

Welcome

**Northumberland County
Master Drainage Plan Study
Hamilton Unnamed 07 East
Watercourse and Drainage Area**

**Public Information Centre No. 2
- Open House -**

June 17, 2019

Please sign in and take a comment sheet.

Municipal Class EA and Master Plan Process

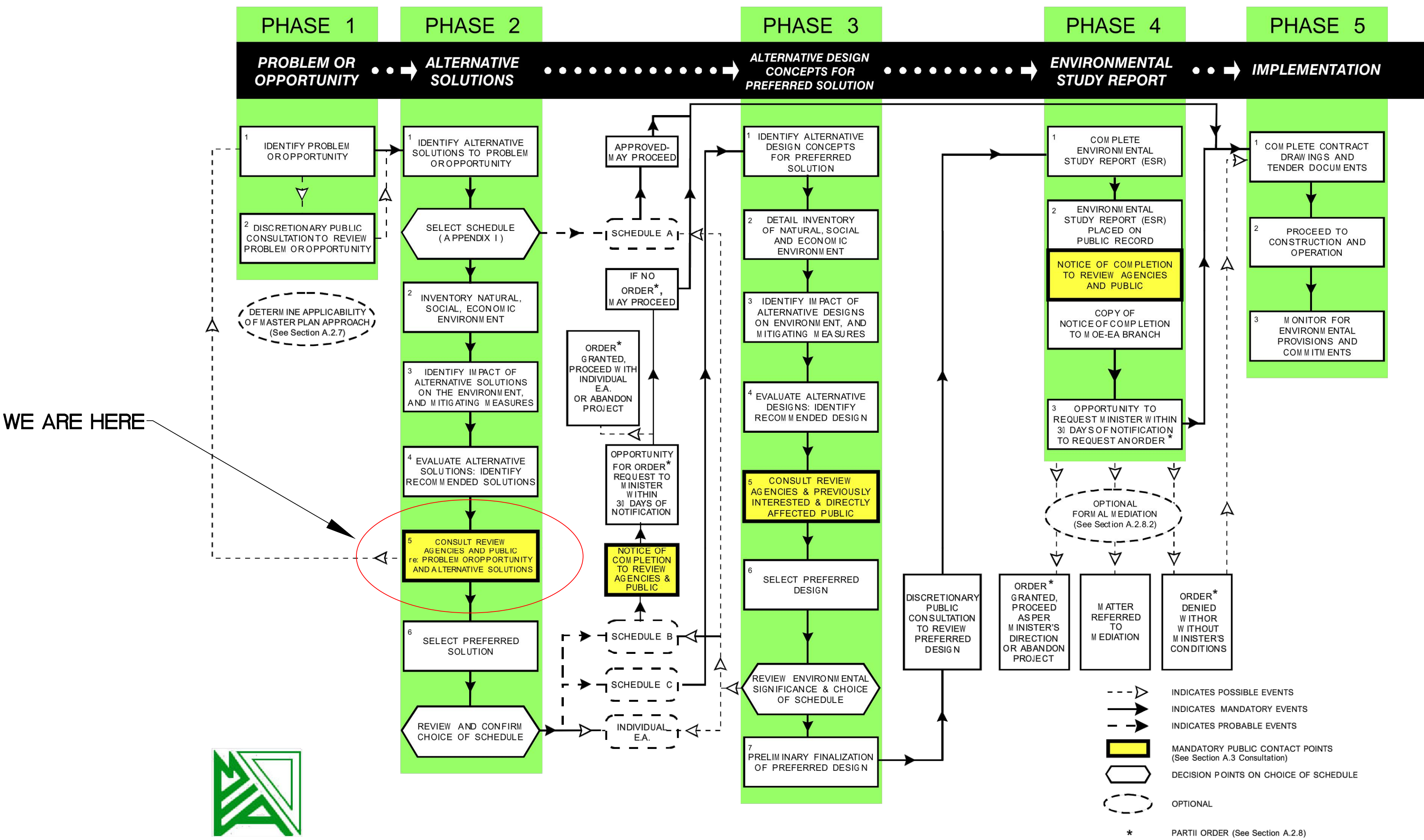
Watershed Master Plan Process

- The project is following the Master Planning Process of the Municipal Class EA document.
- Master Plans are long-range plans which integrate infrastructure requirements for existing and future land use with environmental planning principles.
- Master Plans will examine infrastructure systems (in this case the drainage system) in order to recommend a number of solutions. Master Plans are not undertaken to address a site-specific problem.
- The final Master Plan will recommend a set of solutions that are distributed geographically across the study area. This Master Plan is following "Approach 2" of the Master Plan process. As such, the Master Plan will address Phase 1 and Phase 2 of the Municipal Class EA process. Recommended projects may require further assessment, and these will be identified in the final Master Plan.

EXHIBIT A.2

MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA



Watershed Master Plan Process

The purpose of this Public Information Center is to gather feedback from the public and review agencies on the Preferred Alternative

Where are we Now?

- The Project Team is currently evaluating alternative solutions using evaluation criteria to address the problem statement. **We are looking for your feedback.**

Next Steps

- The Project Team will consider all comments received by the public and any review agencies to confirm the preferred solution.
- Following PIC #2, a Master Plan document will be developed that outlines the process and identifies an implementation plan. Any members of the public or review agencies on the project mailing list will receive a Notice of Completion for the Master Plan. The Master Plan will then be available for a 30-day review period.

We want to hear from you...

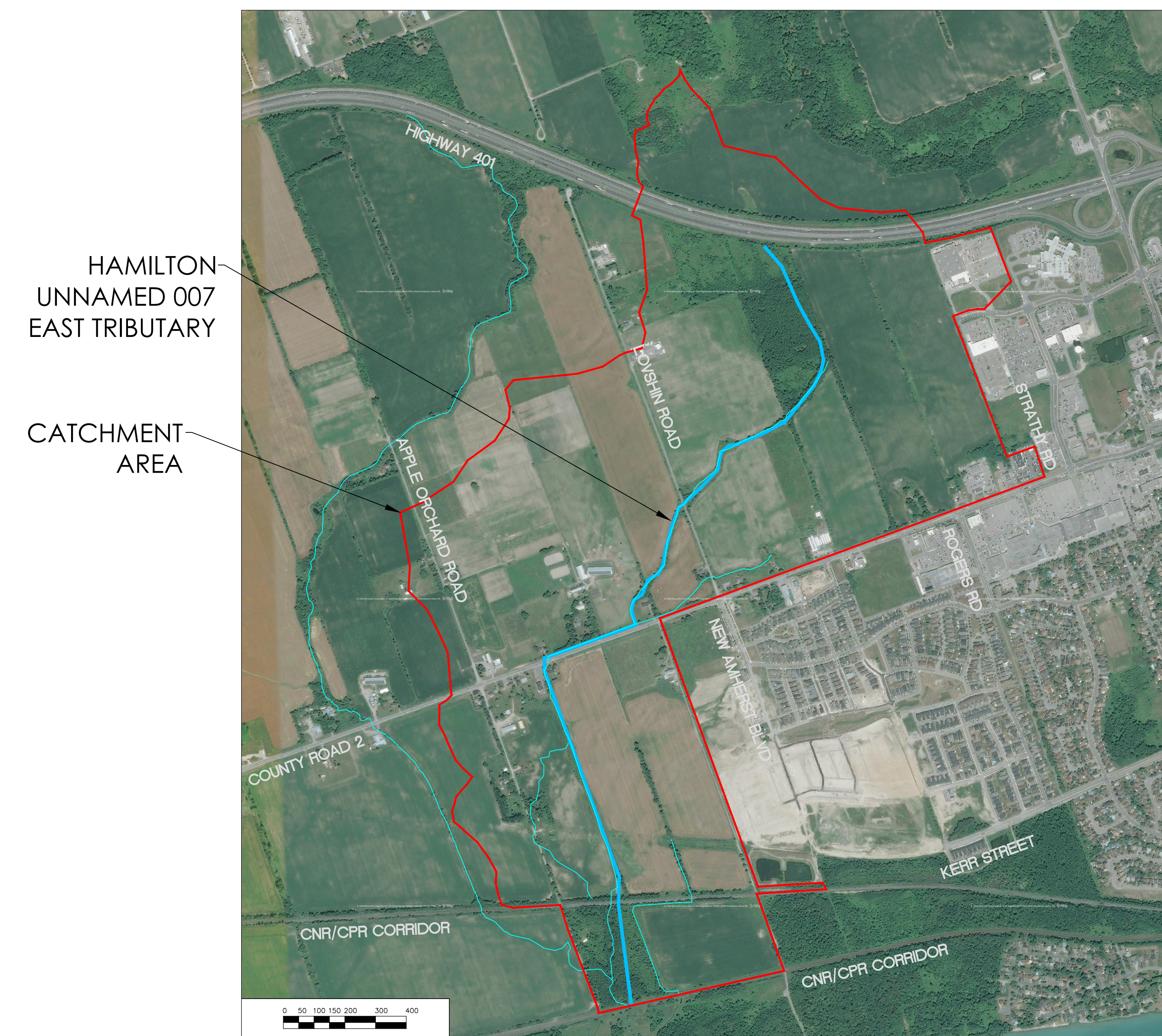
- Do you have any comments on the preferred alternative? Please fill out a comment sheet.
- If you have any other questions or comments on the project, please talk to a member of the project team. Any comments received will become part of the final Master Plan.

Problem or Opportunity

Phase 1

Identification of Problem or Opportunity

General Location Plan



Problem / Opportunity Statement

The study will identify existing drainage limitations surrounding the Hamilton Unnamed 07 East tributary and provide runoff targets and capacity improvement opportunities for infrastructure and development planning purposes.

Study Area

- The Study Area is bounded by Highway 401 to the north, CP/CN Rails to the south, Strathy Road to the east, and Bob Carr Road to the west, and is defined by the catchment area for the Hamilton Unnamed 07 East tributary. The tributary outlets south to wetland areas and Lake Ontario south of the railway corridor.

Purpose of Study

- The Hamilton Township and Town of Cobourg official plans were reviewed. The Town of Cobourg official plan includes ongoing / future residential development on the west side of town as well as future commercial development within the Cobourg West Business Park Secondary Plan Area.
- In order to help facilitate development in the area and to address other transportation needs, the County completed the County Road 2 Municipal Class EA. Due to the complexity of existing drainage issues, the EA concluded that a Master Drainage Plan be commissioned to assess drainage related issues and concerns for the areas tributary to the Hamilton Unnamed 07 East tributary.

Public and Review Agency Consultation

- A "Notice of Public Information Centre" was previously published on social media, on the local radio (My FM), on the County Website, and sent to review agencies and identified stakeholders.
- The previous Public Information Centre (PIC #1) presented the study problem or opportunity statement to the public and provided an opportunity for members of the public to review and discuss the project with the Town of Cobourg, Northumberland County, Township of Hamilton and the GRCA, provide input for consideration during the planning of this project, express any concerns with respect to the existing conditions, and discuss potential impacts associated with construction related to the project.
- This Public Information Centre (PIC #2) is intended to present the evaluation of the alternative solutions and the preferred solution, and to provide an opportunity for feedback.

Existing Natural Heritage

Natural Environment

- Biologists from Wills conducted a desktop background review relating to the natural environment of the project area and confirmed the information with a site investigation to take an inventory of the natural environment. The following areas of interest were identified:
 - Several Wetlands within the Study Area and within close proximity to the Study Area.
 - Barn Swallows (*Hirundo rustica*, Threatened Provincially) were observed in flight at two (2) locations within the Study Area. At both of these locations there were multiple Barn Swallows in flight.
 - The Department of Fisheries and Oceans Canada (DFO) aquatic species at risk maps showed no indication of the presence of any aquatic species at risk in any of the watercourses found within the Study Area.



Existing Drainage Capacity

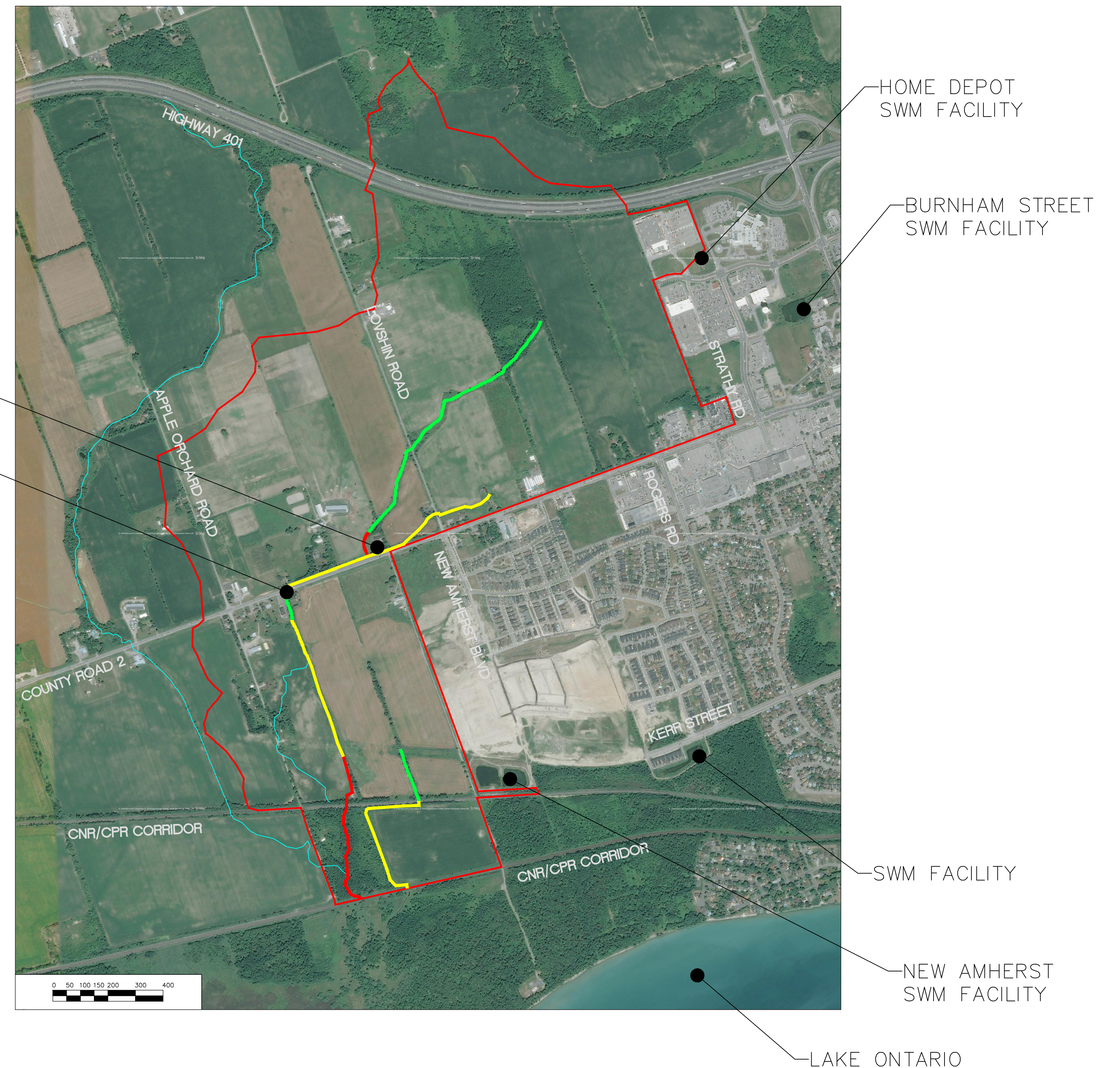
Drainage Overview:

- The Hamilton Unnamed 07 Tributary generally flows from north to south through farmland before it joins the roadside ditch at County Road 2. It crosses County Road 2 through a 1.2 m x 3.3 m open footing concrete box culvert, then continues to flow south beneath CNR and CPR tracks before outletting to Carr Marsh and Lake Ontario.
- Upstream of County Road 2, the northern reach of the tributary appears to provide capacity greater than the 100 year storm.
- As the tributary approaches County Road 2, the capacity is limited, in some areas to less than the 5 year storm.
- There is a history of flooding along the properties adjacent to County Road 2 where the grade of the creek flattens out to meet the roadside ditch before the tributary crosses the road.
- Downstream of the County Road 2 culvert, the tributary varies in form and capacity, providing very limited capacity as the reach approaches the CNR/CPR corridors.

- CONTAINS 100-YEAR STORM
- CONTAINS 5-YEAR STORM
- DOES NOT CONTAIN 5-YEAR STORM

KNOWN AREA OF
FLOODING

CONCRETE BOX-
CULVERT



Existing Erosion and Channel Stability

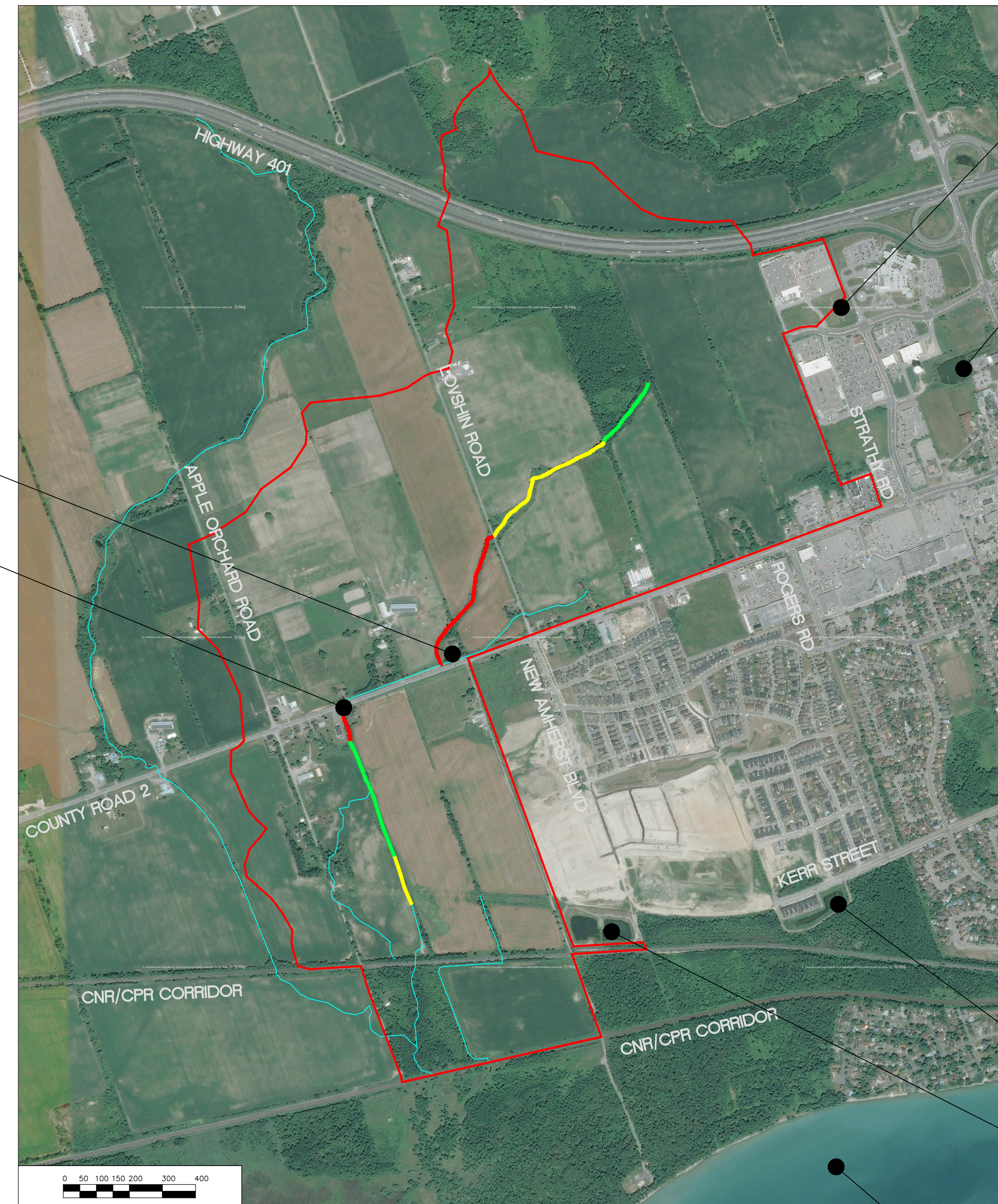
Channel Stability Overview:

- Upstream of County Road 2, the tributary appears to be incised, and is currently cutting laterally at its banks, which increases the sediment load in the watercourse during larger flows.
- There is a history of flooding along the properties adjacent to County Road 2 where the grade of the creek flattens out to meet the roadside ditch before the tributary crosses the road. The creek appears to deposit its sediment load at this change in slope, and fills in the channel year after year.
- Downstream of the County Road 2 culvert, the tributary appears to be armoured on both sides with concrete and rip rap, which is broken and undermined in most locations. The channel is widening here.
- The channel appears to substantially lose its form upstream of the CNR/CPR corridor, as flows generally 'fan out' before collecting upstream of two culvert crossings.

- IN REGIME (STABLE)
- TRANSITIONAL (MODERATE)
- IN ADJUSTMENT (UNSTABLE)
- NOT ASSESSED / CONSTRUCTED

KNOWN AREA OF
FLOODING

CONCRETE BOX-
CULVERT



HOME DEPOT
SWM FACILITY

BURNHAM STREET
SWM FACILITY

SWM FACILITY

NEW AMHERST
SWM FACILITY

LAKE ONTARIO

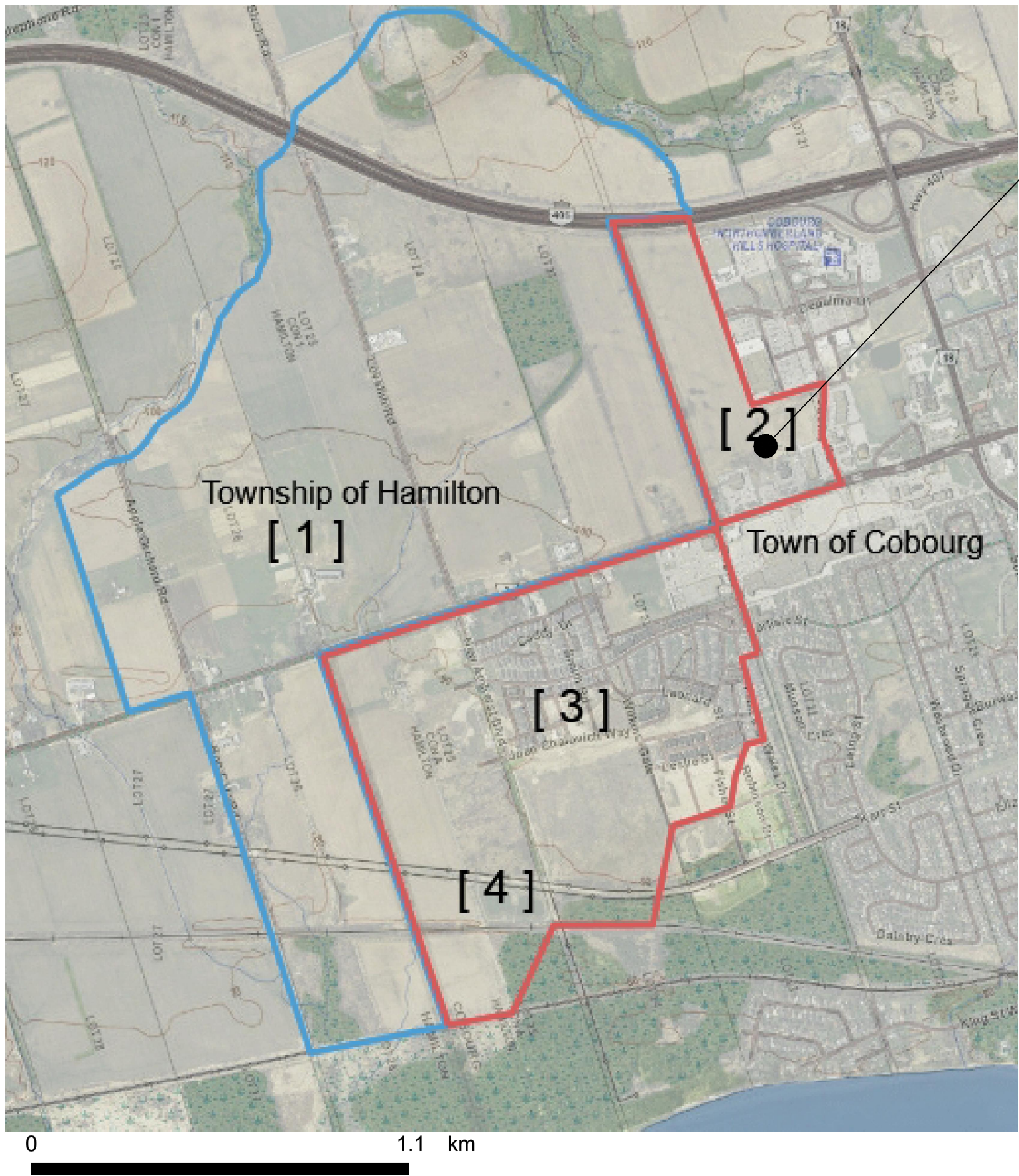
Development Potential

Agricultural System in Ontario's Greater Golden Horseshoe (2018)



Prime Agricultural Area

Township of Hamilton and Town of Cobourg
Official Plan Zoning



The Township of Hamilton Official Plan (1) includes zoning for Rural Residential, Rural Highway Commercial, Community Facility, and mostly Permanent Agriculture.

The Town of Cobourg Official Plan divides the study area into three areas (2, 3 and 4):

- The area labeled (2) includes Shopping Centre Commercial, Business Park and District Commercial zoning. This area of potential development has been labeled as Area 'A' for consideration in the various alternatives.
- The area labeled (3) includes Neighbourhood Residential, District Commercial, Development and Open Space zoning.
- The area labeled (4) includes Development, Transportation Corridor, and Neighbourhood Residential zoning.

Detailed information on the Township of Hamilton Official Plan and the Town of Cobourg Official Plan can be found on the Township of Hamilton and Town of Cobourg websites.

Introduction of Alternatives

The capacity of the Hamilton Unnamed 07 Tributary is limited in areas, and has historically flooded as it is unable to convey flows during large runoff event. There are areas of the channel that are unstable and susceptible to erosion and deposition of sediment. If left unmitigated, future development in the area is likely to increase surface water flow and further impact lands and properties.

In general, the alternatives investigate measures to improve the capacity of the channel and/or control runoff from development areas. They include the following:

Alternative 1 is to **Do Nothing**. This will not address the problem/ opportunity statement as it will not mitigate the potential impact of development with respect to increased flood risk and channel erosion, and the associated impacts to lands and properties.

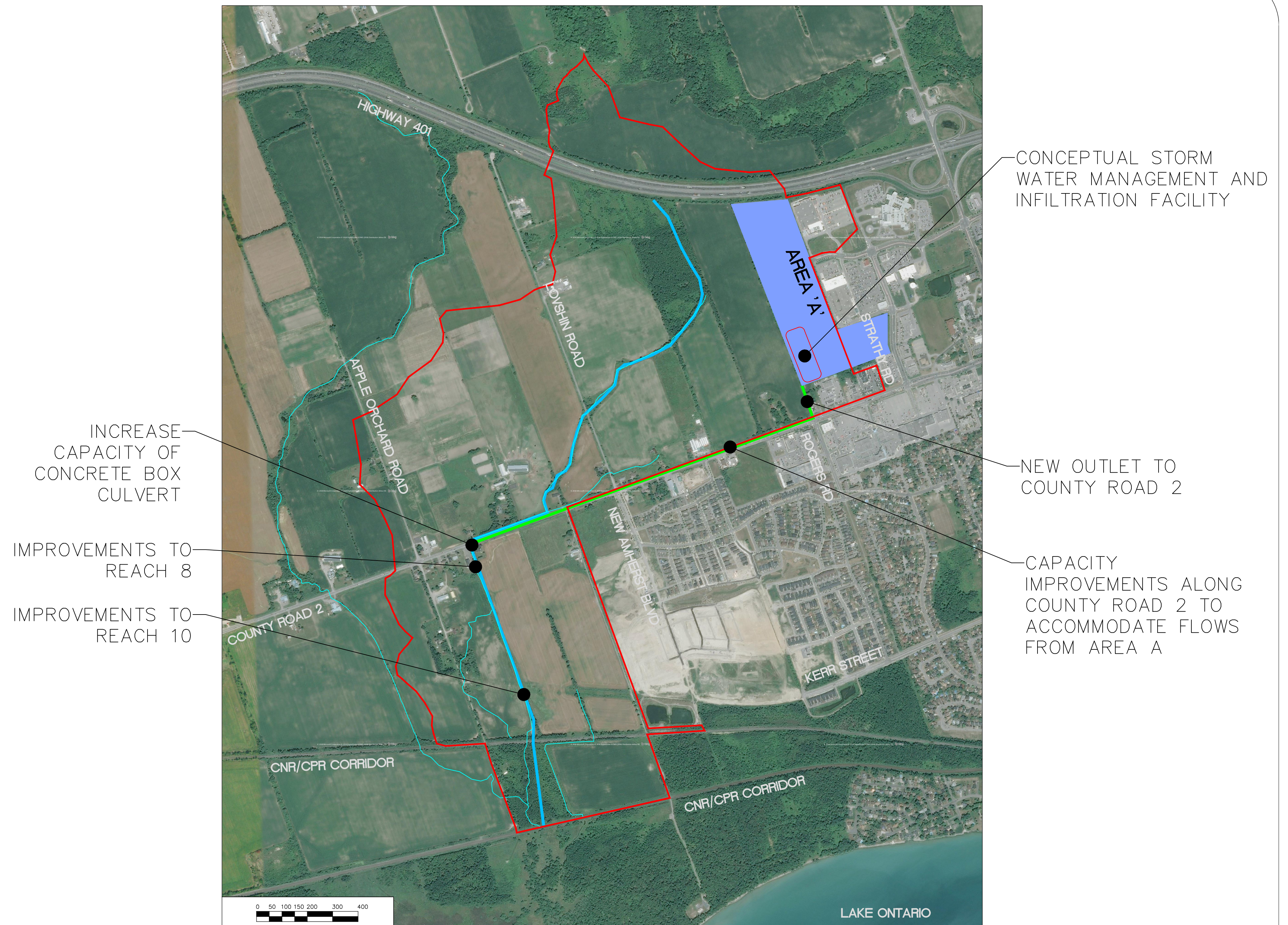
Alternatives 2 and 3 focus on conventional stormwater management and low-impact development targets to control future runoff to existing levels. These alternatives contemplate improvements to the channel and drainage features to ensure adequate long-term conveyance of flows.

Alternatives 4 and 5 focus on over-control and full capture of runoff from future development to facilitate flows that are less than existing levels. These alternatives envision less channel and drainage improvements and rely on a lower runoff burden within the watershed.

Alternative 2 - Convey Existing Flows along County Road 2

Alternative 2: Control to Pre-Development Runoff and Create Southern Outlet

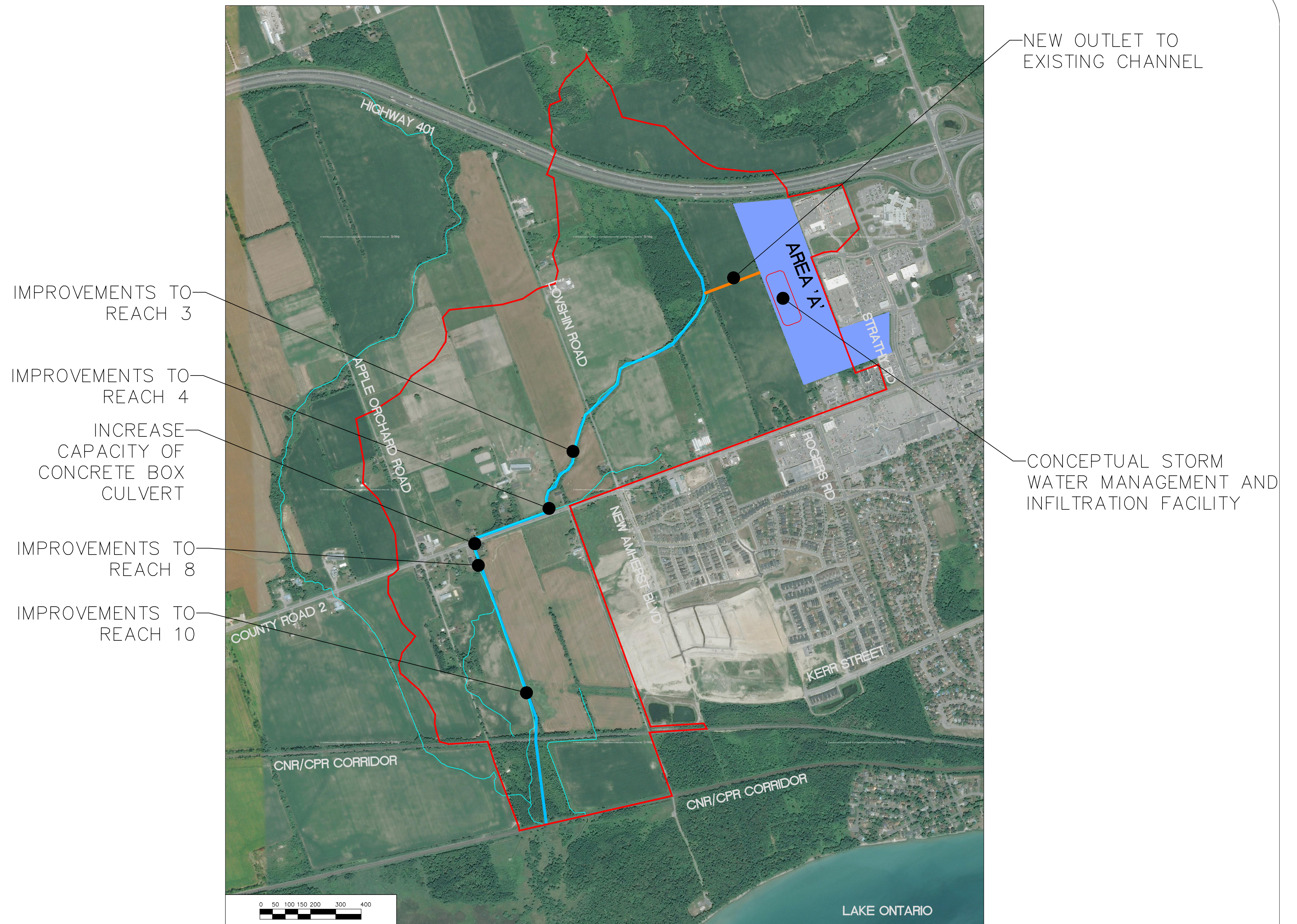
- Runoff from Area A and County Road 2 will be controlled and released at current flow rates.
- Infiltration within Area A and County Road 2 will be achieved to match existing conditions.
- A new outlet will be created from Area A **southerly** to County Road 2
- The drainage capacity on the north side of County Road 2 will be improved westward to the concrete box culvert crossing County Road 2.
- The capacity of the County Road 2 concrete box culvert will be increased.
- Reach 8 and Reach 10 will require improvements, using natural channel design principles to repair degradation and aggradation, respectively.



Alternative 3 - Convey Existing Flows within Watercourse

Alternative 3: Control to Pre-Development Runoff and Create Western Outlet

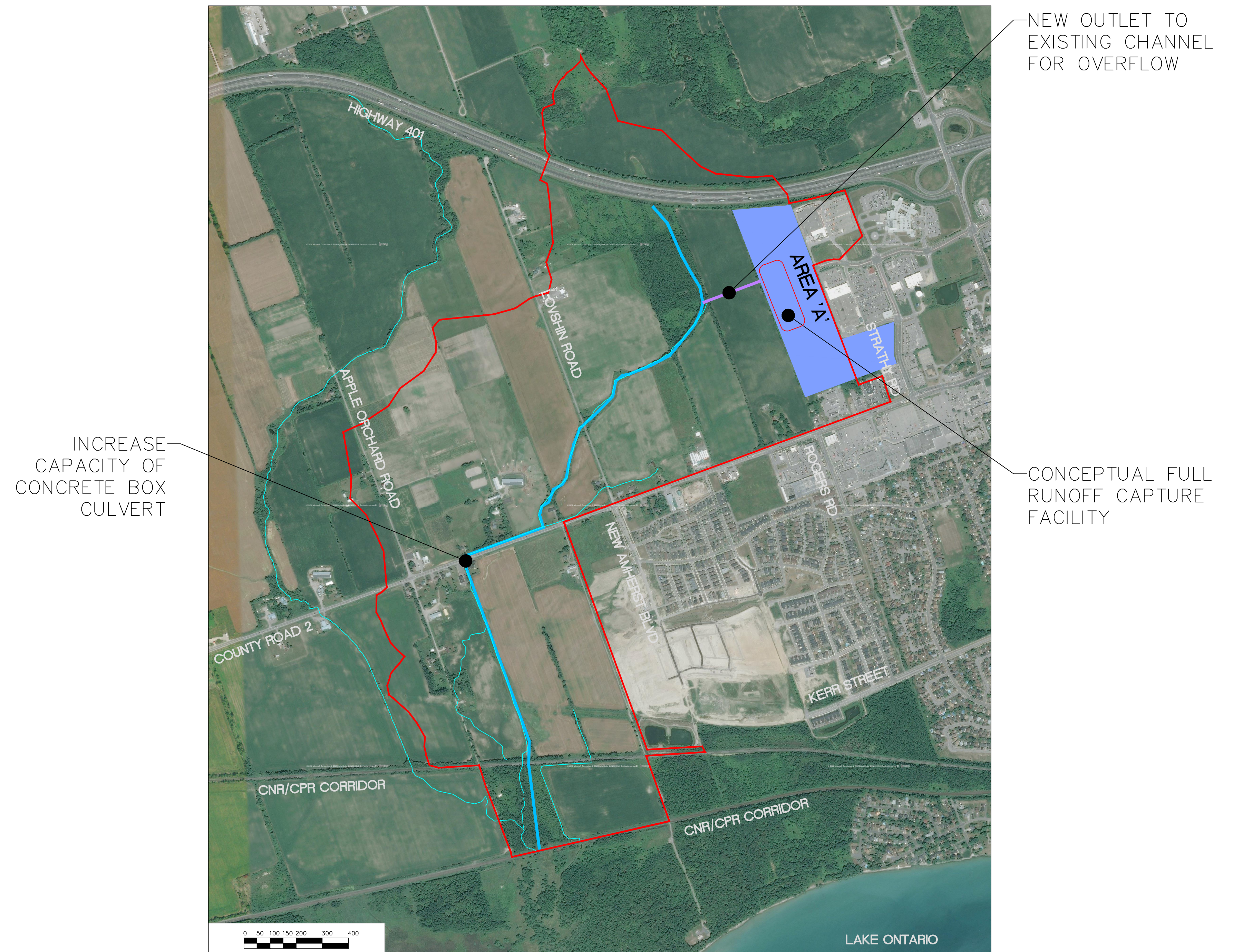
- Runoff from Area A and County Road 2 will be controlled and released at current flow rates.
- Infiltration within Area A and County Road 2 will be achieved to match existing conditions.
- A new outlet will be created from Area A **westerly** to the existing wetland.
- Reach 3 will require improvements using natural channel design principles to repair and prevent degradation.
- Reach 4 will require improvements using natural channel design principles to increase capacity and prevent aggradation.
- The capacity of the County Road 2 concrete box culvert will be increased.
- Reach 8 and Reach 10 will require improvements, using natural channel design principles to repair degradation and aggradation, respectively.



Alternative 4 - Reduce Runoff and Overflow to Watercourse

Alternative 4: Fully Capture Runoff and Create Western Overflow Outlet

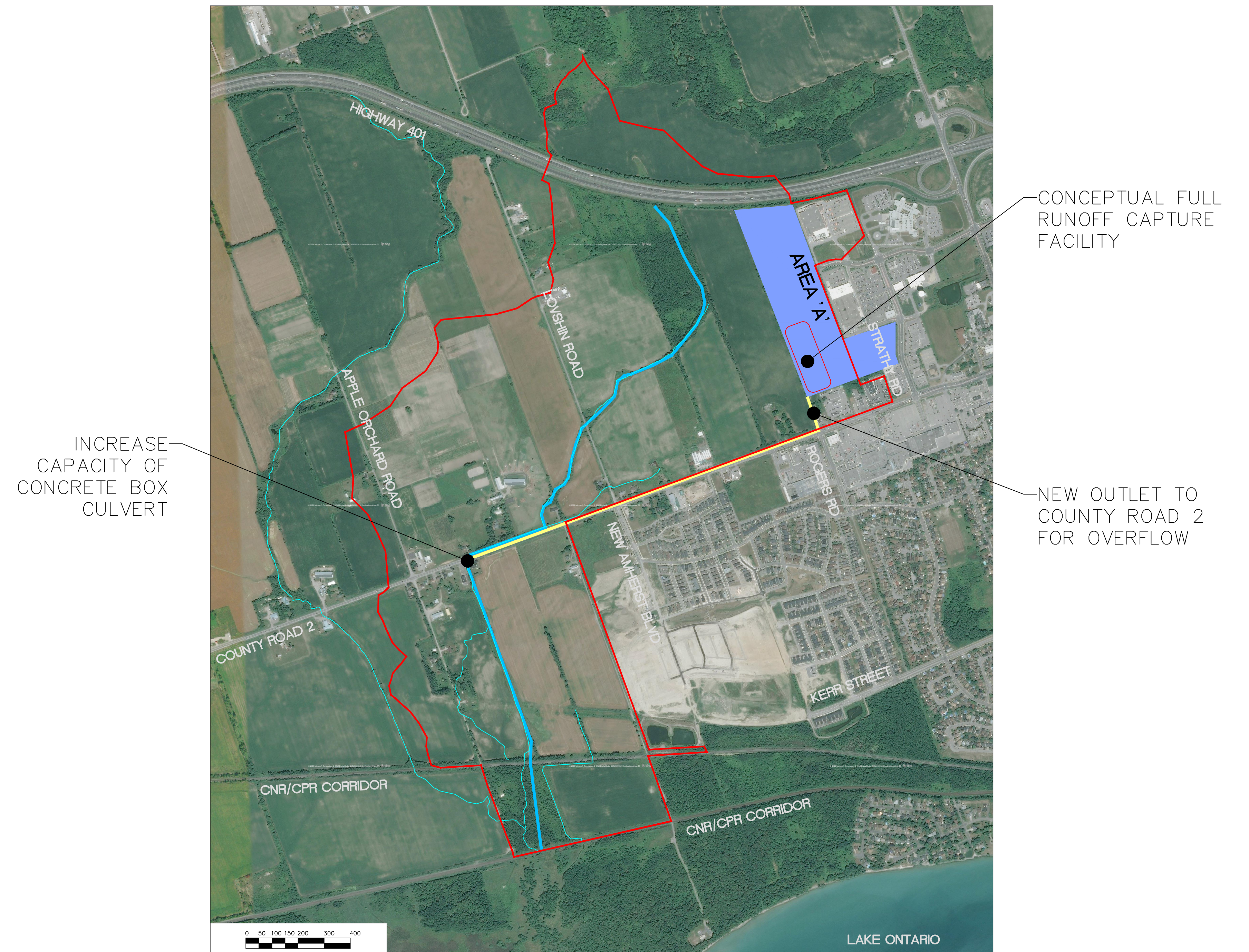
- Capture, store, and infiltrate the 100 year flow from Area A and County Road 2.
- A new outlet will be created **westerly** for the emergency overflow only to the existing wetland.
- The capacity of the County Road 2 concrete box culvert will be increased.



Alternative 5 - Reduce Runoff and Overflow to County Road 2

Alternative 5: Fully Capture Runoff and Create Southern Overflow Outlet

- Capture, store, and infiltrate the 100 year flow from Area A and County Road 2.
- A new outlet will be created southerly, for the emergency overflow only, to County Road 2.
- The capacity of the County Road 2 concrete box culvert will be increased.



Evaluation of Alternatives

Evaluation Criteria		Alternative 1: Do Nothing	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Impacts on the Existing Wetlands	Impacts on the Existing Wetlands	None	Possible un-mitigatable impacts to the wetland hydrologic function	Opportunity to provide water balanced discharge to the existing wetland features	Opportunity to provide water balanced discharge to the existing wetland features	Possible un-mitigatable impacts to the wetland hydrologic function
	Impacts to Species at Risk	None	Potential impacts would require further study during detailed design	Potential impacts would require further study during detailed design	Potential impacts would require further study during detailed design	Potential impacts would require further study during detailed design
	Impact to Fish and Fish Habitat	None	Potential temporary impacts during construction in Reach 8 and 10, with no change in flow regime	Potential temporary impacts during construction in Reach 3, 4, 8 and 10, with no change in flow regime	Potential impacts due to reduced flow in Reach 3, 4, 8 and 10	Potential impacts due to reduced flow in Reach 3 and 4, and redirected flow away from Reach 8 and 10
	Impacts to Water Quality	None	Opportunity to mitigate impacts from development via SWM and LID strategies	Opportunity to mitigate impacts from development via SWM and LID strategies	Opportunity to mitigate impacts from development via SWM and LID strategies	Opportunity to mitigate impacts from development via SWM and LID strategies
	Geomorphological Impacts and Erosion Potential	None	Opportunity to improve Reach 8 and 10	Opportunity to improve Reach 3, 4, 8 and 10	Flow reduction to Reach 3, 4, 8 and 10 may lower erosion potential	Flow reduction to Reach 3, 4, 8 and 10 may lower erosion potential
	Impact to Significant Vegetation Communities	None	Potential Impacts would require further study during detailed design	Potential Impacts would require further study during detailed design	Potential Impacts would require further study during detailed design	Potential Impacts would require further study during detailed design
Temporary impacts to Public during Construction		None	Construction access and natural channel restoration works required south of Area A and Reach 8 and 10	Construction access and natural channel restoration works required at Reach 3, 4, 8 and 10	Limited construction on private lands	Construction access and natural channel restoration works required south of Area A and adjacent to New Amherst
Impacts to Current Flooding Potential		No improvement to existing drainage deficiencies	Improvements to capacity at CR2, and Reach 8 and 10, flow reduction at Reach 3 and 4	Improvements to capacity at CR2, and at Reach 3, 4, 8 and 10	Improvement to capacity at CR2, and flow reduction at Reach 3, 4, 8 and 10	Improvement to capacity at CR2, and flow reduction at Reach 3, 4, 8 and 10
Archaeology		None	All alternatives will require a Stage 1 archaeology study	All alternatives will require a Stage 1 archaeology study	All alternatives will require a Stage 1 archaeology study	All alternatives will require a Stage 1 archaeology study
First Nations Engagement		None	All alternatives will require further consultation with First Nation groups	All alternatives will require further consultation with First Nation groups.	All alternatives will require further consultation with First Nation groups.	All alternatives will require further consultation with First Nation groups.
Impact to Existing Utilities		None	Some potential for utility conflicts with CR2 Right-of-Way	Limited potential for utility conflicts	Limited potential for utility conflicts	Some potential for utility conflicts within CR2 Right-of-Way and adjacent to New Amherst
Requirement for Additional Infrastructure		None	Some new infrastructure within CR2 Right-of-way	Limited new infrastructure	Limited new infrastructure	Some new infrastructure within CR2 Right-of-way and adjacent to New Amherst
Constructability		None	Minimal fall for outlet to CR2; pipe cover or open channel required	Minimal fall for outlet to wetland; pipe cover or open channel required	Minimal fall for outlet to wetland; pipe cover or open channel required	Minimal fall for outlet to CR2; pipe cover or open channel required
Durability / Life-cycle Impacts		None	SWM and pipe infrastructure will increase County maintenance burden	SWM infrastructure will increase County maintenance burden; Limited burden due to Natural Channel Design principles	SWM infrastructure will increase County maintenance burden; Limited burden due to Natural Channel Design principles	SWM and pipe infrastructure will increase County maintenance burden
Flow Conveyance and Flood Protection		No improvement to existing drainage deficiencies	Proposed drainage improvements will demonstrate 100 year conveyance	Proposed drainage improvements will demonstrate 100 year conveyance	Proposed SWM over-control will provide improvement as compared to existing drainage conditions	Proposed drainage improvements will demonstrate 100 year conveyance
Traffic and Transportation		None	Supports long-term traffic planning objectives	Supports long-term traffic planning objectives	Supports long-term traffic planning objectives	Supports long-term traffic planning objectives
Requirements for Easements and/or Land Acquisition		None	Drainage easement required south of Area A	Drainage easement required south of Area A	Drainage easement required south of Area A	Drainage easement required south of Area A and adjacent to New Amherst
Capital Costs		None	Costs will include County Road 2 sewers and Reach 8 and 10 improvements	Costs will include Reach 3, 4, 8 and 10 improvements	SWM Infrastructure approximately 25% larger; no conveyance improvement costs	SWM Infrastructure approximately 25% larger; no conveyance improvement costs
Maintenance Costs and Access		None	Increased County Road 2 maintenance costs	Limited channel maintenance and infrastructure costs	Ongoing channel stability maintenance costs	Ongoing channel stability maintenance costs
Risk/Liability		All future development will incorporate drainage liabilities	Drainage liability will be mitigated via SWM and conveyance improvements	Drainage liability will be mitigated via SWM and conveyance improvements	Drainage liability may be mitigated by SWM. Some drainage liability may remain, as Reach 10 may not be a sufficient outlet	Drainage liability will be mitigated via SWM and conveyance improvements
		Does Not Satisfy Problem Statement	Ranked 3rd	Ranked 1st - Preferred Alternative	Ranked 2nd	Ranked 4th

Legend:

No impact; or improvement from existing conditions	Potential for minor impact; or no impact following mitigation measures	Potential for moderate impact; unlikely to provide full mitigation	Potential for significant and un-mitigatable impact
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Preferred Alternative: Alternative 3

The Preferred Alternative will include the following projects:

Stormwater Management (SWM) Plan

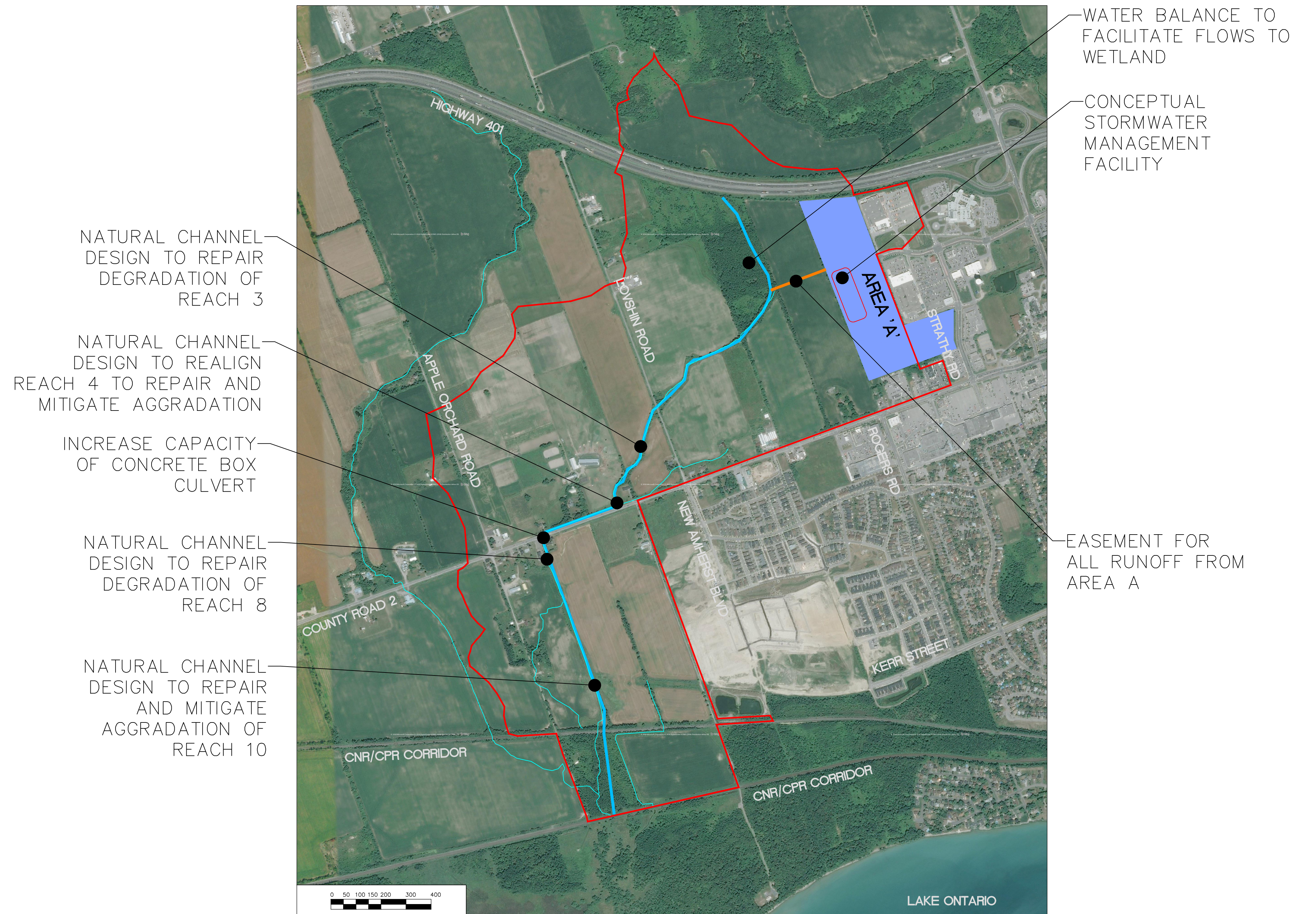
- A SWM facility will be created in Area A and will control peak flows from Area A and County Road 2 to the pre-development condition.
- The SWM facility may include an above-ground facility such as a pond or basin; an underground facility such as storage volume created beneath a parking lot; Low Impact Development (LID) practices such as infiltration swales, bioretention facilities or permeable pavement; or a combination of SWM options.
- A water balance will be completed as part of the Stormwater Management Plan for Area A (specifically for flows reaching the wetland west of Area A), as well as for the development of County Road 2.
- Runoff from Area A will drain west through an easement or right-of-drainage, to achieve a hydraulic connection with the existing wetland and channel.

Concrete Box Culvert Replacement

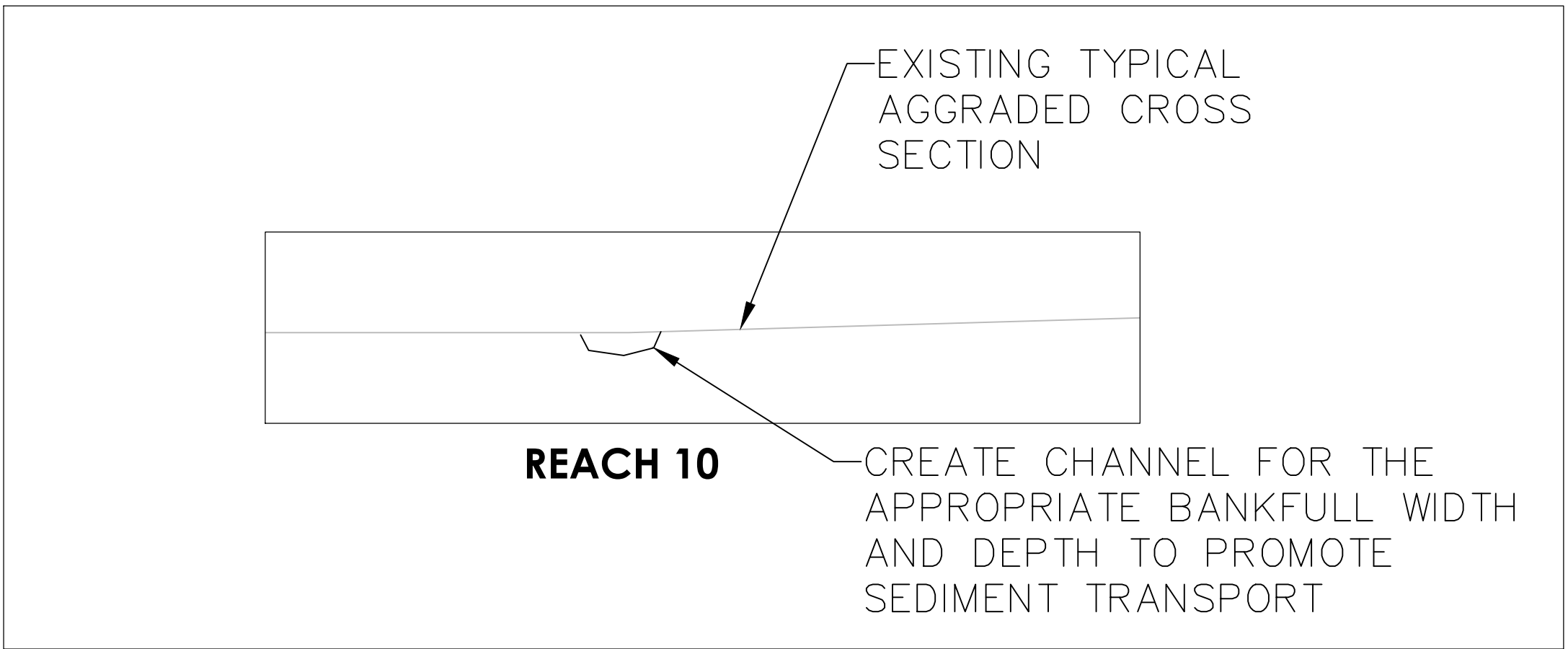
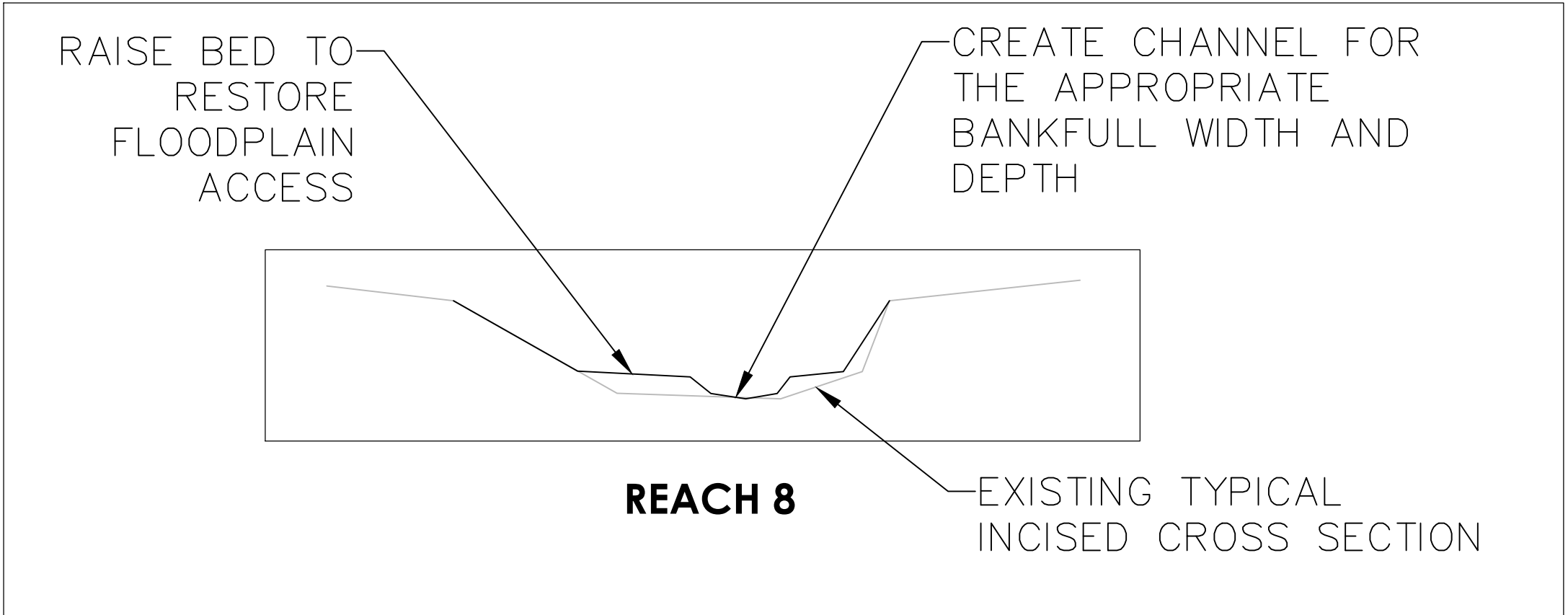
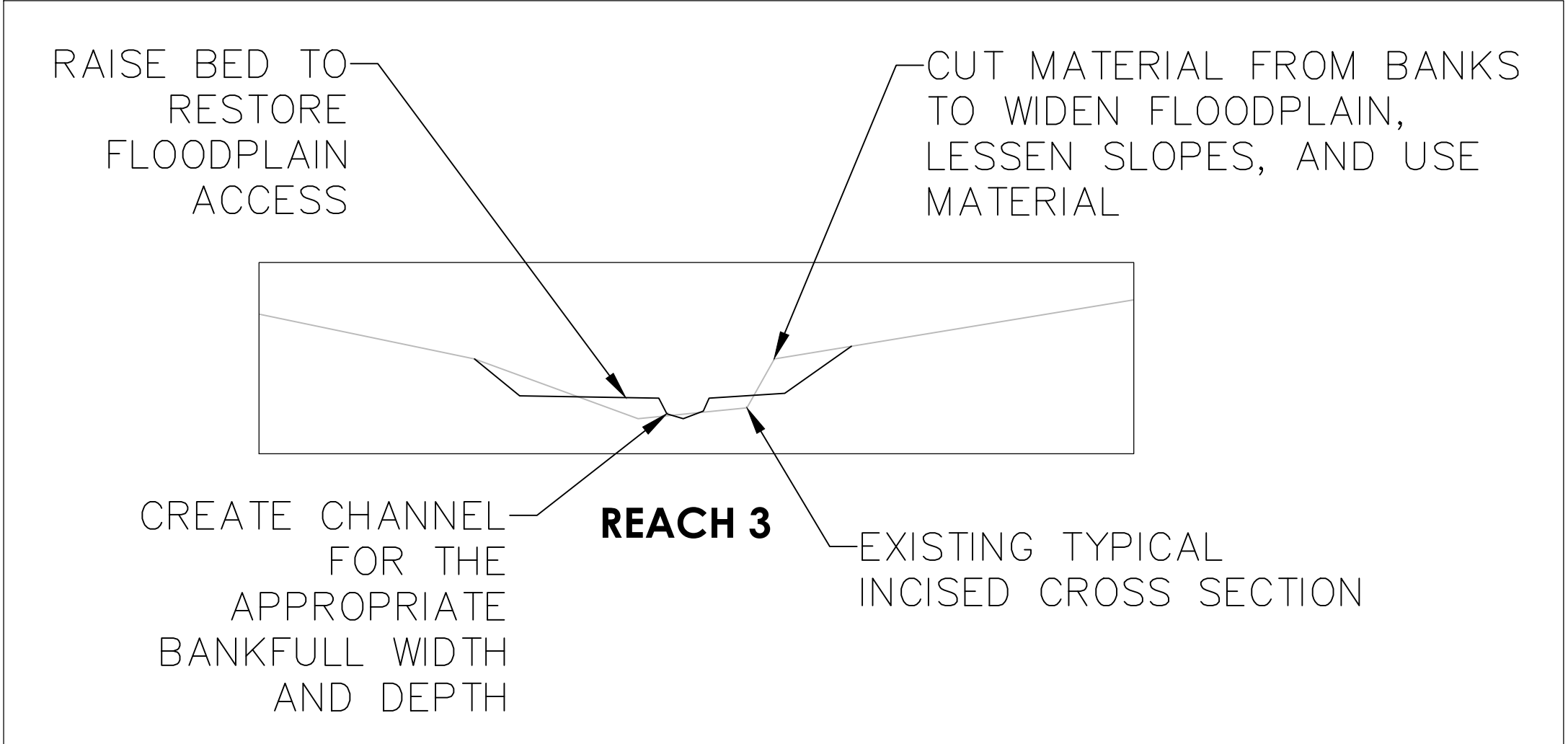
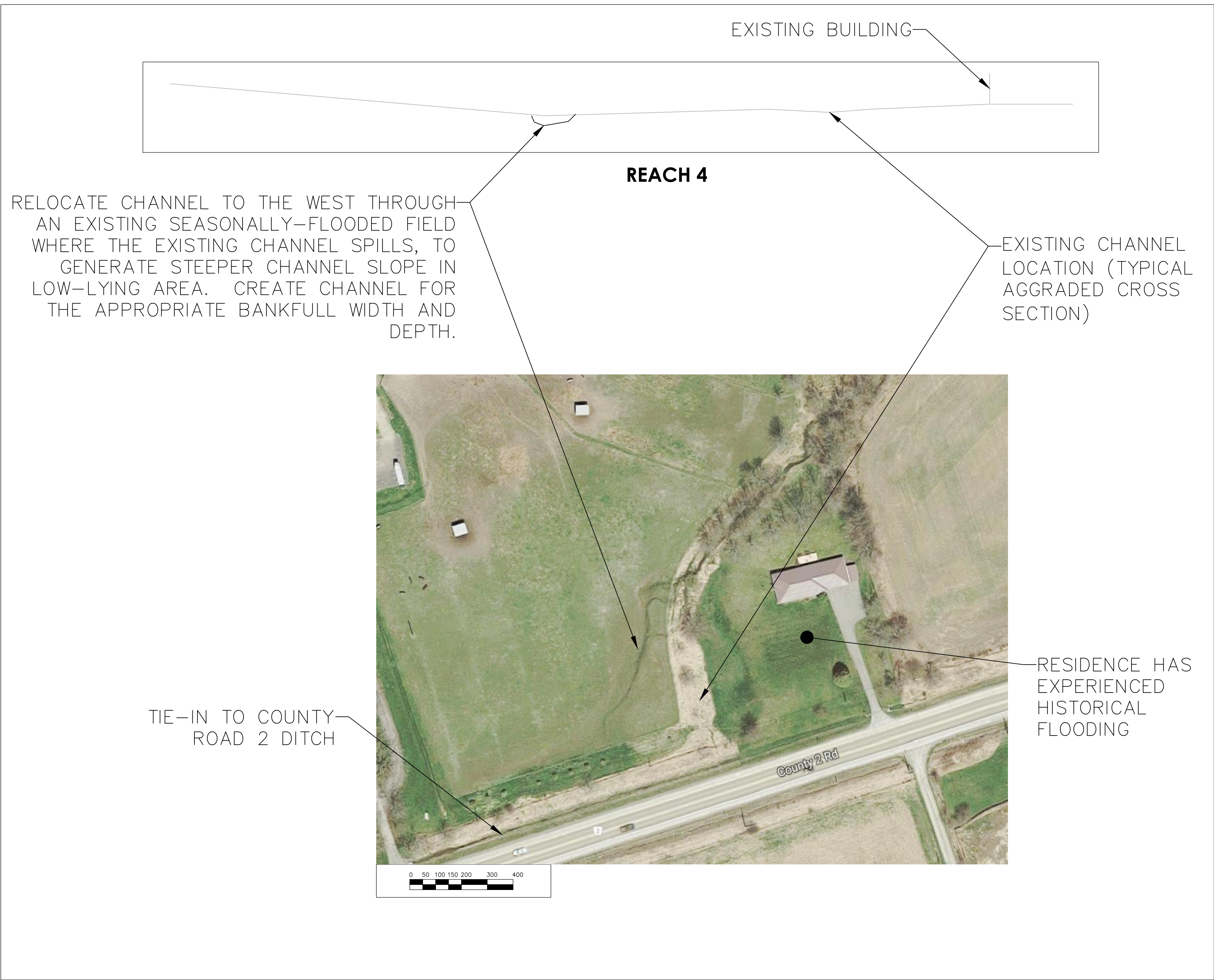
- The capacity of the County Road 2 Culvert must be increased to support the development of Area A.

Natural Channel Design of Reach 3, 4, 8, and 10

- Reach 3 and Reach 8 will require improvements using natural channel design principles to repair erosion and prevent future degradation.
- Reach 4 will require improvements using natural channel design principles (realignment) to increase capacity and prevent aggradation (sedimentation).
- Reach 10 of the existing channel will require improvements, using natural channel design principles to increase capacity and prevent future aggradation (sedimentation).



Conceptual Watercourse Rehabilitation Strategies



Next Steps and Project Contacts

Next Steps

- Prepare Draft Master Drainage Plan documents.
- Publish "Notice of Study Completion" and place Draft Master Plan on Public Record for a 30-day review period.
- Review Public and Review Agency comments on the Master Plan, if any.

Public Input and Comment

- Feel free to provide written input or comment, for consideration by the project team, using the comment sheets provided or the contact information below.
- Information and comments received are collected under the authority of the Municipal Act and will be subject to the requirements of the Freedom of Information and Protection of Privacy Act.
- Should you have any questions or concerns at any time during the project, or would like additional information please contact the representatives below.

THANK YOU FOR ATTENDING

County of Northumberland

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