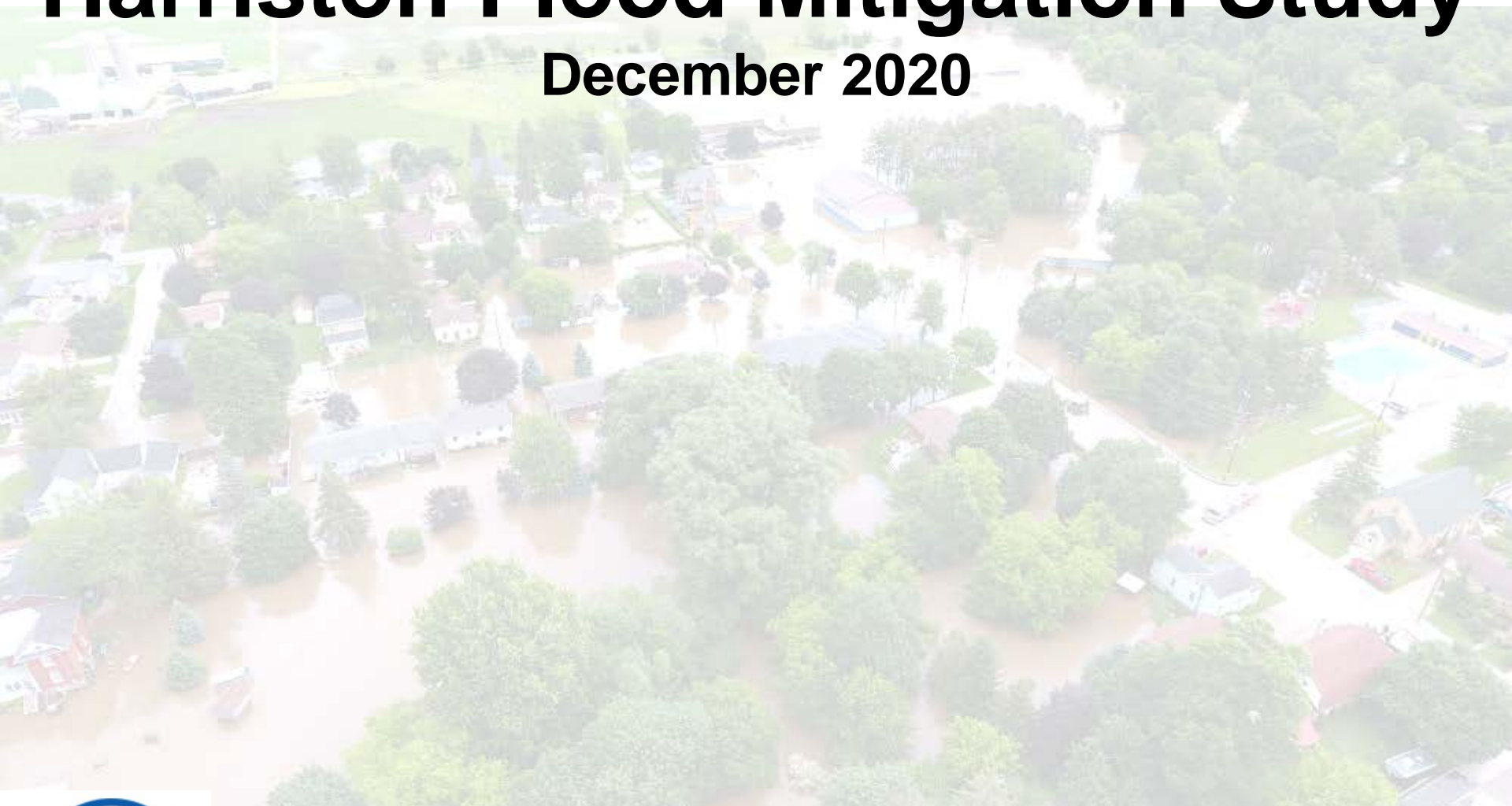


Harriston Flood Mitigation Study

December 2020



Presentation Format

- Opening remarks - Derrick Thomson, CAO
- Introduction - Bill White, Triton
- Technical - Chris Clark, Triton
- Estimated Costs and Next Steps - Chris Clark, Triton
- Staff Remarks- Mike McIsaac, Roads & Drainage Manager



Opening Remarks

- Harriston Flood Mitigation Study provides a comprehensive review of existing conditions and future works within the Harriston sub-watershed to facilitate the implementation of practical corrective actions to address flooding within Harriston.
- Applies the latest technology such as LIDAR mapping to simulate impacts of major rainfall events to evaluate mitigation alternatives
- Proposed implementation strategy for recommended mitigation alternatives through short-, mid- and long-term actions over a 20 year period to guide Council and MVCA
- Support Federal and Provincial funding requests, and future approaches to other possible partners

Study Methodology & Vision

- Provincial Watershed Planning in Ontario document as a guideline
 - Three-Phase Framework
- Consistent with Town's Strategic Plan to "promote environmentally friendly development" and to "protect natural areas and floodplains"
- 5 Goals, 20 Objectives, 7 Targets



"Provide practical corrective actions through realistic financial strategies that the Town of Minto and partners can complete in 20 years or less to meaningfully increase public safety and reduce or eliminate property damage caused by riverine flooding in the Harriston Sub-Watershed of the Maitland River."

Phase 1: Existing Conditions

- Background/History
- Inventory of Existing Conditions
- Hydrologic Conditions: physiography, topography, and soil characteristics
- Natural Environment: landscape, vegetation, wetlands, wildlife and habitat
 - Natural Heritage Assessment by Aboud & Associates
- Cultural Environment
 - Stage 1 Archaeological Assessment and Cultural Heritage Screening by Timmins Martelle Heritage Consultants
- Technical Environment: floodway and flood fringe identification, relevant planning documents

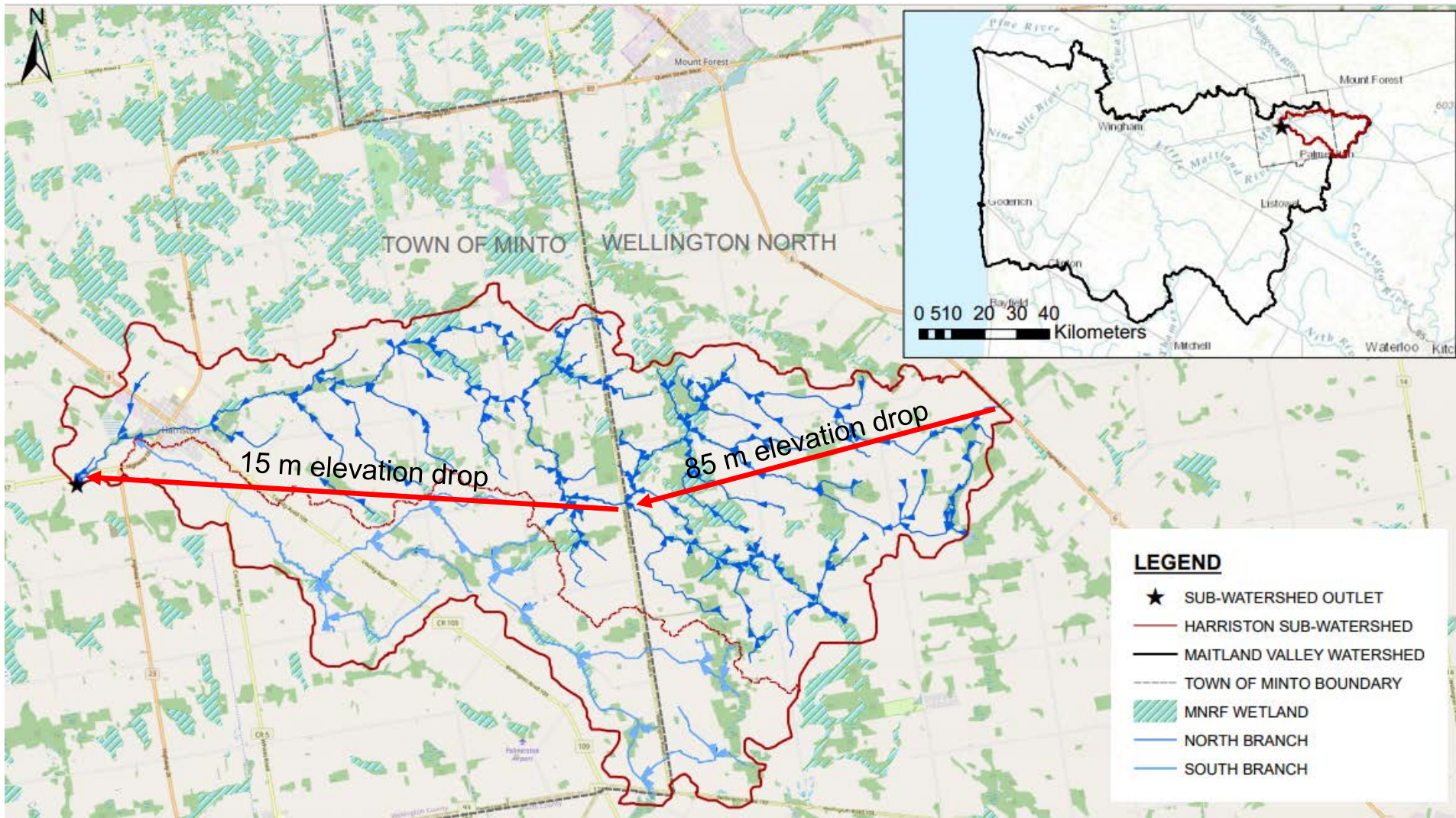
Phase 2: Impacts, Scenarios and Directions

- Mitigation scenarios and alternatives developed, refined and evaluated in consultation with the public
- Alternative 5 preferred/recommended

Phase 3: Implementation Strategy

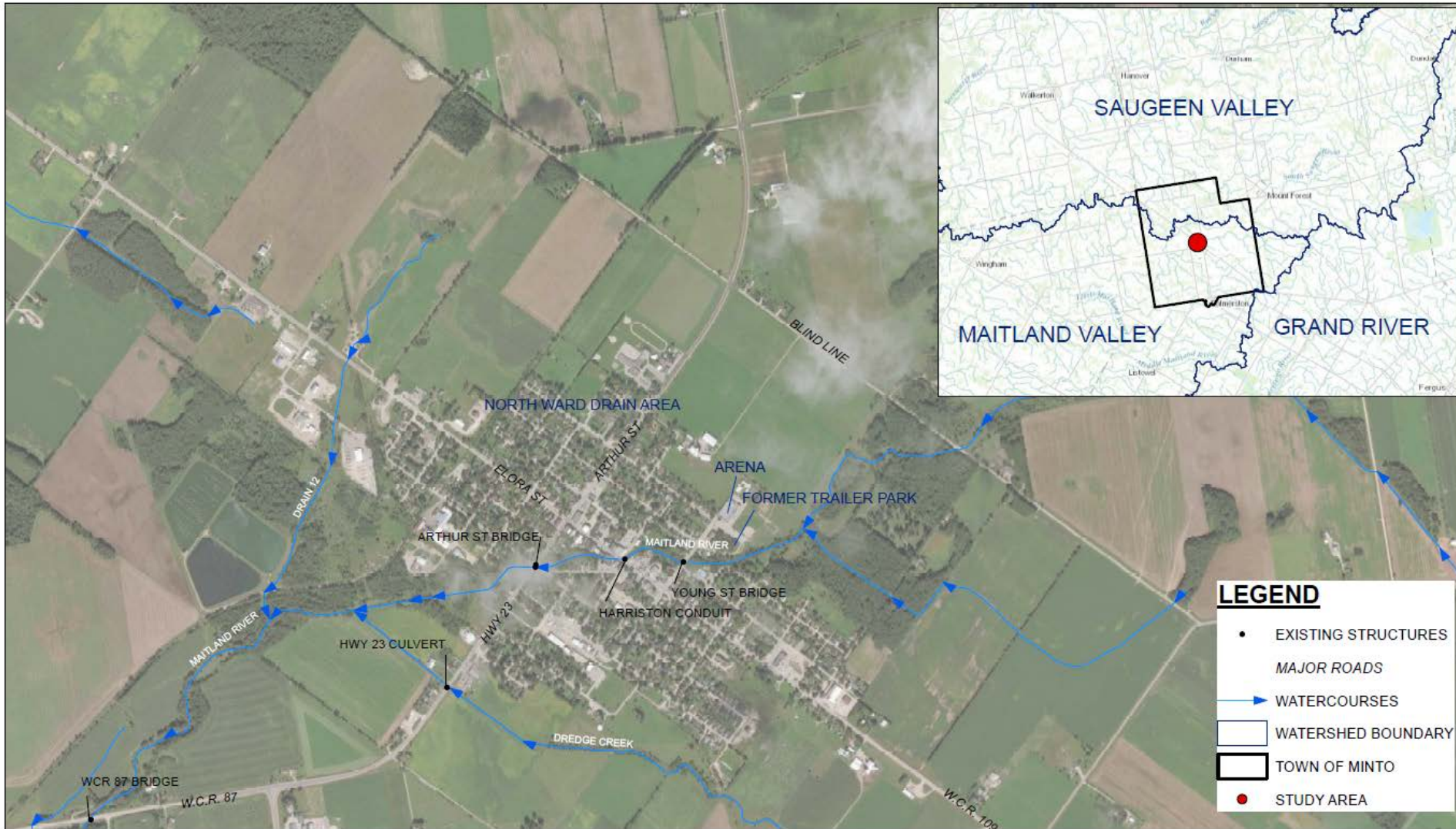
- Goals, Objectives and Targets defined to implement recommended alternative to satisfy Study's Vision
- Financial strategy including capital costs and funding assumptions
- Recommended Actions & Strategy
 - Short <5 yrs, Medium 5-10yrs, Long >10 yrs

Harriston Sub-Watershed



- North Branch of Maitland River through Harriston Sub-Watershed is 20 km long, dropping 105 metres in elevation
- The elevation drop over the lower 3 km reach (i.e. through the urban area of Harriston) is ~ 5 m.

Study Area



History of Flooding

- At least 15 documented floods have occurred in Harriston over its history (since mid-1800s)
- June 2017 - severe flood, approximated as 1:100 year event, significant impacts
- February 2018 - 1:10 year event, localized impacts



Elora St Conduit (Harriston Historical Society, Circa 1948)

Existing Hydrologic Conditions

- The Maitland River runs through Harriston, with a majority of residences and businesses constructed within the floodplain
- During major storm events, existing structures (Young St., Elora St., and Arthur St. bridges) can restrict flow through the urban centre causing water levels to rise very quickly
- Water does not back up into Harriston– high flows can't get through urban area
- MVCA states the amount and intensity of rainfall events (i.e. more rain occurs over a shorter time period) have been increasing in recent years
- Flood risk increases when significant rainfall or snowmelt occurs over a short time and soil moisture is elevated, where the MVCA has noted a direct link between soil moisture and flood severity during historic flood events in Harriston

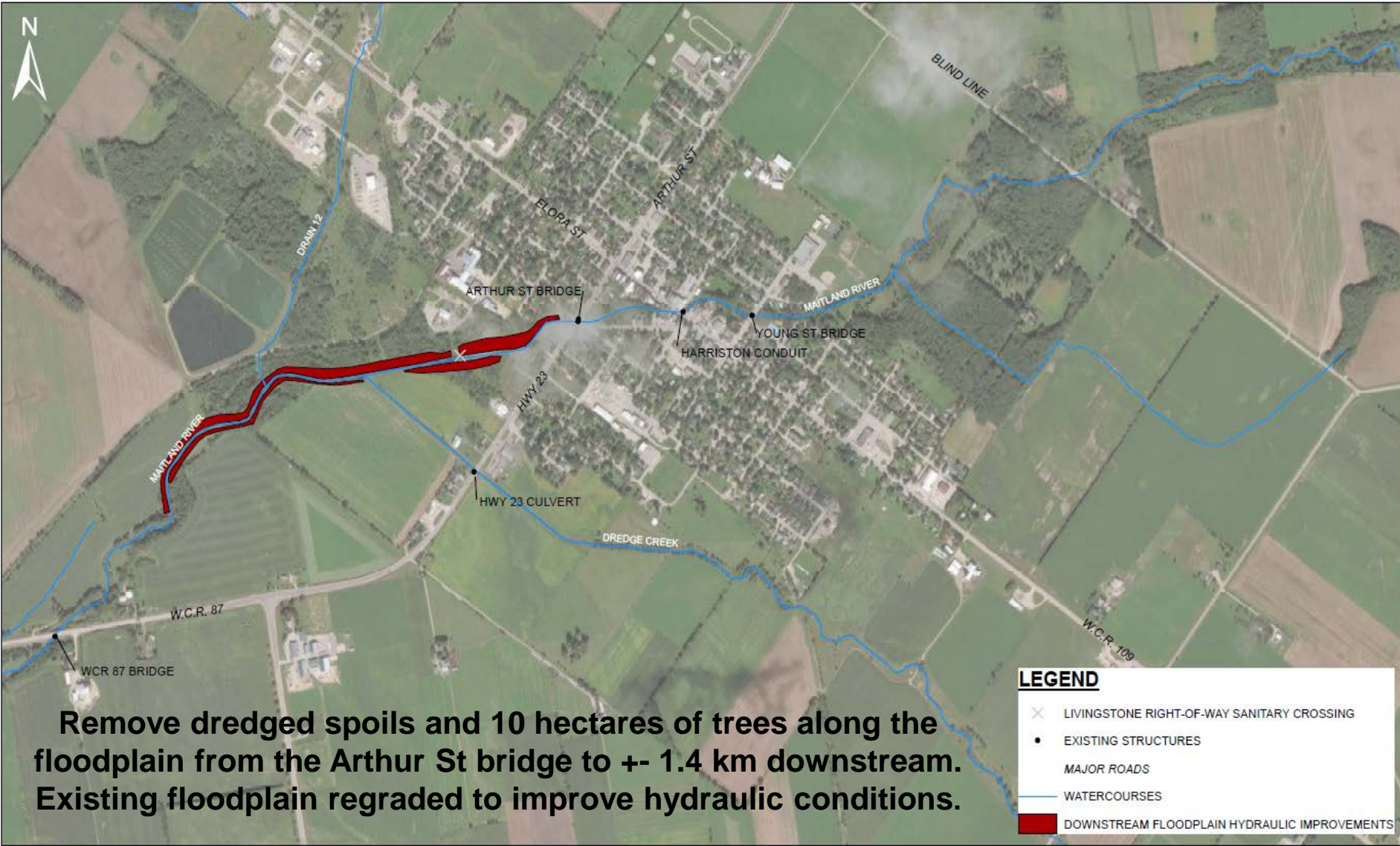
Technical Environment

- **Floodway** where water flow, depth, velocity “pose a threat to life and/or property damage”
- **Flood fringe** lands that have the potential of flooding during a Regional Storm Event; depth and/or velocity not normally an immediate threat to life; currently impacts +- 274 properties.
- Comprehensive floodplain modelling completed by applying HEC RAS software tied into ground control, linked with LiDAR & air photos; validated using June 23/17 drone footage; very reliable.
- Floodway and flood fringe mapping for the Harriston urban area identified and adopted in 2019.

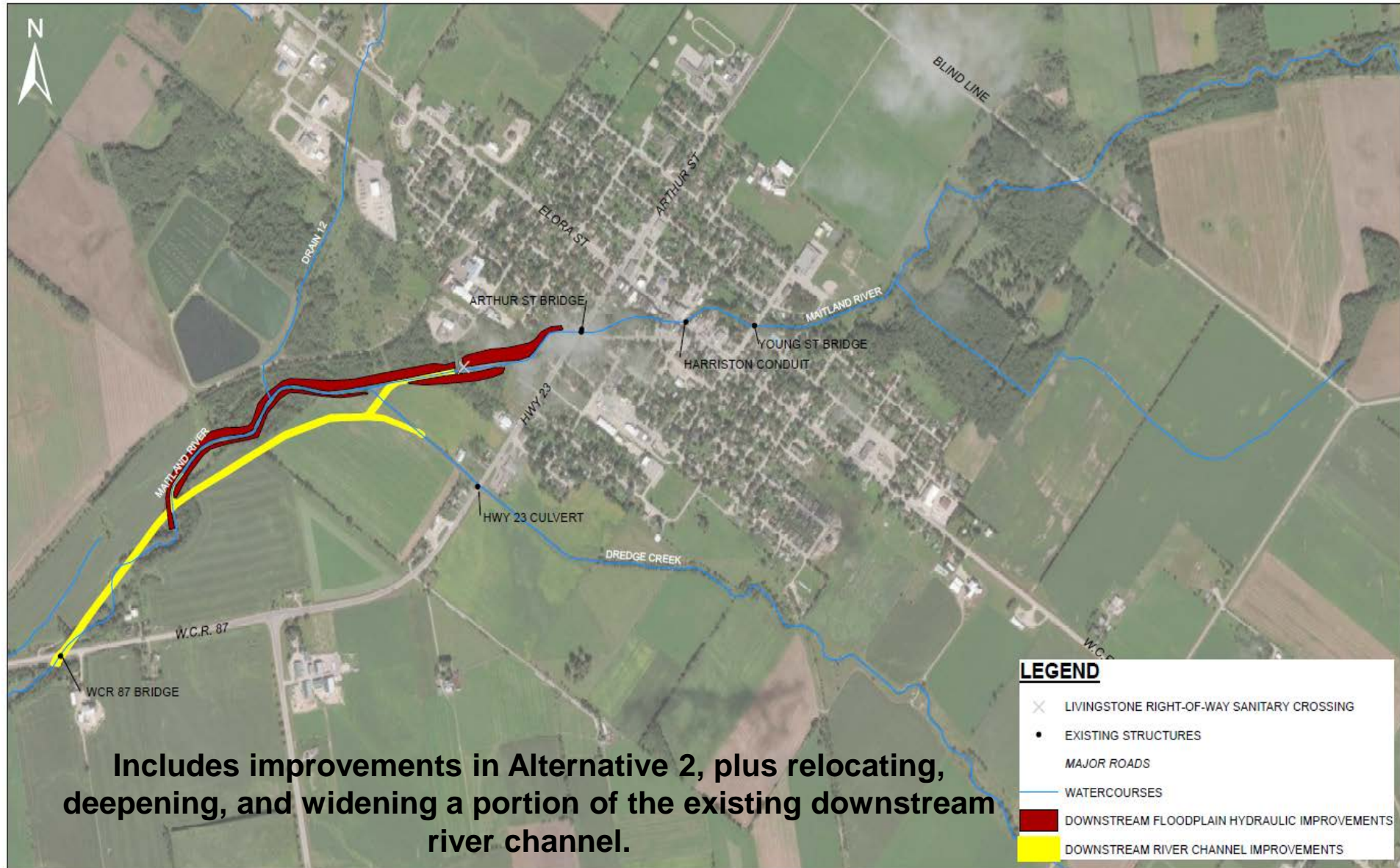
Flood Mitigation Alternatives

- Assessment of 10 preliminary mitigation scenarios presented to Council in November 2019
- Shortlisted to three scenarios for further technical analysis
- Refined into five alternatives in 2020
 - Alternative 1- “Do Nothing”/ Existing Conditions
 - Alternative 2- Downstream floodplain hydraulic improvements
 - Alternative 3- Downstream river channel improvements
 - Alternative 4- Harriston river channel improvements
 - Alternative 5- Maitland river Harriston bypass

Alternative 2

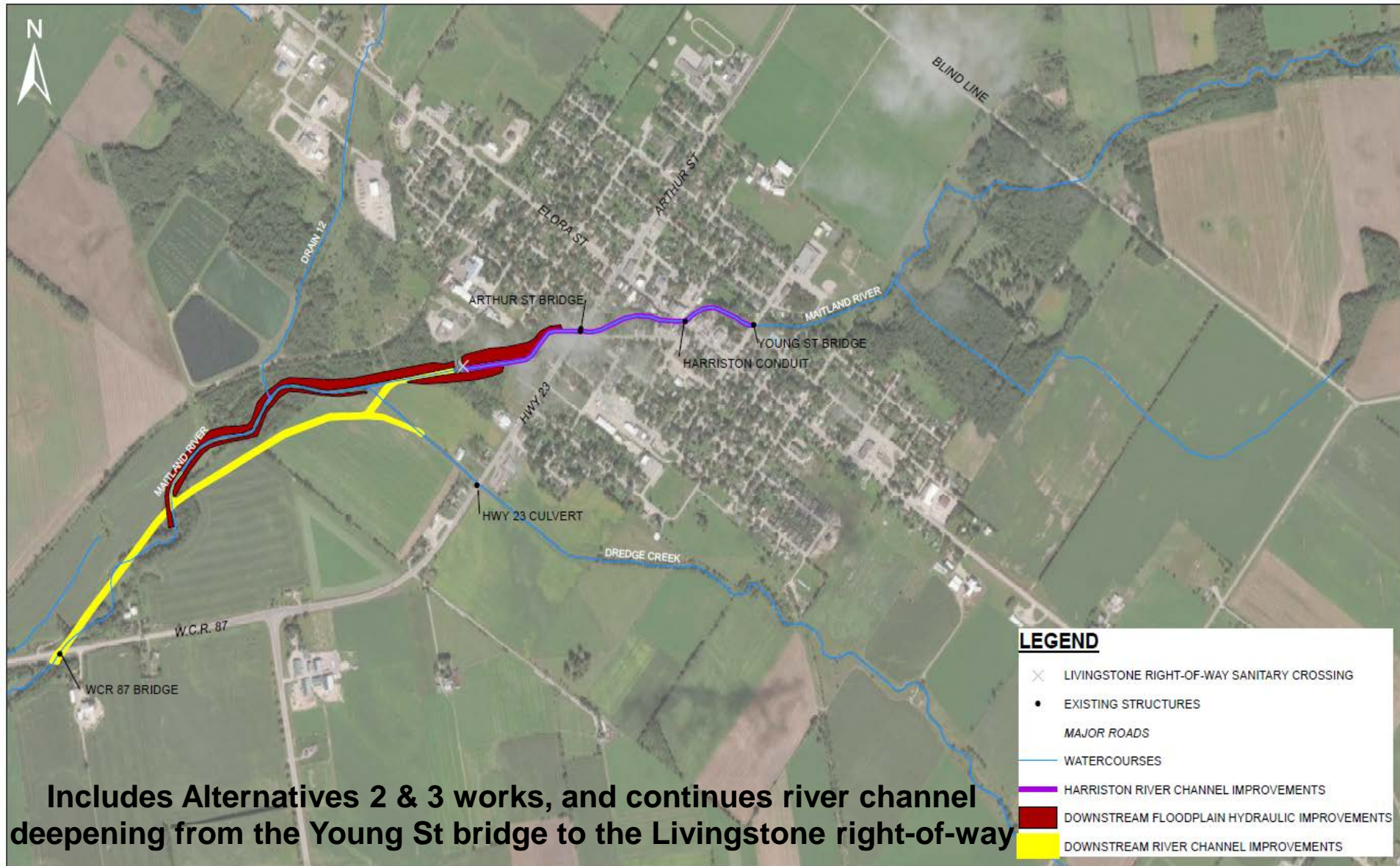


Alternative 3

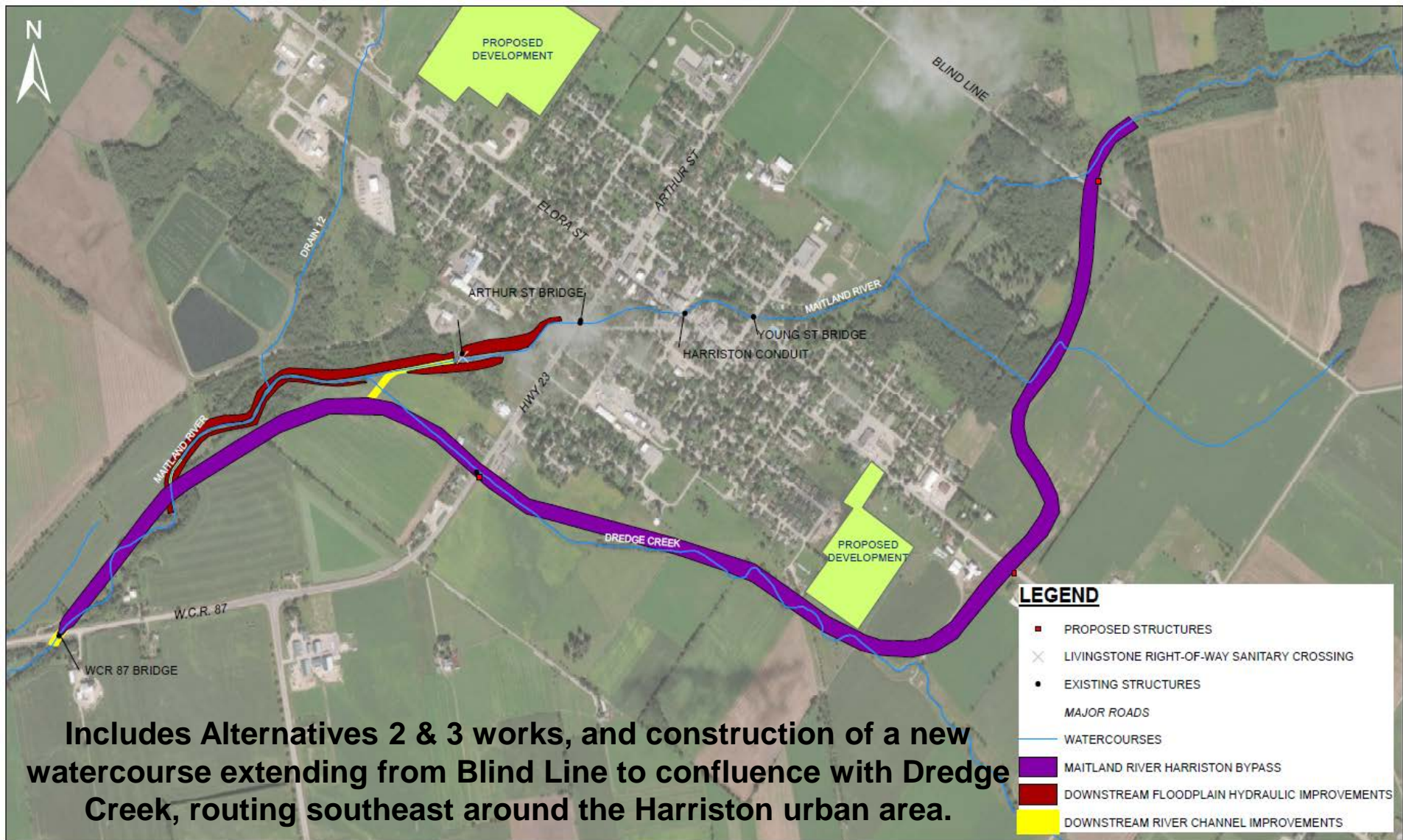


Includes improvements in Alternative 2, plus relocating, deepening, and widening a portion of the existing downstream river channel.

Alternative 4

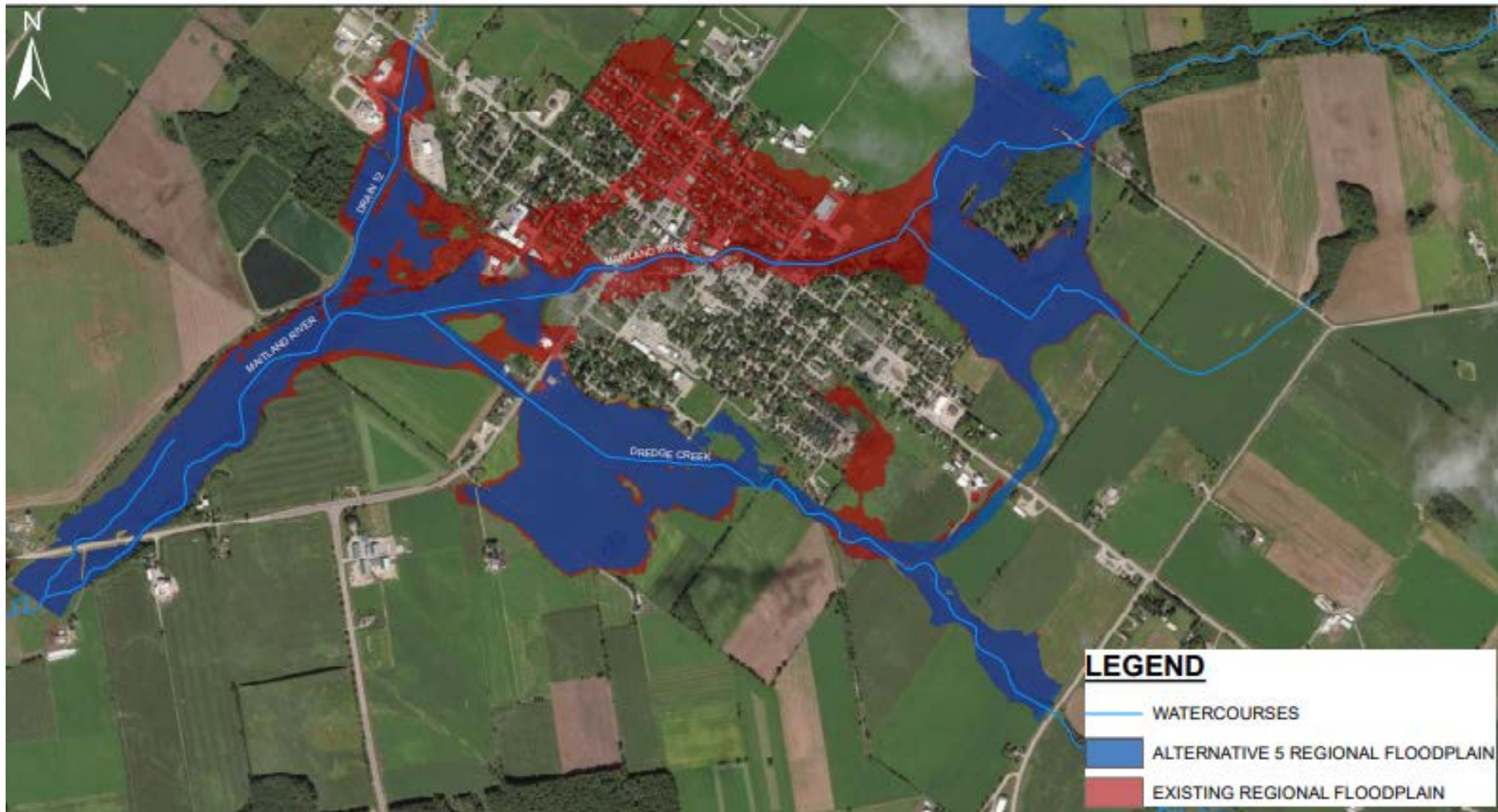


Alternative 5



Includes Alternatives 2 & 3 works, and construction of a new watercourse extending from Blind Line to confluence with Dredge Creek, routing southeast around the Harriston urban area.

Alternative 5 Flood Extent



Regional Storm Event

- Only 4 buildings within floodplain

Alternative 5 Flood Extent



100-Year Storm Event

- 0 buildings within floodplain

Summary of Results

Flood Water Point Elevation Locations



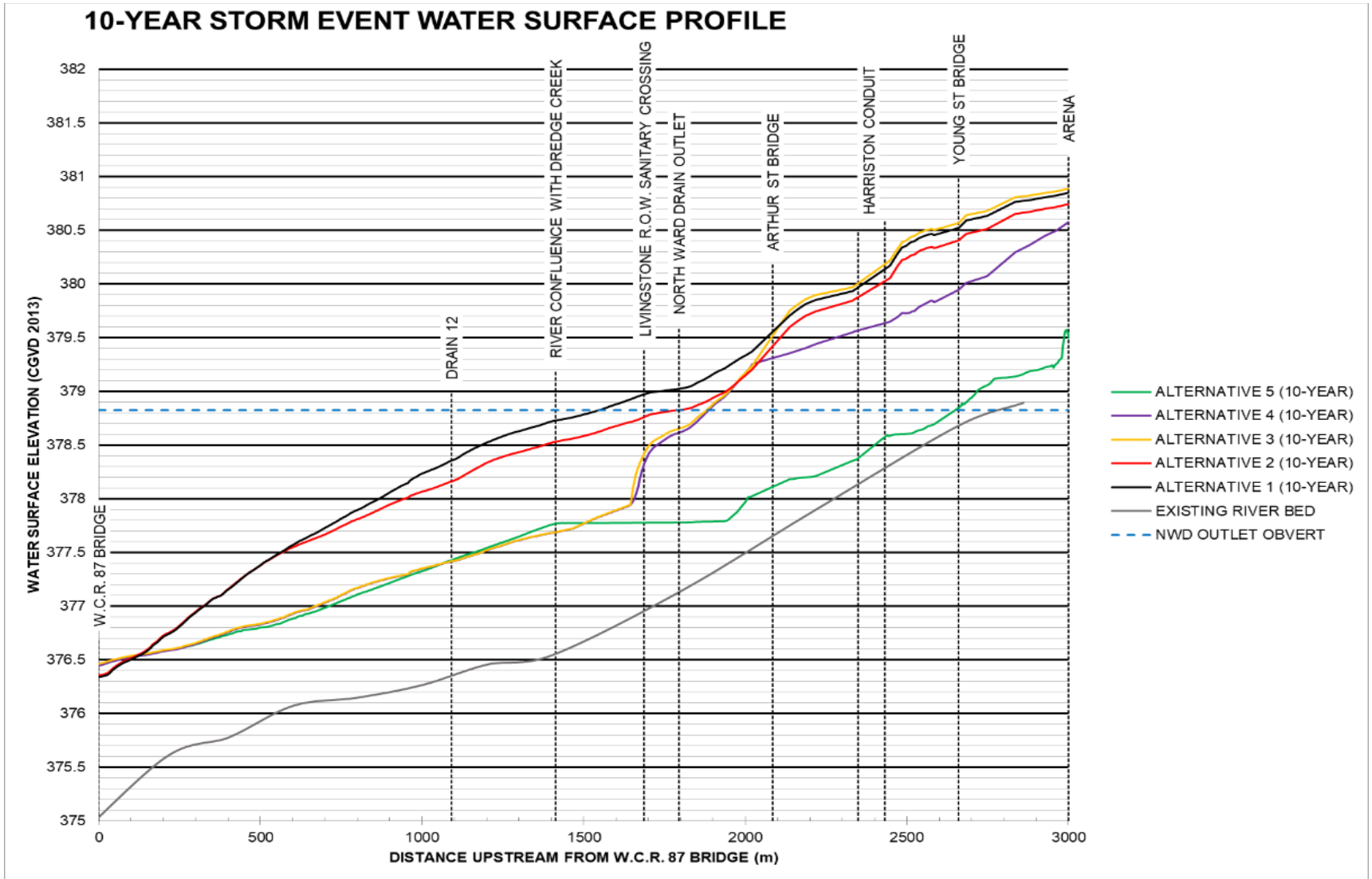
Summary of Results

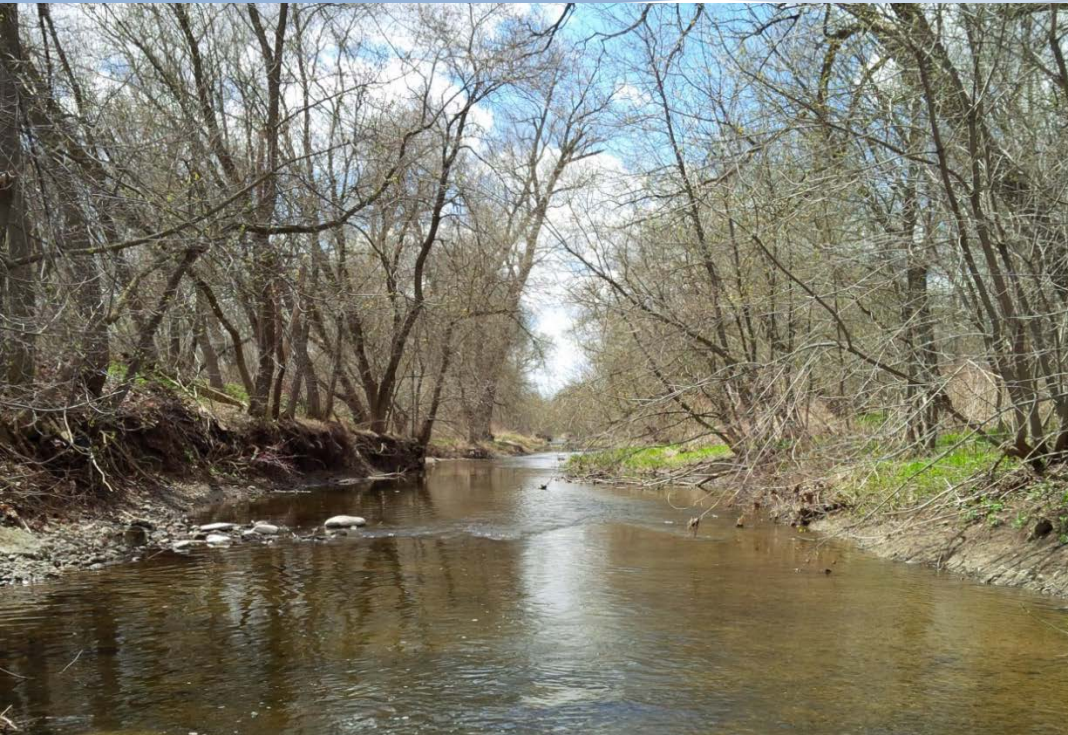
Alternatives Evaluation

Alternative	Description	100-Year Storm Event				Regional Storm Event			
		Estimated Number of Properties in Floodplain	Flood Elevation (m)			Estimated Number of Properties in Floodplain	Flood Elevation (m)		
			Upstream of Harriston Conduit (Loc. 1)	Upstream of Arthur St Bridge (Loc. 2)	Drain 12 (Loc. 3)		Upstream of Harriston Conduit (Loc. 1)	Upstream of Arthur St Bridge (Loc. 2)	Drain 12 (Loc. 3)
1	“Do Nothing”	167	381.21	380.37	378.75	302	382.37	381.16	379.32
2	Downstream Floodplain Hydraulic Improvements	153	381.21	380.37	378.51	294	382.37	381.16	378.99
3	Downstream River Channel Improvements	150	381.21	380.37	377.77	292	382.37	381.16	378.30
4	Harriston River Channel Improvements	46	380.68	380.05	377.78	271	382.08	380.77	378.30
5	Maitland River Harriston Bypass	0	378.67	378.32	377.86	4	378.91	378.86	378.47

Summary of Results

North Ward Drain



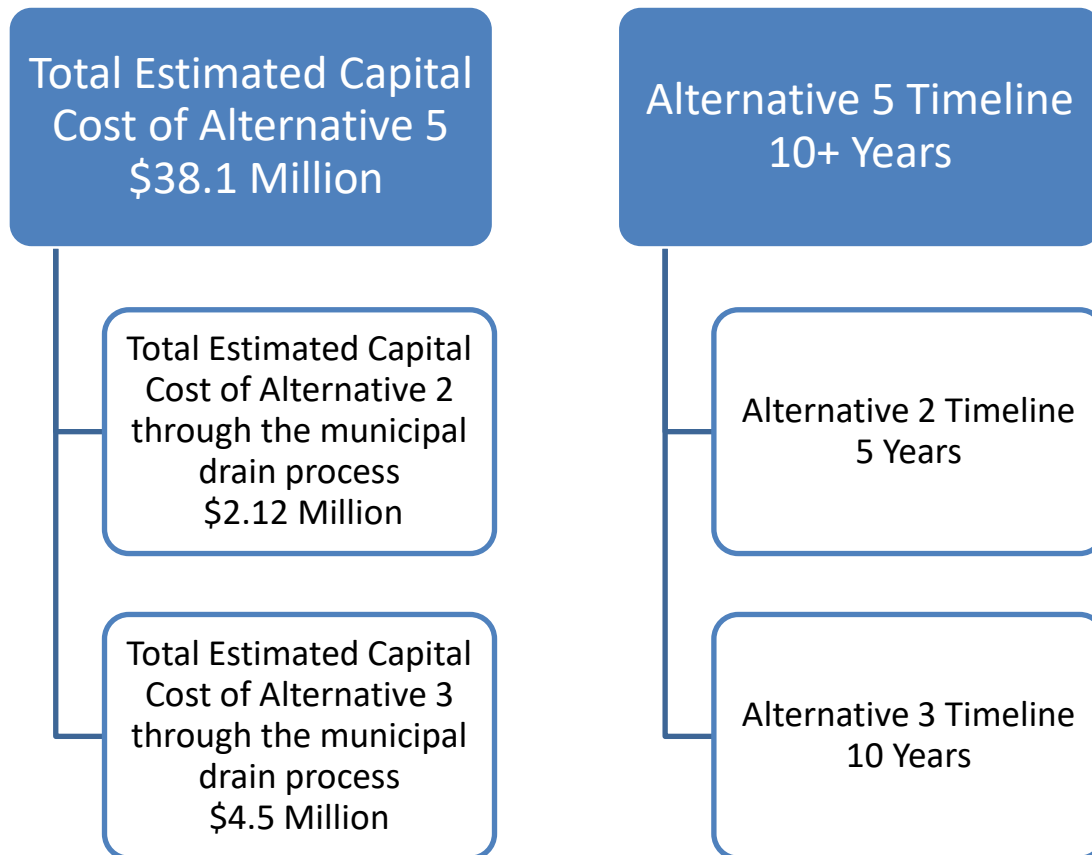


Channel Condition
Before (May 2015)

After Channel
Improvements
(Rendering)



Summary of Estimated Capital Costs and Proposed Implementation

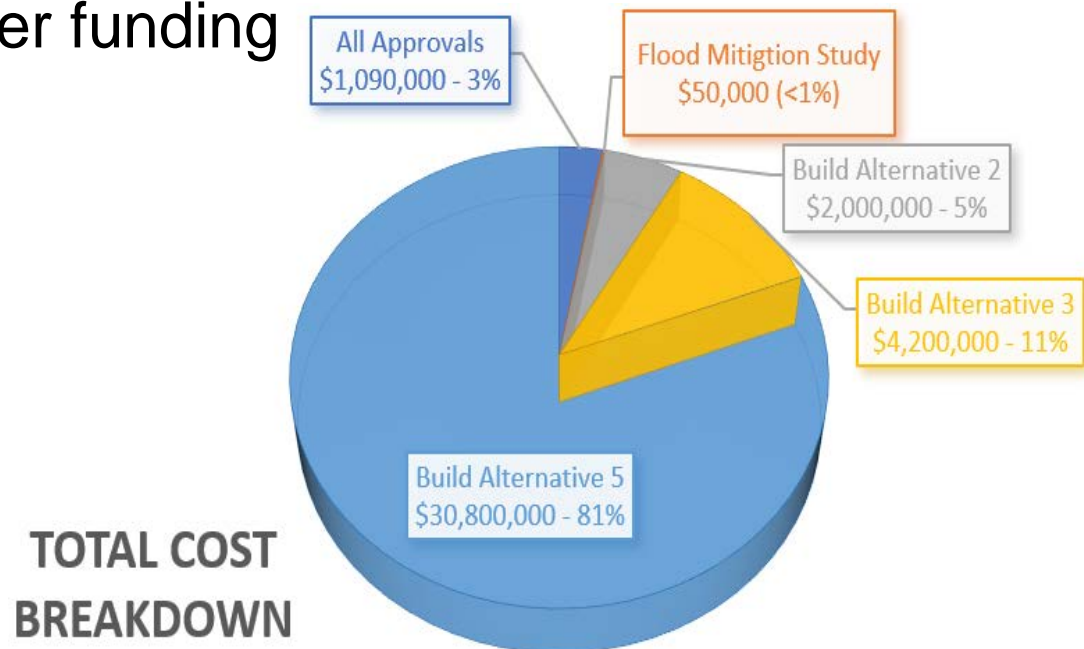


Summary of Estimated Capital Costs and Proposed Implementation

Components for Implementation	Time Period			
	2020 to 2024	2025 to 2029	2030+	Total Estimated Costs
Flood Mitigation Study	\$ 50,000	-	-	\$ 50,000
Approvals (i.e. Drainage Act or Class EA)	\$ 220,000	\$220,000	\$ 650,000	\$ 1,090,000
Construct Alternative 2	\$ 2,000,000	-	-	
Construct Alternative 3	-	\$ 4,200,000	-	
Construct Alternative 5	-	-	\$ 30,800,000	\$ 37,000,000
Total Estimated Costs	\$ 2,270,000	\$ 4,420,000	\$ 31,450,000	\$ 38,140,000

Financial Considerations

- Bring forward for budget annual contribution to flood reduction
- Approach Senior Levels of Government for funding using Flood Mitigation Study
- Consider other partner funding



Next Steps

- Final report available for public information (Town of Minto website)
- Finalize financial strategy for phased flood mitigation approach
- Initiate detailed design and approvals for phased approach
 - Alternative 2 & 3- Drainage Act
 - Alternative 5- Schedule C Class EA
- Establish maintenance program and set aside operating funds to sustain infrastructure



