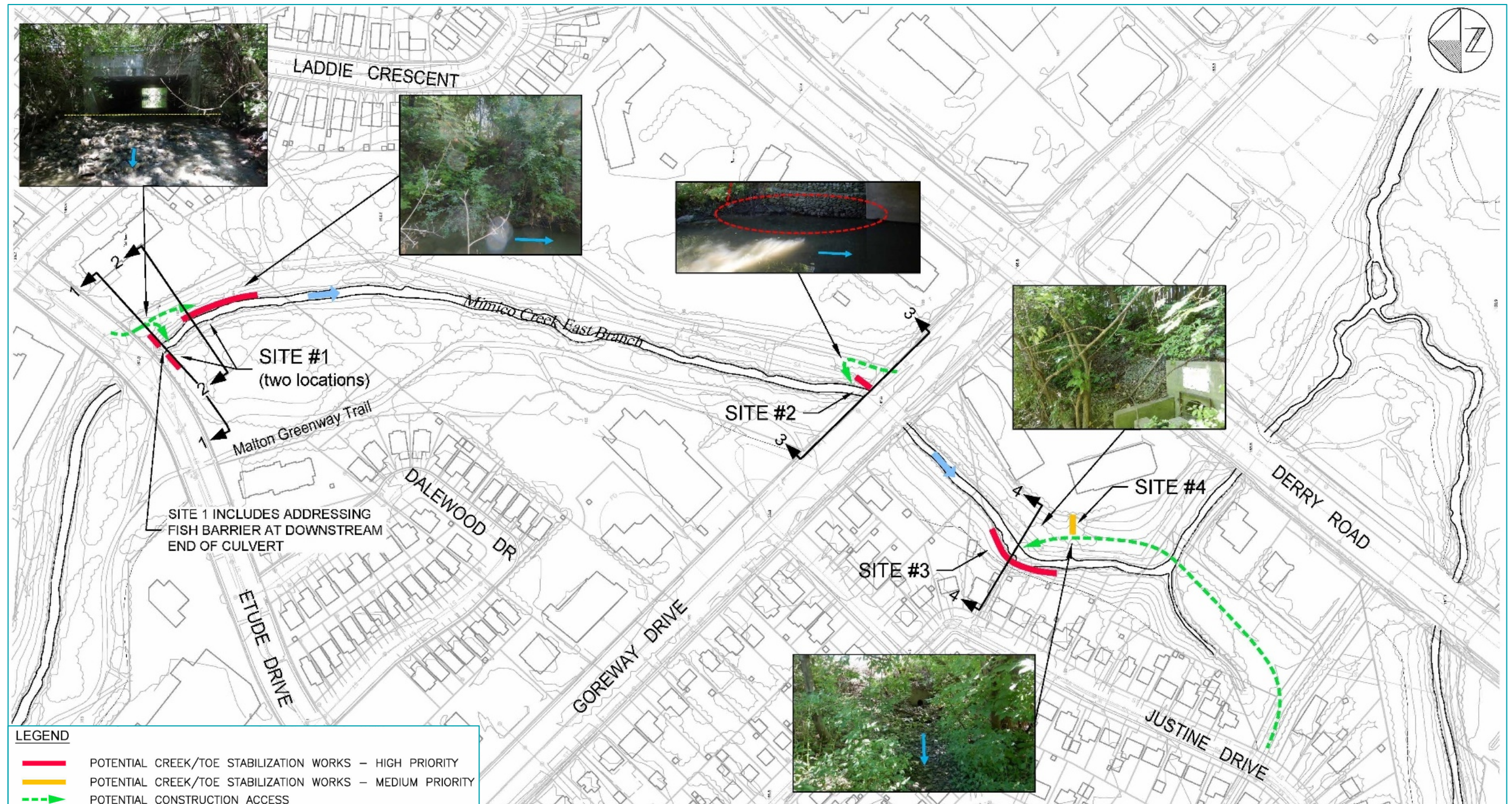
Preferred Solution – West Branch

Erosion stabilization works have been proposed at two (2) high priority erosion sites within the West Branch. These locations currently have erosion failures and slope stability concerns at the toe of the valley wall. A series of existing gabion grade control structures will also be examined for structural stability. The City may consider removing them once they approach the end of their design lives. Treatments are also proposed at each of the five (5) medium priority sites in the West Branch, given the opportunity and lack of impact or adverse disturbance to mature vegetation along proposed access routes.



Preferred Solution – East Branch

Erosion stabilization works have been proposed at three (3) high priority erosion sites within the East Branch. These stabilization works will mitigate valley wall contacts, risk to property, and rehabilitate failing protection. With one exception, medium priority sites are not proposed for treatment at this time due to the lack of any adverse threat to existing infrastructure or private property, and because the disturbance to mature forest area for access and construction would be significant, relative to the erosion protection benefit.



Example Photos of Creek Erosion Stabilization Works

The photographs presented on this slide and the following two slides depict examples of the preferred solution for erosion control, through a combination of stabilization works, and for both protecting the banks in-place, and for minor realignment, where possible. The photographs are a combination of creek works under construction, immediately after construction, and one-year post-construction.



Typical creek bank stabilization with boulder revetment and vegetated banks



Boulder and armour stone bank stabilization



Rehabilitated creek bank with multiple rows of armour stone

Example Photos of Creek Erosion Stabilization Works



Timber crib bioengineered bank stabilization



Localized erosion protection with minor regrading, stone and vegetated banks with erosion blanket



Full reconstruction and realignment of creek with natural stone pools and riffles, and vegetated banks

Example Photos of Creek Erosion Stabilization Works



Creek with single row of armour stone



Boulder toe protection and vegetated banks



Rehabilitated creek with natural stone substrate, boulder toe protection and vegetated banks

Next Steps

- The Study Team will develop Project File Report to document the decision-making process leading to the selection of the Preferred Solution.
- The Project File Report will be made available for public review and comment for a minimum of 30-day review period. A Notice of Completion will be issued, providing details of when and where the report will be made available for review.
- If no requests for a Part II Order are received, the project will proceed to detailed design and construction.
- Various additional investigations will be completed to support the detailed design for the proposed works. Permits will be obtained from regulatory agencies (e.g., TRCA) prior to proceeding to construction.

Thank You!

Thank you for taking the time to review this information package. Your input is important to us. Please provide us your comments by **July 8, 2021**. Comments can be sent to the following contacts via email:

Greg Frew, P.Eng.

Project Manager

City of Mississauga

Greg.Frew@mississauga.ca

Brian Bishop, P.Eng.

Consultant Project Manager

Wood Environment & Infrastructure Solutions

brian.bishop@woodplc.com