Welcome to the Public Information Centre No. 2

- **All relevant information regarding this project (including the display material presented today) is available for public review on the Town of Tecumseh's website (www.tecumseh.ca).**
- Please sign in to record your attendance.
- Please review the display material and provide any comments on the sheet provided. You may submit your comments by mail / fax / e-mail or you may place them in the Comment Box located on the sign-in table.
- All comments for this Information Centre must be received by **February 14, 2020** to be given consideration in the development of the preferred solution for this project. Contact information for the Project Team is available below, and also on the comment sheet provided.
- The Project Team members present will be pleased to discuss any questions you may have.

Project Team

This study has been initiated by the Town of Tecumseh. Landmark Engineers Inc. has been retained by the Town to serve as the Lead Consultant on the project.

Any comments, questions or suggestions relevant to this study should be directed to the following primary members of the Project Team:

Liz Michaud, B.A.Sc.
Landmark Engineers Inc.
2280 Ambassador Drive
Windsor, Ontario N9C 4E4
Phone: (519) 972-8052
Fax: (519) 972-8644
Email: lmichaud@landmarkengineers.ca

John Henderson, P.Eng.
Town of Tecumseh
917 Lesperance Road
Tecumseh, Ontario N8N 1W9
Phone: (519) 735-2184 ext. 166
Fax: (519) 735-6712
Email: jhenderson@tecumseh.ca

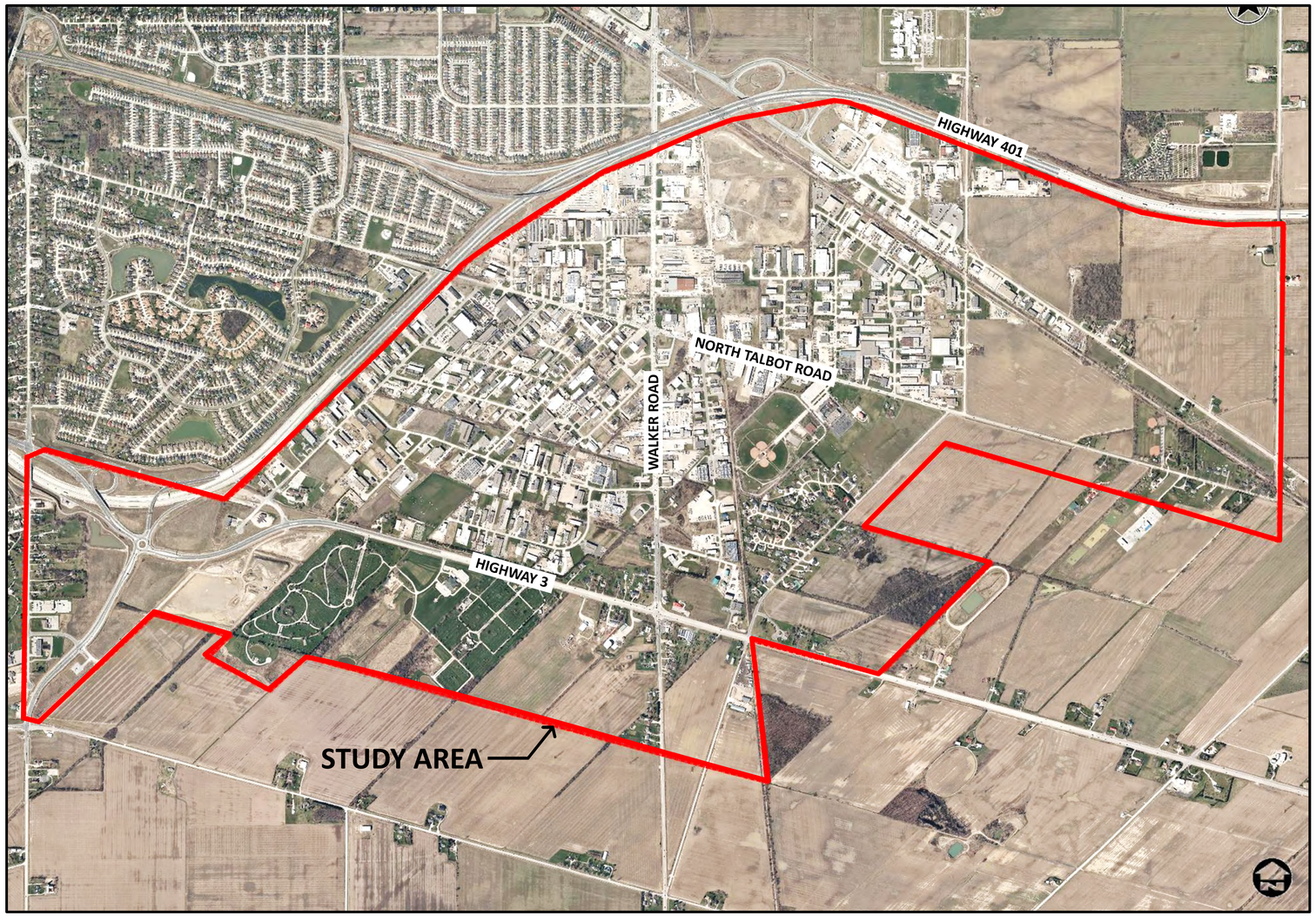
Background and Project Objectives

Background

The Town of Tecumseh plans to undertake a Stormwater Master Plan for the Oldcastle Hamlet within the Town of Tecumseh. The Stormwater Master Plan will include a capacity review of the current storm sewer system and drains in consideration of both current and future development. As part of the review, the need for alterations, improvements and / or construction of new storm sewer system components will also be identified.

Project Objectives

- Review the capacity of the current stormwater system;
- Identify the areas of concern;
- Review the stormwater needs of future development;
- Identify potential improvement alternatives; and,
- Create a strategy for implementing the proposed improvements.



Purpose, Problem and Process

Purpose

This Public Information Centre is intended to:

- Present the Problem / Opportunity Statement for the Project;
- Introduce the members of the Project Team;
- Present the scope of the Class Environmental Assessment (Class EA) process;
- Present existing conditions and areas of concern; and,
- Obtain feedback from local residents, property owners and community groups.

Problem / Opportunity Statement

"This study intends to evaluate the current stormwater system capacity of the Oldcastle Hamlet, identify the capacity needed for existing and projected future demands and develop a strategy to implement proposed improvements."

Environmental Assessment (EA) Master Plan Process

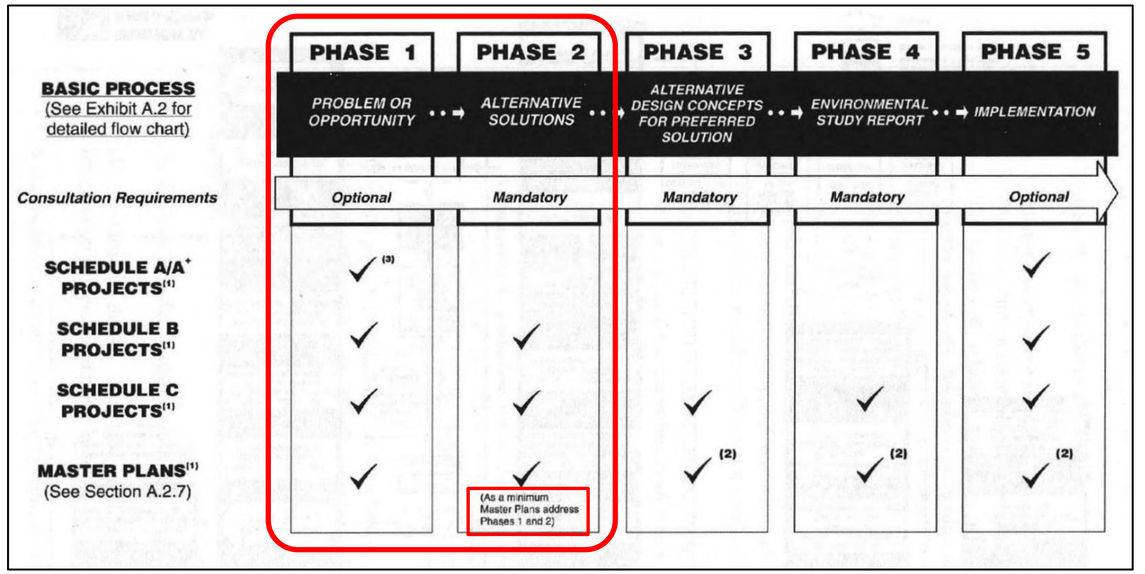
- This project will follow the planning process set out in the Municipal Engineers Association's *Municipal Class Environmental Assessment (Class EA)* for Master Plans (Approach #2).

- Master Plans are defined as: A long range plan which integrates infrastructure requirements for existing and future land use with environmental assessment principles. At a minimum, a Master Plan addresses Phases 1 and 2 of the Municipal Class EA process.

- Given the Master Plan will minimally cover Phases 1 and 2, all projects identified in the Master Plan that are 'Schedule B' will be considered complete through the EA Process and may proceed to construction. Projects identified as 'Schedule C' will have to complete Phases 3 and 4 before they may proceed to construction.

- For 'Schedule B' projects, only one point of Public Consultation is required. Given the nature of this project, however, the Project Team has elected to increase the level of public consultation (over and above the minimum requirement), and host **an extra** Public Information Centre, creating a total of **two** Public Consultations for this project.

- A copy of the MCEA document is on-site and is available for review by the public.



Environmental Assessment Process

Where we have been:

1	2	3	4	5	6	7
Identify Problem or Opportunity	Identify Alternative Solutions to the Problem/ Opportunity	Select Project Schedule	Inventory Natural, Social, Economic Environment	Identify Impact of Alternative Solutions on the Environment and Mitigating Measures	Evaluate Alternative Solutions	Consult with Public (Public Information Centre No. 1)
Complete (This was completed as part of the Master Plan)	Complete (This was completed as part of the Master Plan)	Complete (Project falls under Schedule 'B')	Complete	Complete	Complete	Complete

Where we are going:

8	9	10	11	12	13
Refine inventory of Natural, Social and Economic Environment based (in part) on Public Feedback	Identify Impact of Alternative Solutions on the Environment and Mitigating Measures	Evaluate Refined Alternative Solutions	Consult with Public and Review Agencies (Public Information Centre No. 2)	Select Preferred Solution	Notice of Completion to Review Agencies and Public / Place Project File on the Public Record
Complete	Complete	Complete	We Are Here	Prepare project file by March 2020.	Public has 30 days to request a Part II Order from the Minister of the Environment (Schedule B Projects only) (see Note 1)

Note: 1. In accordance with the terms of the Municipal Engineers Association's *Municipal Class EA*, if concerns regarding this project cannot be resolved with the Municipality, any member of the public may request that the Minister of the Environment make an order for the project to comply with Part II of the EA Act - requiring an individual EA (not Class EA).

2. A Part II Order can only be requested for the individual Schedule B project identified in the Master Plan.

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Environmental Inventory

The following displays are intended to present the Environmental Inventory of the Study Area that has been compiled by the Project Team. This inventory documents the existing conditions of the site in terms of the following categories:

Physical Environment

- Site Location
- Physical Infrastructure
- Topography

Natural Environment

- Species at Risk
- Drainage Patterns

Social / Economic Environment

- Land Ownership
- Land Use Map
- Heritage & Archaeological Resources

BUSINESS PARK (WALKER ROAD (CR11) LOOKING NORTH)

HAMLET RESIDENTIAL (PICADILLY AVENUE LOOKING EAST)

GENERAL COMMERCIAL (PROVINCIAL ROAD)

BUSINESS PARK (PULLEYBLANK ROAD LOOKING SOUTH)

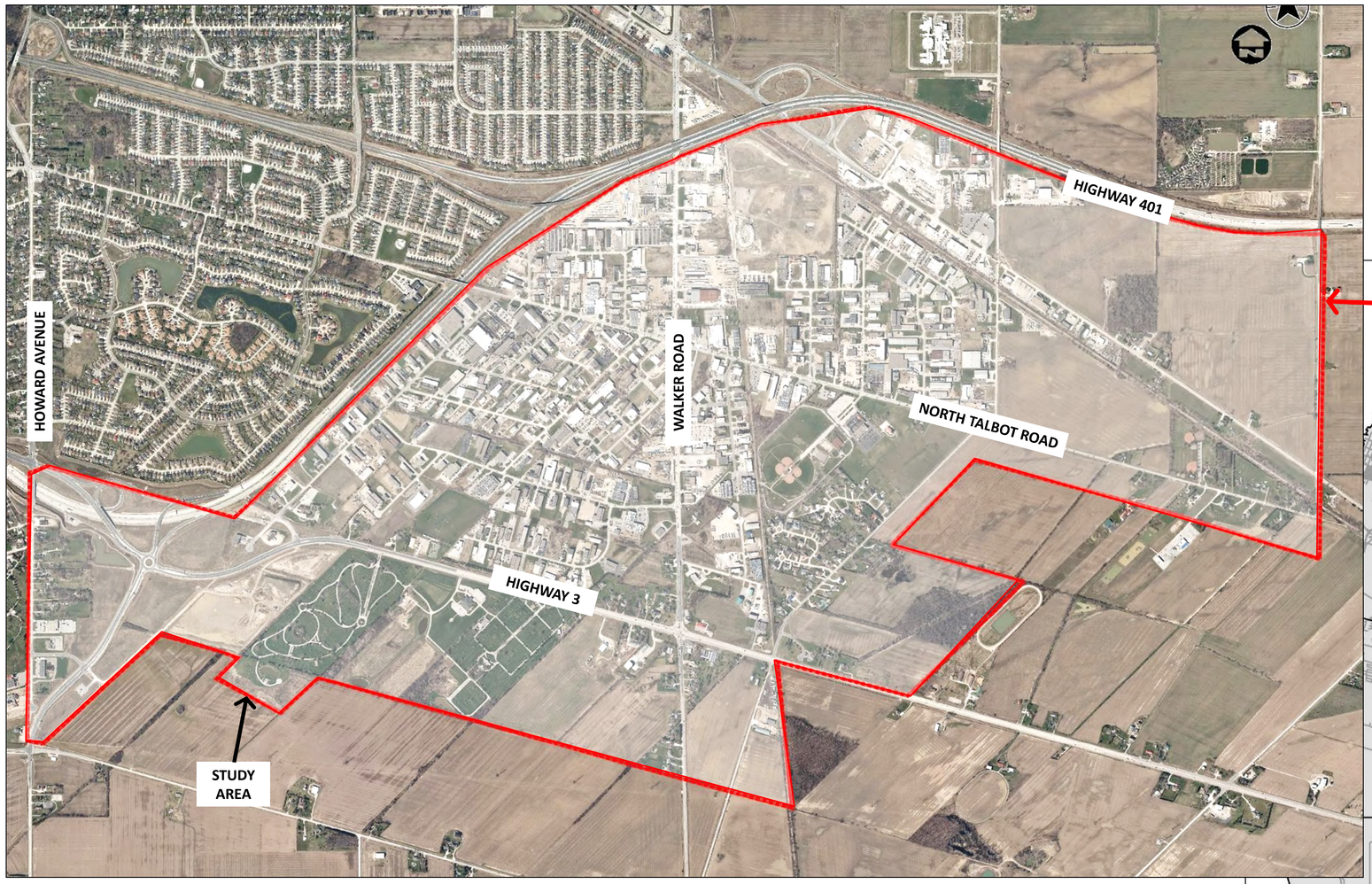
COMMUNITY FACILITY (VICTORIA MEMORIAL GARDENS)

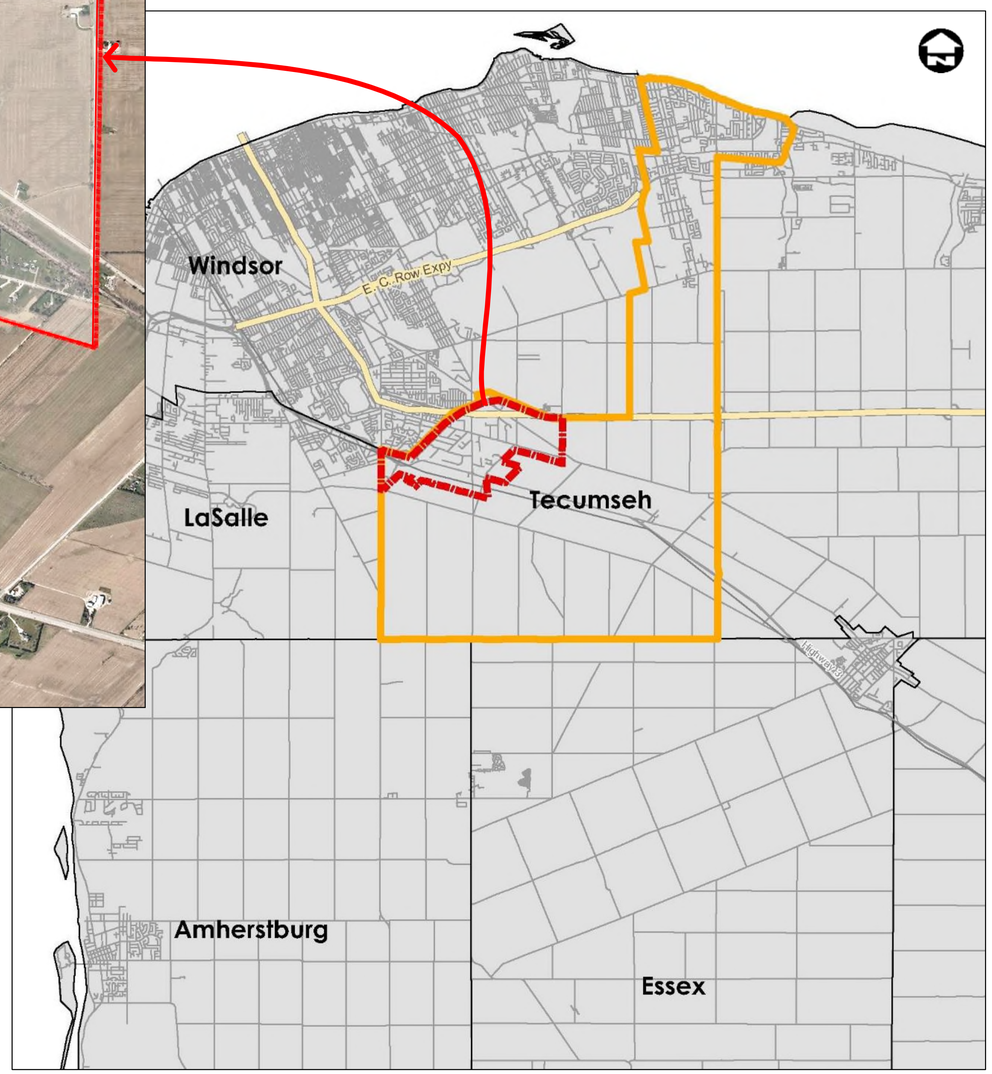
HAMLET DEVELOPMENT (NORTH TALBOT ROAD)

Note: All images on this page are from Google Earth.

Environmental Inventory

Site Location



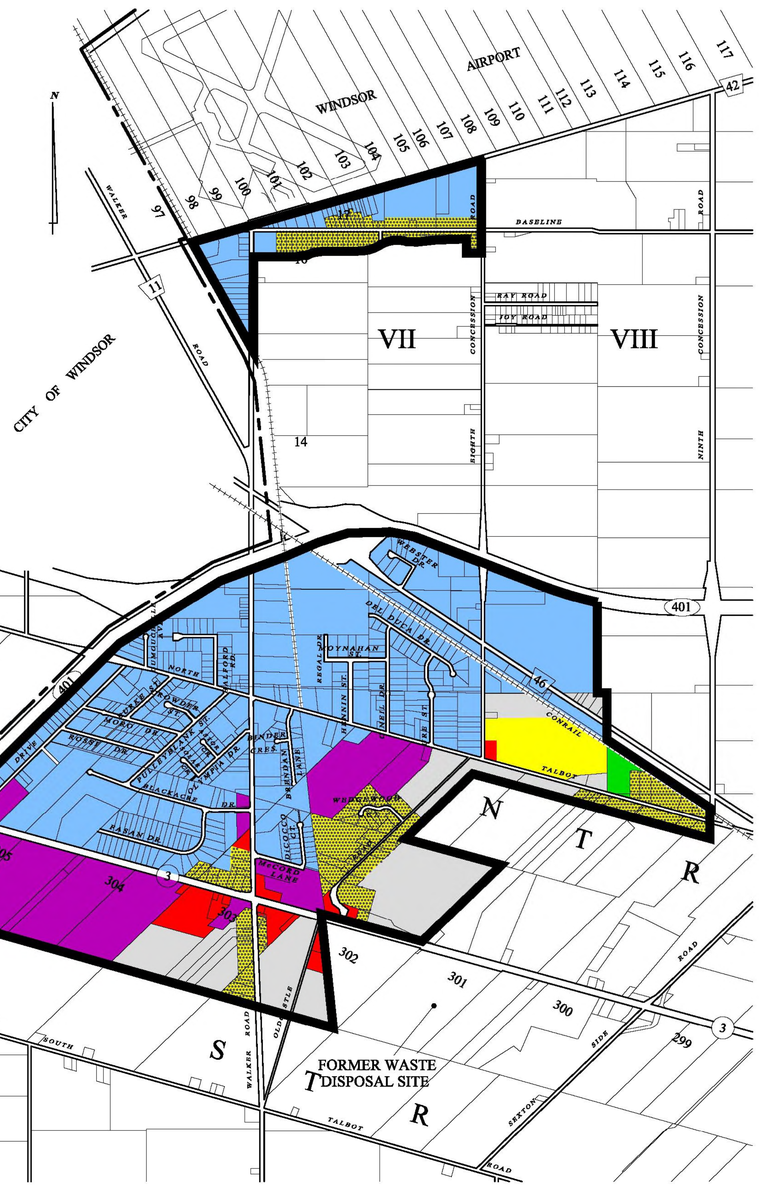


OLDCASTLE, TECUMSEH

The study area is located in the south west corner Town of Tecumseh commonly known as the Oldcastle Business Park. It is bound by Highway 401 along the north. Walker Road bisects the study area running north / south. North Talbot Road and Highway 3 area the main east / west roads.

Land Uses

This display presents the zoned land uses for the Study Area. As illustrated by the map below, the area is comprised primarily of Business Park, Hamlet Development and Community Facility with very little Hamlet Residential, General Commercial and Recreational.



SCHEDULE "A-2"
TOWNSHIP OF SANDWICH SOUTH
OFFICIAL PLAN
OLDCASTLE HAMLET & BASELINE ROAD HAMLET URBAN AREA LAND USE PLAN

- **Urban Area Boundary**
- **Low Density Residential**
- **Hamlet Residential**
- **General Commercial**
- **Business Park**
- **Community Facility**
- **Recreational**
- **Hamlet Development**

prepared by: Prince, Silani & Associates Limited
revised June, 1997 January, 1997 - psa - A - 42008
revised Nov., 1997
revised February, 2002

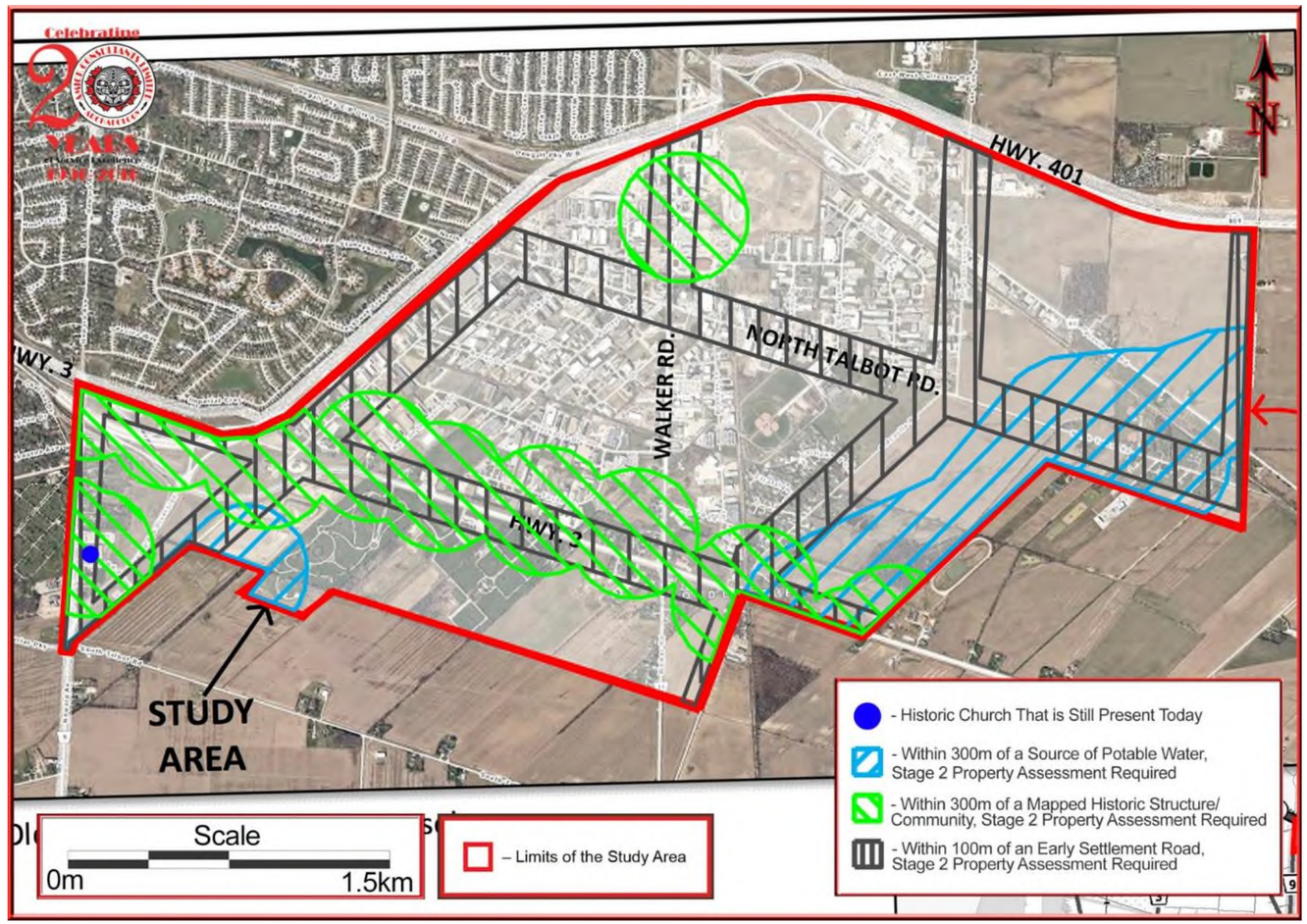
Landmark Engineers Inc.

Social Environments

Archaeological Potential

AMICK Consultants Ltd. were retained to complete a Stage 1 Archaeological Assessment of the Study Area. The following is a summary of their findings and recommendations:

- The study area has been identified as a property that exhibits potential to yield archaeological deposits of Cultural Heritage Value or Interest.
- A Stage 2 Archaeological Assessment is recommended for the Study Area (once the areas that will be impacted by improvements are known).
- No soil disturbance or removal of vegetation shall take place within the study area prior to the acceptance of a report recommending that all archaeological concerns have been addressed and no further studies are warranted.



Note: Image from AMICK Consultants Ltd. report.

First Nations Consultations

Under provincial environmental law, First Nation and Metis communities must be consulted during the EA process. The Project Team has reached out to 8 local First Nations to keep them apprised of the project progress and offer consultation.

The following First Nations have been contacted to offer consultation:

Aamjiwnaang First Nation
Walpole Island First Nation
Chippewas of the Kettle and Stoney Point First Nation
Chippewas of the Thames First Nation
Caldwell First Nation
Oneida Nation of the Thames First Nation
Munsee-Delaware Nation
Delaware Nation

Social and Natural Environment

Natural Heritage Assessment

MTE Consultants Ltd. were retained to complete a Natural Heritage Constraint Assessment of the Study Area. The report details the natural heritage components protected under municipal, provincial and federal legislation, as well as areas and features that are subject to regulatory authority review. The following recommendations have been made for next steps:

- For areas of known constraints within a considered development area, relevant regulators (DFO, County of Essex, ERCA) should be engaged to determine if the proposed works could be supported through a permitting or approval process and to scope the extent of site specific investigation required.

- For areas where constraints are unknown, but potentially present, they should be confirmed through targeted field surveys and assessments.

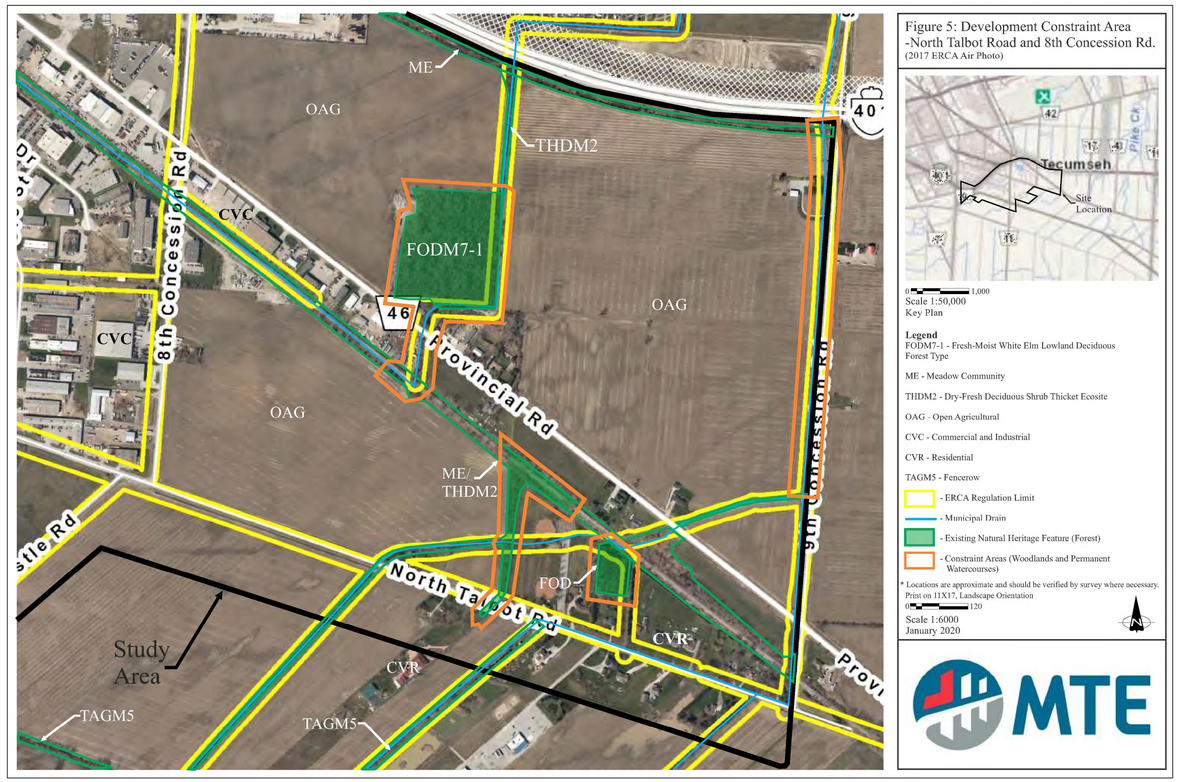


Figure 5 illustrates the typical Development Constraints that can be found within the Study Area.

Cultural Heritage

AECOM Canada Ltd. were retained to complete a Cultural Heritage Assessment of the Study Area. The following is a summary of their findings and recommendations:

- A review of the Town of Tecumseh's Municipal Register of Cultural Heritage Properties indicates that there are no listed or designated properties located within the Study Area.

- Talbot Road (Highway 3) is a historical pioneer route, dating back to the early nineteenth-century. The road was surveyed to provide access to settlements along the north shore of Lake Erie. The 1877 Map of Essex shows there were once as many as twelve residences located along the north and south sides of Talbot Road within the Study Area.

- Contemporary mapping imagery indicates that few of the nineteenth-century structures have survived. Most structures in the Study Area appear to date from the mid-to-late twentieth century.

- Four private properties have been identified within the study area that may contain structures which possibly date to the nineteenth or early twentieth centuries. These structures may require further evaluation if they are likely to be impacted by the project.

Recommendations:

- The proposed project will not have anticipated impacts on cultural heritage resources, and thus, no mitigation measure are recommended at this time.

Geotechnical Investigation

Due to the size of the Study Area, it was determined that it would not be feasible to undertake soil testing for the entire Study Area. Once areas for potential improvements are proposed, the Project Team will determine where geotechnical investigations are required (if warranted). As well, some improvements have been recommended on private properties. The Town would not be able to conduct testing on the property at this time.

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ERCA Regulated Areas

This display presents the locations and extents of ERCA (Essex Region Conservation Authority) regulated drainage corridors. As illustrated in the diagram below, stormwater runoff from within the area of Oldcastle contributes to three different watersheds. These drains and watersheds are listed below.

Downstream Receiving Watersheds

- Little River
- Turkey Creek
- River Canard

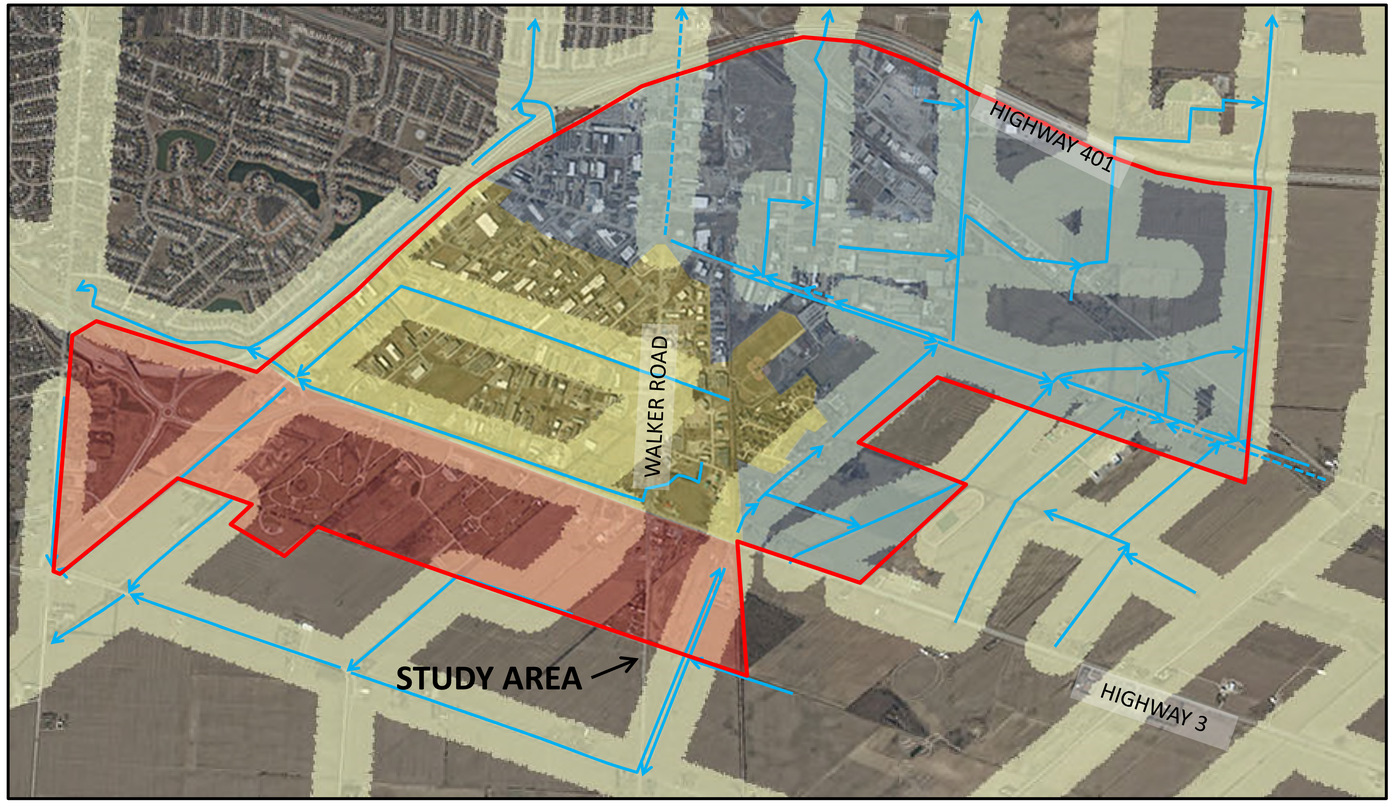
ERCA Regulated Drainage Corridors

- Burke Drain
- Collins Drain
- Shreve Drain
- Wolfe Drain
- Wellwood Drain
- Robinson Drain
- Downing Drain
- Washbrook Drain
- 6th Concession Drains
- 7th Street Drain
- Shuttleworth Drain
- Hurley Drain
- Delmonte Drain
- South Talbot Road Drain
- Oldcastle Road Drain

Source Water Protection (Clean Water Act)

The study area falls within ERCA's Source Water Protection Plan. The drainage areas are also identified as within the Event Based Area and the Intake Protection Zone (Zone 3).

All of the improvements proposed within the Study Area will be sent to ERCA to review for any potential impacts to the vulnerable areas. Given the type of improvements proposed, we do not anticipate any significant impacts. The project team will work with ERCA to satisfy any requirements as deemed necessary.



ERCA Regulated Drains

LEGEND

- ERCA Regulated Municipal Drains - Open
- ERCA Regulated Municipal Drains – Closed/Tiled
- Limits of Study Area
- Event Based Area (IPZ – Zone 3)
- Turkey Creek – Receiving Watershed
- Little River – Receiving Watershed
- River Canard – Receiving Watershed

Note: 1. Depicted drain locations are approximate.
2. Only drains within the study area have been illustrated.

Landmark Engineers Inc.

Climate Change - Mitigation / Adaptation Strategies

As part of our study, consideration has been given to Climate Change mitigation and adaptation strategies. Below is a general summary of these considerations.

How have projected Climate Change impacts been incorporated into project planning / what anticipated impacts has Climate Change had on project design and planning?

- Design has taken into account:
  - Extreme rainfall event statistics
  - The need for stormwater storage
  - Stormwater management standards developed in the Windsor/Essex Regional Stormwater Management Standards Manual
- Consideration of resiliency and vulnerability of stormwater infrastructure due to extreme rain events

What are the impacts and mitigating measures of this project on Climate Change?

Item	Environmental Impact(s)	Mitigating Measure(s)
Construction of the works	• The construction activities have the potential to create greenhouse gases.	• Local Contractors will be used to limit the distance that machinery needs to be transported. • Local suppliers of materials will be chosen (when possible). • The ponds will be landscaped with Trees which will improve air quality and add carbon sinks.
Downstream Outlet	Potential to increase flows downstream.	• Stormwater ponds will store runoff and control the release of water to receiving watercourses.
Increased Volumes due to Climate Change	The volume of water that is anticipated may increase due to Climate Change.	• The increase in volume due to Climate Change has been considered while designing the ponds, flood storage areas, overland flow routes and floodproofing elevations.
Drain Improvements	Works may cause harm to Species at Risk or Species at Risk habitat.	• All work must comply with the ‘Species at Risk Mitigation Plan for Drainage Works’ for the Town of Tecumseh. • During detailed design, a plan will be prepared at the outset that will determine timing windows for construction and any permits required.

Anticipated Impacts and Related Studies

The purpose of the Study is to identify improvements that are required to improve drainage within the Study Area. While doing so, due consideration has been given to mitigating any adverse impacts to the downstream drainage systems. Drainage from the study area does not follow municipal boundaries. The study area outlets to drains in Windsor and LaSalle. The project team has been coordinating with these Municipalities to ensure that the proposed improvements consider the overall drainage scheme, which extends far beyond the boundaries of the study area. To this end, the Project Team has also reviewed the following related studies to ensure that the stormwater plan will coordinate with their findings, recommendations and conclusions:

Upper Little River Master EA
(www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Upper-Little-River-EA.aspx)

The Upper Little River Watershed Master Drainage and Stormwater Management Plan *(ULRMP)* serves to ensure that urbanization of the Upper Little River Watershed can occur in a fashion that will not lead to negative impacts on the receiving stormwater systems, and would allow for future enhancements. The study area encompasses the portion of the Oldcastle study which drains to Little River. The ULRMP recommended *Alternative 6 – Grouped Off-line SWM Controls* to be distributed along SWM corridors as illustrated on this slide.

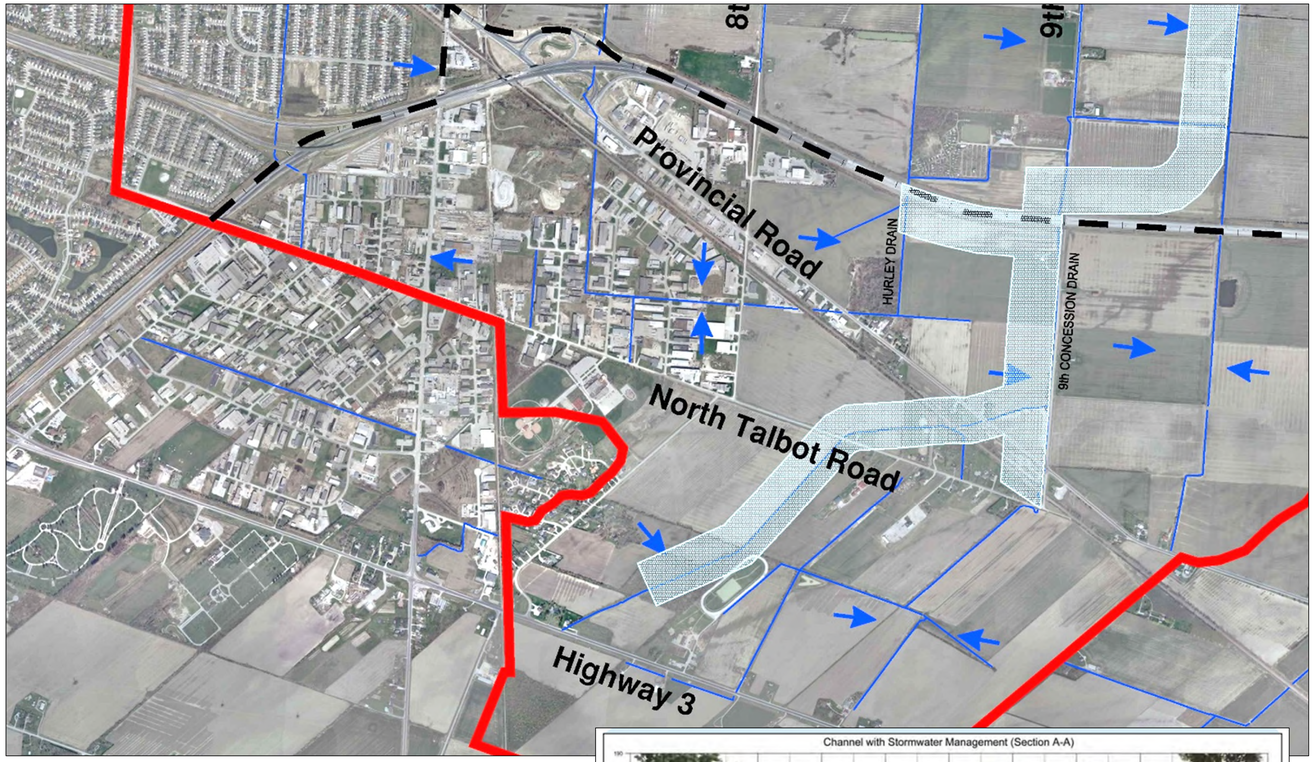


Image Source: Stantec Consulting – Upper Little River Stormwater Master Plan Class Environmental Assessment

Other Relevant Studies

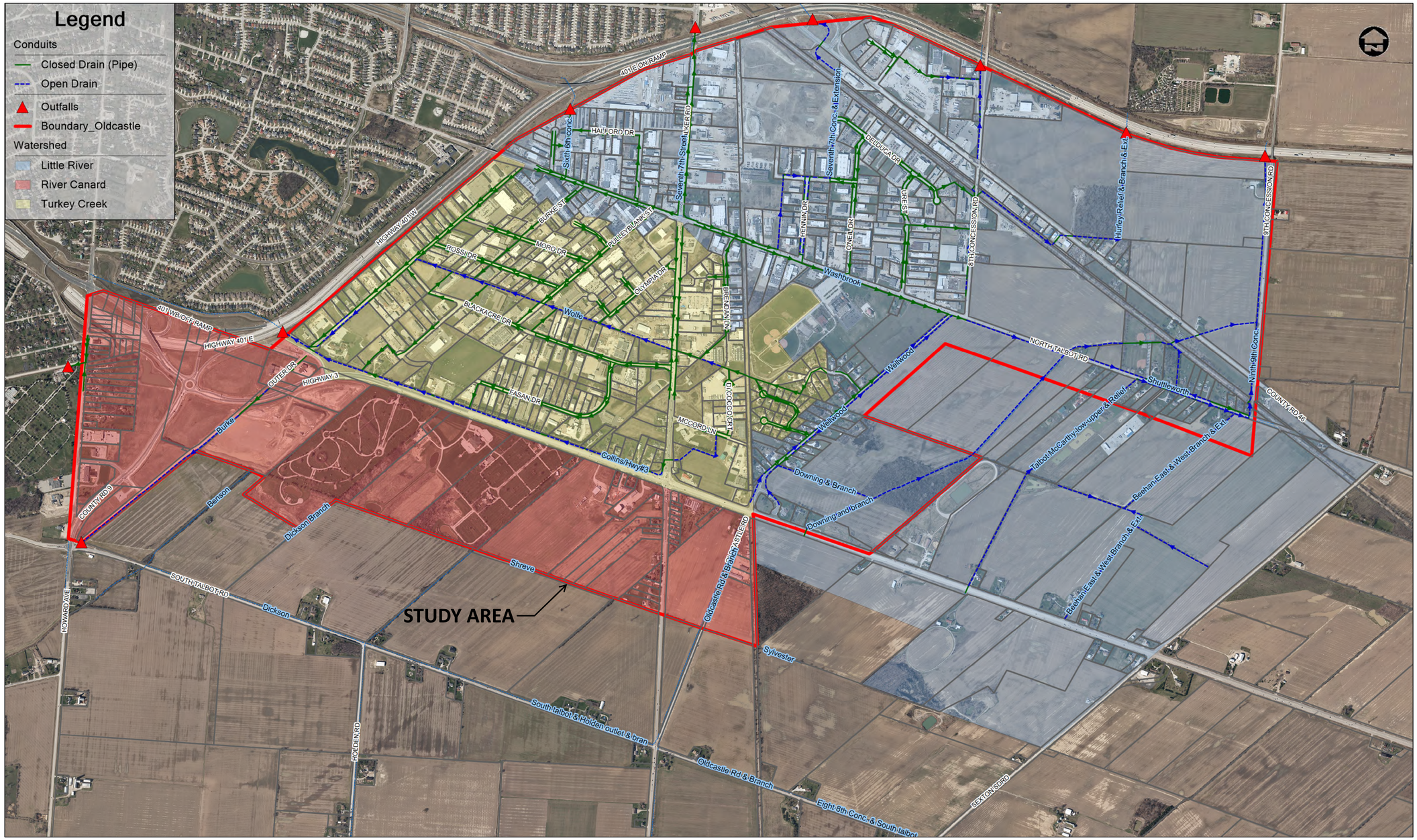
- Howard Bouffard Master Drainage Study (www.lasalle.ca/hbmds)
- Sandwich South Master Servicing Report, Little River Floodplain Mapping
- Town of Tecumseh County Road 42 Master Plan
- City of Windsor County Road 42 Secondary Plan

Topography – Ground Elevations

This display depicts the existing ground elevations within the study area. Elevations range between 185.0 and 192.0 metres above mean sea level. The mapping illustrates a clearly defined ridge bisecting the study area from north to south.

Minor System Drainage

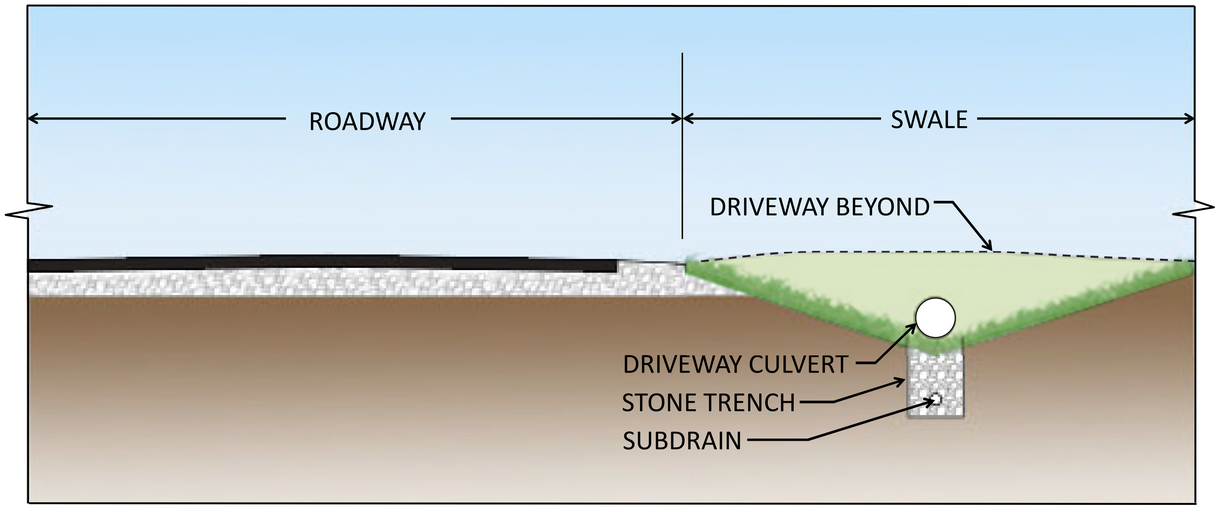
The **minor or "convenience" system** consists of drainage works, such as open drains and closed drains (pipes) that convey flows from frequent events to limit the inconvenience of stormwater ponding. As illustrated by the ridge in the topographic mapping, there is a drainage divide within the study area that results in the minor system draining to 3 separate watersheds – Little River to the northeast, Turkey Creek to the west and River Canard to the southwest.



Subdrain with Shallow Swale & Driveway Culverts

Some industrial areas in the Oldcastle Hamlet are drained by a small pipe in a stone trench combined with a shallow swale and intermittent driveway culverts. Flow capacity for this combined system can be significantly reduced when driveway culverts are blocked or damaged.

However in other instances, the drainage design may undersize culverts to intentionally hold back water in swales for eventual drainage at a controlled rate. This design is often practiced when the downstream receiving drainage feature has limited capacity to handle excess runoff created by the proposed land development.



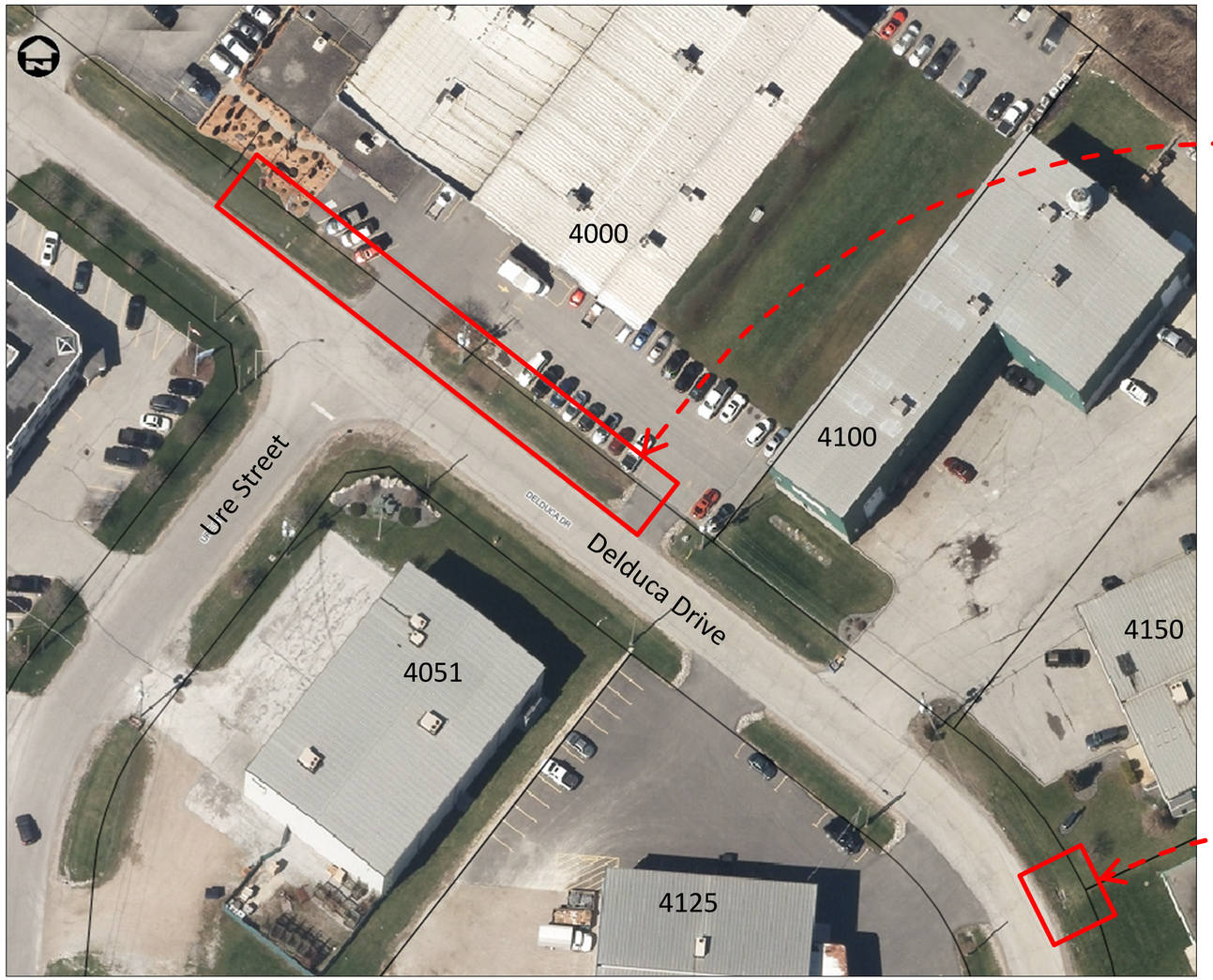
SECTION - TYPICAL SWALE WITH DRIVEWAY CULVERT

SWALE WITH DRIVEWAY CULVERT (TYPICAL)

Flow Constraints

Storm Outlet at 4150 Delduca Drive

This slide illustrates an example of flow constraints that have been observed in the study area. The swale flow along the north side of Delduca Drive is throttled by limited flow through the driveway culverts. As shown, stormwater has overtopped the swale and spread onto the roadway and parking lot while the catch basin has available capacity to receive runoff.



EAST END OF DELDUCA DRIVE

OBSERVED PONDING ON NORTH SIDE OF DELDUCA DRIVE

CATCH BASIN SOUTH EAST OF 4150 DELDUCA DRIVE

Reduced Flow Capacity

The following images are a few examples of conditions observed in the study area that reduce the flow capacity of the minor system (drains and pipes). Deficiencies, such as a plugged culvert, damaged pipe or heavily vegetated drain, reduce flow capacity and potentially create a drainage problem.

PLUGGED CULVERT

HEAVY VEGETATION

PARTIAL BLOCKAGE IN DRAIN

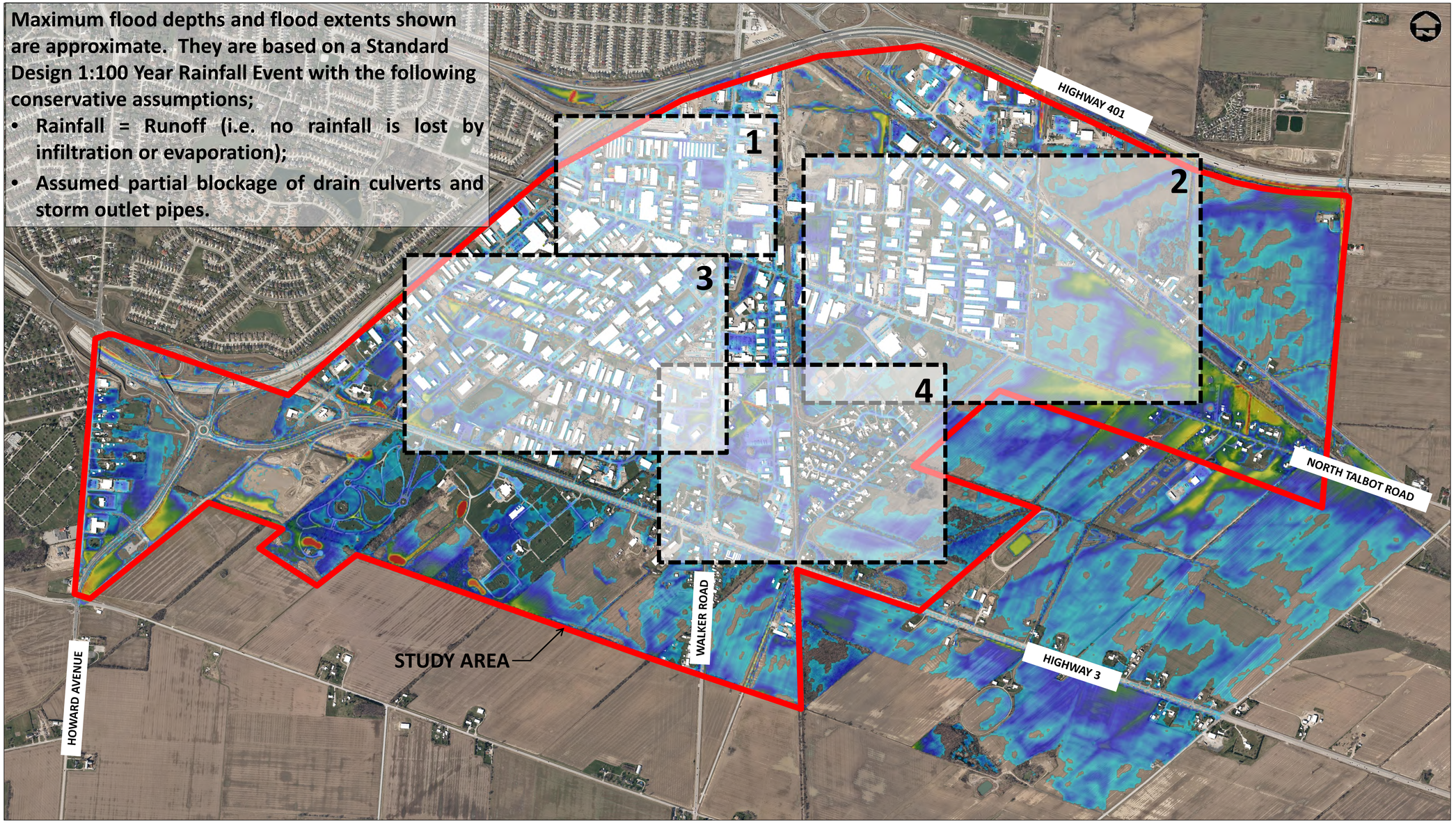
PLUGGED CULVERT

Major System Drainage

The **major system** drainage consists of drainage features that convey flows from infrequent storms. These typically consist of surface features, such as roadways and swales, but can sometimes consist of underground pipes. The major system supports the minor system by providing a pathway to safely convey excess runoff that the minor system cannot handle. The major system always exists, regardless of whether or not it is planned for. The highlighted areas represent the 4 main areas of concern.

Maximum flood depths and flood extents shown are approximate. They are based on a Standard Design 1:100 Year Rainfall Event with the following conservative assumptions;

- **Rainfall = Runoff (i.e. no rainfall is lost by infiltration or evaporation);**
- **Assumed partial blockage of drain culverts and storm outlet pipes.**



Legend

- Study Area
- Area of Concern

Max. Flood Depth (m)

- > 1.0
- 0.8 - 1.0
- 0.6 - 0.8
- 0.4 - 0.6
- 0.2 - 0.4
- < 0.2

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Major System Drainage

The **major system** drainage consists of drainage features that convey flows from infrequent storms. These typically consist of surface features, such as roadways and swales, but can sometimes consist of underground pipes. The major system supports the minor system by providing a pathway to safely convey excess runoff that the minor system cannot handle. The major system always exists, regardless of whether or not it is planned for. The highlighted areas represent the 4 main areas of concern.

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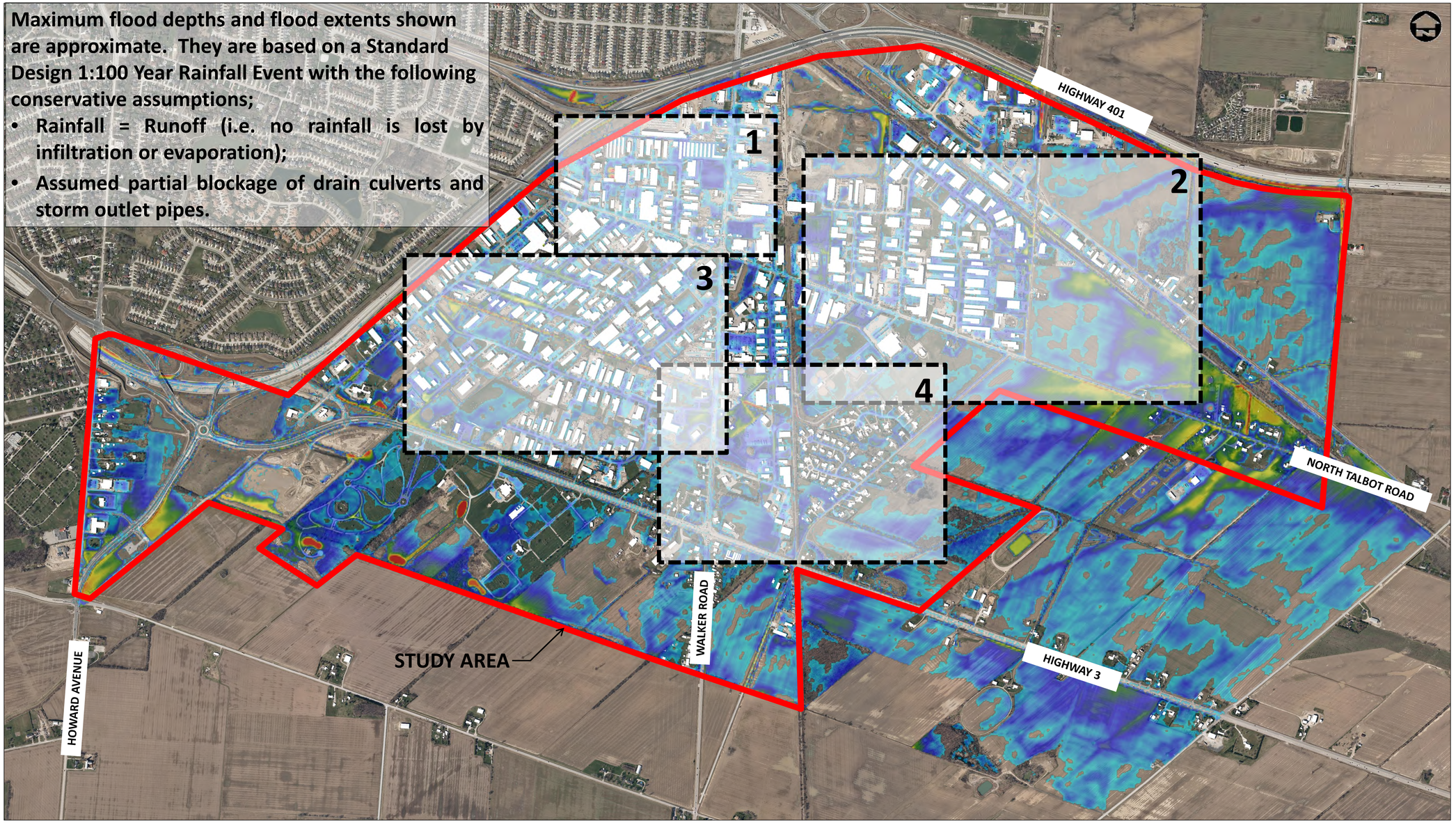

Legend

- Study Area
- Area of Concern

Max. Flood Depth (m)

- > 1.0
- 0.8 - 1.0
- 0.6 - 0.8
- 0.4 - 0.6
- 0.2 - 0.4
- < 0.2

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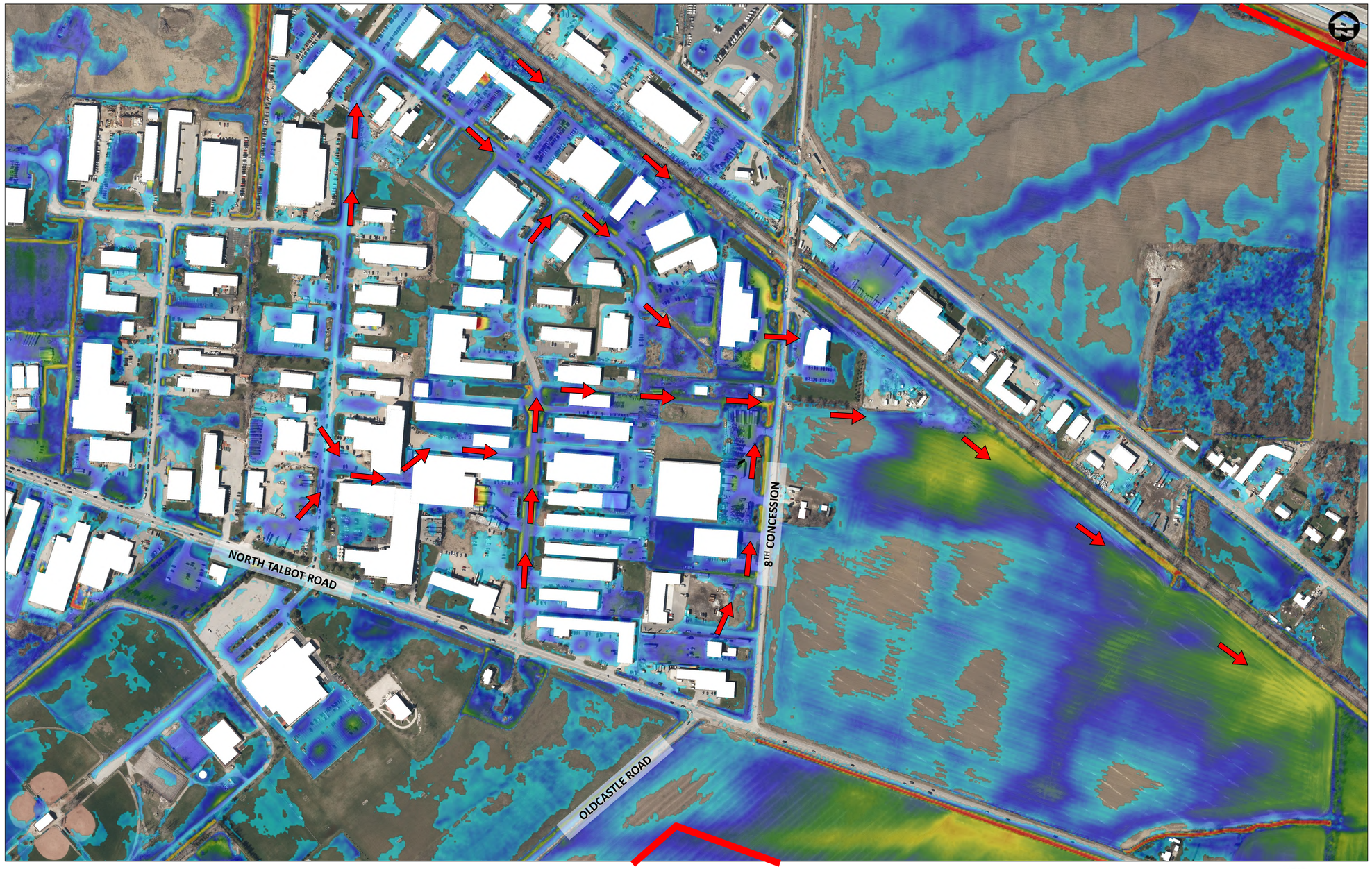
Existing Conditions

Area of Concern - 2

This display shows surface runoff flow paths (overland flow routes) as well as approximate 1:100 year flood depths and flood extents. Some existing flow paths are across one or more private properties. Where flood extents encroach onto building structures, there is a potential for flood damage. Blue ponding depths are typically acceptable on roadways, green is impassable for some vehicles and yellow is impassable for most vehicles. Ponding in undeveloped areas is typically a low risk of damage and/or low consequence.



Legend

- Study Area
- Limited Access
- Overland Flow Route

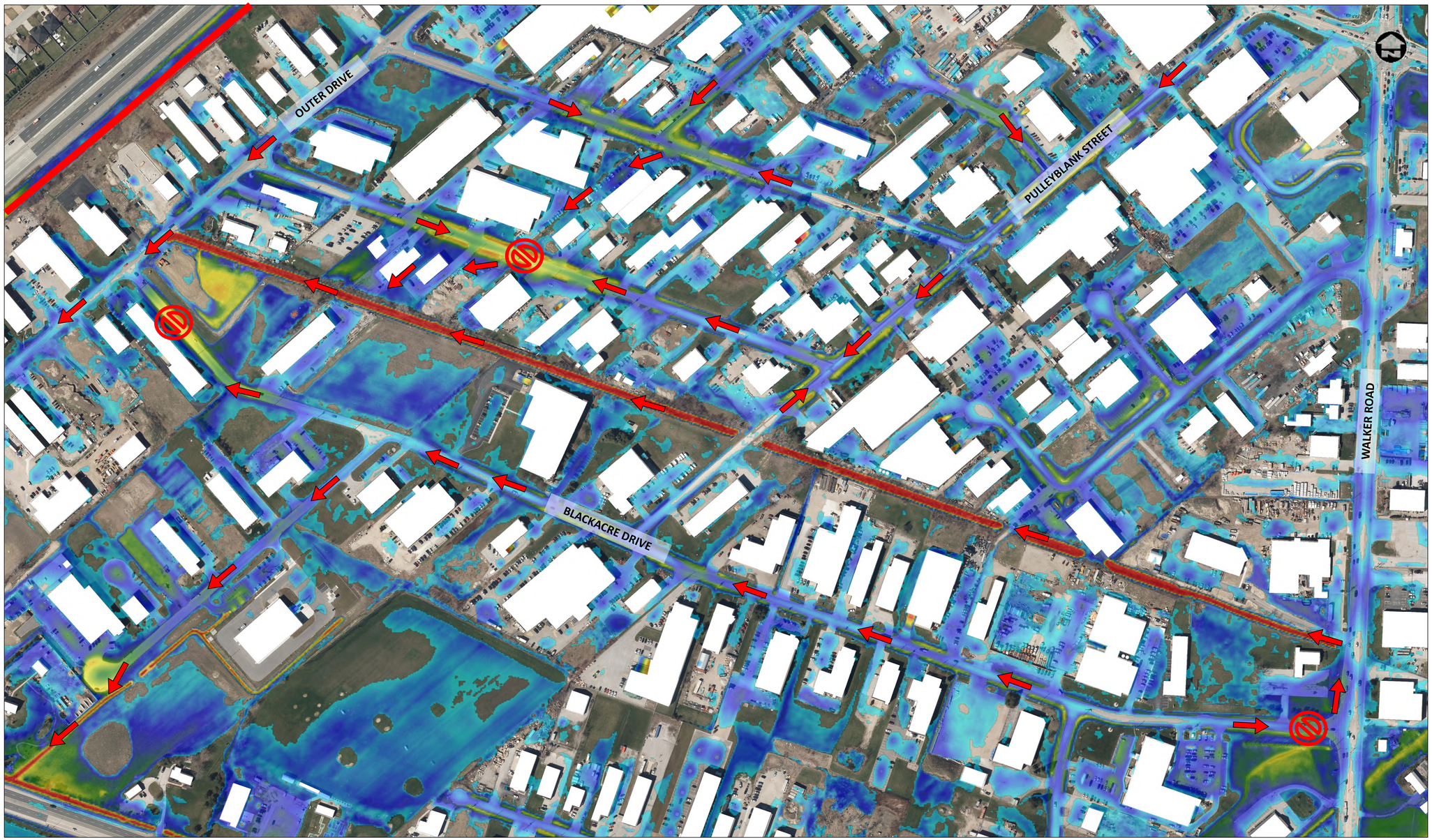
Max. Flood Depth (m)

- > 1.0
- 0.8 - 1.0
- 0.6 - 0.8
- 0.4 - 0.6
- 0.2 - 0.4
- < 0.2

Landmark Engineers Inc.

Area of Concern - 3

This display shows surface runoff flow paths (overland flow routes) as well as approximate 1:100 year flood depths and flood extents. Some existing flow paths are across one or more private properties. Where flood extents encroach onto building structures, there is a potential for flood damage. Blue ponding depths are typically acceptable on roadways, green is impassable for some vehicles and yellow is impassable for most vehicles. Ponding in undeveloped areas is typically a low risk of damage and/or low consequence.



Legend

- Study Area
- Limited Access
- Overland Flow Route

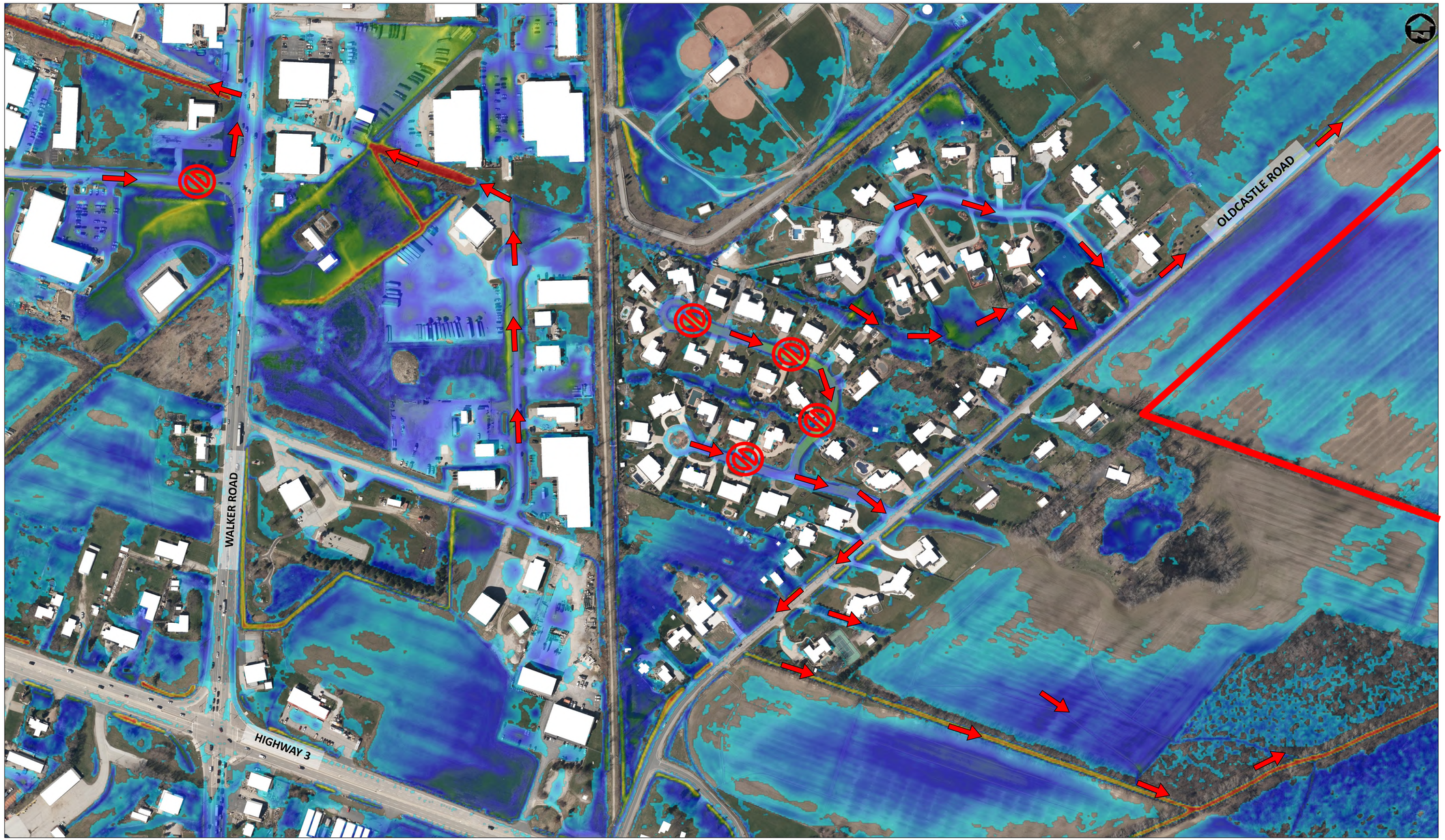
Max. Flood Depth (m)

- > 1.0
- 0.8 - 1.0
- 0.6 - 0.8
- 0.4 - 0.6
- 0.2 - 0.4
- < 0.2

Landmark Engineers Inc.

Area of Concern - 4

This display shows surface runoff flow paths (overland flow routes) as well as approximate 1:100 year flood depths and flood extents. Some existing flow paths are across one or more private properties. Where flood extents encroach onto building structures, there is a potential for flood damage. Blue ponding depths are typically acceptable on roadways, green is impassable for some vehicles and yellow is impassable for most vehicles. Ponding in undeveloped areas is typically a low risk of damage and/or low consequence.



Legend

- Study Area
- Limited Access
- Overland Flow Route

Max. Flood Depth (m)

- > 1.0
- 0.8 - 1.0
- 0.6 - 0.8
- 0.4 - 0.6
- 0.2 - 0.4
- < 0.2

Landmark Engineers Inc.

Evaluation of Alternatives

This slide is intended to discuss the improvement alternatives that will be considered in the next steps of the study.

Alternative A: Enhance / Secure / Establish Acceptable Overland Routes and Storage Areas

The existing topography dictates the surface flow path and depths to which surface water can accumulate. This alternative includes **consideration** of;

- Creating sufficient flow paths to direct flows away from structures;
- Identifying areas to be designated for flood storage during major storm events;
- Acquiring easements and/or dedicated blocks of land to support the above.

This alternative will consider major drainage system improvements via surface features (i.e. roadways, swales and flood storage on dedicated blocks of undeveloped land), which are typically the most cost effective. If warranted, consideration will also be given to new storage infrastructure such as stormwater ponds or underground storage chambers. The goal of this alternative is to minimize potential flood damage and ensure safety to the public.

UNDERGROUND STORAGE CHAMBERS
HIGH COST STORAGE ALTERNATIVE

FLOOD STORAGE ON UNDEVELOPED LAND
LOW COST STORAGE ALTERNATIVE

Source: purdue.edu

This slide is intended to discuss the improvement alternatives that will be considered in the next steps of the study.

Alternative B: Add Storm Relief Sewers

In areas of concern where surface features cannot be accommodated, shallow storm sewers (underground pipes) will be considered to direct stormwater away from these areas and provide flood relief.

Improving drainage may also require a storage feature to control flow to a rate that the receiving downstream drain can handle.

EXAMPLE OF A SHALLOW STORM SEWER INSTALLED WITHIN EXISTING ROADWAY

Source: ads-pipe.com

Alternative C: Improve Minor System (Drains and Pipes)

The Oldcastle Hamlet area drainage system has generally been developed in a fragmented fashion in response to individual developments. The area will benefit from the holistic approach of this Master Plan, which will consider drainage constraints and opportunities on a watershed scale. The existing system does not meet today's modern standards for new developments. This study does not intend to replace the overall existing drainage system to meet current standards. Rather, this study is intended to evaluate the existing system and consider improvements to address parts of the system that are deemed problematic and/or are found to have insufficient drainage capacity. There are several reasons to limit the efficiency of a drainage system, such as;

- Limited flow capacity of the downstream receiving drain;
- Reduce impact of development (increase in runoff volume) by controlling flow to the receiving drain;
- Reduce erosion and pollution potential;
- Smaller pipe sizes.

Evaluation of Alternatives

Do Nothing & Storage Improvements

The following charts present all of the potential proposed improvement that are being considered.

	Proposed Improvements	Description of Improvement	Opportunities	Constraints	Example Images
	Do Nothing	• No improvements.	• No cost to the Town.	• Potential building flooding. • Roadways will continue to flood. • Limited emergency access due to water levels of 0.3m (1ft) or greater in roadways and driveways.	 

Storage is the action of temporarily holding excess stormwater from rainfall events to reduce / control flows being conveyed to the receiving drainage system. Drainage improvements using storage elements, such as stormwater ponds or underground chambers, are used to store stormwater in a safe location to mitigate excessive surface ponding on roadways and private property.

	Proposed Improvements	Description of Improvement	Opportunities	Constraints	EA Project Schedule	Example Image
ST1	Stormwater Pond	• Construct a stormwater pond to collect and store stormwater to be released downstream at a controlled rate.	• Would provide stormwater storage for a large portion of the Study Area. • Provides outlet relief for the storm sewers. • Proposed in low lying areas within the watershed where ponding tends to occur naturally. • Less expensive than underground storage.	• Town must secure a piece of property to construct the pond.	Schedule B	
ST2	Flood Storage on Undeveloped Land	• Naturally low lying area will be used for flood storage during large storm events.	• Cost effective flood water storage solution. • Land can still be used when there is no flooding (e.g.: agricultural use, park or soccer fields)	• Town must secure a piece of property to use as storage.	Schedule B	
ST3	Enlarge Existing Stormwater Pond	• Enlarge an existing pond to accommodate a larger storage volume.	• Less expensive to expand on an already existing facility than build new.	• Town may need to secure private property to expand the pond.	Schedule B	
ST4	Underground Storage	• Install underground storage chambers to store water.	• May be installed within the Towns right-of-way.	• Town may have to secure land to accommodate the number of chambers required.	Schedule A (existing easement) or Schedule B (private land)	

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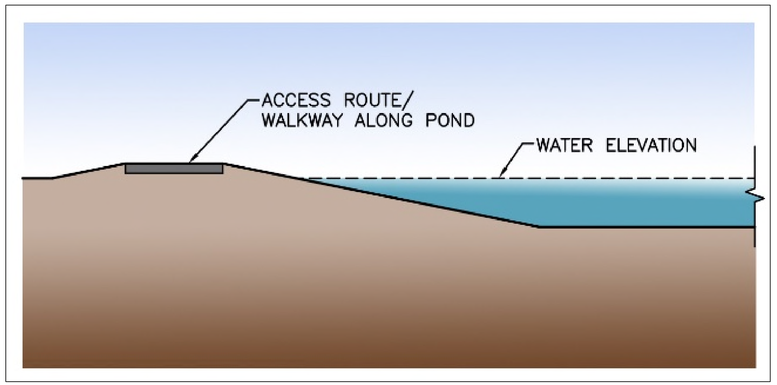
Storage Improvements

Stormwater Pond

Stormwater ponds are proposed in areas where large volumes of water need to be stored before being outlet downstream. The ponds can hold a larger volume of water in a smaller area as compared to the option of flood storage on undeveloped lands resulting in lower land acquisition cost and higher construction cost. As well, ponds are typically installed at the downstream end of a drainage area and have weirs to control the release rate to downstream receivers.

The proposed pond locations have been determined based on the existing drainage patterns and features of the lands. The proposed locations are generally low lying areas that tend to flood during large storm events.

ST1: Typical Stormwater Pond Cross Section

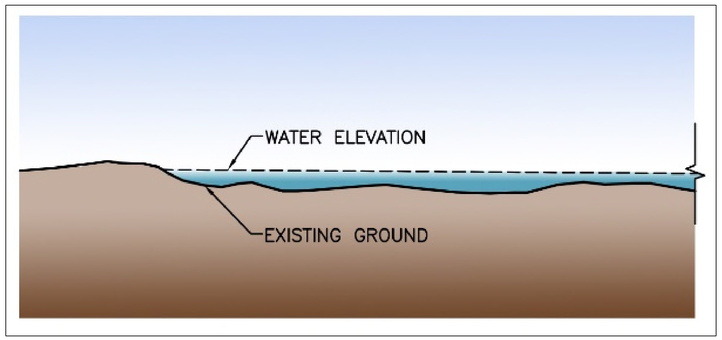


Flood Storage on Undeveloped Land

This solution involves allocating areas of land to be flood storage and therefore, undevelopable in the future. The land could be used for agriculture, parkland or soccer pitches, but not for structures or parking. The intent is to allow flood water to accumulate on the lands during large storm events.

The proposed locations are typically low lying lands where water tends to accumulate naturally. Due to the typical depths of water based on existing elevation, the area required would be much larger than the area required for a stormwater pond (larger land acquisition cost, lower construction cost).

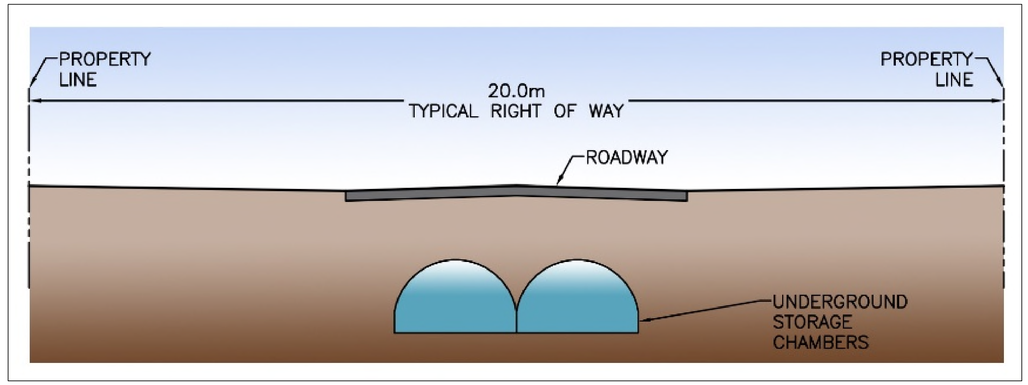
ST2: Typical Flood Storage on Undeveloped Land Cross Section



Underground Storage

Underground storage is the most expensive of the storage improvement options. This improvement has been proposed in areas where other storage options are limited by developed properties. Underground storage chambers can be used under the roadways within the Town's right of way and no property acquisition is required.

ST4: Typical Underground Storage Section under a Roadway



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Evaluation of Alternatives

Conveyance Improvements

Conveyance is the action of moving stormwater from one place to another. Drainage improvements using conveyance elements such as drains, sewers and surface (overland) flow routes are used to move stormwater more efficiently off the roadway surface and away from buildings.

	Proposed Improvements	Description of Improvement	Opportunities	Constraints	EA Project Schedule	Example Image
CV1	Establish Overland Flow Route	• Create secured flow paths to direct flows away from structures and reduce ponding and flood risk. • Work generally consists of re-grading grassy areas to create swales.	• Proposed flow routes are generally where ponding is occurring naturally. • More cost effective than underground sewer.	• Town must secure easements through private properties. • Must respect downstream outlet capacity.	Schedule A (existing easement) or Schedule B (private land)	
CV2	Improve Existing Underground Sewers	• Replace / upgrade existing storm sewers to meet acceptable drainage standards. • Existing sewers undersized for capacity required. • Replace existing culverts.	• Cost effective solution to provide flow capacity required for the system. • All work completed in the right-of-way (no property acquisition required). • Pre-approved work the Town can undertake at any time.	• Work is disruptive to adjacent business access and roadways. • Must respect downstream outlet capacity.	Schedule A	
CV3	New Drainage Corridor	• Construct a drainage corridor to carry flows downstream. • Open channel design.	• Provides outlet for local sewers. • Carries larger flows to downstream outlet. • More cost effective than underground sewers.	• Town may need to secure land to accommodate the drainage corridor. • Must respect downstream outlet capacity.	Schedule B	
CV4	New Underground Sewers	• Install new underground storm sewers where required.	• For areas where surface features (overland flow routes) cannot be accommodated.	• Work is disruptive to adjacent business access and roadways. • The Town must secure easements for sewers proposed on private properties. • Must respect downstream outlet capacity.	Schedule A (existing easement) or Schedule B (private land)	
CV5	Improve Existing Drains	• Includes cleaning and/or widening of existing drain corridors.	• Improves conveyance. • Work can be completed under the *Drainage Act* for all Municipal Drains.	• May be subject to species at risk timing windows for construction. • Must respect downstream outlet capacity.	Schedule A / Drainage Act	
CV6	Re-Grade Roadway	• Remove, regrade and replace existing roadway. • Adjustment to storm sewer catch basins may be required.	• Improves drainage without acquiring land. • Pre-approved work the Town can undertake at any time.	• Work is disruptive to adjacent business access and roadways. • Business driveway entrances will require re-grading as well. • More expensive option.	Schedule A	

Conveyance Improvements

Easements

In order for the Town to implement any of the conveyance improvements on privately owned lands, an easement would be required. An easement is a legal right to use another's land for a specific limited purpose. In order to secure the easements required for the conveyance improvements, the Town would work with the individual property owners to determine fair compensation for use of the land for the intended purpose.

Some information regarding easements:

- Property owners still own the land - the Town does not own the land the easement occupies.
- Easements are typically 6 meters wide.
- Easements are typically along property lines within the building setback for most lots.
- Depending on the intended use of the easement, the area may need to be kept clear of all obstructions, such as, structures, parking lots and fences.
- An agreement between the property owner and the Town will detail the intended use and any use restrictions for the easement.

Overland Flow Route

Overland flow routes have been proposed primarily between properties within the developed areas. The routes would be graded into a swale which will be dry most of the time. The swale will convey water during large storm events. In many cases, the locations where overland flow routes are identified, are routes that the water tends to take naturally but have not been specifically defined as flow routes. In order to incorporate these routes in the overall drainage plan, the routes must be secured by the Town. The flow routes must be maintained to ensure proper function during storm events.

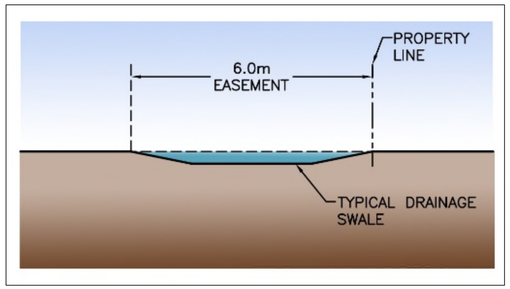
New Underground Sewer

Underground sewers have been proposed where overland flow routes may not be feasible. The Town must secure easements for these sewers for future maintenance and control development over the sewers. If the land is already developed in some cases (parking lots), this option may allow for the parking to remain within the easement.

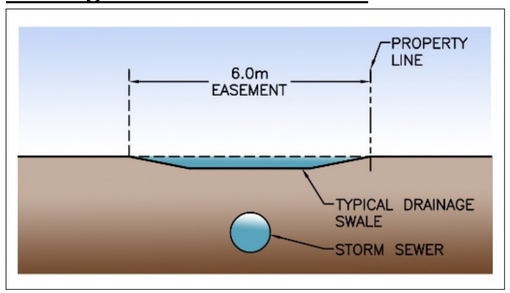
New Drainage Corridor

New drainage corridors have been identified in areas where a larger volume of water needs to be accommodated. The proposed new drains typically carry flows to a pond downstream. The Town would have to acquire land or an easement in order to establish the new drain corridors.

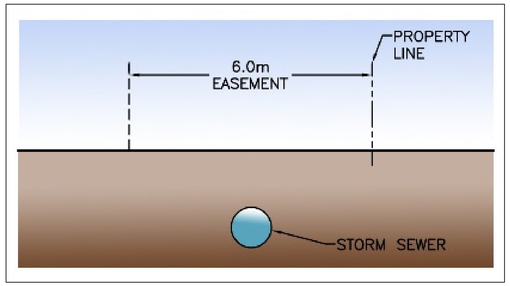
CV1: Typical Overland Flow Route Section



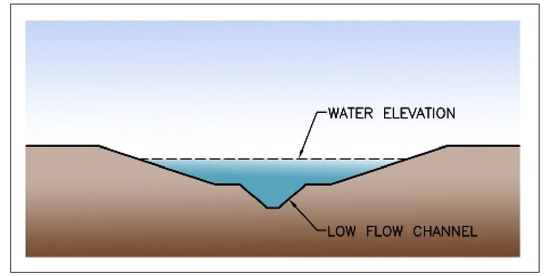
CV1 & CV2: Typical Overland Flow Route with Underground Sewer Section



CV2: Typical Underground Sewer Section



CV3: Typical Drainage Corridor Section



Existing Culvert Assessment

Culvert Assessments

As part of the study, all of the culverts within the Study Area were assessed for condition. The culverts were each given a rating based on the following criteria:

Good: 76-100% effective flow area
Fair: 51-75% effective flow area
Poor: 26-50% effective flow area
Very Poor: 0-25% effective flow area

Evaluation of Alternatives

The following alternatives were considered for the culverts:

1. Replace culvert (CV2) – The culverts in poor repair could be replaced to restore effective flow area. This option is not a permanent solution as the culverts could again fill with sediment or become crushed over time.

2. Install new underground storm sewer (CV4) – Installing a storm sewer system within the right of way would replace the need for the culverts. The storm sewers would provide a higher level of service.

Both alternatives area considered pre-approved works under Schedule A Class Environmental Assessment Projects. The Town may proceed with construction and no further EA process is required.

Recommended Solution

The recommended solution is to **install new underground storm sewers** to replace the existing swales and culverts. This solution is intended to alleviate drainage issues associated with problematic culverts. Although this is the more expensive solution, it provides the most effective long-term service.

The locations for these improvements can be found on the Recommended Solutions boards.

Good

Fair

Poor

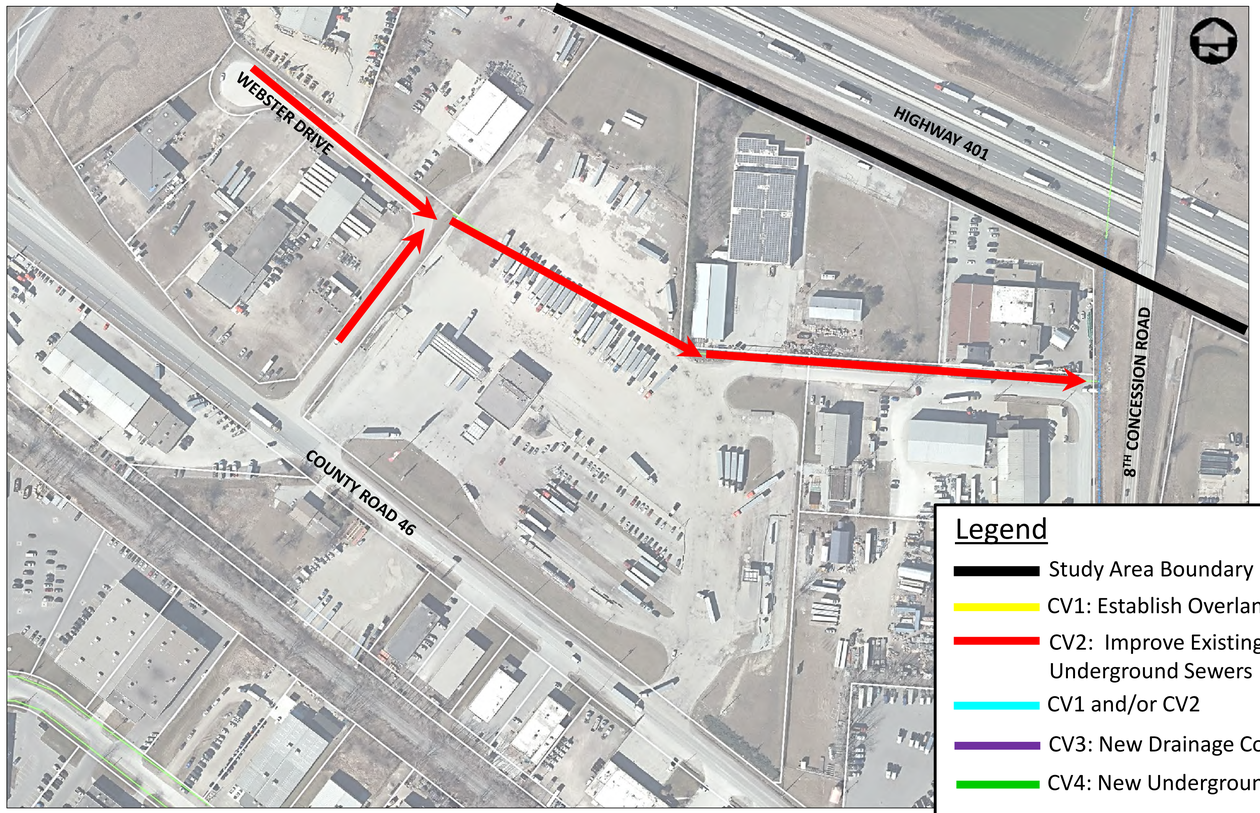
Very Poor

Recommended Solutions

All of the recommended improvements for each area are shown on the proceeding Recommended Solutions boards. The types of improvements recommended at each location are based on the type of issue to be resolved. Options have been shown where applicable.

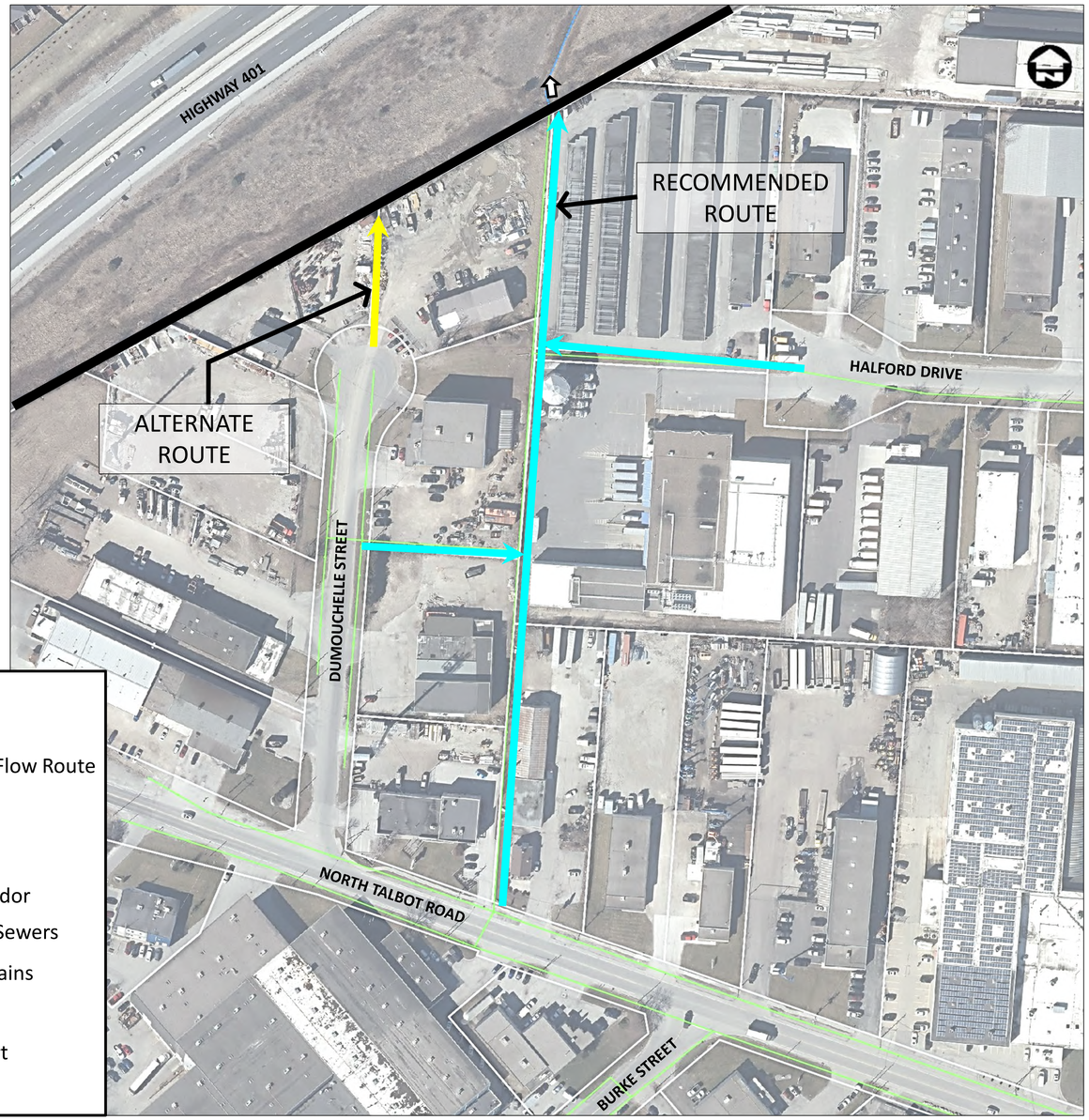
The County Road 46 / 8th Concession Area drainage system is in need of improvement. It is recommended that the existing drainage be replaced with storm sewers and open drain that provide a reasonable level of service.

County Road 46 / 8th Concession Area



The Dumouchelle / Halford Area would benefit from storm relief sewers and/or overland flow routes to mitigate the potential for flood damage.

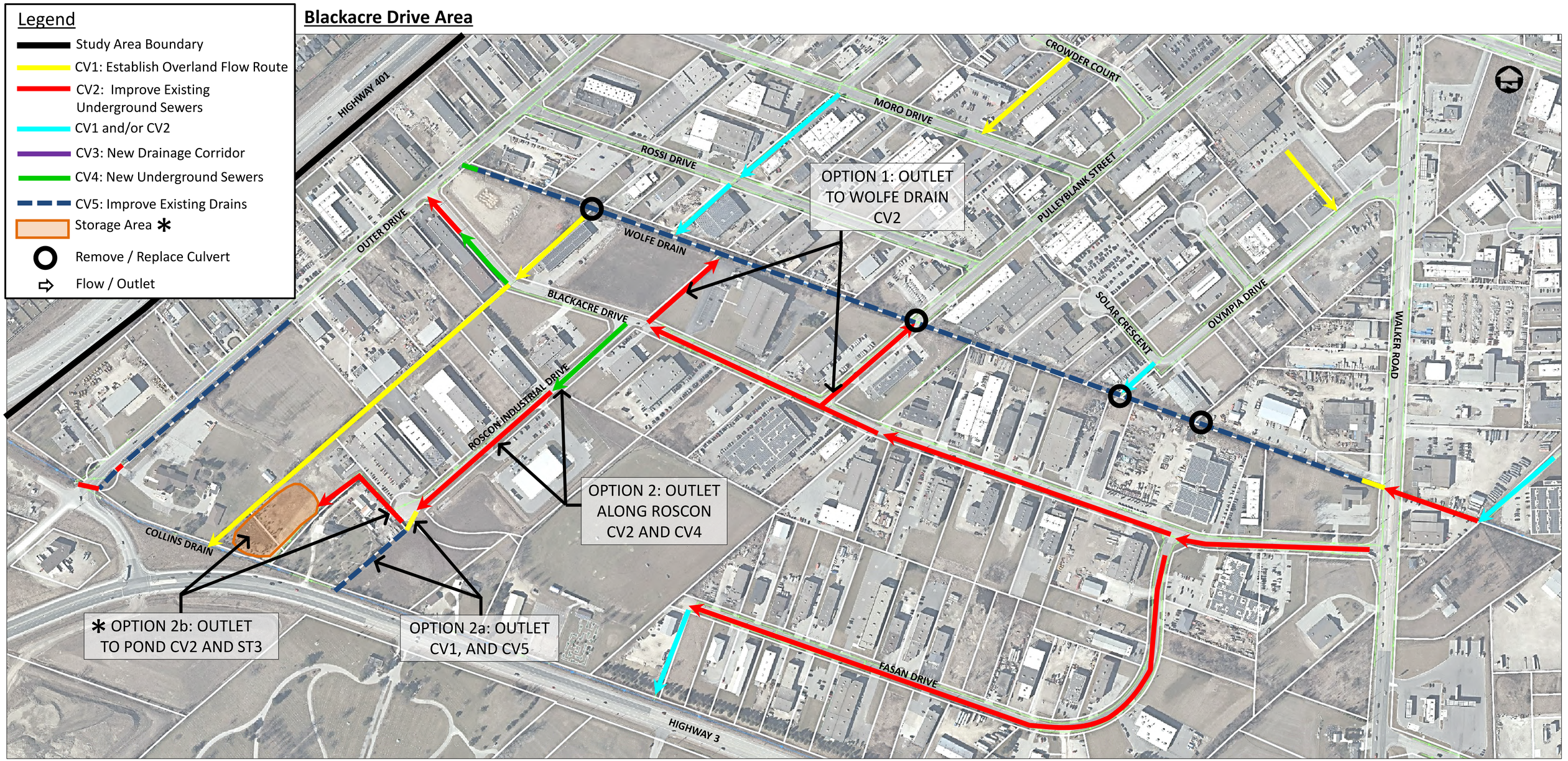
Dumouchelle / Halford Area



Recommended Solutions

The Wolfe Drain watershed presents an opportunity to improve conveyance to the extent that the downstream drain has been designed to handle. Recommended improvements include storm relief sewers and overland routes. It is recommended that the existing swale / culvert drainage along Blackacre and Fasan Drive be replaced with new storm sewers. Two outlet options exist for Blackacre Drive drainage. Option 1 maintains the existing outlet scheme and Option 2 considers re-routing stormwater along Roscon Industrial Drive.

Blackacre Drive Area



* The storage areas depicted in this slide are conceptual representations of the approximate area required based on functional level evaluations of storage requirements. Actual storage area and associated land requirements may vary in shape and size.

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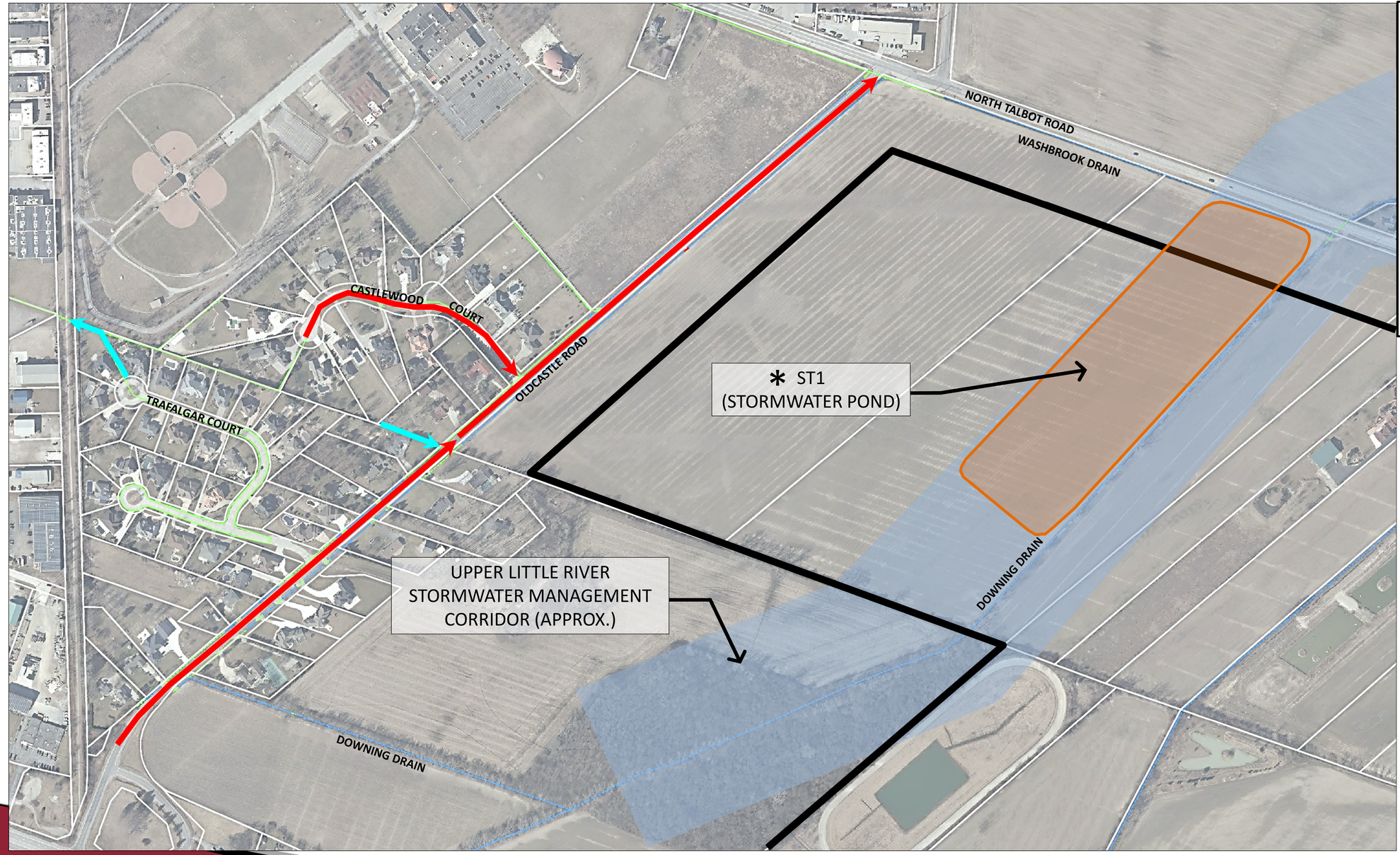
Recommended Solutions

Oldcastle Road is a busy collector roadway with a swale / culvert drainage system that is in need of improvement. It is recommended that the existing drainage be replaced with new storm sewers. Storm relief sewers and/or overland flow routes are also recommended to mitigate the potential for excessive surface ponding in the residential areas shown.

As local conveyance improvements will move stormwater more efficiently downstream, the receiving Washbrook Drain has limited capacity to convey this additional flow. Moreover, the evaluation of potential major storm conditions show a significant amount of surface ponding (flood storage) south of North Talbot Road. It is recommended that a storage element be provided in the general location shown. This recommendation meets the intent of the Upper Little River Master Drainage and Stormwater Management Plan.

Oldcastle Road Area



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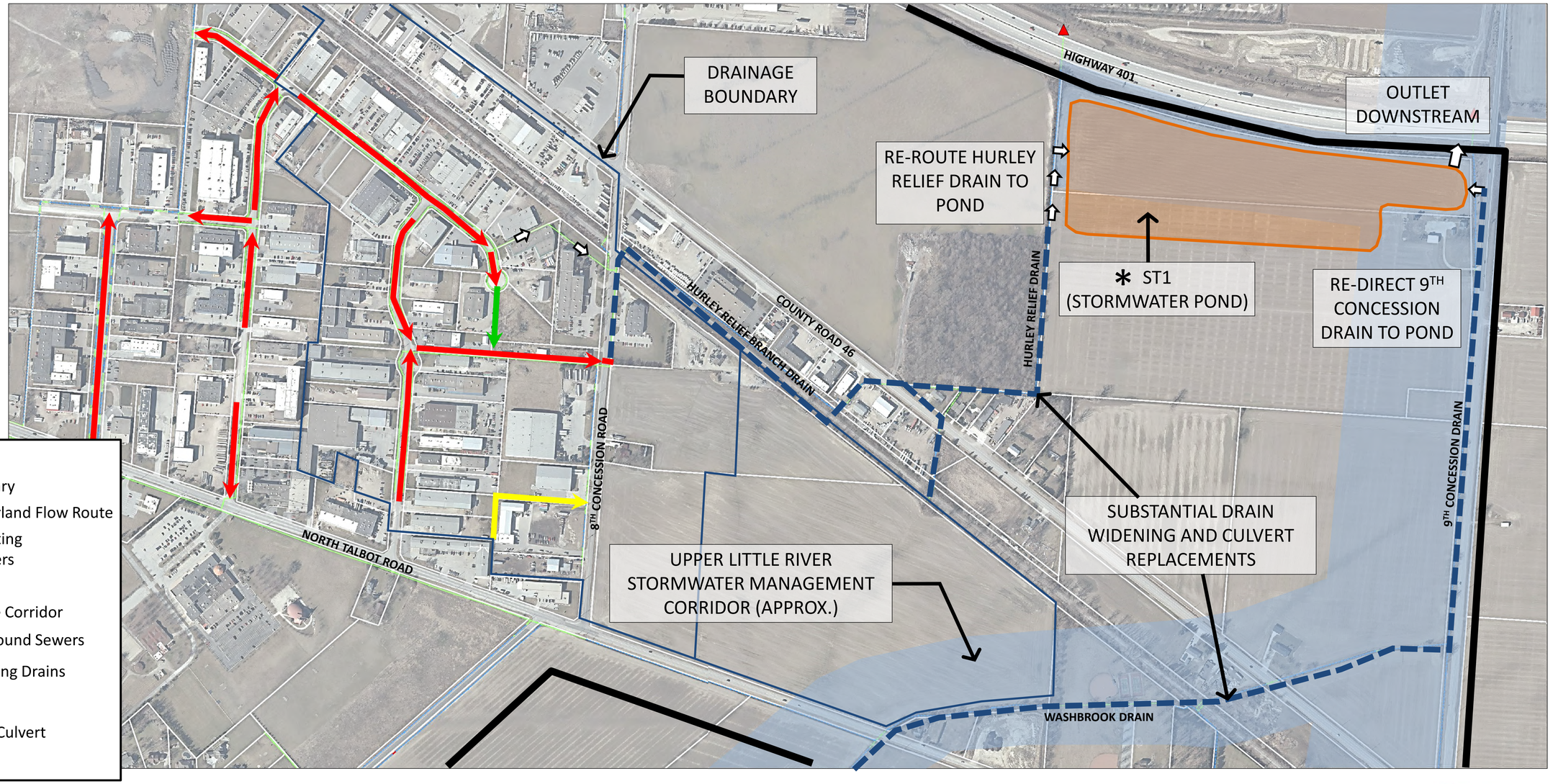
Recommended Solutions

To address local drainage deficiencies, it is recommended that the existing swale / culvert drainage along Del Duca Drive, Hennin Drive, O'Neil Drive and Ure Street be replaced with new storm sewers. Additionally, there are three options for improvements west of 8th Concession Road.

Option 1 considers **substantially** increasing conveyance capacity to route major storm flows to a single stormwater pond servicing 9th Concession Drain, Hurley Relief Drain, Washbrook Drain as well as all upstream tributary drains. This option deviates from the intent of the *Upper Little River Watershed Master Drainage and Stormwater Management Plan (Recommended Alternative 6 – Grouped Off-line SWM Controls)* to be distributed along SWM corridors in lieu of this option, which would fall under *Alternative 3 – Communal Stormwater Facility.* In addition, the existing railway is currently a landform that restricts any surface overflows south of the railway from reaching the pond. As such, conveyance capacity would be strictly limited to what the drainage system can convey with no assistance from surface (overland) flow routes that often provide a factor of safety to account for potential blockages as well as excess flow from storms exceeding the drainage system conveyance capacity.

North Talbot Road / 8th Concession Area – Option 1



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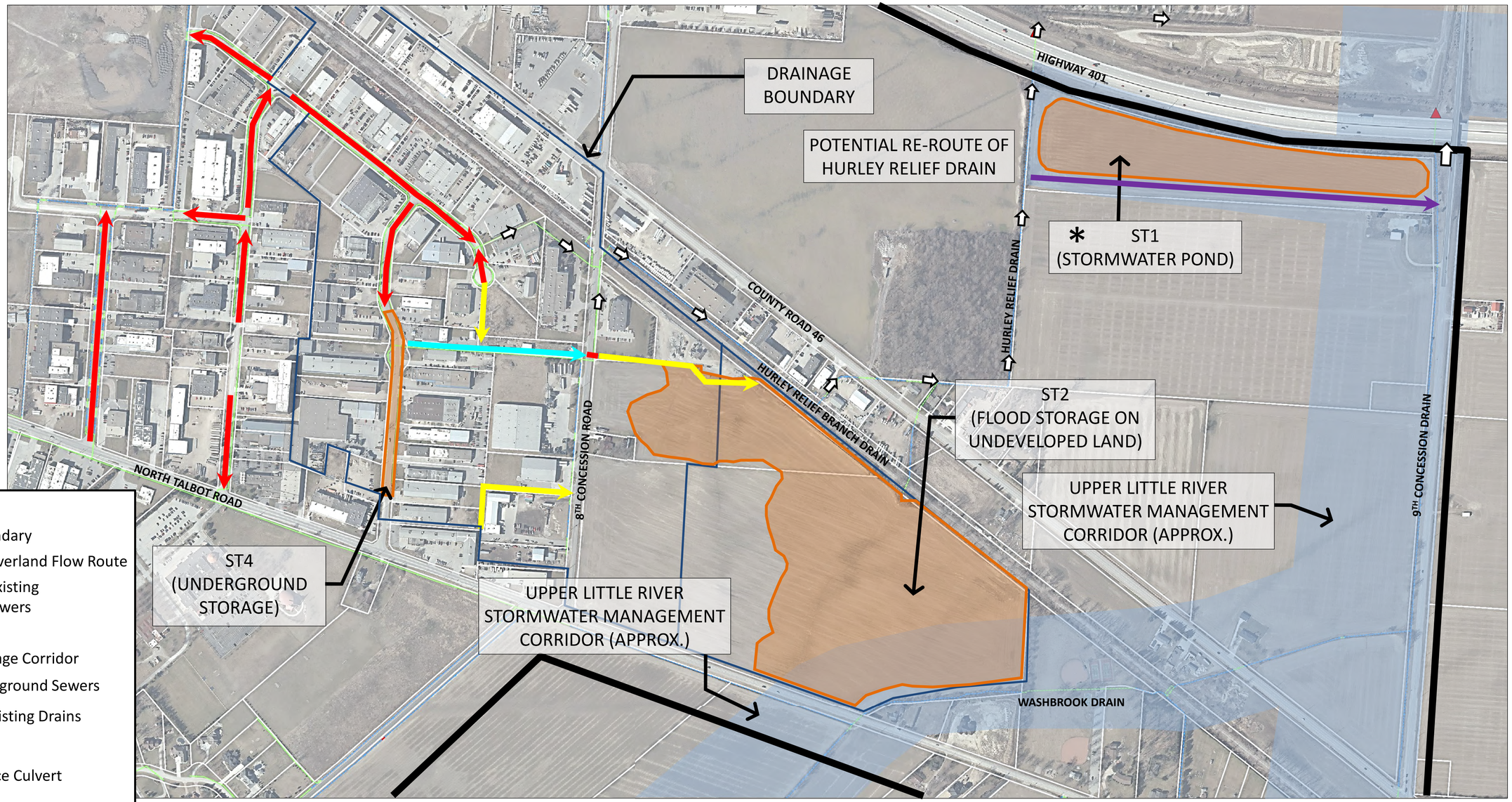
Recommended Solutions

Option 2 considers local storage within roadway right-of-way to store excess stormwater until the existing drainage system can convey flow to the receiver (Hurley Relief Branch Drain). Option 2 also considers conveyance improvements to more effectively direct major storm flows to the existing low lying area, which provides flood storage.

North Talbot Road / 8th Concession Area – Option 2



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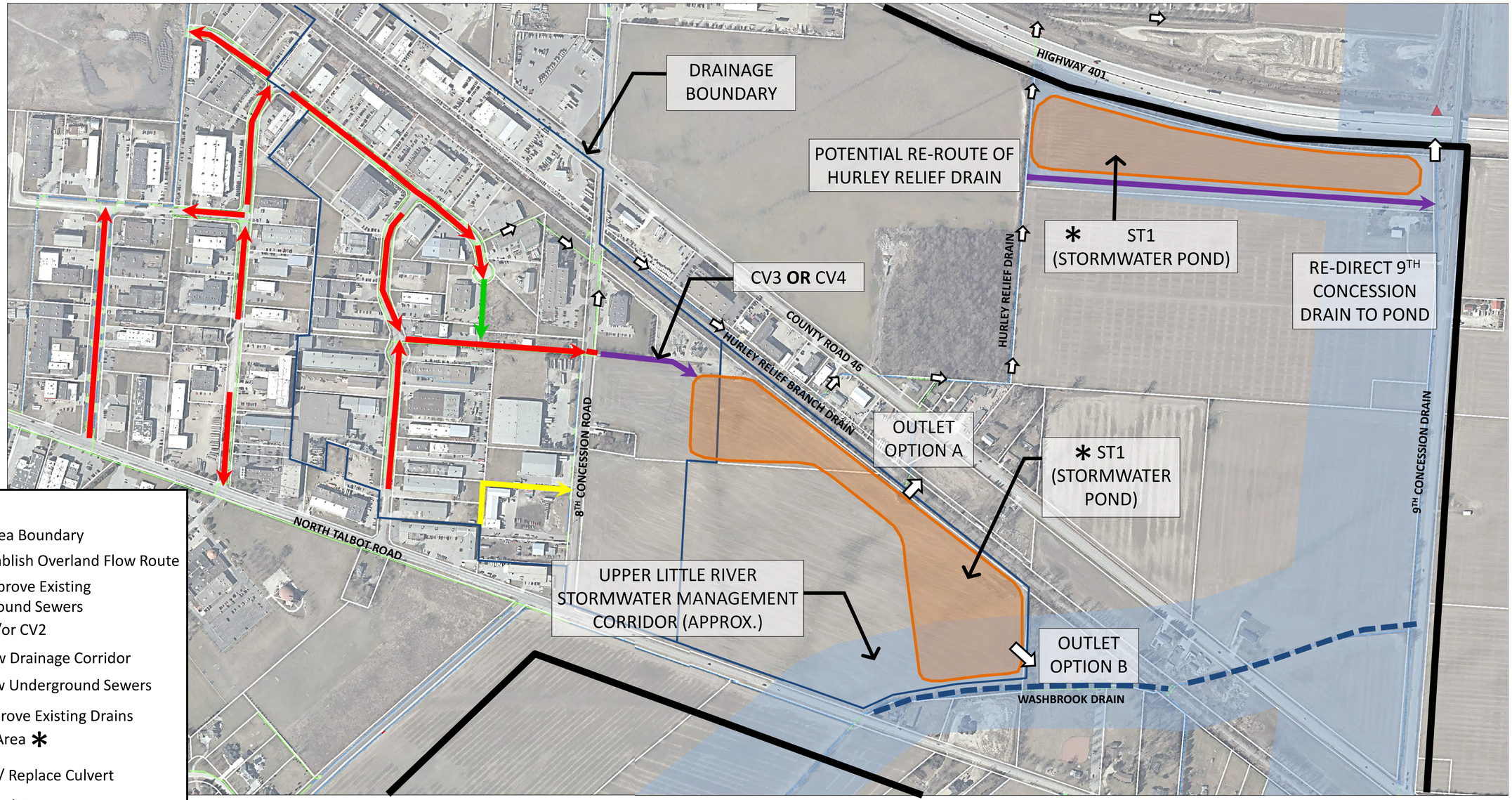
Recommended Solutions

Option 3 considers increasing conveyance from the industrial area and re-routing flows to a new stormwater pond. The pond catchment area is currently assessed to the Hurley Relief Drain and would utilize Outlet A under the current municipal drainage boundaries. Alternatively, subject to re-assessment of municipal drainage boundaries, the pond could drain to the Washbrook Drain (Outlet B). Outlet B is approximately 0.6 metres (2 feet) lower than Outlet A, which reduces the potential pumping requirements for the pond but may require conveyance improvements downstream of the outlet **OR** storage upstream of the outlet (south of North Talbot Road) to reduce upstream flows.

Recommended Solution

The recommended solution is **Option 3**. This option provides improved conveyance as compared to the existing Hurley Relief Branch Drain outlet and aligns sewer flows with the natural overland flow towards low lying area east of the 8th Concession Road and south of the railway.

North Talbot Road / 8th Concession Area – Option 3



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Next Steps

- All comments received from today's meeting (up until February 14, 2020) will be reviewed and used to help refine the Recommended Solutions and define the Preferred Solutions for this study.
- The project website will then be updated and a Notice of Completion will be published, alerting the public that the 30-day public review period for this Stormwater Master Plan has commenced.
- Provided that all outstanding issues are resolved and no Part II Orders are requested, the project may proceed to final approvals and construction upon completion of the 30-day public review period.

We encourage you to fill out a comment sheet so that your issues and concerns can be addressed and to ensure that your comments become part of the public record.

Thank you.

PRIVACY INFORMATION

All personal information included in a submission – such as name, address, telephone number and property location – is collected, maintained and disclosed by the Ministry of the Environment for the purpose of transparency and consultation. The information is collected under the authority of the Environmental Assessment Act or is collected and maintained for the purpose of creating a record that is available to the general public as described in section 37 of the *Freedom of Information and Protection of Privacy Act*.

Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

For more information, please contact the Project Office or the Ministry of the Environment's Freedom of Information and Privacy Coordinator at 416-327-1434.

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